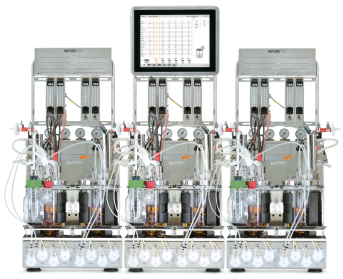
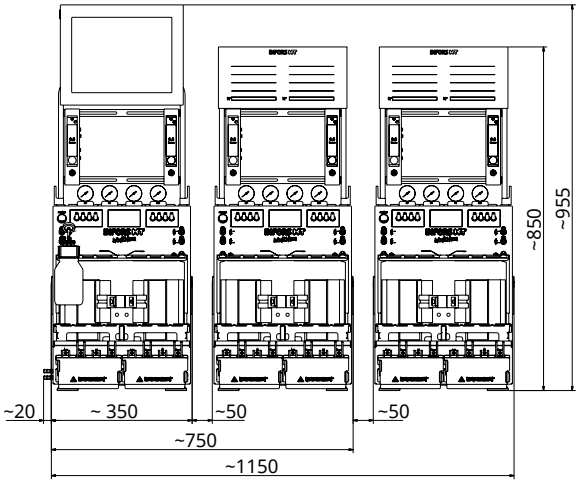
INFORS HT
We bring life to your laboratory

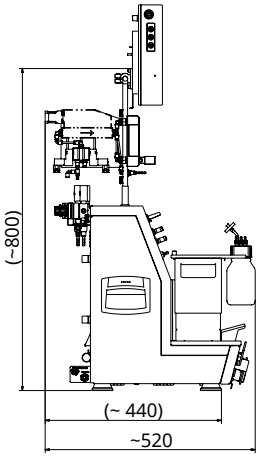
Multifors 2

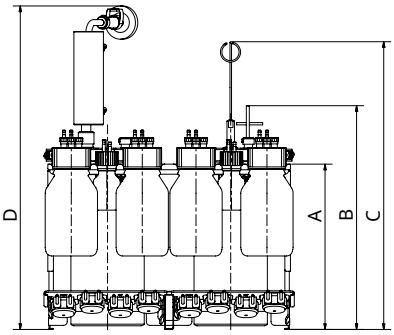


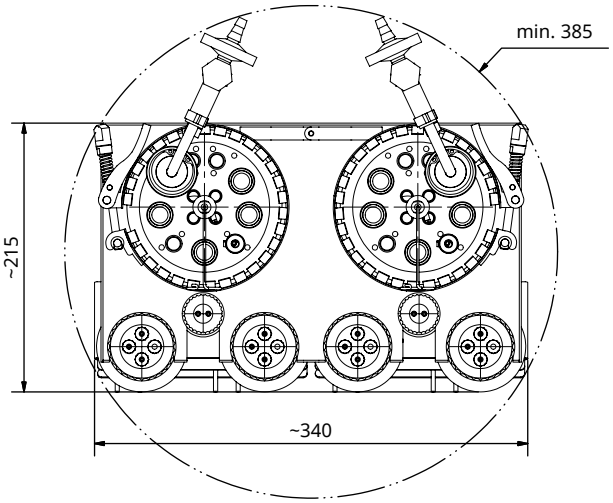
With Multifors 2 you can work with up to six bioprocesses in parallel. Thanks to a selection of preconfigured packages and a variety of connection possibilities and options, you will be ideally equipped for optimizing sophisticated bioprocesses on a small scale.

Dimensions and Weights









Dimensions	Vessel size		
	400 mL	750 mL	1400 mL
A	182 mm	196 mm	222 mm
B	260 mm	274 mm	300 mm
C	350 mm	364 mm	390 mm
D	395 mm	409 mm	435 mm

Weight	
Touch screen operating panel	5 kg
Basic unit with 2 culture vessels (with standard fittings) and operating panel	approx. 40 kg

Culture Vessel

General	
Form	Cylindrical with flat bottom
Material glass vessel	Borosilicate glass
Material top plate and built-in parts	AISI 316L, electropolished [1]
Material O-rings (in contact with product)	EPDM

[1] *Exceptions: impellers in 750 mL and 1400 mL culture vessels and stirrer shaft bearings of all vessel sizes. For details refer to Stirrer.*

Vessel sizes			
Total volume, mL	400	750	1400
Max. working volume, mL	250	500	1000
Min. working volume, mL	115	180	320
Nominal diameter (DN, inner diameter vessel), mm	70/55	70	90
Height, mm	181	195	220

Ports in top plate		Quantity acc. to vessel size		
Diameter	Thread	400 mL	750 mL	1400 mL
7 mm	None	4	4	4
10 mm	None	4	4	4
12 mm	Pg13.5	3	4	5

Temperature Control System

Heating		Electrical, thermal block 315 W
Cooling		Tap water or chiller via thermal block
Sensor		Type: Pt100 1/3 DIN-B
Measurement range		0 °C to 145 °C
Control range		From 5 °C above inlet temperature to 70 °C (standard) or 90 °C (option)
Accuracy measurement and control	at ≤ 60 °C	± 0.3 °C
	at > 60 °C	± 0.5 °C

Stirrer

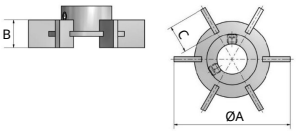
General		
Drive		Magnetic
Direction of rotation of stirrer shaft		Counter-clockwise (top view)
Bearing housing material		Ceramic, Teflon
Motor type		DC, external rotor motor
Nominal power of motor [1]		56 W
Nominal torque [1]		90 mNm
Rotation speed [2]	Vessels 400/750 mL	100 min^{-1} to 1600 min^{-1}
	Vessels 1400 mL	100 min^{-1} to 1500 min^{-1}
Accuracy measurement	at ≤ 1000 min^{-1}	± 5 min^{-1}
	at > 1000 min^{-1}	1 % setpoint
Accuracy control	at ≤ 1000 min^{-1}	≤ ± 5 min^{-1}
	at > 1000 min^{-1}	≤ 1 % setpoint

[1] *At max. rotation speed*

[2] *With water at 30 °C, and 0.5 vvm air flow sparger*

Impellers vessel 400 mL	
Type	6-bladed impeller (90°)
Material	AISI 316L, electropolished
Quantity	2

Impellers vessels 750/1400 mL	
Type	Rushton impellers, 6 blades
Material	PEEK
Quantity	2

Dimensions impellers		400 mL	750 mL	1400 mL
	A	24 mm	30 mm	38 mm
	B	6.5 mm	8.0 mm	9.0 mm
	C	4.8 mm	8.0 mm	11.0 mm

Gassing System

General specifications	
Gas entry	Sparger
Specific gassing rate [1]	2 min^{-1}
Gas(ses)	Air; Air + O_2; Air + N_2; Air + O_2+ N_2; CO_2 [2]

[1] *Calculated for the max. working volume for all vessel sizes.*

[2] *CO_2 optional for pH control via sparger.*

Gassing strategy variant Basic	
Gas flow control	One Rotameter
Accuracy measurement and control	± 5 %
Gas mix control [3]	Solenoid valves, one per gas

Gassing strategy variants Standard and High End		
Gas flow control	Standard	One MFC
	High End	MFCs, one per gas
Accuracy measurement		± 1.5 % FS
Accuracy control		≤ ± 1.5 % FS
Gas mix control [3]	Standard	Solenoid valves, one per gas
	High End	via MFCs

[3] *Only relevant for multi-gas configurations*

Measurement ranges MFCs or rotameters in L min^{-1}			
Vessel size	Basic (rotameter)	Standard and High End (MFC)	CO_2 (sparger, MFC)
400 mL	0.08 to 0.6	0.005 to 0.5	0.0025 to 0.25
750 mL	0.1 to 1	0.01 to 1	0.005 to 0.5
1400 mL	0.3 to 2	0.02 to 2	0.01 to 1

pH Control

General	
Control	Peristaltic pumps *Acid* and *Base* or with CO_2 instead of acid
Control range	pH 2 to 12
Accuracy measurement	pH ± 0.1

Measurement system HAMILTON (digital)	
Sensor type	Easyferm Plus ARC
Measurement range	pH 0 to 14

Measurement system METTLER (digital)	
Sensor type	InPro 3253i, ISM
Measurement range	pH 0 to 12

Measurement system METTLER (analogue)	
Sensor type	405-DPAS-SC-K8S/120
Measurement range	pH 2 to 12

pO_2 Control

General	
Control via cascade	Stirrer, gas flow, gas mixture (addition of O_2)
Control range	0 %-sat. to 100 %-sat.
Accuracy measurement	± 1 %

Measurement system HAMILTON (digital)	
Sensor type	Visiferm DO ARC / RS485-ECS
Measurement range	0 %-sat. to 300 %-sat.

Measurement system METTLER (digital)	
Sensor type	InPro6860i, ISM
Allowed temperature range	0 °C to 60 °C
Measurement range	0 %-sat. to 285 %-sat.

Measurement system METTLER (analogue)	
Sensor type	InPro 6820/25/080
Measurement range	0 %-sat. to 150 %-sat.

Antifoam Control

Sensor	Conductive with dosing needle
Control	Peristaltic pump *Antifoam*
Display	0 % (no foam) / 100 % (foam)

Pumps

Integrated pumps		
Type		Peristaltic
Quantity	Digital	3 (Acid, Base, Antifoam)
	Analogue	Standard: 1 (Feed) Option: 1 additionally (Feed 2)
Rotation speed	Digital	74 min^{-1} / fixed rotation speed
	Analogue	0 min^{-1} to 74 min^{-1} / adjustable within range of 0 % to 100 % (increment 0.1 %)
Accuracy		± 1 % FS

External pump(s) (option)	
Type	Watson Marlow 120U/DV, peristaltic
Rotation speed	Adjustable within range of 0 % to 100 %

Hoses	Standard	Option 1	Option 2
Inside diameter	1.0 mm	0.5 mm	2.5 mm
Wall thickness	1.1 mm	1.15 mm	1.0 mm
Delivery rate min., mL min^{-1}	0.0034	0.0012	0.017
Delivery rate max., mL min^{-1}	3.52	1.12	16.13
Material	PharMed BPT		

Operating Panel

HMI	12" colour touch screen
Protection	IP 66

Turbidity Measurement (Optional)

Variant ASD12-N	
Sensor type	ASD12-N
Optical path lengths	OPL01 (highest cell densities) OPL05 (higher cell densities) OPL10 (lower cell densities)
Measurement range absorption	0 CU to 4 CU

Variant CGQ BioR	
Sensor type	CGQ BioR
Measurement modes	Green (521 nm) (low cell densities), Infrared (940 nm) (high cell densites)
Measurement range	0 to 1000

Permissive Measurement (Optional)

Sensor type	ABER Futura
Measurement range permittivity	0 pF cm^{-1} to 400 pF cm^{-1}
Measurement range conductivity	0 mS cm^{-1} to 40 mS cm^{-1}

Exit Gas Analysis (Optional)

		CO_2	O_2
Ranges, Vol. %	BlueInOne Ferm	0 to 10	1 to 50
		0 to 25	1 to 50
	BlueInOne Cell	0 to 10	0 to 100
	BlueVary (cartridge ZrO_2)	0 to 10	0.1 to 50
		0 to 25	0.1 to 50
	BlueVary (cartridge eC)	0 to 10	0 to 100
		0 to 25	0 to 100
		0 to 25	0 to 25

Sensor accuracy	BlueInOne Ferm, BlueInOne Cell	< ± 0.2 % FS, ± 3 % of value
	BlueVary CO_2	± 3 % of value, ± 0.2 % of range; ± 5 % of value, ± 0.5 % of range for 50 % range
	BlueVary O_2 (eC and ZrO_2)	± 3 % of value, ± 0.2 % of range
Sensor drift	BlueInOne Ferm, BlueInOne Cell	< ± 2 % value / year
	BlueVary	0.2 % value / month

Redox Measurement (Optional)

Measurement system HAMILTON digital	
Sensor type	Easyferm Plus ORP ARC
Measurement range	-1500 mV to +1500 mV

Measurement system METTLER analogue	
Sensor type	Pt4805-DPAS-SC-K8S
Measurement range	-2000 mV to +2000 mV

Conductivity Measurement (Optional)

Sensor type	Conducell 4USF ARC with built-in electronics
Measurement range	1 µS cm^{-1} to 300000 µS cm^{-1}
Accuracy	± 3 % at 1 µS cm^{-1} to 100000 µS cm^{-1} ± 5 % at 100 µS cm^{-1} to 300000 µS cm^{-1}

Balances (Option)

A: Mettler MA6002
B: Mettler MA32001L
C: Kern FKB 6K0.02-B
D: Kern DS 30K0.1-A

	A	B	C	D
Max. capacity, kg	6.2	32.2	6	30
Readability, g	0.1	0.1	0.02	0.1
Power supply	100 to 240 V, 50/60 Hz, 0.3 A			

Note: In order to use one of the supported balances, the balance must be prepared and configured by INFORS HT.

Operating Conditions

Ambient temperature	5 °C to 40 °C
Ambient humidity	20 % to 90 %
Altitude operating location	max. 2000 m.a.s.l
Pollution degree as per EN 61010-1	2
Minimum distance	150 mm

Interfaces

25 pin Dsub Multi I/O	analog	4 x IN (0/4 mA to 20 mA) 6 x OUT (0/4 mA to 20 mA)
	digital	2 x OUT
9-pin D-SUB, RS232		Balance input
USB 2.0		Backups/service purposes
Ethernet, RJ45		To integrate the device into a network

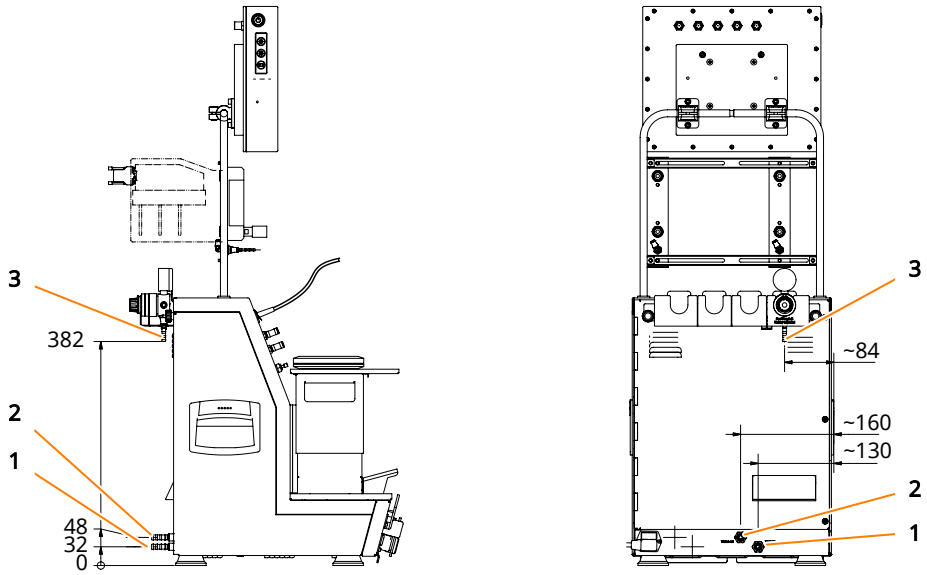
Various

IP rating	IP22
Sound pressure	< 70 dB (A)

Electrical Connection and Power Values

	Type 230 V	Type 115 V
Mains voltage	230 VAC	115 VAC
Mains frequency	50 / 60 Hz	60 Hz
Max. current consumption	4 A	8 A
Fuse (two 5 x 20 mm fuses, time lag)	4 A	8 A

Connections/Utilities



Pos.	Connection	Size	Pressure	Requirements
1	Water inlet	Hose nozzle 8.3 mm	2 bar ± 1 bar	■ Min. flow temperature: 1 °C ■ Water quality: $CaCO_3$ concentration 0 mmol L^{-1} to 1.5 mmol L^{-1}
2	Water outlet	Hose nozzle 8.3 mm	No back pressure	■ Designed to withstand water temperatures of up to 80 °C (or 90 °C for devices with optional stronger heating).
3	Gas inlets	Hose nozzle 7 mm	2 bar ± 0.5 bar	■ Dry, clean and free of oil and dust ■ Compressed air: Class 1,2,3,4 as per DIN ISO 8573-1
	Exit Gas	Hose nozzle 8 mm	No back pressure	

eve®

eve® is a platform software for planning, execution and analysis of bioprocesses. eve® allows you to record bioprocess data and store it in a central database. The software offers workflows from simple bioprocesses to the planning and execution of complex strategies with various phases.

eve® makes it possible to generate and store bioprocess knowledge. Various libraries for storing information on organisms and culture media are available. Thanks to soft-sensors, additional knowledge can be generated.

In addition to INFORS HT products, biotech machines and analysis devices from third-part manufacturers can be connected. This makes it possible to holistically control, monitor and analyse bioprocesses using a single software.

eve® is installed on a centralised server. Access takes place via a browser, no client side installation is required. Bioprocess data is therefore available directly via the browser and independent of the operating system.

Various packages of the software are available. This makes it possible to adapt it to the individual needs and requirements of its users. eve® (in the premium version) is also suitable for working in a validated environment as per FDA CFR 21 Part 11.