fisherbrand

Operations Manual

Gravity Convection Ovens

Fisher Sci 60L Gravty Oven 120 V
Fisher Sci 100L Gravty Oven 120 V
Fisher Sci 180L Gravty Oven 120 V
Fisherbrand 65L Oven 230 V
Fisherbrand 105L Oven 230 V
Fisherbrand 176L Oven 230 V

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Trademarks

All trademarks mentioned in the operating instructions are the exclusive property of the respective manufacturers.

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Safety Notes

Basic Operating Precautions

These operating instructions describe Fisherbrand ovens.

Fisherbrand ovens have been manufactured to the latest state of the art and been tested thoroughly for flawless functioning prior to shipping. However, the oven may present potential hazards, particularly if it is operated by inadequately trained personnel or if it is not used in accordance with the intended purpose. Therefore, the following must be observed for the sake of accident prevention:

- Never step into the unit.
- Fisherbrand ovens must be operated by adequately trained and authorized professional personnel.
- Fisherbrand ovens must not be operated unless these operating instructions have been fully read and understood.
- The present operating instructions, applicable safety data sheets, plant hygiene guidelines and the corresponding technical rules issued by the operator shall be used to create written procedures targeted at personnel working with the subject matter device, detailing:
  - the safety precautions to be taken when processing specific agents,
  - the measures to be taken in case of accidents.
- Repair work on the oven must be carried out only by trained and authorized expert personnel.
- The contents of these operating instructions are subject to change at any time without further notice.
- Concerning translations into foreign languages, the German version of these operating instructions is binding.
- Keep these operating instructions close to the oven so that safety instructions and important information are always accessible.
- Should you encounter problems that are not detailed adequately in these operating instructions, please contact Thermo Fisher Scientific immediately for your own safety.

Operational Safety Rules

The following rules must be heeded when working with Fisherbrand ovens:

- Observe the sample weight limits specified for your Fisherbrand oven as a whole and its shelving in particular; See “Technical Data” on page 47.
- Do not load the bottom of the interior workspace to avoid the risk of overheating any samples placed there.
- Arrange the samples evenly throughout the work space, making sure not to place them too closely to the interior walls to ensure a uniform temperature distribution.
- Do not load your Fisherbrand oven with substances that exceed the capabilities of the available lab apparatus and Personal Protection Equipment to provide sufficient degrees of protection to users and third parties.
- Check the door seal once a month for proper sealing performance and possible damage.
- Do not process any samples containing hazardous chemical substances that may be released into the ambient air through defective seals or may cause corrosion or other defects on parts of the Fisherbrand oven.

Warranty

Fisher Scientific warrants the operational safety and functions of the Fisherbrand ovens only under the condition that:

- the oven is operated and serviced exclusively in accordance with its intended purpose and as described in these operating instructions,
- the oven is not modified,
- only original spare parts and accessories that have been approved by Fisher Scientific are used (third-party spares without Fisher Scientific approval void the limited warranty),
- inspections and maintenance are performed at the specified intervals,
- an installation verification test is performed on commissioning the oven for the first time and repeated after each inspection and repair activity.

The warranty is valid from the date of delivery of the oven to the customer.

Explanation of Safety Information and Symbols

Safety Notes and Symbols Used Throughout These Operating Instructions

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injuries.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injuries.

CAUTION

Indicates a situation which, if not avoided, could result in damage to equipment or property.

NOTE
Is used for useful hints and information regarding the application.

Additional Symbols for Safety Information

Wear safety gloves!

Wear safety goggles!

Harmful liquids!

Electric shock!

Hot surfaces!

Fire hazard!

Explosion hazard!

Suffocation hazard!

Danger of tipping!

Symbols on the Oven

Observe operating instructions

Mark of conformity USA/Canada

Intended use of the device

Correct Use

Fisherbrand ovens are laboratory devices for heating applications, equipped with precision temperature control.

They are designed for heat treating samples or materials at operating temperatures between 50 °C (122 °F) and 250 °C (482 °F), including - for example, drying, aging, analyzing, decomposing, burn-in, oxidizing, reducing, and preheating.

Fisherbrand ovens have been designed for installation and operation in the following fields of application:

- heat treatment;
- drying of material.

Fisherbrand ovens are for professional use only.

Incorrect Use

To avoid the risk of explosion do not load the oven with tissue, material, or liquids that:

- are easily flammable or explosive;
- release vapor or dust that forms combustible or explosive mixtures when exposed to air;
- release poisons;
- create a humid atmosphere;
- release dust;
- exhibit exothermic reactions;
- are pyrotechnical substances;
- exceed the specified hurdle load.

Standards and Directives

The oven complies with the following standards and guidelines:

- IEC EN 61010 - 1, IEC EN 61010 - 2 - 010
- Low Voltage Directive 2014/35/EC
- EMC Directive 2014/30/EC
- China EEP Hazardous Substances Information
  http://www.thermofisher.com/us/en/home/technical-resources/rohs-certificates.html

Additionally, the oven is in compliance with many other international standards, regulations and directives not listed here. Should you have any questions regarding compliance with national standards, regulations and directives applicable for your country, please contact your Fisher Scientific sales organization.

Delivery of the Oven

Packaging

Fisherbrand ovens are delivered in a rugged packaging box. All packaging materials can be separated and are reusable:

Packaging materials

Packaging carton:	Recycled paper
Foam elements:	Styrofoam (CFC-free)
Pallet:	Chemically untreated wood
Packaging film:	Polyethylene
Packaging ribbons:	Polypropylene

Acceptance Inspection

After the oven has been delivered, check the delivery immediately for:

- completeness,
- possible damage.

If components are missing or damage is found on the oven or the packaging, in particular damage caused by humidity and/or water, please notify the carrier as well as Technical Support immediately.

Risk of injury

Should sharp edges have formed in damaged areas or elsewhere on the device, take all necessary precautions to protect personnel handling the oven. For example, have them wear protective gloves and other personal protection equipment.

Scope of Supply

Ovens

Quantity of components supplied (pieces)	Gravity Convection Ovens
Wire-mesh shelf	2
Shelf support	4
Power cord	1
Operating manual	1
Summarized Safety Instructions (SSI)	1

Installation

Ambient Conditions

Location Requirements

Built-in units of incubators can, heating and drying ovens must be operated with an air exhaust system and exhaust hose (only original Fisher Scientific accessory should be used).

For safety reasons, the installation space should be made of non-combustible materials, according to DIN 4102.

NOTE
During installation of built-in units, ensure that the escaping air will be safely discharged out of the installation space.

Use with Air Exhaust Systems

For built-in units, a temperature-resistant and corrosion-proof exhaust hose should be used, which can be connected to the air exhaust port with a draft interrupter.

If several built-in units in a row are connected to a central air exhaust system (see illustration), a draft interrupter should be installed.

When the oven is connected to an air exhaust system be sure to adjust its air flow so the temperature distribution pattern throughout the oven's workspace remains unchanged and precision temperature control is maintained.

Also, be sure to interlock the oven and its exhaust system so both start and run at the same time. The oven may be unable to overcome the extra flow resistance introduced by the idle air exhaust system, which may cause the exhaust air to be vented into the surrounding lab room.

Before using existing piping in the building to exhaust hot air from the oven, be sure that such exhaust piping is made of heat-resistant material, so it will not overheat, melt and/or cause a fire.

The oven’s outer surfaces and its air exhaust piping may become hot, so be sure to maintain the proper spacing from walls and ceilings specified by local building codes and/or fire protection regulations.

Mark hot exhaust air piping with appropriate hot surface warning signs or restrict access to such piping altogether to avoid the risk of injury through contact with hot surfaces.

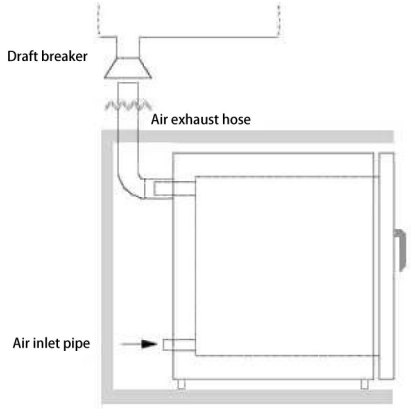


Fig. 1

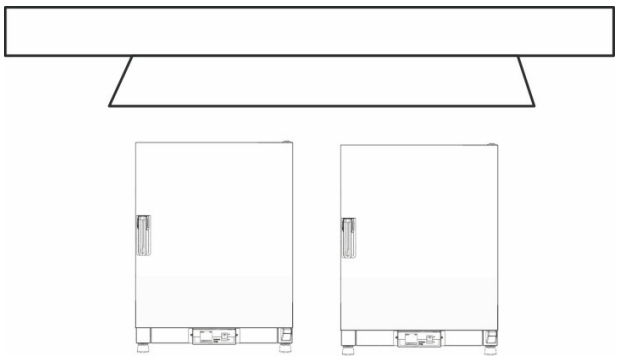


Fig. 2

The oven must only be operated in a location that meets all of the ambient condition requirements listed below:

- Draft-free and dry indoor location.
- The dust burden may not exceed the contamination category 2 based on EN 61010-1. Using the oven in an atmosphere with electrically conductive dust is prohibited.
- The minimal distance to adjacent surfaces must be observed on all sides.
- The operating room must be equipped with appropriate ventilation.
- Solid, level, fire-proof surface and no flammable materials opposite to the rear panel of the oven.
- Vibration-proof substructure (floor stand, lab table) capable of bearing the dead weight of the oven and its accessories (particularly if two devices are stacked).
- The ovens have been designed for an operating height of up to 2000 m above sea level.
- Ambient temperature range from 18 °C to 32 °C / 64.4 °F to 89.6 °F.
- Relative humidity up to 80% (maximum; preferably 60-70%), non condensing.
- Should condensation exist, wait until the moisture has evaporated completely before connecting the oven to a power source and powering up.
- If a high-voltage test is to be performed on the unit, it must first be heated for around 30 minutes at 75°C.
- Avoid direct exposure to sunlight.
- Devices that produce excessive amounts of heat must not be placed near the oven.
- To avoid drying operation without an appropriate fresh air supply make sure that the air inlet (which may be equipped with an optional fresh air filter) is not obstructed or blocked by any adjacent objects.
- Power line voltage variations must not exceed ±10 % of the nominal voltage.
- Transient overvoltages must not exceed the values usually encountered throughout the power supply network. The nominal transient overvoltage level shall be the surge withstand voltage according to overvoltage category II of IEC 60364-4-443.

- Place the oven on a floor stand (option; to be ordered separately), never on the lab floor.
- Consider installing one dedicated upstream circuit breaker per oven to avoid multiple device failures in case of an electrical fault.

Intermediate Storage

When the oven is placed in intermediate storage, which is permissible for a maximum of four weeks, make sure that the ambient temperature is between 20 °C to 60 °C (68 °F to 140 °F) and the maximum relative humidity does not exceed 90%, non-condensing.

Room Ventilation

Heat dissipating from the oven during continuous operation may cause a change in the room climate.

- Therefore, the oven must only be installed in rooms with sufficient ventilation.
- Do not install the oven in room recesses without ventilation.
- When several devices are to be placed in the same room, additional ventilation may have to be provided as necessary.
- To avoid any impact of the heat dissipated by the oven on the ambient climate the room must be vented by means of a laboratory-grade ventilation system that complies with applicable local and national health and safety regulations and has sufficient capacity.
- If excessive temperatures tend to occur in the operating room, be sure to provide a thermal protection means that cuts out the power supply to mitigate the impact of overtemperature scenarios.

Oven Dimensions and Clearances

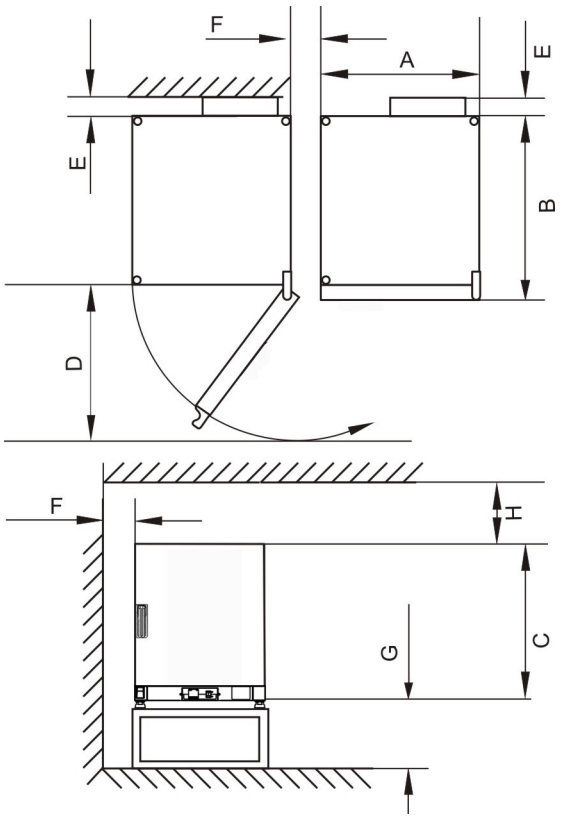


Figure 3-1 Oven dimensions and required clearances

Table 3-1 Oven Dimensions

Type	A (mm/inch[a])	B (mm/inch)	C (mm/inch	D (mm/inch)
Fisher Sci 60L Gravty Oven 120 V	530 / 20.8	565 / 25.2	720 / 28.3	540 / 21.3
Fisher Sci 100L Gravty Oven 120 V	640 / 25.2	565 / 25.2	820 / 32.3	650 / 25.6
Fisher Sci 180L Gravty Oven 120 V	640 / 25.2	738/ 29.1	920 / 36.2	650 / 25.6
Fisherbrand 65L Oven 230 V	530 / 20.8	565 / 25.2	720 / 28.3	540 / 21.3
Fisherbrand 105L Oven 230 V	640 / 25.2	565 / 25.2	820 / 32.3	650 / 25.6
Fisherbrand 176L Oven 230 V	640 / 25.2	738/ 29.1	920 / 36.2	650 / 25.6

[a] Dimensions in inches are rounded equivalents specified for information only. Depth of handle /display (66 mm/2.6 in) not included in overall depth specified; height of adjustable feet (36 mm/1.4 in) not included in overall height specified.

Table 3-2 Required Clearances

E (mm/inch)	F (mm/inch)	G (mm/inch)	H (mm/inch)
80 / 3.2	50 / 2	300 / 12	300 / 12

Transport

For transport, do not lift the oven using the doors or components attached to the oven as lift points.

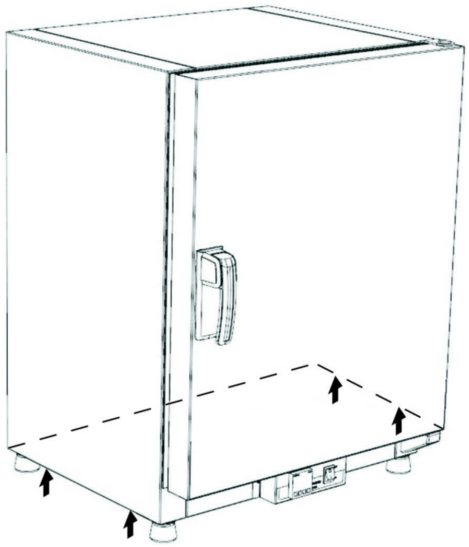
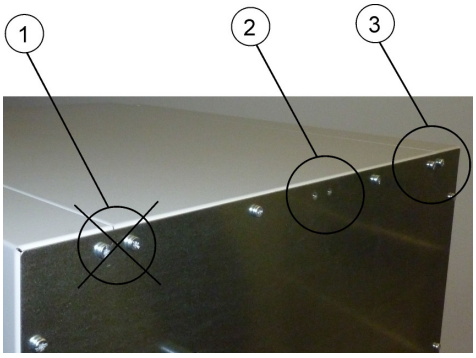


Figure 3-2 Lift Points

		CAUTION **Heavy loads! Lift with care!** **To avoid injury through physical strain, such as strain traumata and slipped discs, do not attempt to lift the oven alone!** **To avoid injury through dropped loads, be sure to wear Personal Protection Equipment, such as safety shoes, when lifting the oven.** **To avoid crushing your fingers or hands (particularly in a closing door) or damaging the oven, do not use any other lift points than those indicated in the illustration above.**

Installing the Anti-tilt Anchor

The anti-tilt anchor secures the device to a solid part of a building. The anti-tilt anchor is to be mounted on the side opposite of the door hinges.
Bend the fixing tabs of the anti-tilt anchor up on one side and down on the other by an angle of approx. 90°.



1. Do not use this position if the door is hinged on this side. Right-hand hinges represent the standard configuration.
2. Preferred position.
3. Alternative position. Do not use if the door is hinged on this side.
4. Remove the bracket screws. Use the preferred position, if possible.
5. Fix the anti-tilt anchor with the bracket side down to the unit.
6. Position the unit with the anti-tilt anchor to in an angle of approx. 90° +/- 20%.
7. Take care that the stacking feet of the unit are still in correct place on the lower unit or on the stacking adapter.
8. Fix the anti-tilt anchor to a solid part of the building.

Additionally, the following caution notes must be heeded at all times:

		CAUTION **Risk of overheating with stacked devices** **To avoid the risk of electrical components and the outer enclosure overheating or temperature control failing due to insufficient ventilation, do not exceed the specified stacking height!**

		CAUTION **Risk of tipping and dropping of stacked devices** **You should be aware at all times that stacked devices do not form a stable unit, even when the stacking pads and frames are used correctly. The top device may tip over and drop down when being transported in a stack. To avoid injury to persons and damage to equipment, do not attempt to move stacked devices as a unit! Separate and move each device one by one, then restack them.** **Fisher Scientific accepts no responsibility or liability whatsoever with regard to stacked third party devices; this is at the user's own risk.**

Product Description

This section describes Fisherbrand ovens for standard laboratory applications.

Gravity Convection Oven Overview

Gravity convection ovens come equipped with the following features:

- high-precision work space temperature control, adjustable in steps one degree up to 250 °C/482 °F;
- a mechanically-operated damper for venting the work space, equipped with an external slider rotary button control;
- one/two wire-mesh shelves;

The individual features of gravity convection ovens are shown in the figures below.

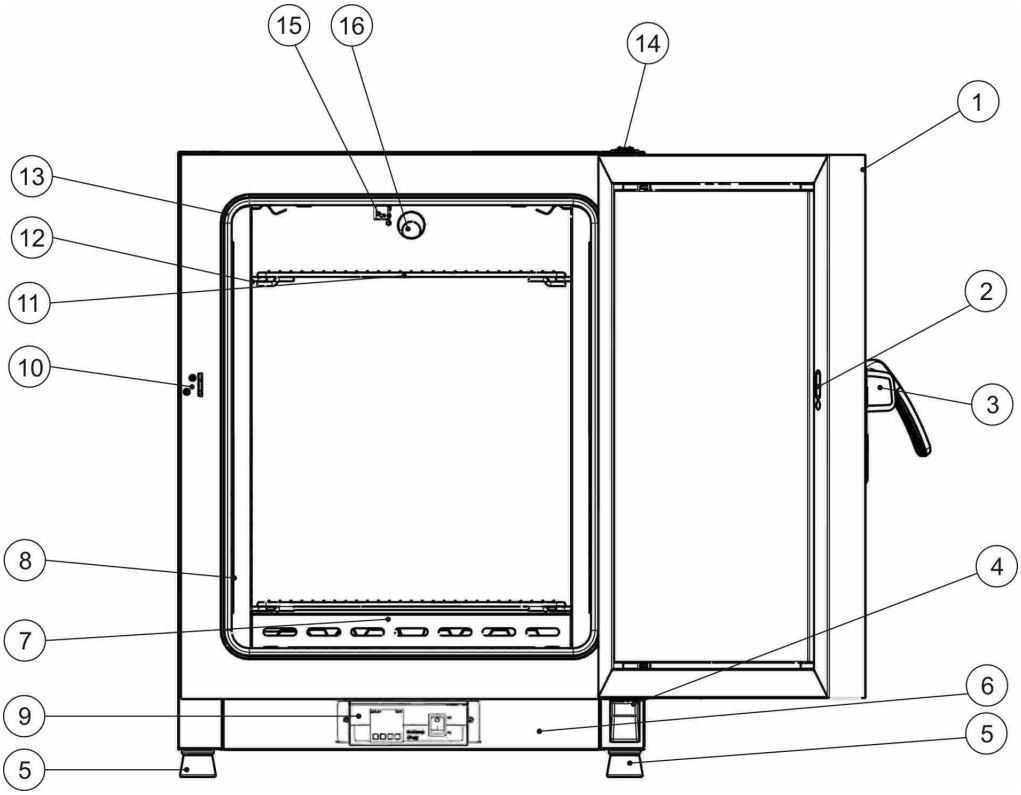


Figure 4-1. Gravity Convection Oven Front View

[1] Outer door
[2] Door latch cutout
[3] Door latch and handle
[4] Door hinge, lower
[5] Leveling foot
[6] Nameplate
[7] Air baffle, bottom
[8] Air baffle, side
[9] Controller
[10] Door hook catch
[11] Wire-mesh shelf

[12] Support rail for wire mesh shelf
[13] Door seal
[14] Door bearing
[15] Temperature sensor
[16] Exhaust air tube

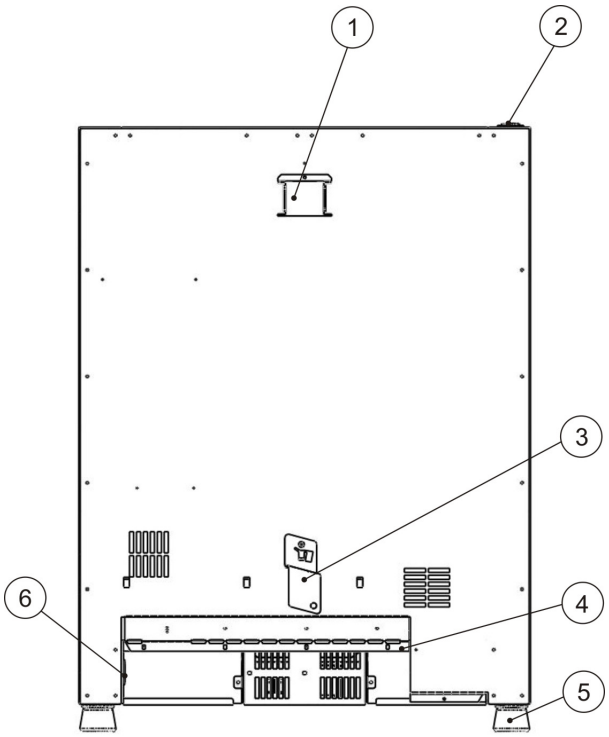


Figure 4-2. Gravity Convection Oven Rear View

[1] Spacer
[2] Door bearing
[3] Mechanical air inlet slider
[4] Electronics compartment
[5] Leveling foot
[6] Mains supply

Safety Devices

The oven is equipped with the following safety features:

- an overheat protection cut-out feature that shuts down the heater of the oven completely when excessive temperatures occur in the workspace;
- dual fuses rated at 16 amperes.

Work Space Atmosphere

To ensure undisturbed operation, the ambient temperature in the operating room must be at least 18 °C (64.4 °F). The heating system controls the temperature in the oven's workspace of 50 °C/122 °F up to the maximum of 250 °C/482 °F.

Sensing and Control System

The PT 100-type sensor for the control of the work space temperature and for the thermal protection [1] is mounted in the top panel of the work space compartment.

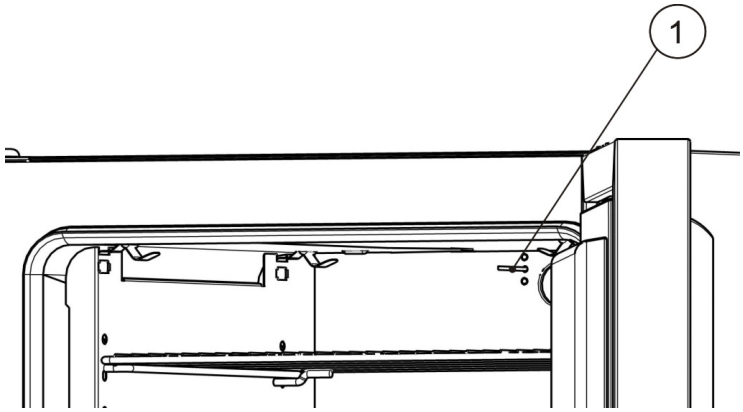


Figure 4-3. Sensor Mounting Location

The work space temperature sensor provides the inputs to the oven's built-in controller, which continuously compares the measured values to the user-specified set value and adjusts the heaters according to the result.

NOTE
Protect the sensor from mechanical damage.

When the user acknowledges the error message, the red alarm icon is illuminated and the Temperature Set Value icon is highlighted by a red border to indicate that thermal protection has kicked in.

AC Power Socket

The oven is connected to the AC supply mains via the socket in the left side cavity, which accepts a power cord with an IEC standard plug.

Fuses

Two 16 A slow-blow fuses mounted on the oven's electronic box protect internal circuitry from the impact of excessive power consumption.

NOTE
Replacement should only be carried out by skilled and authorized qualified personnel of electro technology/signal engineering!

NOTE
Fuse replacement
The device fuses are not user-serviceable. When the oven exhibits the typical signs of a blown fuse (no response to pressing the On/Off button, control panel remains extinguished, no heating operation), call Customer Service to have the fuses replaced.

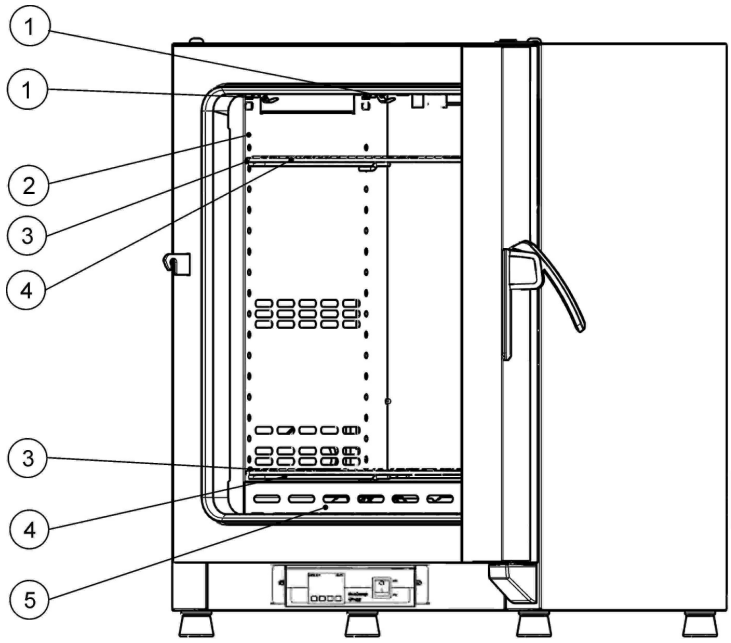
Work Space Components

Inner Chamber

All components of the work space are made of corrosion-resistant galvanized steel and have an absolutely smooth and easy-to-clean surface. Any embossings have a large radius.

Shelf System

The oven is supplied with two wire-mesh shelves. The shelf support rails have an alternating pattern of oblong and round perforations spaced evenly at 30 mm, allowing the shelf support brackets to be inserted without any room for error, yet in a very flexible way to accommodate different heights of sample containers. The shelves have an integrated tilt protection and withdrawal stop. For details on using the shelf system, see the section “Start-up” on page 19.



[1] Retaining spring
[2] Air baffle, lateral
[3] Support rails
[4] Wire-mesh shelf
[5] Air baffle, bottom

Figure 4-4. Shelf System - Gravity Convection Oven

Start-up

Installing the Shelf System

The installation of the shelf system does not require any tools. The support rails are secured in place by spring action. Once the shelf support brackets have been inserted into the rails, the wire-mesh shelves can be simply pushed onto their support hooks to complete the installation.

NOTE
The support rails of the floor stand ovens cannot be removed.

Initial installation

Fisherbrand gravity convection ovens have the shelving support rails integrated with the air baffles, which are readily pre-installed when the devices are shipped from the factory.

Fisherbrand forced air ovens come with separate support rails, which need to be installed as follows:

1. Peel off the protective foil from the support rails.
2. Push the retaining spring [1] into the guide on the support rail [2], making sure that the locking nub [3] on the retaining spring safely engages with the matching hole in the support rail.

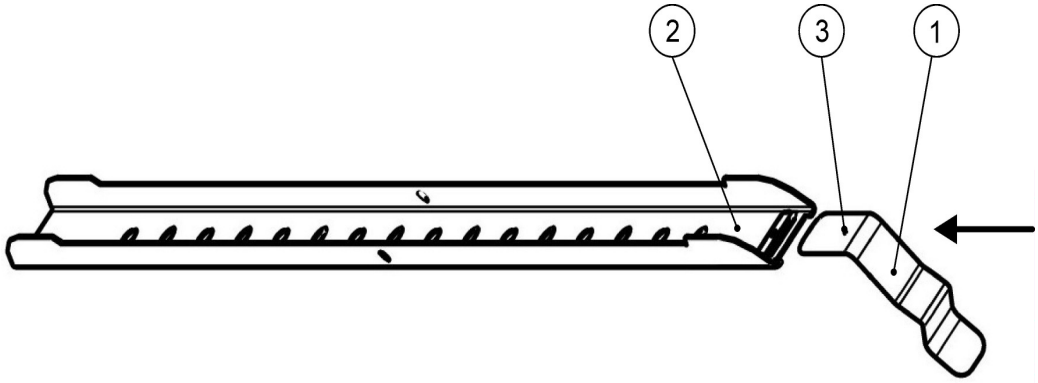
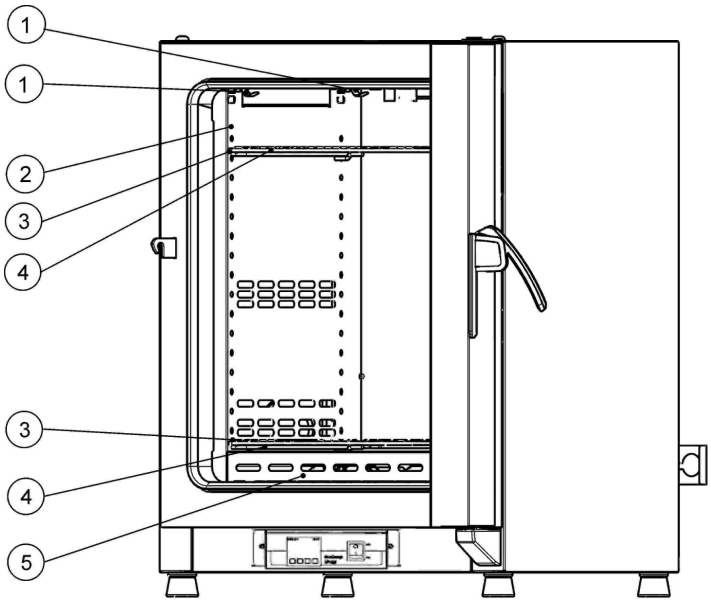


Figure 5-1. Sliding the Retaining Spring into the Support Rail

Installing the Shelving

The illustrations below show the placement of the shelf system elements.



[1] Retaining spring
[2] Air baffle, lateral
[3] Shelf support
[4] Wire-mesh shelf
[5] Air baffle, bottom

Figure 5-2. Gravity Convection Oven - Installing the Shelving

Preparing the Work Space

The following work space components should be checked for cleanliness and cleaned prior to use:

- shelf support brackets,
- wire-mesh shelves,
- work space surfaces,
- work space seals and gaskets,

NOTE Disinfection
For details about the cleaning of the oven, please refer to the section “Cleaning” on page 35.

Installation or Removal of the Support Rails (forced air oven only)

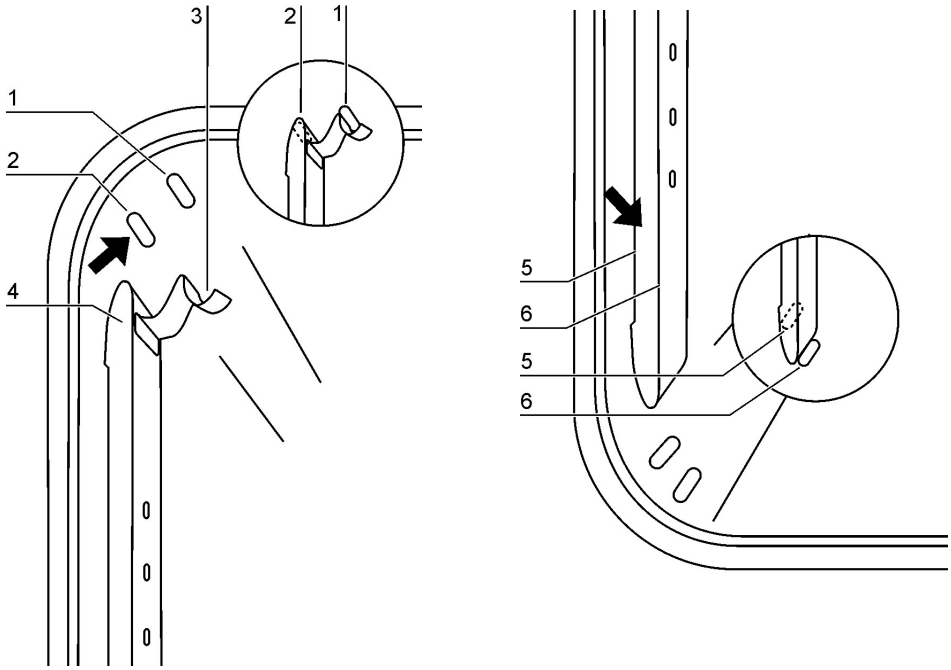


Figure 5-3. Support Rail Installation

The embossings at [2] and [5] act as lateral guides for the support rails, while the embossings at [1] and [6] secure the support rails in place. For the support rails to install correctly the retaining spring [3] must be facing upwards.

1. Place the support rail [4] on the lower embossing [6] and tilt it upwards against the work space side wall so that the rail is positioned over the two embossings at [5] and [2].
2. Clamp the retaining spring [3] behind the upper embossing [1].
3. To remove the support rails, pull the retaining spring tab down out of the embossing and remove the support rail assembly.

Installing and Uninstalling the Air Baffles

The following section describes the installation and removal of the air baffles.

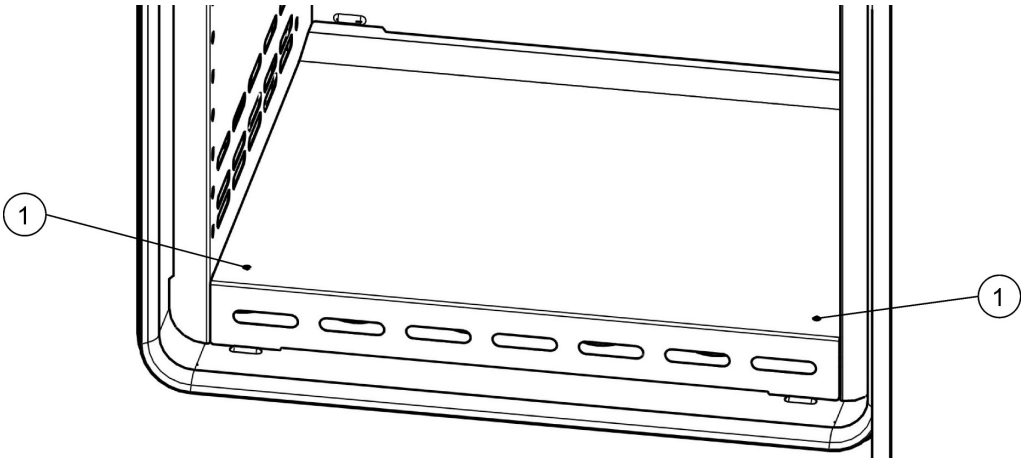


Figure 5-4. Removing the Bottom Panel

1. Loosen the two screws [1] in the bottom panel, then remove the entire bottom panel by lifting it out of its two embossings.

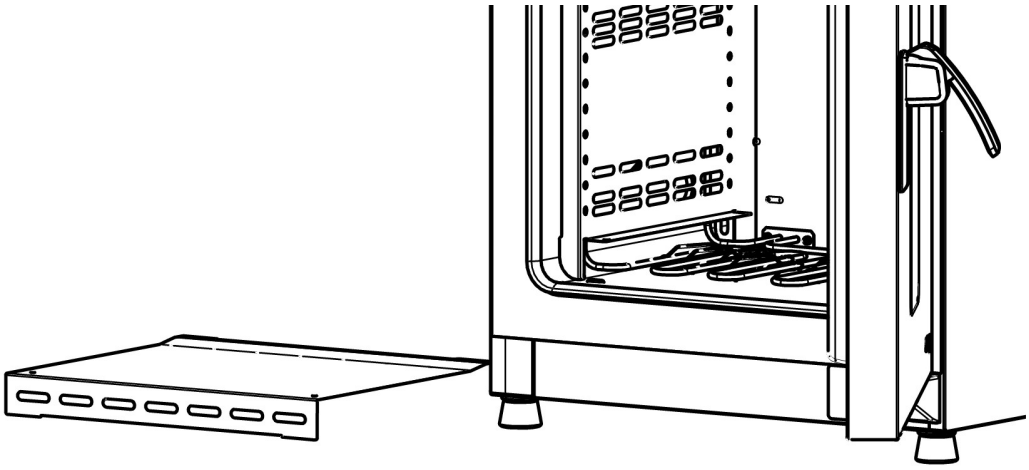


Figure 5-5. Bottom Panel Removed

2. Grab the two retaining springs [1] at their tabs and pull them downwards out of the embossings, then pull off the lateral air baffle.

		WARNING **Risk of damage to sensor!** **To prevent accidental damage, be sure to avoid collision with the sensor when installing or uninstalling panels in the oven's workspace.**

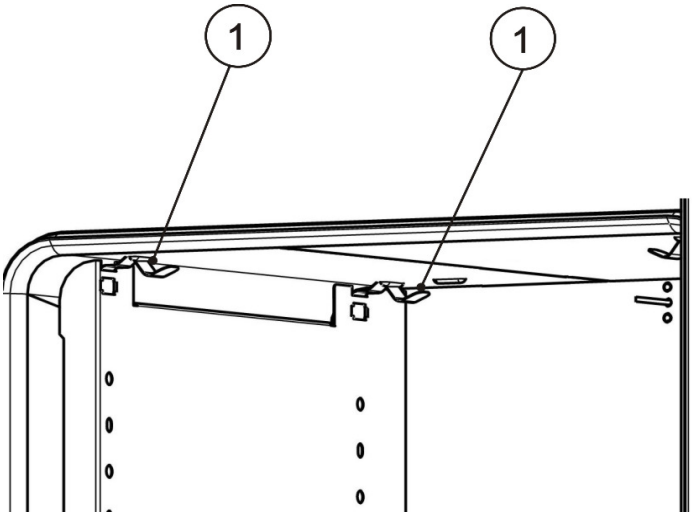


Figure 5-6. Removing the Lateral Air Baffle

3. For the lateral air baffles to install correctly, the two retaining springs [1] must be facing upwards. Place the lateral air baffle on the lower embossings and tilt it upwards against the side wall of the work space.
4. Clamp the two retaining springs [1] into the upper embossings.
5. Replace the bottom panel into the embossings and secure it by fastening the two screws at [1].

Commissioning, general

Installing the Shelf Support Brackets

1. Insert the shelf support brackets [3] into the perforations [1] of the support rail and air baffle and tilt them downwards.
2. Make sure that the two vertical elements [2] of the shelf support bracket butt against the support rail and air baffle.

NOTE
Horizontal position of support rails
Please note the alternating sequence of round and oblong holes. Be sure to use the correct pair of opposite holes, so the support rails are truly horizontal.

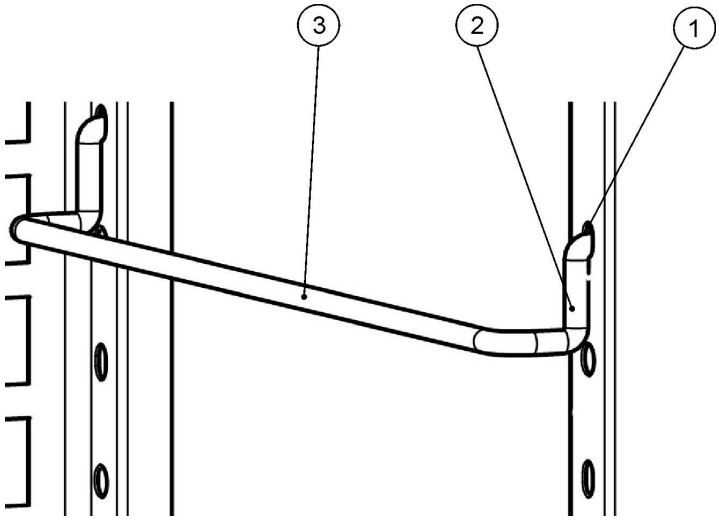


Figure 5-7. Shelf Support Bracket Installation

Installing the Wire-mesh Shelves

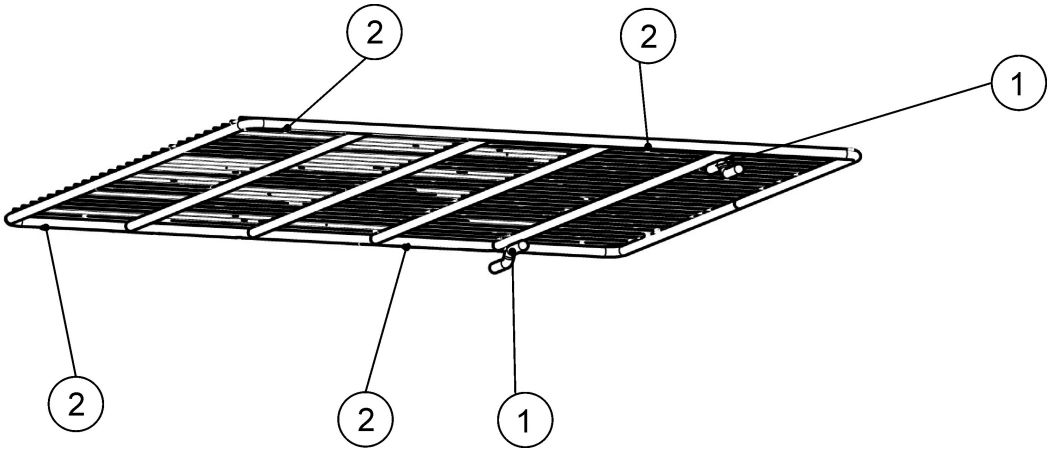


Figure 5-8. Wire-mesh shelf

1. Push the wire-mesh shelf onto the shelf support brackets with the tilt protection devices [1] facing the rear panel of the oven. The tilt protection devices [1] also serve as guides for the wire-mesh shelves.
2. Slightly raise the wire-mesh shelf so that the pull-out stops [2] can slide over the shelf support brackets.
3. Make sure that the shelves and both of their tilt protection devices are free to move over the shelf support brackets.

Leveling the ovens

1. Position a bubble level onto the center shelf.
2. Manually adjust the leveling feet until the wire-mesh shelf is horizontally aligned in all directions. Perform the adjustment of the leveling feet from left to right and from rear to front.

Mains Connection

DANGER **Electric shock**

Contact with live electrical components may cause a lethal electric shock. Before connecting the oven to the power supply, check the power cord and the plug for damage. Do not use damaged cables for connecting the oven to the power supply!

The oven has a class I, protection-earthed enclosure. To minimize the risk of electrical shock, use the AC power cord supplied to connect the oven to a correctly installed and protection-earthed power supply source, with the following features in place for each oven:

- T 16 A slow-blow fusing
- B 16 circuit breaker
- FI circuit breaker

NOTE
Benefits of using separate electrical feeders
Although several devices may be operated on the same electrical feeder if the rated current is not exceeded, we strongly recommended to provide one feeder with a dedicated upstream circuit breaker per oven to avoid the failure of multiple devices in case of an electrical fault.

Connection to the Power Supply Source

1. Before connecting the oven to the power source, check to see if the power supply voltage corresponds with the specifications on the nameplate on the front of the oven. If the voltage (V) and current (A) ratings given are not as required, do not connect the oven to the power source!
2. Connect the IEC connector to the socket at the rear of the oven.
3. Route the power cord along a path that does not cross exhaust air piping or passageways and aisles.
   With stacked devices, keep the power cord away from hot spots on the other oven in the stack.
4. Connect the protection-earthed plug of the power cord to a correctly protection-earthed and earth leakage circuit breaker fused power socket.
5. Make sure the power cord is not subjected to tensile or compressive force.

NOTE
Condensation
When taking the oven into operation for the first time allow some time for stabilization before switching on to avoid condensation forming on live parts.
If a high-voltage test is to be performed on the unit, it must first be heated for around 30 minutes at 75°C.

Electrical Requirements to be Met when Operating the Ovens in the European Union:

The ovens are designed to operate on an AC mains having a maximum system impedance Zmax = 0.321 Ohms, as measured at the system transfer point according to EN 61000-3-11, paragraph 6.2.2. The user must ensure that the device is operated on a mains that complies with this requirement. Where necessary, it is recommended to have the system impedance confirmed by the power utility company.

Operation

Preparing the Oven

The oven must not be released for operation before all major start-up activities have been completed (see “Start-up” on page 19).

Device Check

Prior to starting operation, the following oven components must be checked for their correct function:

- The door seal in the front frame must not be damaged.
- The shelving components must be installed safely.

Disinfecting the Oven’s Work Space

Disinfect the work space according to the operator-specified hygiene guidelines.

Starting Operation

1. Turn the oven on using the control panel.
2. Adjust the temperature set value on the control panel.
3. The temperature controller starts adjusting the work space to the user-specified temperature set value now.

NOTE
Upon initial installation and subsequent heat-up, this appliance may produce an odor and trace evolution of non-toxic vapor that results from brake-out of the insulation binder. This condition is normal for factory-new products and will diminish with continued operation.

DANGER **To avoid any risk of explosion or fire**

- **refrain from loading the oven with any of the substances listed in the section “Incorrect Use” on page 5**
- **make sure that the ambient air is free of any solvents**
- **do not operate the oven in areas with an explosion hazard**

4. Load the work space with samples.

		CAUTION Risk of overloading Overloading may damage the shelves or cause the shelves and/or the oven to tilt when the shelves are being drawn out, ultimately destroying the samples. To avoid overloading the oven or its shelving be sure to observe the sample weight limits specified in See “Technical Data” on page 47.

		**WARNING** Hot surfaces After opening the door, this may swing back automatically. The interior panel of the outer door as well as the surfaces of the outer housing, the shelving and the work space become extremely hot while the oven runs through its heating cycles. When removing samples from a running or recently completed heating cycle, always wear safety gloves and other appropriate personal protection equipment to avoid burns on hot surfaces!

NOTE
Proper loading
To ensure sufficient air circulation and uniform heating of the samples, do not use more than 70% of the maximum surface area of the work space. Bulky objects in the work space that dissipate heat may impair heat distribution.

Handling and Control

Overview

Fisherbrand gravity convection ovens come with a front panel mounted control unit consisting of a multi-functional display, four control buttons, and an on/off button. The four control buttons interact with the display window to let users access all of the user control functions and adjustments of the oven.

The graphic below shows the control panel with all of its visualization elements and controls.

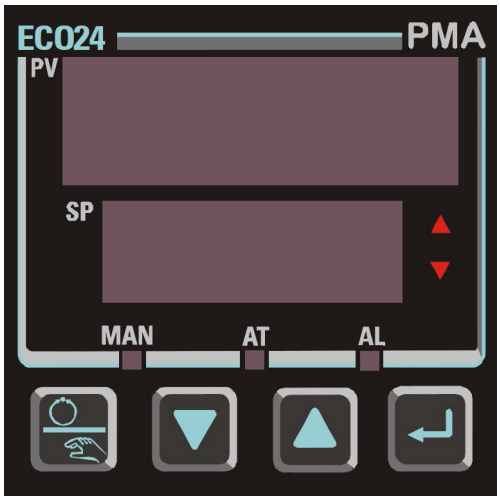


Figure 7-1. Control Panel for Fisherbrand gravity convection ovens

The table below contains brief descriptions of the buttons on the control panel.

Area/Button	Description
PV Display	Process variable - Actual value during normal operation
SP Display	Setpoint value
	For internal use only
	For internal use only
	For internal use only
	For internal use only
	Blinking: Alarm active

	ON: Controller output power up
	For internal use only
	For internal use only
	Down button
	Up button
	Function button (scroll button)

Operator mode

This mode is entered at power on.

NOTE
All configuration mode and Setup mode parameters must be set as required before starting normal operations.

Press ↵ to scroll through the parameters, then press ▲ or ▼ to set the required value.

NOTE
All parameters in Display strategy 6 are read only, and can only be adjusted via Set mode.

Upper Display	Lower Display	Display Strategy When Visible	Description
PV Value	Active SP Value	1 & 2 (initial screen)	PV and target value of selected SP SP adjustable in Strategy 2
PV Value	Active SP Value	3 & 6 (initial screen)	PV and target value of selected SP (e.g. ramping SP Value). Read only
PV Value	(Blank)	4 (initial screen)	Process variable only. Read only
Active SP Value	(Blank)	5 (initial screen)	Target value of selected setpoint only. Read only
SP Value	SP	1, 3, 4, 5 & 6 if digital input is not diS1	
Active Alarms	ALSt	when one or more alarms are active. ALM indicator will also flash	
Offset	OFFS		Enables the adjustment of the temperature offset. The adjusted value will be added to the displayed actual temperature (PV-value). This can be used to calibrate the oven.

Calibration of the reference sensor

The temperature measurement for calibration is performed with a reference sensor placed in the center of the inner chamber.

After placing the reference sensor in the chamber wait at least 2 hours until the temperature is stabilized.

In operator mode the temperature offset can be adjusted.

CAUTION **Calibration parameters**

Only trained personnel should perform the calibration.
Be aware that initial calibration parameters are not stored!

Adjustment of the temperature offset:

Press 2 x ↵ to scroll to the offset input *OFFS*.

If an alarm is displayed the ↵ button must be pressed 3x.

Press ▲ or ▼ to set the required value in 0.1 °C steps.

Acknowledge the entry with ↵ or wait approx. 2 min for automatically storage of the value.

The new temperature is adjusted.

For example:

Before | 37.1
37.0 | offset 1.5 °C | then | 38.6
37.0

The controller adds the adjusted offset to the measured value on the display.

NOTE
Entering an offset value more than 2 °C, an alarm is indicated and is present as long as the readjustment takes.
Only 1 offset value can be entered. The entered offset value is valid for the complete temperature range. This means, if the setpoint temperature is changed the same offset value remains.

Shut-down

This chapter provides instructions for shutting the oven down for prolonged periods of time, that is, at least for several days in a row.

Shutting the Oven Down

1. Remove the containers with the samples and all accessories from the work space.
2. Turn the oven off using the control panel.
3. Unplug the power cord and secure it against accidental reconnection.
4. Until the oven is shut down, the work space must be continuously ventilated. Leave the door open and secure it against accidental closure.

Cleaning and Disinfection

Cleaning

CAUTION **Incompatible cleaners**

Some oven components are made of plastics. Solvents may attack plastics. Strong acids or alkaline solutions may cause embrittlement of plastics.
Please consult the manufacturer or his agent if there is any doubt about the compatibility of decontamination or cleaning agents.

CAUTION **Moisture-sensitive components**

Do not spray cleaning agent onto the control panel and the control box at the rear of the oven. When wiping the oven clean, always make sure that no moisture enters into these components.
Wipe the display window down with a slightly dampened cloth, then wipe dry with a rag made of 100% microfiber.

Cleaning exterior surfaces

Remove dirt residues and depositions thoroughly using a solution of lukewarm water and commercial detergent.

Wipe the surfaces clean using a clean cloth and clear water.

Then, wipe the surfaces dry using a clean cloth.

Wipe / Spray Disinfection

The manual wipe and spray disinfection is the following process:

- predisinfection,
- Cleaning as appropriate for the current application.

CAUTION Alcoholic disinfectants!

Disinfectants having an alcohol content of more than 10% may form, in combination with air, easily combustible and explosive gas mixtures.

When using such disinfectants, avoid open flames or exposure to excessive heat during the entire disinfection process!

Use such disinfectants only in adequately ventilated rooms.

After the disinfectant has been allowed to react, wipe the cleaned oven components thoroughly dry.

Observe safety regulations to avoid fire and/or explosion hazard caused by alcohol-containing disinfectants.

Chloride-containing disinfectants!

Chloride-containing disinfectants can corrode stainless steel and galvanized metal surfaces.

Use only disinfectants that do not affect stainless steel and galvanized metal surfaces!

Preparing the manual wipe/spray disinfection

DANGER Electric shock

Touching live electrical components may cause a lethal electric shock.
Before connecting the oven to the power supply, check the plug and power cord for damage. Do not use damaged cables for connecting the oven to the power source!

WARNING Health hazard

The surfaces of the work space may be contaminated. Contact with contaminated cleaning liquids may cause infections. Disinfectants may contain harmful substances.

When cleaning and disinfecting, always observe the safety instructions and hygiene guidelines!

- **Wear safety gloves.**
- **Wear safety goggles.**
- **Wear mouth and respiratory system protection gear to protect your mucous membranes.**

Observe the safety instructions of the disinfectant's manufacturer and the hygiene supervisor.

Predisinfection

1. Remove all samples from the work space and store them in a safe place.
2. Spray disinfectant onto the surfaces of the work space and of the accessories or wipe the surfaces clean using disinfectant.
3. Allow time for the disinfectant to act as specified by the manufacturer.

NOTE
Disinfecting hard-to-reach components
Spray the sensor and other hard-to-reach components with disinfectant!

NOTE
Check to ensure that the air baffles are securely screwed into place after cleaning and moving the unit.

Maintenance

Regular maintenance is mission-critical to avoid malfunctions due to aging and wear. Failure to perform maintenance on a regular basis may result in:

- deviations in heating performance
- damage to samples
- loss of control over temperature distribution throughout the work space

Inspections and Checks

To ensure the operational performance and safety of the oven, their functions and the components listed below must be checked at regular intervals.

Regular Checks

- Check the oven for overall cleanliness and remove any debris from previous processes.
- To avoid operation without an appropriate fresh air supply, check the air filter (optional) in the air inlet for contamination.

Monthly Inspection

- Check integrity and proper seating of the door seal.
- Swap air filter cartridge (optional) in air inlet.
- Perform functional check of the control panel and of the oven's built-in controller.
- Perform electrical safety check in accordance with the relevant national regulations.

NOTE
Functional check
If safety devices were removed or disabled for inspections, the oven must not be operated before the safety devices have been reinstalled and checked for their correct function.

Spare Parts and User Modifications

To avoid major malfunctions of the oven and associated safety hazards that may result in death, serious injuries, or damage to the oven and other equipment, use spare parts approved by Thermo Fisher Scientific only. Third-party spares without approval void the limited warranty.

Do not modify the oven in any way without obtaining the prior written authorization from Thermo Fisher Scientific. Unauthorized modifications may compromise operational safety and give rise to hazards that may result in death, serious injuries, or damage to the oven and other equipment.

Service Intervals

During ongoing operation, the following service work must be performed:

Annual service

Have the oven inspected and serviced by an authorized Technical Service agent.

NOTE
Service contract
Thermo Fisher Scientific offer a product-specific service contract comprising all necessary tests and service work.

Preparing Temperature Calibration

To determine the exact measured value of the oven's integral temperature sensor, a temperature comparison measurement must be performed every three months. If a major temperature deviation is found during this check, temperature calibration is required. During this process, the temperature controller of the oven is set to the value measured during the temperature comparison measurement.

Use a calibrated measuring instrument with an accuracy of < ± 0.1 °C (0.18 °F) for this test.

To minimize temperature variations during the measurement, put the measuring sensor in an isothermal container (such as a bowl filled with glycerol) before placing it in the work space. Use the center of the work space as the reference location for the comparison measurement.

NOTE
Isothermal container
Do not use a container filled with water as an isothermal container because the evaporation of water will result in a lower temperature reading.

NOTE
Excessive work space temperatures
Excessive work space temperatures after the calibration may be reduced by leaving the doors open for approx. 30 seconds.

Comparison Measurement Procedure

1. Turn the oven on using the power switch.
2. Set the temperature set value and allow the oven to stabilize. This may take several hours.
3. Place the measuring device in the center area of the work space. Alternatively, a temperature sensor may be positioned in this location. Route the connecting cable between the glass panel and the interior tank.
4. Close the doors.
5. Wait until the temperature value displayed on the measuring instrument has stabilized.
6. Use the temperature reading from the measuring device to calibrate temperature control manually.

Replacing the Door Seal

The door seal of the outer door is located in the retaining slot. The door seal should be inspected for any signs embrittlement every six months when the oven has been used at maximum temperatures of up to 250 °C / 482 °F.

No tools are required to replace the seal.

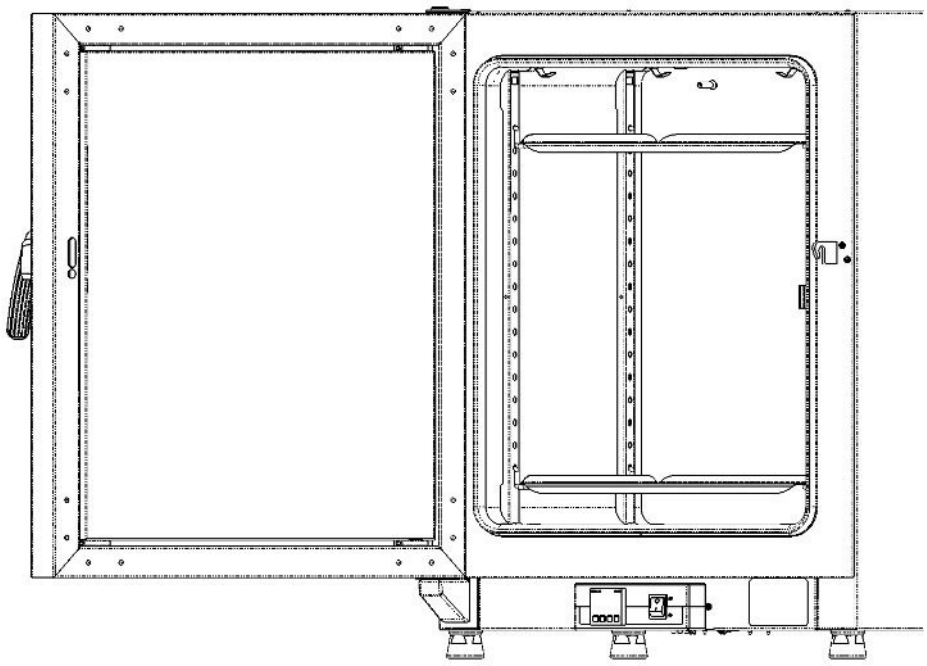


Figure 10-1. Door seal replacement

1. Pull the seal out of the guide slot.
2. Starting on the hinge side of the door, position the seam of the new seal at the location indicated by the arrow in Figure 10-1 above.
3. Gently press the seal into the slot, working around the circumference of the door. In doing so, be careful not to stretch the seal.
4. Make sure that the retaining rail taper is positioned correctly in the slot and that the seal is flush with the door frame.

Replacing the Power Cord

When the device's power cord is damaged, it must be replaced with an original spare part. Using a standard power cord with a lower temperature withstand class is prohibited.

Returns for Repair

Prior to returning any materials, please contact our Customer Service Department for a "Return Materials Authorization" number (RMA).

Material returned without an RMA number will be refused.

WARNING **Contamination hazard**

The oven may have been used for treating and processing infectious substances, which may have caused contamination of the oven and its components.
Prior to return shipment, it is therefore mandatory that all oven components be properly decontaminated.

- **Clean the oven components thoroughly, then disinfect or decontaminate them (depending on application).**
- **Fill in and attach a safety declaration with details on decontamination activities performed to the items that are to be repaired.**

Disposal

WARNING **Contamination hazard**

The oven may have been used for treating and processing infectious substances, which may have caused contamination of the oven and its components.
Prior to disposal, it is therefore mandatory that all oven components be properly decontaminated.

Clean the oven components thoroughly, then disinfect or decontaminate them (depending on application).

- **Attach a declaration of decontamination with details on decontamination activities performed to the items that are to be disposed of.**

Overview of Materials Used

Component	Material
Thermal insulation components	Glass wool
Printed circuit boards	Coated electrical components contain various plastics materials. Components mounted on circuit boards containing epoxy resin bonder.
Plastic components, general	see material labeling
Exterior housing	Galvanized steel sheet, painted
Oven rear panel	Galvanized steel sheet
Outer door	Galvanized steel sheet, painted
Door inner panel	Stainless steel 1.4016
Heater	Stainless steel-sheathed resistance heater wires
Interior containers, installed components and shelves	Stainless steel 1.4016 and galvanized steel; shelves are chrome-plated
Door frame seal	Silicone
Cables	Plastic-sheathed stranded copper wire
Packaging	Corrugated board, polyethylene film, and styrofoam, chemically untreated wood

Error Codes

The table below lists the error messages that may appear in the control panel display window and provides instructions for clearing such alarms.

Parameter	Upper Display	Lower Display	Description
Alarm		Normal	Fisherbrand ovens incorporate a variety of safety features. An alarm LED indicates that the unit temperature is 5°C above setpoint. The controller is operating the oven back to set temperature.
Sensor Break	OPEN	Normal	Break in input sensor or wiring.
OTP - Overtemperature protection	cHH>		This code is displayed up to 105 °C, then „*OPEN*“ is displayed. If the oven does not heat, possibly an activation of the OTP has occurred. In this case the heater will remain off. Contact Technical Service.

Technical Data

The technical data are valid only for an empty device equipped with three shelves, a spray-painted outer enclosure and a power line voltage 120 V 60 Hz (Table 1) or 230 V 50/60 Hz (Table 2). Options may have an impact on the specified performance.

Table 1. Technical Data - Gravity Convection Ovens 120 V

Parameter	Unit	Fisher Sci 60L Gravty Oven	Fisher Sci 100L Gravty Oven	Fisher Sci 180L Gravty Oven
Process				
Work Space Atmosphere Min.[1]	°C/°F	50/122	50/122	50/122
Max.	°C/°F	250/482	250/482	250/482
Temperature deviation from set value at 150 °C (302 °F), spatial. Max. value/ Typical. value	K	±4.5 / ±4.0	±5.5 / ±4.5	±5.5 / ±5.0
Temperature deviation from set value at 150 °C (302 °F), over time. Max. value/ Typical. value	K	±1.0/±0.5	±1.0/±0.5	±1.0/±0.6
Heat-up time (work space unoccupied, from 25 °C (77 °F) to 98% of set temperature of 150 °C/ 302 °F). Max. value/ Typical. value	min	38/25	38/24	35/33
Recovery time (work space unoccupied, door open for 30 s, to set temperature). Max. value/ Typical. value	min	11/10	11/10	11/10
Heat dissipation to environment (at set temperature of 150 °C (302 °F) and room temperature of 25 °C/ 77 °F)	W	194±10%	261±10%	320±10%
Max. air change at 150 °C/302 °F	h^{-1}	19	16	18
Overall dimensions				
Height	mm/in	720/28.3	820/32.3	920/36.2
Width	mm/in	530/20.8	640/25.2	640/25.2
Depth	mm/in	565/25.2	565/25.2	738/29.1
Overall weight	kg/lbs	42/93	53/117	66/146
Loading capacity				
Loading capacity per shelf	kg/lbs	25/55		
Max. overall loading capacity per device	kg/lbs	50/110	50/110	75/165
Electrical data				
Power rating	W	1730	1680	1680
Maximum current	A	14.4	14.0	14.0
Earthing system (e.g. 1/N/PE)		1/N/PE	1/N/PE	1/N/PE

Table 1. Technical Data - Gravity Convection Ovens 120 V

Parameter	Unit	Fisher Sci 60L Gravty Oven	Fisher Sci 100L Gravty Oven	Fisher Sci 180L Gravty Oven
Power line frequency	Hz	60		
Power line voltage +/- 10 %	V	120		
IP protection system		IP 20		
Protection class		I		
Overvoltage category to IEC 60364-4-443		II		
Device fusing, building side	A	16		
Device fusing	A	2 x 16		
Environmental conditions				
Min. ambient temperature	°C/°F	18/65		
Max. ambient temperature	°C/°F	32/90		
Max. humidity in service, non condensing	% r.F./ % r.H.	80, non condensing		
Min. storage temperature	°C/°F	20/68		
Max. storage temperature	°C/°F	60/140		
Max. humidity in storage, non condensing	% r.F./ % r.H.	90, non condensing		
Post-transport acclimation time	h	2		
Noise level	dB(A)	no inherent noise		
Pollution degree to IEC EN 61010-1		2		
Site conditions				
Maximum altitude above sea level	m/y ASL	2000/2187		
Minimum side clearance	mm/in	50/2		
Minimum front clearance	mm/in	590/23.2	690/27.2	814/32
Minimum back wall clearance	mm/in	80/3.2		
Minimum bottom clearance	mm/in	200/8		
Minimum top clearance	mm/in	300/12		

1 Temperatures as low as ambient +10 °C can be selected, this requires open damper and no additional heat in unit.

Table 2. Technical Data - Gravity Convection Ovens 230 V

Parameter	Unit	Fisherbrand 65L Oven	Fisherbrand 105L Oven	Fisherbrand 176L Oven
Process				
Work Space Atmosphere Min.[1]	°C/°F	50/122	50/122	50/122
Max.	°C/°F	250/482	250/482	250/482
Temperature deviation from set value at 150 °C (302 °F), spatial. Max. value/ Typical. value	K	±4.5 / ±4.0	±5.5 / ±4.5	±5.5 / ±5.0
Temperature deviation from set value at 150 °C (302 °F), over time. Max. value/ Typical. value	K	±1.0/±0.5	±1.0/±0.5	±1.0/±0.6
Heat-up time (work space unoccupied, from 25 °C (77 °F) to 98% of set temperature of 150 °C/ 302 °F). Max. value/ Typical. value	min	38/25	38/24	35/33
Recovery time (work space unoccupied, door open for 30 s, to set temperature). Max. value/ Typical. value	min	11/10	11/10	15/10
Heat dissipation to environment (at set temperature of 150 °C (302 °F) and room temperature of 25 °C/ 77 °F)	W	194±10%	261±10%	320±10%
Max. air change at 150 °C/302 °F	h^{-1}	19	16	18
Overall dimensions				
Height	mm/in	720/28.3	820/32.3	920/36.2
Width	mm/in	530/20.8	640/25.2	640/25.2
Depth	mm/in	565/25.2	565/25.2	738/29.1
Overall weight	kg/lbs	42/93	53/117	66/146
Loading capacity				
Loading capacity per shelf	kg/lbs	25/55		
Max. overall loading capacity per device	kg/lbs	50/110	50/110	75/165
Electrical data				
Power rating	W	1550	1400	1400
Maximum current	A	6.7	6.1	6.1
Earthing system (e.g. 1/N/PE)		1/N/PE	1/N/PE	1/N/PE
Power line frequency	Hz	50/60		
Power line voltage +/- 10 %	V	230		
IP protection system		IP 20		
Protection class		I		
Overvoltage category to IEC 60364-4-443		II		
Device fusing, building side	A	16		

Table 2. Technical Data - Gravity Convection Ovens 230 V

Parameter	Unit	Fisherbrand 65L Oven	Fisherbrand 105L Oven	Fisherbrand 176L Oven
Device fusing	A	2 x 16		
Environmental conditions				
Min. ambient temperature	°C/°F	18/65		
Max. ambient temperature	°C/°F	32/90		
Max. humidity in service, non condensing	% r.F./ % r.H.	80, non condensing		
Min. storage temperature	°C/°F	20/68		
Max. storage temperature	°C/°F	60/140		
Max. humidity in storage, non condensing	% r.F./ % r.H.	90, non condensing		
Post-transport acclimation time	h	2		
Noise level	dB(A)	no inherent noise		
Pollution degree to IEC EN 61010-1		2		
Site conditions				
Maximum altitude above sea level	m/y ASL	2000/2187		
Minimum side clearance	mm/in	50/2		
Minimum front clearance	mm/in	590/23.2	690/27.2	814/32
Minimum back wall clearance	mm/in	80/3.2		
Minimum bottom clearance	mm/in	200/8		
Minimum top clearance	mm/in	300/12		

[1] Temperatures as low as ambient +10 °C can be selected, this requires open damper and no additional heat in unit.

Spare Parts and Accessories

Material No.	Description
150145852	Stainless steel perforated shelf for 60L/65L gravity convection ovens, including 2 shelf supports
150145853	Stainless steel perforated shelf for 100L/105L gravity convection ovens, including 2 shelf supports
150145854	Stainless steel perforated shelf for 176L/180L gravity convection ovens, including 2 shelf supports
150145846	Wire mesh shelf for 60L/65L gravity convection ovens, including 2 shelf supports
150145847	Wire mesh shelf for 100L/105L gravity convection ovens, including 2 shelf supports
150145848	Wire mesh shelf for 176L/180L gravity convection ovens, including 2 shelf supports

Device Log

Oven type:		Part number:	
Serial number:		Service number:	
Location		Operator's note:	

Work carried out	Notes	Date	Signature

In the United States:
For customer service, call 1-800-766-7000
To fax an order, use 1-800-926-1166
To order online: fishersci.com

In Canada:
For customer service, call 1-800-234-7437
To fax an order, use 1-800-463-2996
To order online: fishersci.ca

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Norway: +47 22 95 59 59
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