



Cell culture

Reliable performance and excellent value

Forma Direct Heat
CO₂ Incubators

Performance and value

For everyday culturing

Thermo Scientific™ Forma™ Direct Heat CO₂ Incubators combine high capacity and dependable performance in an easy to use design, for researchers who prefer the convenience of direct heat temperature control technology.

- **High capacity chamber for maximum culturing space** — We provide a 6.5 cu. ft. (184.1 liters) interior volume and include heavy-duty stainless steel shelves to support a full product load.
- **Adaptable to your needs** — The ideal solution for basic cell culture incubation, the flexible Direct Heat Incubator can be configured with your choice of either TC (thermal conductivity) or IR (infrared) CO₂ gas sensors, and a variety of useful process and contamination control options, to meet your specific requirements.
- **Easy configuration and use** — Quality construction, proven reliability and convenience, our direct heat CO₂ incubators are designed for simple operation and fast and easy cleaning.



Forma Direct Heat Incubators are readily stackable to preserve floor space (hardware included).



Sturdy stainless steel shelves and supports can be removed without tools for easy cleaning or adjustment.

Features for contamination control

Minimizing the risk of product loss and downtime

Precise direct heat temperature control

Lighter in weight and more mobile than traditional water jacketed designs, our proven direct heat technology enables the excellent temperature uniformity and recovery characteristics you depend on. With high performance heating elements and advanced insulation surrounding the culture chamber, accurate temperature control can be established.

Designed for easy cleaning

- Polished stainless steel interior with coved corners is easy to clean.
- Sturdy stainless steel shelves and supports are designed to support a full product load, and can be readily removed without tools for easy cleaning or adjustment.
- Microbiological filters are provided on gas inlet and sample ports and are readily accessible for simplified routine replacement.
- Inner door gasket is removable and cleanable, and adjusts continually to enable a tight seal.

100% HEPA filtered air

An optional in-chamber HEPA Filter Airflow System continuously filters the entire chamber volume of air every 60 seconds to help prevent surface contamination and product loss.

The HEPA filtration system reduces airborne contaminants which may enter the incubator upon routine door openings and are the primary source of contamination in most cell culture lab settings.

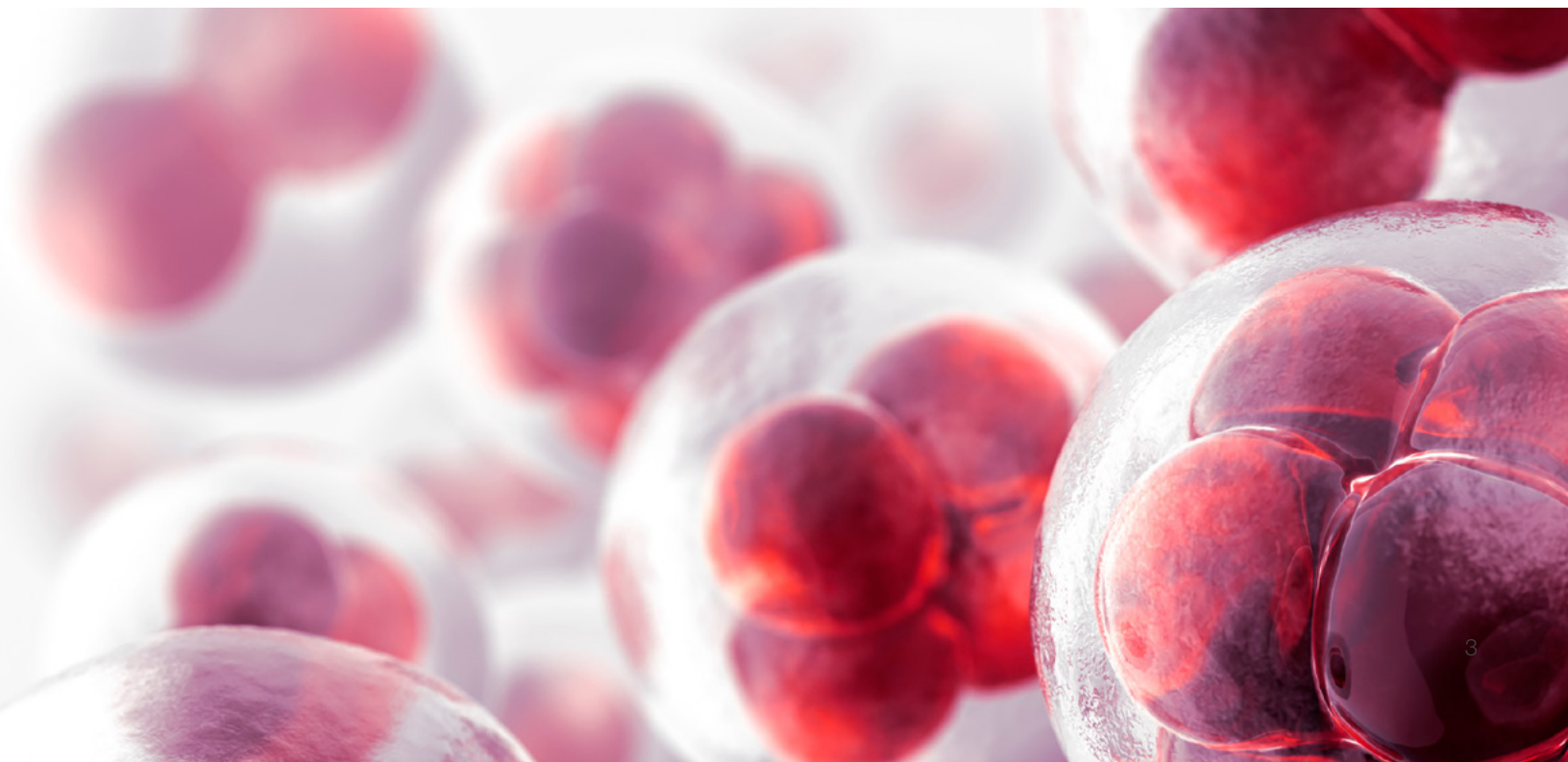
HEPA VOC filtration

An optional built-in VOC filtration system is available to compliment the HEPA system by removing volatile organic vapors which could cause risk to sensitive cultures. Its molecular sieve technology captures potentially toxic chemicals commonly found in products such as lab solvents, cleaning agents and plastics, which may find their way into the incubator.

Solid copper components*

Known for its ability to effectively prevent bacterial and fungal growth on contact, an available solid copper interior component kit may be incorporated to help provide passive surface contamination protection.

* Copper is solid, not plated. Available components include perforated shelves, interior ductwork, and humidity pan. Refer to the 'Accessories and options' sections for details.



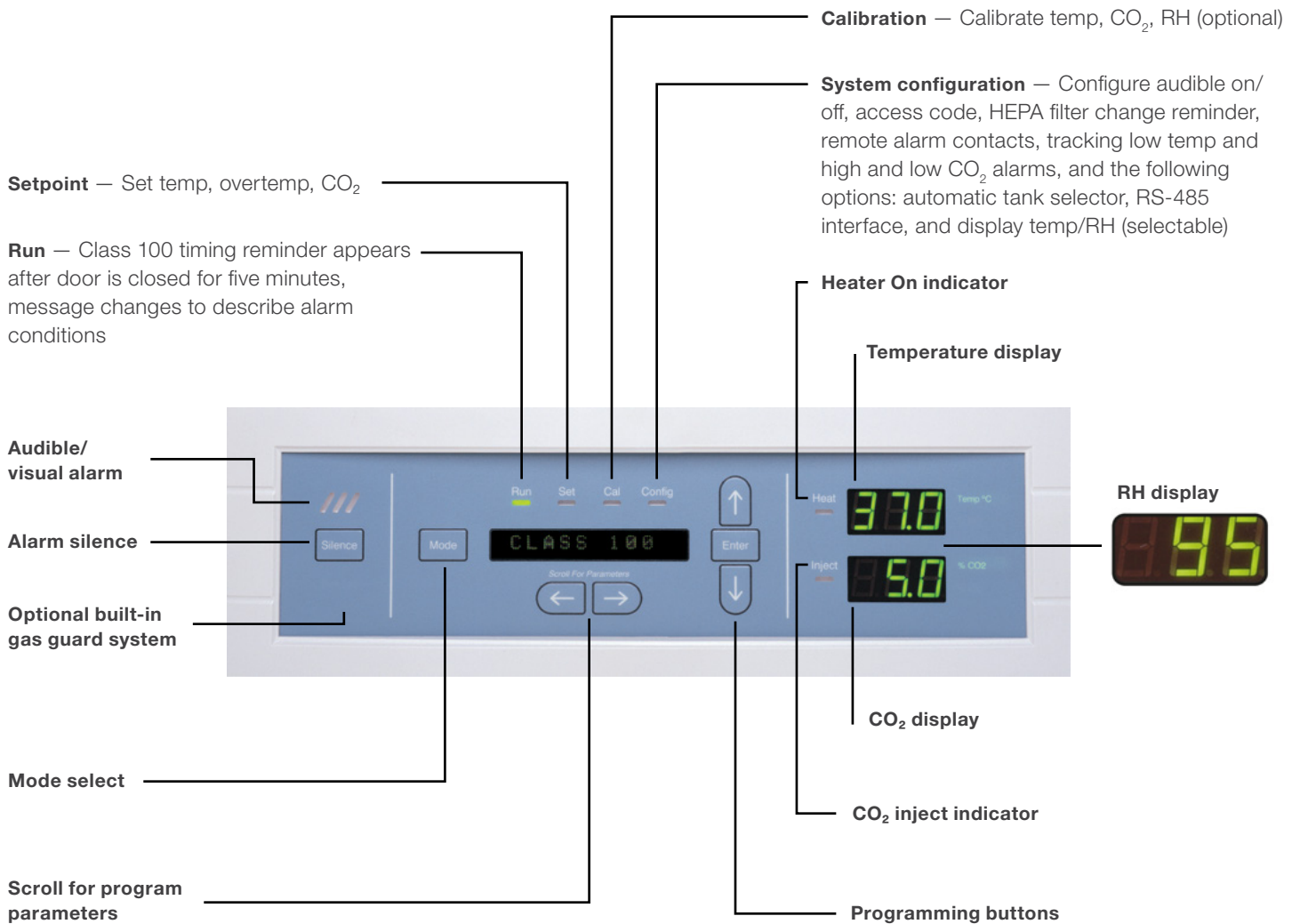
Easy-to-use control panel

Touchbutton simplicity

Easy configuration and use

Slide-out front drawer enables convenient access to electronic components for maintenance.

- Standard remote alarm contacts (NO, NC, COM) and optional RS-485, 0-1V, 0-5V, and 4-20 milliamp data outputs permit connection to an alarm/monitoring system to meet internal and regulatory requirements.
- Flexible, intuitive controls enabling ease of use.



Specifications

Details			
Temperature			
Control	±0.1°C	Uniformity	±0.3°C @ 37°C (98.6F)
Range	5°C above ambient to 50°C (122F)	Tracking alarm	User-programmable low
Overtemperature			
Sensor	Precision thermistor	Setability	0.1°C
Temperature Safety			
Sensor	Independent thermostat	Controller	Independent analog electronic
CO ₂ (choice of T/C or IR sensor)			
Control	Better than ±0.1%	Range	0-20%
Inlet pressure	15 PSIG (1.0 bar)	Readability and setability	0.1%
Tracking alarm	User-programmable high/low		
Humidity (opt. display available)			
RH	Ambient to 95% @ 37°C (98.6F)	Humidity pan	3.2 qt. (3.0 liters) standard
Perforated, stainless steel or solid copper shelves			
Dimensions	18.5"x 18.5" (47.0cm x 47.0cm)	Surface area, max. per Chamber	2.4 sq. ft. (0.2 sq. m) per shelf, 40.8 sq. ft. (3.8 sq. m) max.
No. standard	3	No. maximum	16
Shelf load limit	35 lbs. (16kg) sliding in and out, 50 lbs. (23kg) stationary		
Construction			
Interior volume	6.5 cu. ft. (184.1 liters)	Interior	Type 304, shiny, stainless steel or solid copper
Exterior	18 gauge, cold-rolled steel		
Outer door gasket	Four-sided, molded, magnetic vinyl	Inner door gasket	Feather-edged, silicone
Electrical			
Models 310/320	115V, 50/60 Hz, 2.4 FLA (Operating range 90-125V) NEMA 5-15P Plug		
Models 311/321/351	230V, 50/60 Hz, 2.0 FLA (Operating range 180-250V) CEE 7/7 Plug		
Model 361	230V, 50/60 Hz, 1.5 FLA (Operating range 180-250V) CEE 7/7 Plug		
Circuit breaker, power switch	6 Amps, 2 Pole		
Convenience receptacle	75 Watts max. (matches cabinet voltage)		
Alarm contacts	Deviation of temp, CO ₂ , RH; power failure; customer connections through jack on back of unit		
Access port, CO ₂ inlet	1.3" (3.3cm) with removable silicone plug, 1/4" barbed hose		
Unit heat load	341 BTUH (100 Watts), 85 kcal per hour		
Dimensions			
Exterior	26.1"W x 38.5"H x 24.7"D (66.3cm x 97.8cm x 62.7cm)	Interior	21.3"W x 26.8"H x 20.0"D (54.1cm x 68.1cm x 50.8cm)
Weight			
Net	210 lbs. (95.3 kg)	Shipping (motor)	270 lbs. (122.5 kg)

Accessories and options

Description	Cat. No	
RH display		
Humidity (RH) display ¹ , readable in 1% increments, includes low RH programmable alarm (alerts you of the need to add water to humidity pan), factory installed	190643	
Chamber and shelf components		
Independent inner glass door kit (eight doors with latches), mounts inside heated inner glass door, is removable and can be autoclaved (Fig. 01)	190650	
Solid copper components	Copper shelf kit	190879
	Copper humidity pan	237020
	Copper ductwork ¹ ; includes shelf supports, top duct, shelf channels, four shelves, and pan; factory installed	190870
Stainless steel components	Stainless steel shelf kit	190884
	Stainless steel humidity pan	237016
	Stainless steel ductwork; includes side ducts and shelf channels	190670
Filtration² and decontamination kits		
HEPA filter airflow system ¹ ; factory installed	190858	
Replacement HEPA filter (Fig. 02)	760175	
HEPA value pack (four filters)	760209	
HEPA filter replacement kit; includes HEPA; in-line, and access port filters	1900067	
HEPA ² VOC filter replacement kit; includes HEPA ² in-line and access port filters	1900094	
HEPA ² VOC filtration system kit; converts HEPA filter airflow system to HEPA ² filtration system; includes HEPA ² filter and two plugs	760199	
Decontamination kit for HEPA filtered units	190868	
Decontamination kit for standard units	190869	
CO₂ accessories		
CO ₂ Fyrite [®] analyzer kit, 0-20%	155021	
Built-in CO ₂ gas guard ¹ to monitor CO ₂ supply, automatically switches from one cylinder to the other when the supply is exhausted, factory installed	190640	
Two-stage CO ₂ gas regulator with barbed connection and shut-off valve (Fig. 03)	965010	
Wall clamp for a CO ₂ bottle; includes cylinder holder with web strap	950316	
Roller base		
Roller base (heavy-duty, powder coated steel base) with dual-wheel, swivel locking casters and leveling feet; supports one or two (stacked) incubators; raises unit 3.0" (7.6cm) off the floor (Fig. 04)	1900063	

¹ Factory installed

² HEPA and HEPA² filters are rated a minimum 99.97% efficient at 0.3 microns. Filters are easily replaced without tools.

Accessories and options

Description	Cat. No.
Thermo Scientific™ Sensaphone™ Telephone Dialing Systems	
Interface with standard touch-tone phone system for up to four input channels	400047
Interface with standard touch-tone phone system for up to eight input channels	400134
Data outputs¹ (select one)	
RS-485 interface	190523
4-20 milliamp	190512
0-5V analog	190543
0-1V analog	190544
Miscellaneous accessories	
Sealed modular incubator chamber, purge with any gas mixture to create a “mini-incubator” inside your incubator for unusual gas and temperature controlled experiments, dimensions: 12.0" (30.5cm) circular chamber, 4.7" (11.9cm) high (Fig. 05)	190043

¹ Factory installed



Fig. 01 | Inner glass door kit



Fig. 02 | HEPA air-filter (VOC)



Fig. 03 | Two-stage CO₂ gas regulator



Fig. 04 | Roller base and stand



Fig. 05 | Sealed modular incubator chamber

Ordering information

Product	Chamber	CO ₂	Voltage	FDA Class 2 Medical Device Catalog No.	(Standard) Catalog No.
Forma Direct Heat CO ₂ Incubator	Stainless Steel	T/C	115V 50/60 Hz	310	310GP
	Stainless Steel	IR	115V 50/60 Hz	320	320GP
	Stainless Steel	T/C	230V 50/60 Hz	311	311GP
	Stainless Steel	IR	230V 50/60 Hz	321	321GP
	Copper	T/C	230V 50/60 Hz	351	
	Copper	IR	230V 50/60 Hz	361	

All units are UL listed to United States and Canadian requirements and bear the CE Mark.

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Remote monitoring

4-20mA signal output is included for interfacing with external data collection systems such as the Thermo Scientific™ Smart-Vue™ Pro Remote Monitoring System which provides external sensors and CFR-21 compliant software packages suitable for GMP environments. The Smart-Vue Pro system offers a customizable and scalable architecture that is compatible across multiple brands and equipment types, offering self-installation and long range capabilities.

Learn more at thermofisher.com/smart-vuepro

Learn more at thermofisher.com/co2

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