1. Product Information

GEX PRODUCT ID	PRODUCT NAME
P4850	Forced Air Incubator – small
P4855	Forced Air Incubator – large

2. Product Description

Intended Use: The P4850 / P4855 forced-air incubator is a front loading, open-cavity, forced-air incubator that is ideal for heat treatment of B3 film dosimeter products including dosimeters in the original factory package/pouch, dosimeters out of the package/pouch, dosimeters in array cards (energy & uniformity), and bare B3 film strips and sheets.

Description:

- Built-in timer
- Double doors (interior glass, exterior stainless steel) for a clear view without a drop in temperature
- One shelf (standard)
- Side entry port for introducing connections at the side, can be closed by flap
- Intuitive and easy-to-use operating menu

The P4850/P4855 incubators provide outstanding precision and reliability. Use the built-in timer on the incubator, or an external timer to track the duration of heat treatment.

The P4850 / P4855 incubators have flexible and powerful controls. You can use basic control functionality (typical usage), or you can set more complex functions such as over temperature protection and alarms. If desired, you can program the incubator using the onboard AtmoCONTROL logging software.

PRODUCT IMAGE – EXTERIOR	PRODUCT IMAGE – INTERIOR
	

3. Product Specifications

SPECIFICATION		DESCRIPTION
Interior		Stainless steel, material 1.4301 (ASTM 304) with all-round deep-drawn ribs to integrate the large area heating with ceramic-metal sheath.
	Volume	P4850 – 32 L P4855 – 53 L
	Dimensions (w x h x d)	P4850 – 400 x 320 x 250 mm (d less 39mm for fan) P4855 – 400 x 400 x 330 mm (d less 39mm for fan)
Housing (exterior)		Textured stainless steel, rear zinc-plated steel, intuitively operated TwinDISPLAY (TFT colour display) with touchscreen; inner glass door, outside fully insulated stainless steel door.
	Dimensions (w x h x d)	P4850 – 585 x 704 x 434 mm (d +56mm door handle) P4855 – 585 x 784 x 514 mm (d +56mm door handle)
	Door hinged	Left
Temperature		
	Setting temperature range	+20 to +80 °C
	Working temperature range	Min. 10 °C above ambient up to +80 °C.
	Setting temperature accuracy	0.1 °C
	Temperature sensor	2 Pt100 sensors DIN Class A in 4-wire-circuit for mutual monitoring, taking over functions in case of an error.
Ventilation		
	Fan	Forced air circulation by quiet air turbine, adjustable in 10 % steps for each segment individually.
	Fresh air	Admixture of pre-heated fresh air by electronically adjustable air flap.
	Vent	Vent connection with restrictor flap.
Control technology		
	Operation panel	Located on the front of the device. TwinDISPLAY technology with adaptive multifunctional digital PID-microprocessor controller with 2 high-definition TFT-color displays. Users can select basic functionality or program features.
	Timer	Digital backwards counter with target time setting, adjustable from 1 minute to 99 days.
	Calibration	Three freely selectable temperature values.
	Adjustable parameters	Temperature (Celsius or Fahrenheit), fan speed, air flap position, program time, time zones, summertime/wintertime.

Safety		
	Temperature control	Mechanical temperature limiter TB, protection class 1 according to DIN 12880 to switch off the heating approximately 20°C above nominal temperature. Overtemperature monitor TWW, protection class 3.1 or adjustable temperature limiter TWB, protection class 2, selectable on display.
	Auto-diagnostic system	For fault analysis.
	Alarm	Visual and acoustic.
Electrical		
	P4850	
	EU plug - Voltage Electrical Load	230 V, 50/60 Hz Approx. 1600 W
	US plug - Voltage Electrical Load	115 V, 50/60 Hz Approx. 800 W
	P4855	
	EU plug - Voltage Electrical Load	230 V, 50/60 Hz Approx. 1000 W
	US plug - Voltage Electrical Load	115 V, 50/60 Hz Approx. 900 W
Ambient Conditions		
	Set Up	The distance between the wall and the rear of the appliance must be at least 15 cm. The clearance from the ceiling must not be less than 20 cm and the side clearance from walls or nearby appliances must not be less than 5 cm.
	Ambient temperature	+5 °C to +40 °C
	RH (relative humidity)	Maximum 80% RH, non-condensing.
	Overvoltage category	II
	Pollution degree	2 (Area must be free of heavy dust production or aggressive vapors)

Included Items

ITEM	DESCRIPTION
Shelf	1 Stainless steel grid shelf, electropolished
Calibration certificate	Standard works calibration certificate (measuring center point of chamber at +37 °C) provided by Memmert. Certificate shipped with product.

Connections	Mains cable with plug.
Plug	US or EU
AtmoCONTROL software on USB storage medium	AtmoCONTROL is software for programming and logging Memmert appliances of the generation 2012 of appliances with Ethernet and/or USB interface and corresponding equipment.

Optional Items

ITEM	DESCRIPTION	GEX P/N
Additional Shelf *	1 Stainless steel grid shelf, electropolished.	P4851
Calibration at Memmert factory – single temperature point	Calibration at Memmert factory for a freely selectable temperature value.	Special order
Calibration at Memmert factory – three temperature points	Calibration at Memmert factory for three temperature values: +37, +52, +70 °C	Special order
FDA AtmoCONTROL	Software conforming to FDA AtmoCONTROL. Meets the requirements for the use of electronically stored data sets and electronic signatures as laid down in Regulation 21 CFR Part 11 of the US Food and Drug Administration (FDA). Base licence for the control of one unit (only for units with TwinDISPLAY). Respective IQ/OQ documents available in German and English language (without surcharge).	Special order
GEX Onsite IQOQ	IQ/OQ qualification on site includes temperature distribution survey with 5 temperature measuring points per shelf.	S9190 – by quote

* GEX does not recommend usage of other types of shelves. The grid shelf allows the air to flow around the product and is appropriate for heat treatment of B3 film dosimeters. Other options, such as the perforated stainless-steel shelf sold by Memmert, will block air flow.

4. Safety

Follow Memmert published user manual for complete safety and installation instructions. The user manual is available in multiple languages. Printed copy shipped with product or download from Memmert website https://www.memmert.com/en/downloads/downloads.

According to DIN 12880:2007-05, EN 61010-1 (IEC 61010-1), EN 61010-2-010. Standard units are safety-approved and bear the test marks

Installation Warnings:

WARNING	**Products can tip over and cause injury** • Due to its center of gravity, the appliance could tip forwards and injure you or someone else.

- Follow the product's user manual to ensure it is installed according to the Memmert recommendations for wall attachment and anti-tilt bracket.

	**Crushing hazard due to heavy equipment** The unit is heavy. Crushing injuries to hands or feet can occur when transporting and installing the unit. • Wear protective gloves and safety boots. • Grab hold of the sides of the unit to carry it.
	**Lifting the appliance incorrectly** The unit is heavy. The appliance is heavy, so you could injure yourself if you try to lift it on your own. • Make sure that enough people are on hand to lift and carry the appliance. • Larger appliances must not be carried and only transported by pallet truck or forklift truck.

Operation Warnings:

	**Hot surfaces.** Depending on the operating situation, the unit and the load may be hot. Contact with hot surfaces may have serious health consequences due to burns!
	**Overheating the appliance when door is open. DO NOT leave the door open during operation.** Leaving the door open during operation can cause the appliance to overheat or pose a fire hazard.

Power Supply Warnings:

	**Only use a power outlet as a ground terminal. The product should be connected to the rated power supply as specified on the label on the rear side of the unit. If the product is connected to wrong power source, it may cause overheating.**
	**Use conditioned power whenever possible by connecting via a surge suppression and/or battery backup intermediary.**

5. Shipping / Delivery

Transport information	Must be transported upright.
Country of origin	Germany
WEEE-Reg.-No.	DE 66812464
Shipping carton	Cardboard box
Pallet	Shipped on half pallet (wood).
Dimensions approx. incl. carton or shipping box (w x h x d)	P4850: approx. 660 x 890 x 650 mm (26 x 35 x 25 in) P4855: approx. 730 x 950 x 670 mm (28 x 37 x 26 in)
Net weight	P4850: approx. 48 kg (106 lbs.) P4855: approx. 57 kg (126 lbs.)
Gross weight carton	P4850: approx. 64 kg (142 lbs.) P4855: approx. 76 kg (168 lbs.)

CAUTION

Always keep shipping containers and product box upright.

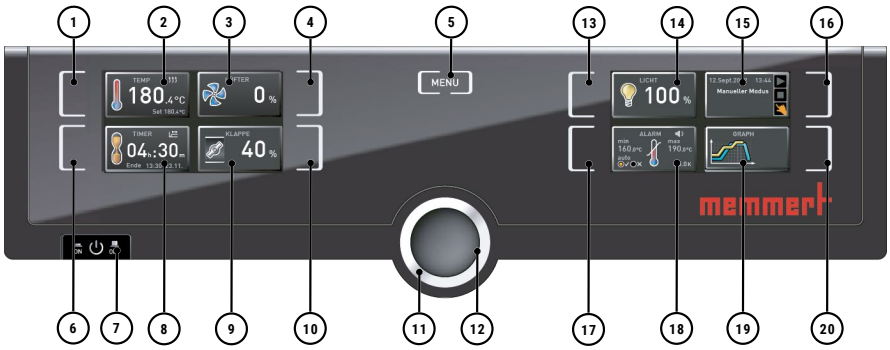
CAUTION

Always store in a cool, dry area. See *Product Specifications – Ambient Conditions*.

6. Basic Usage

Refer to the Memmert User Manual (see *Related Documents*) for detailed usage information to include the basic operating precautions and operational safety rules.

6.1 Operations panel touchscreen



1	Activation key for temperature setpoint input	**2**	Setpoint and actual temperature display
3	Fan speed display	**4**	Activation key for fan speed setting
5	Switch to menu mode	**6**	Activation key for digital backwards counter with target time setting, adjustable from 1 minute to 99 days
7	Main switch	**8**	Display of digital backwards counter with target time setting, adjustable from 1 minute to 99 days
9	Air flap position display	**10**	Activation key for air flap position adjustment
11	Turn control for setpoint adjustment	**12**	Confirmation key (applies setting made with the turn control)
13	Activation key for adjustment of interior lighting (additional option)	**14**	Interior lighting display (additional option)
15	Appliance state and program display	**16**	Activation key for the appliance state
17	Activation key for adjustment of temperature monitoring	**18**	Temperature monitoring display
19	Graphic representation	**20**	Activation key for graphic representation

6.2 Installation & Setup Instructions

GEX sets the incubator parameters prior to shipment. Basic installation and setup instructions are below. Consult the Memmert User Manual for complete instructions and follow all Memmert instructions for safely handling and installing the incubator (see *Related Documents*). See also *Installation Warnings*.

INSTALLATION	
Unpack	Un-package the device from shipping box and inspect for any shipping damage. Contact GEX support immediately if there is visible damage. CAUTION *To avoid damage, do not unpack the incubator until you reach the installation site.*
Place incubator in usage location	Using two people for transport, carefully move and place the incubator on a flat, stable, even surface with unobstructed airflow around the incubator and preferably away from air drafts. • The recommended distance of each side is minimum of 15 cm from the back wall, 5cm from the side walls, and 20cm from the ceiling. • Ensure the surface being used can withstand the radiated heat produced by typical incubators and does not vibrate. • Ensure the ambient conditions of the installation location meet the specifications (see *Specifications – Ambient Conditions).* • Ensure the power supply of the installation location meet the specifications (see *Specifications – Electrical).* Conditioned power/surge protector is recommended, see *Installation Warnings – Power Supply*. WARNING *The incubator is heavy! Follow Memmert recommendations for lifting and placing the device.*
Power supply	Plug the power cord into a properly grounded power supply. Conditioned power/surge protector is recommended.
Shelves	Insert the shelf(s) at desired height(s).

OPERATION SETTINGS	
Power On	Power on the device using the switch located on the upper left of the front panel (Item 7). Heating operation is indicated by the symbol. Allow temperature to stabilize. Typically, the temperature will stabilize in about 15-30 minutes.
Manual Mode	Ensure the unit is in manual mode (Item 15).
Temperature	Confirm set point temperature (Item 2). GEX set the temperature at 60 °C. The fan speed is set to 10%. The air flap position is 0% Adjust temperature set point as needed. Select temperature setpoint (Item 1). Adjust the temperature using the rotary dial (Item 11) and press the center button on the dial (Item 12) to complete the selection and exit the temperature adjustment.

	NOTE *NOTE: You may need to adjust the setpoint temperature according to your known required temperature to heat treat B3 film dosimeters which is specific to your irradiation process and your dosimetry lab environment. See **Heat Treatment**.*
Fan Speed	Confirm the fan speed (Item 3). GEX sets the fan speed setting at 10%. Adjust the fan speed as needed. Select fan speed adjustment (Item 4). Adjust the fan speed using the rotary dial (Item 11) and press the center button on the dial (Item 12) to complete the selection and exit the temperature adjustment. CAUTION *CAUTION: B3 film is lightweight and will blow around the incubator at high fan speeds. Do not allow the B3 film to touch the bottom of the incubator or film damage may occur.*
Air Flap Position	Confirm the air flap position (Item 9). GEX sets the air flap position at 0%. Adjust the air flap position as needed. Select the flap adjustment (Item 10). Adjust the fan speed using the rotary dial (Item 11) and press the center button on the dial (Item 12) to complete the selection and exit the temperature adjustment.
Timer	Display digital backwards counter with target time setting (Item 8). Adjust as needed. Select timer (Item 6). Adjust using the rotary dial (Item 11) and press the center button on the dial (Item 12) to complete the selection and exit the temperature adjustment.
Calibration	The incubator is temperature calibrated and adjusted at the factory (Calibration certificate included with shipped device). In case readjustment is necessary later, the incubator should be calibrated using three calibration temperatures of your choice. See instructions in the *Memmert User Manual – Calibration*.
Malfunctions, warnings and error messages on incubator control panel	See instructions in the *Memmert User Manual – Malfunctions, warning and error messages*. Contact GEX support for troubleshooting and assistance.

6.3 Intended Use

The P4850 / P4855 forced-air incubator is for the heat treatment of all types of B3 film dosimeter products, including dosimeters in the original factory package/pouch, dosimeters out of the package/pouch, dosimeters in array cards (uniformity & energy), and bare B3 film strips and sheets.

6.3.1 About heat treatment of B3 film dosimeters

Post-irradiation heat treatment of B3 film is necessary to catalyze chemical reaction and finalize the color change. After heat-treatment, the radiation-induced color change of B3 dosimeters is stable for weeks when stored under normal laboratory conditions. The film stability allows users to measure the optical absorbance of B3 dosimeters in accordance with their business needs and allows for re-measurement days or weeks later.

6.3.2 Prerequisites before routine use of incubator

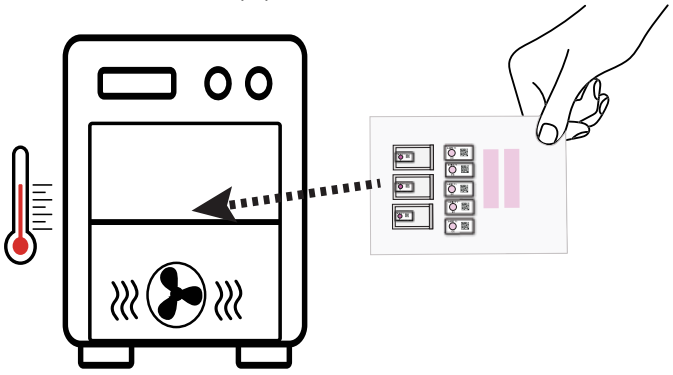
- Determine your incubator set-point temperature and heat treatment time duration to achieve successful heat treatment of B3 film. Successful heat treatment ensures the B3 response is stable (the response does not change

significantly over time) but does not damage the B3 film (the film can get damage due to overheating). GEX pre-sets the incubator temperature to 60°C, which is a typical heat treatment temperature for B3 film. However, you must test your heat treatment procedure and adjust the setpoint temperature according to your known required temperature to heat treat B3 film dosimeters which is specific to your irradiation process and your dosimetry lab environment. See *Related Documents – GEX Technical Report – Post-Irradiation Heat Treatment of GEX B3 dosimeter products, Doc. 100-201.*

- **Qualify the incubator prior to routine use.** Users should perform IQ, OQ, and PQ prior to using the incubator for heat treatment of B3 film dosimeters.

NOTE *ALWAYS test your heat treatment procedure before using B3 dosimeters. See Qualification - Performance Qualification (PQ).*

6.3.3 Basic process – Heat treatment of B3 dosimeters in the P4850/P4855 Forced Air Incubator:

Incubator ready for use	Ensure the incubator is powered on and stable at the set point temperature. NOTE: For ease of use, you can leave the incubator powered on to ensure the device is ready for use as needed.
Follow your heat treatment process	After irradiating dosimeters, follow your process to heat treat the dosimeters.
Place irradiated dosimeters into incubator	Put dosimeters flat on a paper sheet or similar. Place onto the shelf inside the incubator. 
	Allow airflow. Do not overlap with dosimeters or use a solid shelf.
	Keep fan speed low, ~10%. Dosimeters are lightweight and will blow around inside.
	DO NOT allow B3 films to touch metal sides or bottom of incubator.
Set timer	Set timer to the appropriate heat treatment duration. Set the timer on the incubator's operations panel or use an external timer.
Remove dosimeters from incubator	Remove dosimeters from the incubator when the timer indicates.
	DO NOT heat treat B3 film for longer than 2 hours (or verify with testing). Extensive heat treatment times may cause the B3 film color to fade.
Measure dosimeters	Measure B3 dosimeters according to your process. After heat treatment, B3 dosimeter response is stable.

7. Qualification

7.1 Installation and operation qualification (IQ and OQ)

Complete all qualification activities prior to routine use of the incubator. If needed, GEX provides IQ/OQ procedure for the P4850/P4855 Forced Air Incubator, see *Related Documents - Heat Treatment Incubator IQ/OQ Test Procedure for the Forced Air Incubator GEX Doc 100-276.*

- Verify the incubator is installed and operating correctly before use. This will verify the incubator calibration and provide a temperature map of the interior to ensure it is functioning as expected.
- Calibration verification acceptance criteria: Use a calibrated digital thermometer appropriate for purpose. The temperature measured must be ±0.5°C from the incubator's displayed temperature.
- Verify the temperature uniformity ≤ 2% C.V. all shelves.

7.2 Performance Qualification (PQ)

GEX does not provide an explicit procedure for execution of PQ. Each user must define the limits to test when conducting performance qualification of the heat-treatment process and must consider the impacts of the dosimeter retrieval requirements and dosimeter handling procedure for the site for which qualification will be performed.

GEX recommends users validate the 'Process for Routine Dosimetry' as they would do any other process. Users should also assess whether the dosimeter handling process for dosimetry tests used in Irradiator IQ/OQ/PQ (testing methods such as product dose mapping and dosimetry-related irradiator qualification activities) will vary significantly from routine dosimetry and consider in their qualification of heat-treatment. For example, if routine dosimeters will always be heat-treated within 2 hours of irradiation, but dosimeters from Product Qualification Dose Mapping are not typically heat-treated until the next day, there may be a difference in performance to characterize and consider.

8. Quality Assurance

GEX's Quality Management System (QMS) is ISO 9001 accredited. Download certificates and view more information at https://www.gexcorp.com/quality.html

Product conformity documents, WEEE declaration, material compliance REACH and RoHS, CE statements, and other product documents can be obtained by contacting GEX or downloading from the Memmert website https://www.memmert.com/en/downloads/.

9. Related Documents

Product documents can be downloaded from the Memmert GmgH website at https://www.memmert.com, https://www.memmert.com/en/downloads/ or contact GEX for a copy. Printed versions of the product user manuals are shipped with the product.

GEX PRODUCT	DOC. ID	DESCRIPTION
P4850	IF30plus Product Specification	Memmert publication. Download https://www.memmert.com/en/products/incubators/incubator/if30plus/pdf
P4855	IF55plus Product Specification	Memmert publication. Download https://www.memmert.com/en/products/incubators/incubator/if55plus/pdf
P4850/P4855	User manual I plus Incubators IN plus, IF plus	Memmert publication. Download https://www.memmert.com/en/downloads/
P4850/P4855	User manual AtmoCONTROL	Memmert publication. Download https://www.memmert.com/en/downloads/

GEX documents can be downloaded from the library at https://library.gexcorp.com. Search by document number or title.

GEX DOC. ID	TITLE
100-101	B3 Dosimeter Products specifications and usage
100-201	GEX Technical Report – Post Irradiation Heat Treatment of B3 Film Dosimeters *This document is an overview and summary of several published studies and GEX internal studies regarding the heat treatment of B3 radiochromic film. It does not provide guidance about how to execute a heat treatment process or heat treatment temperature specifications.*
100-276	Heat Treatment Incubator IQ/OQ Test Procedure (for the Forced Air Incubator)

10. Revision History

DATE	CHANGE DESCRIPTION	REVISION
10/24/2025	Transferred the product information and specs from GEX Doc. PSU 100-142_ Rev. D to the new PSS template; assigned a new Doc ID number, HDWR-HEAT-PSS-2. ECO 75077	A