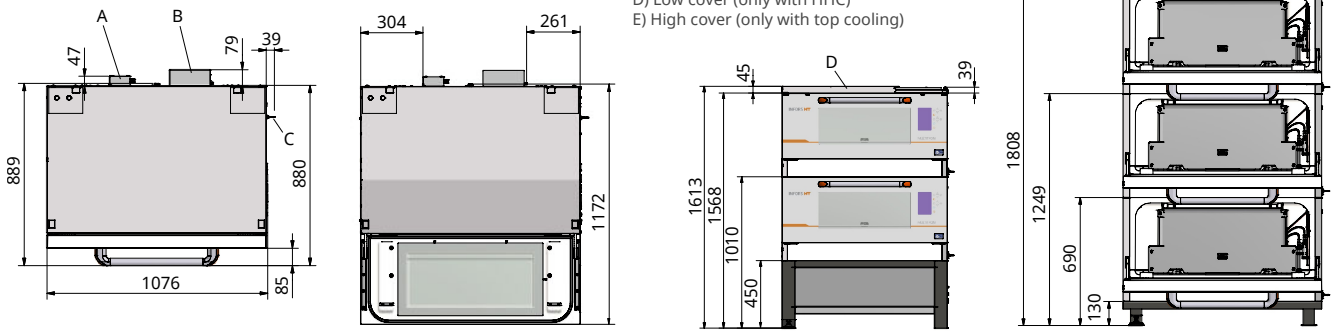
INFORS HT
We bring life to your laboratory

Multitron



The Multitron is the number-one choice for reliable, convenient cultivation of microorganisms and cell cultures. The incubator shaker guarantees homogeneous conditions and delivers reproducible results, leaving nothing to be desired regarding its features and capacity.

Dimensions and Weights



Note: The dimensions above only apply to the 230 V version. The heights of the bases of the 115 V version are slightly different (high base = 406 mm instead of 450 mm; low base = 140 mm instead of 130 mm).

Various		
Interior dimension (w x d x h)		935 mm x 570 mm x 380 mm [1]
Volume	Total space	approx. 270 L
	Visible space	approx. 210 L
Tray size		M (850 mm x 470 mm)
Additional space for ventilation		Back: 100 mm, Side: 80 mm

[1] *With LED lighting option, the usable height is reduced by 30 mm*

Weight single unit without base frame and options	
Single unit 3 mm throw	129 kg
Single unit 25 mm throw	137 kg
Single unit 50 mm throw	144 kg
Single unit adjustable throw	143 kg

Weight base frames	230 V	115 V
Low base	26 kg	31 kg
High base	42 kg	45 kg

Weight stacked units (throw = 50 mm) without options	230 V	115 V
2 units with low base	337 kg	342 kg
3 units with low base	481 kg	486 kg

Weight options and accessories	230 V	115 V
Cooling unit single-compressor [1]	45 kg	42 kg
Cooling unit dual-compressor [1] (only available for version 230 V)	80 kg	---
Hygienic Humidity Control (HHC)	3 kg	3 kg
CO_2 control	0.5 kg	0.5 kg
LED lighting	5 kg	5 kg
UV decontamination	1 kg	1 kg
Analog output	1 kg	1 kg
Universal tray	4.5 kg	4.5 kg

[1] *Mass including cooling coil and cover*

Shaker Drive / Rotation Speed

Direction of rotation	Clockwise
Throw (fixed throw)	3, 25 or 50 mm
Throw (adjustable throw)	12.5, 19, 25 and 50 mm
Setting range (3 mm throw)	20 min^{-1} to 1000 min^{-1}
Setting range (25 mm throw)	20 min^{-1} to 400 min^{-1}
Setting range (50 mm throw)	20 min^{-1} to 350 min^{-1}
Increment setpoint	1 min^{-1}
Accuracy control (at maximum rotation speed, full scale)	± 1 %

Max. Rotation Speeds

Single unit	3 mm	12.5, 19 and 25 mm	50 mm
	1000 min^{-1}	400 min^{-1}	350 min^{-1}

Two units stacked	3 mm	12.5, 19 and 25 mm	50 mm
Top unit	1000 min^{-1}	400 min^{-1}	350 min^{-1}
Bottom unit	1000 min^{-1}	400 min^{-1}	350 min^{-1}

Three units stacked	3 mm	12.5, 19 and 25 mm	50 mm
Top unit	1000 min^{-1}	400 min^{-1}	300 min^{-1}
Middle unit	1000 min^{-1}	400 min^{-1}	350 min^{-1}
Bottom unit	1000 min^{-1}	400 min^{-1}	350 min^{-1}

Hygienic Humidity Control (HHC) (Option)

General	
Setting range	20 % to 85 %
Increment setpoint	1 %
Accuracy control	± 3 %
Water consumption (typical)	10 g h^{-1}
Max. temperature for use	40 °C

Reachable values		AT [1]	IT [1]	
Max. value (without condensation)	w/o HEPA filter	20 °C	37 °C	80 %rH
		25 °C	37 °C	85 %rH
	with HEPA filter	20 °C	37 °C	80 %rH
		25 °C	37 °C	80 %rH
Min. value (dehumidification)		25 °C	30 °C	70 %rH
		25 °C	40 °C	50 %rH

[1] *AT = ambient temperature, IT = temperature in incubation chamber*

Temperature Control

General		
Setting range	w/o HEPA filter	4 °C to 65 °C
	with HEPA filter	28 °C to 50 °C
Increment setpoint		0.1 °C
Accuracy control 4 °C to 50 °C		± 0.3 °C
Accuracy control > 50 °C		± 0.5 °C

Temperature distribution *(at 37 °C, on tray with 5 flasks)*		
Difference between highest and lowest value	w/o HEPA filter	± 0.4 °C
	with HEPA filter	± 0.8 °C
Max. difference to actual value on display	w/o HEPA filter	± 0.5 °C

Lowest Attainable Temperature (without HEPA Filter Option)

Without cooling	Lowest attainable temp.
Single unit	10 °C above ambient temp.
Two units stacked	10 °C above ambient temp.
Three units stacked	10 °C above ambient temp.

Cooling unit single-compressor	Lowest attainable temp.
Single unit	18 °C below ambient temp.
Two units stacked	17 °C below ambient temp.
Three units stacked	15 °C below ambient temp.

Cooling unit dual-compressor	Lowest attainable temp.
Single unit	25 °C below ambient temp.
Two units stacked	24 °C below ambient temp.
Three units stacked	22 °C below ambient temp.

CO_2 Control (Option)

Setting range	0.1 % to 20 %
Increment setpoint	0.1 %
Accuracy control (at 1013 hPa, 20 °C to 40 °C, 0 % to 20 % CO_2)	0.2 %
Gas consumption at 5 % CO_2 (air vent open)	< 2 NL h^{-1}
Gas consumption at 10 % CO_2 (air vent open)	< 3.5 NL h^{-1}
Gas consumption at 10 % CO_2 (air vent closed)	< 0.5 NL h^{-1}
Max. temperature for use	60 °C

LED Lighting (Option)

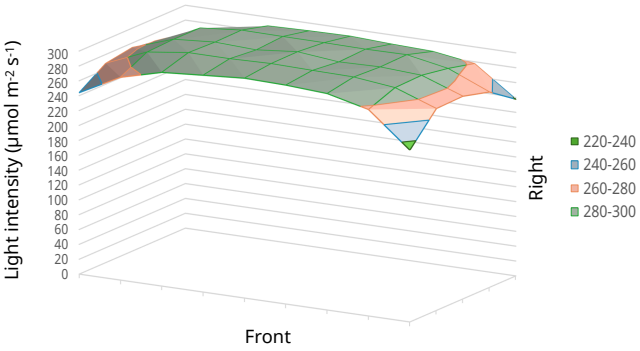
Setting range		1 % to 100 %
Increment setpoint		1 %
Light intensity [1]	at 15 °C	2 to 240 µmol m^{-2} s^{-1}
	at 28 °C	2 to 240 µmol m^{-2} s^{-1}
	at 65 °C	2 to 220 µmol m^{-2} s^{-1}
Light distribution on the tray [2]		± 8 %
Nominal power (setpoint 100 %)		120 W
Cooling		Mandatory
Minimum temperature in the incubation chamber		10 °C below ambient temperature

[1] *Linear, setpoint 1 % to 100 %; temperature in the incubation chamber*

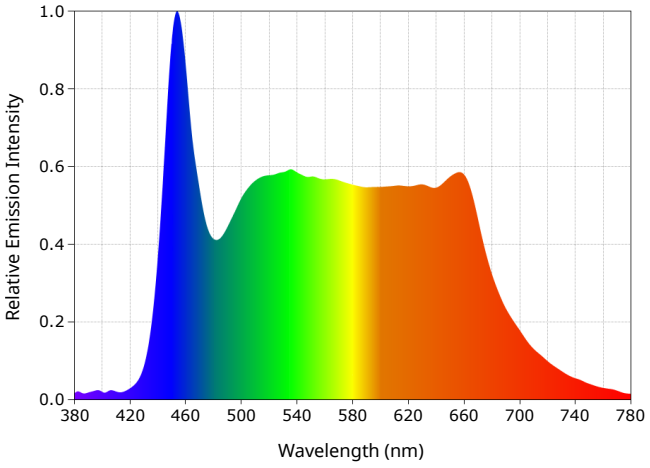
[2] *Relative standard deviation of the total number of 45 measuring points distributed evenly across the tray, with darkening foil*

Light Distribution on the Tray

The following figure shows the distribution of the light intensity on the tray. The measurement was carried out at 45 points evenly distributed on the tray at 100 % light intensity and 28 °C in the incubation chamber.



Light Spectrum





HEPA Filter (Option)

General		
Attainable air quality in the incubation chamber		ISO cleanroom class 4 (ISO 14644)
Recovery time [1]	ISO class 9 to ISO class 4	≤ 10 min
	ISO class 6 to ISO class 4	≤ 3 min
Filter class as per EN 1822-1:2009		H14
Efficiency (MPPS)		99.995 % (0.3 µm)

[1] *Time required to reduce the particle load in the air in the incubation chamber to the respective ISO cleanroom class*

Compatibilities	
Compatible throws	25 mm 50 mm Adjustable throw
Compatible options	Cooling single-compressor (required) CO_2 control Hygienic Humidity Control

UV Decontamination (Option)

Wavelength UV-C radiation	200 nm to 280 nm
Wavelength at maximum emission	253.7 nm

Materials

Housing	Polyurethane (PUR-IHS) with flame retardant
Door	PUR-IHS, safety glass
Cover plate temperature control	Stainless steel (AISI 304)
Shaking table and universal tray	Aluminium, anodized

Operating Conditions

Load	
Load max.	55 kg
Load optimal (3 mm throw)	7 kg
Load optimal (25/50 mm throw)	15 kg

Ambient conditions		
Ambient temp.	w/o HEPA filter	10 °C to 30 °C
	with HEPA filter	20 °C to 25 °C
Ambient humidity	w/o HEPA filter	10 % to 85 %
	with HEPA filter	10 % to 60 %
Altitude operating location		max. 2000 m above sea level
Pollution degree as per EN 61010-1		2
Minimum distance side		80 mm
Minimum distance back		100 mm

Electrical Connection and Power Values

General	230 V	115 V
Mains voltage	230 V (± 10%)	115 V (± 10%)
Mains frequency	50/60 Hz	60 Hz
Max. power consumption (all options)	1650 W	1700 W
Max. current consumption (all options)	7.2 A	15 A
Power consumption cooling single-compressor	350 W	360 W
Power consumption cooling dual-compressor	725 W	---
Fuse (two 5 x 20 mm fuses, time lag)	10 A	---
Thermal protection switch	---	15 A

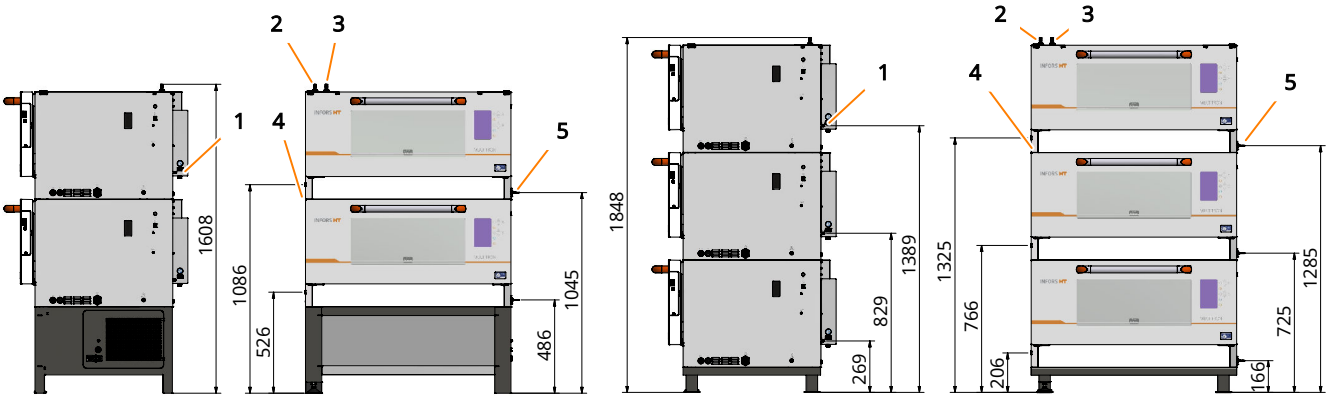
Various

IP rating		IP20
Sound pressure		< 70 dB(C)
Cooling agent in compressor	230 V version	R290 (90 g)
	115 V version	R290 (80 g)
Size of the display (diagonal line)		170 mm

Interfaces

Alarm connection: Stereo jack, 3.5 mm, allows to send system alarms to an external system.
Ethernet interface: RJ45, 10/100 Mbps Ethernet
Analog output (optional): 8 channels, 4 mA to 20 mA; allows to control the device and record data.
Profibus DP Gateway and Modbus TCP Gateway (optional): allow to connect the device to a SCADA system to control the device and record data.

Connections/Utilities



Pos.	Connection	Size	Pressure	Requirements
1	Demineralised water In	UNF 1/4-28 for hoses 1/8" (= 3.2 mm)	max. 2.0 bar(g)	■ Water hardness ($CaCO_3$ equivalent): < 0.01 mmol L^{-1} ■ Dissolved solids: < 10 mg L^{-1} ■ Recommendation: Reverse osmosis water with a conductivity of approx. 5 µS cm^{-1} or ultra-pure water/WFI. Do not use tap water, not even as an additive to ultra-pure water.
2	Cooling liquid In	Hose nozzle DN10, for hose Ø = 10 mm	max. 4.0 bar(g)	■ Water hardness ($CaCO_3$ equivalent): 0 to 1.5 mmol L^{-1}. For medium-hard to very hard water quality, use demineralised water as an alternative. ■ Cooling liquid: Based on 1,2-propanediol with inhibitor (suitable for copper). Must be approved for the food and pharmaceutical sectors.
3	Cooling liquid Out	Hose nozzle DN10, for hose Ø = 10 mm	pressureless	N/A
4	Discharge outlet	Internal thread G1/4", for hose Ø = 10 mm	N/A	N/A
5	CO_2 In	Hose nozzle DN4, for hose Ø = 3 mm to 4 mm	0.4 bar(g) to 0.6 bar(g)	■ For best efficiency, it is recommended to use a gas with a high CO_2 concentration (e.g. 99.5 %).

eve®



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