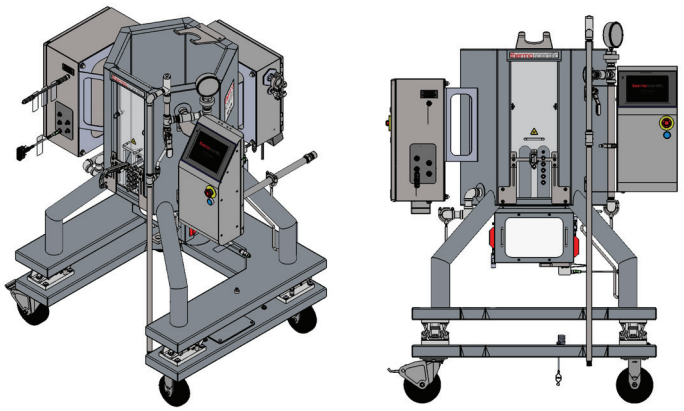
imPULSE Single-Use Mixer with Touchscreen Console

The Thermo Scientific™ imPULSE™ Single-Use Mixer (S.U.M.) can be utilized for many bioprocess mixing applications. Design features include innovative disc mixing technology, configurable high-end controls, and monitors to fit specific process requirements. These features all enable uniform, superior mixing—scalable from 30 L to 5,000 L.

The Touchscreen Console provides integrated sensor monitoring and pump control for pH and saline titration as well as for automatic fill and harvest of the S.U.M.



Efficient and customizable

The standard imPULSE mixing BioProcess Containers (BPCs) are made of Thermo Scientific™ ASI™ 26/77 polyethylene two-layer film. These BPCs are available with four inlet/outlet lines and a powder addition port. The standard tube sets connect to the imPULSE mixing BPC for liquid addition, powder addition, recirculation, inflation, and vent control. The tube sets are modular and can be customized to best suit your process.

Features

- 304L stainless steel vessel and sliding window or door and window
- Cleanroom-grade stainless steel, non-marring casters available on 30 L—1,000 L systems
- Rolling diaphragm
- Touchscreen Console: IP 54 enclosure
- Fixed powder port

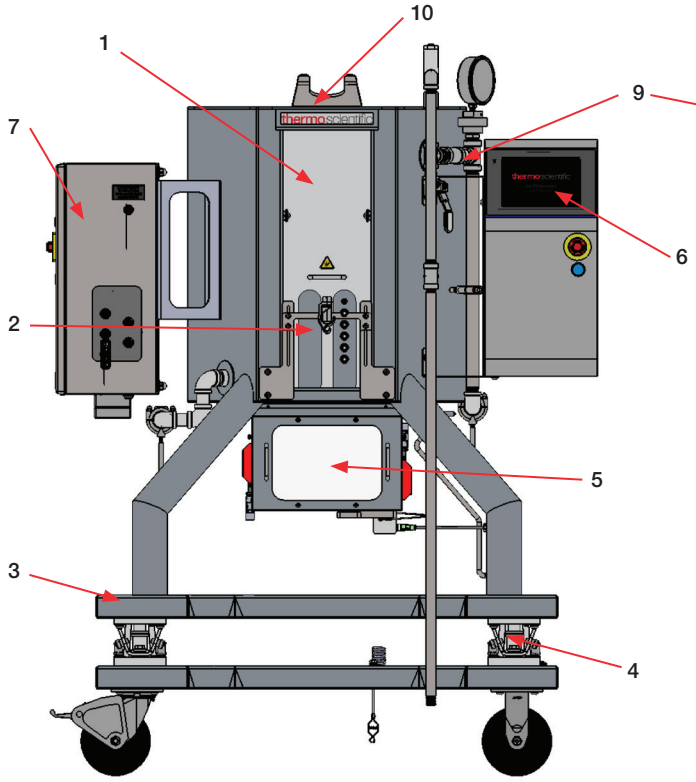
Benefits

- Touchscreen Console provides ease of use with multifunctional capabilities to monitor and control mixing parameters
- Integrated rolling diaphragm provides the pumping action to the mixing disc; the diaphragm will not abrade the surfaces or produce particulates
- Mixing tank jacket and insulation
- Load cells used in weighing systems enable accurate batch weight monitoring
- Auto inflate and vent control options
- Adjustable powder port for 1,000 L—5,000 L mixers that fits 1, 5, and 25 kg Thermo Scientific™ Powdertainer™ BPCs
- Open cart frame for easier cleaning

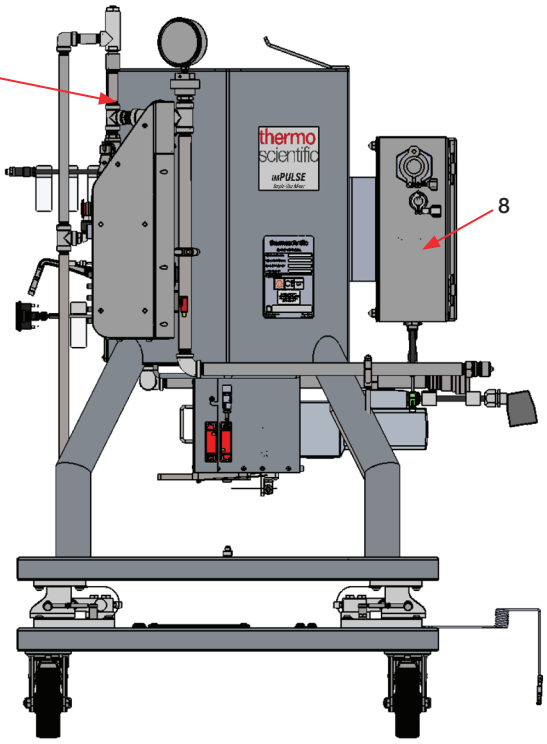
imPULSE hardware design elements

1. Sliding window for BPC loading
2. Probe insertion cutout
3. Unit platform
4. Load cells
5. Drive and gear motor assembly
6. Touchscreen Console
7. AC motor module
8. Pressure control device (PCD) inflate/vent system (optional)
9. Jacket pressure lines
10. Fixed powder port
(adjustable powder port optional, not shown)

Front view

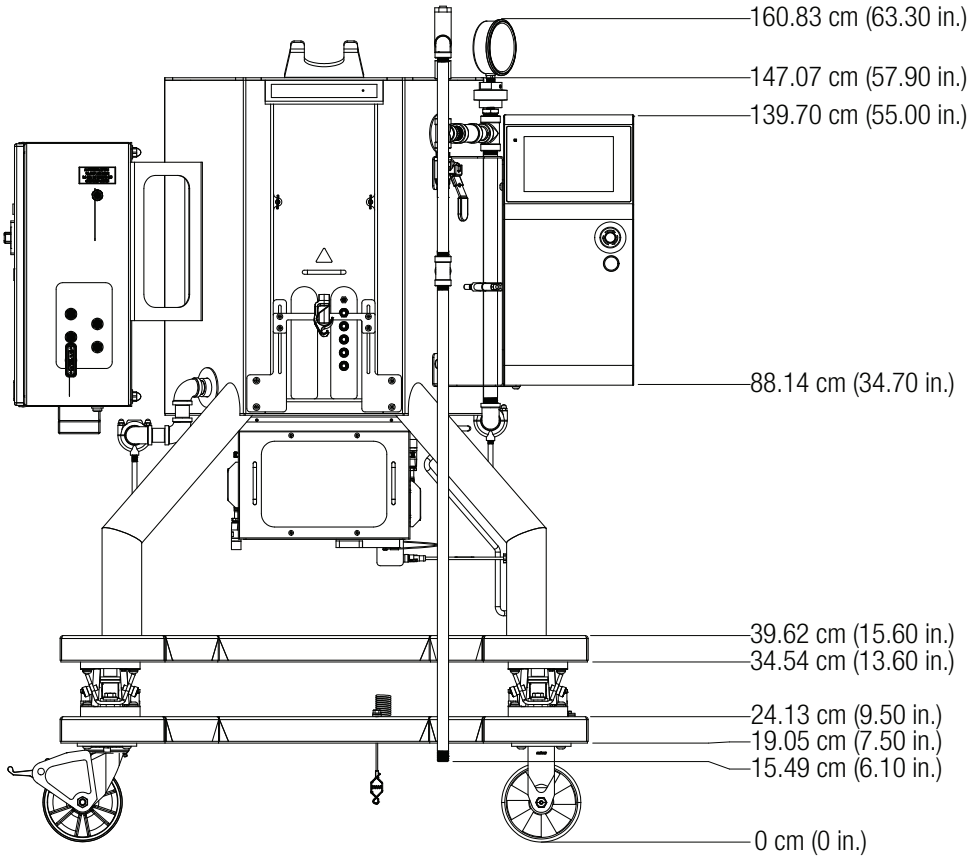


Back view

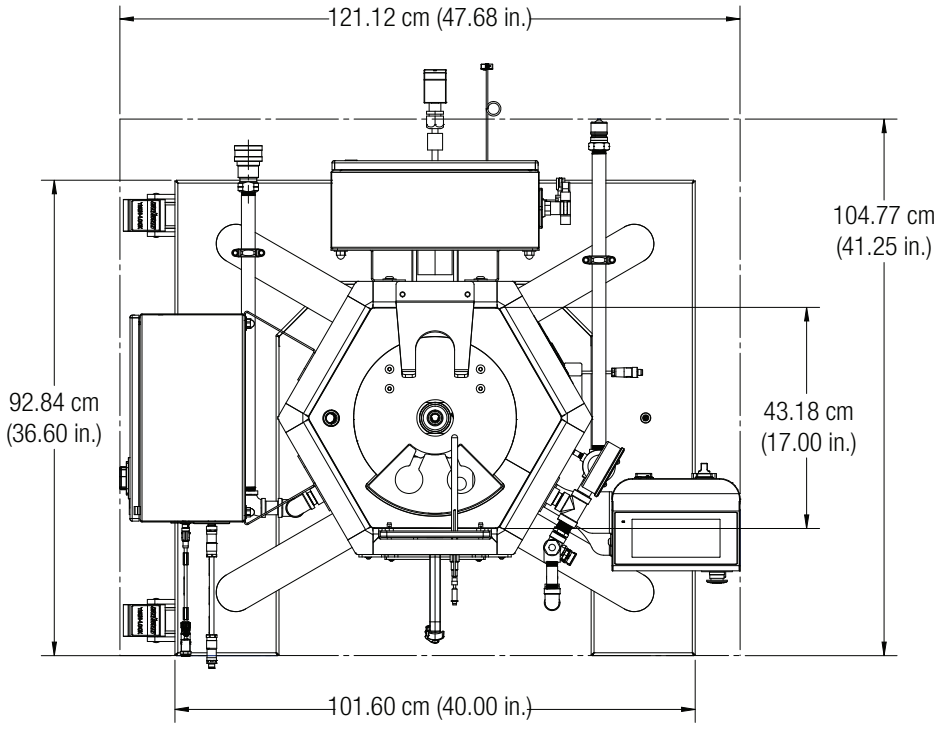


imPULSE hardware specifications

Front view



Top view



Standard 100 L imPULSE S.U.M. hardware

Specifications		
General	Unit dimensions (D x W x H)	104.77 x 121.12 x 160.83 cm (41.25 x 47.68 x 63.30 in.)
	Nominal working volume	100 L
	Maximum working volume	107 L
	Minimum startup working volume	10%
	Minimum drain working volume	0 L
	Dry unit weight	303.4 kg (668.9 lb)
	Wet unit weight (nominal working volume)	410.18 kg (904.29 lb)
	Maximum noise level	<78 dB at 1 m
	Motor load max	1.32 A at 230 V (0.27 hp)
	Electrical power supply requirement (U.S. systems)	**AC motor module:** Powered by the Touchscreen Console **Touchscreen Console:** 10 A, 100–120/208–240 VAC, 50–60 Hz
	Maximum temperature in vessel	40°C
Inflation/cover gas utility requirements	Maximum inflation operations air pressure	**PCD:** 80 psi **Touchscreen Console:** 95 psi
	Temperature	Ambient
	PCD inlet air connection	3/8 in. OD, push-to-connect tube
	TSC inlet air connection	5/16 in. OD, push-to-connect tube
	Process air pressure	30 psig**
	Instrument air pressure	Regulate incoming air according to instrument specifications
	Filtration	Disposable filtration integrated with optional tube sets
Water utility requirements	Flow rate	10–45 L/min
	Maximum temperature	50°C†
	Connection inlet	3/4 in. NPT Quick Connect—SH6-63Y Male
	Connection outlet	3/4 in. NPT Quick Connect—SH6-62Y Female
Agitation	Mixing disc diameter	21.6 cm (8.5 in.)
	Mixer stroke	10.2 cm (4 in.)
	Vessel turnover	7.44 L/sec (13.5 sec total time)
	Motor speed	0–2 Hz

* AC motor module nameplate voltage and Touchscreen Console input voltage need to match.

** For manual inflation.

† The vessel jacket can be operated at 50°C until the BPC reaches 40°C, after which the vessel jacket temperature must be lowered.

Accessories

Sensors and pinch valves

Reusable pH and conductivity probes as well as single-use pressure sensors have been approved and qualified for use with the Touchscreen Console. pH and conductivity measurements can be used to control titration pumps, which enable automatic titration capabilities. The pressure sensors are used in the BPC or line sets to monitor the BPC or liquid pressure, respectively. The BPC can be filled with the proper amount of air when using the pressure sensor in the BPC. The liquid pressure module in the Touchscreen Console is used to control a transfer pump, based on the liquid pressure. Optional pneumatic pinch valves can be used on the fill and harvest line. These valves automatically open and shut when using the fill and/or harvest modules in the Touchscreen Console.

Probe clips

Probe clips are used to hold the probes in place on the S.U.M. tank. The independently movable probe clips hang on a thin brace above the probe port tank cutout (Figure 1).

Heavy-duty tubing clamps

Heavy-duty clamps are used to pinch off line sets that are not in use, to prevent process fluids from escaping. Prior to sterile probe insertion, tubing clamps must be in place to close off the probe ports (Figure 2).

Autoclave tray and probe assembly

The autoclave tray holds the electrochemical probes and bellows in place during the autoclave sterilization process (Figure 3). Design features include the following:

- Fabricated from stainless steel
- Plastic handle provides for easy transport right out of the autoclave
- Positions probes on 15% incline for greater probe and membrane longevity
- Prevents probe bellows from collapsing during sterilization
- Probe holder accommodates two probes

Figure 1. Probe clip.

Figure 2. Heavy-duty tubing clamp.

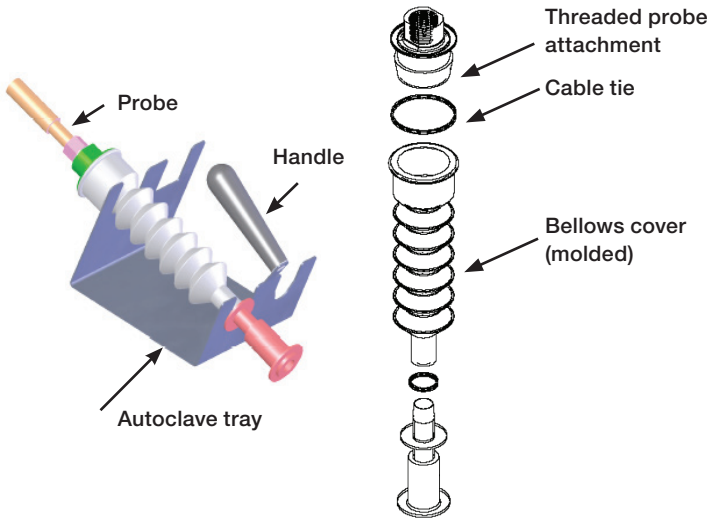


Figure 3. Autoclave tray and probe assembly.

imPULSE S.U.M. BPCs

All imPULSE S.U.M. BPCs are constructed with ASI 26/77 film and silicone tubing (Figure 4).

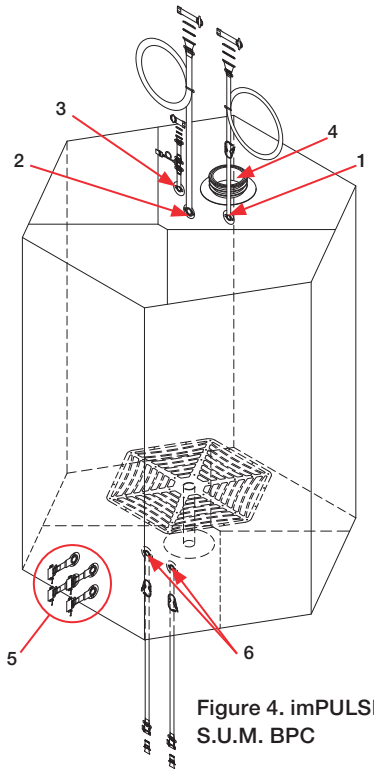


Figure 4. imPULSE S.U.M. BPC

100 L imPULSE S.U.M. BPC specifications

Port	Description
1	1 inlet line: 1.5 in. tri-clover, 0.5 x 0.75 in. ID x OD
2	1 inflate/vent line: 1.5 in. tri-clover, 0.5 x 0.75 in. ID x OD
3	1 pressure sensing line: PendoTECH™ pressure sensor, 0.75 in. tri-clover, 0.5 x 0.75 in. ID x OD
4	1 powder port: 3 in. tri-clover
5	4 side probe ports: 0.5 in. AseptiQuik™ G Connector
6	2 outlet/recirculation lines: MPX body with plug, 0.5 x 0.75 in. ID x OD

Note: Tubing lengths will vary according to each vessel size.

Custom BPC products

Category	Options/capability	Notes
Tubing type	C-Flex™ tubing, platinum-cured silicone, PVC, PharMed™	More information is available in the tubing selection guide
Tubing size	Ranges from 3.18 mm (1/8 in.) to 25.4 mm (1 in.) inner diameter in various lengths	More information is available in the tubing selection guide
Connectors	Luer, Colder Products Company™ (CPC™) quick, SIP, tri-clamp, Kleenpak™, Lynx™ steam-thru, CPC steam-thru, and ReadyMate™ connectors; end plug, swabable valve, needleless injection site	More information is available in the connection system selection guide. Note: The only options for probe port connections are Kleenpak and AseptiQuik connectors.
Probe ports/ line addition ports	Ports may be added if they are compatible with the hardware	The reusable probe port connection uses a Kleenpak and AseptiQuik connectors
Disposable sensors	Pressure sensor: PendoTECH (standard on 500 L and 1,000 L S.U.M.) pH sensors: Hamilton, Mettler Toledo, and Polstar DO sensors: Mettler Toledo and Polstar	Choice of qualified vendors available
Port sizes	Limited engineer-to-order customization only	Dependent on location in BPC and fit with hardware (e.g., 1 in. ID port)
Rearrangement of lines on existing ports	Limited customization possible, contact your sales representative for customer port locations	Dependent on location in BPC and fit with hardware
Dip tube lines	Limited customization possible	Length cannot interfere with mixing head and shaft
Filters on media and supplement inlets	Limited engineer-to-order customization only; choice of filters used to sterilize incoming media or supplements are available	

Note: Not all options are available for all ports. It is not possible to customize port type, chamber dimensions, or mixing assembly. Limited port location changes must be reviewed by the engineering department. For additional information, please see the selection guides in the product catalog.

BPC packaging

Description	Details
Outer packaging	3 polyethylene (PE) outer layers: supplied flat-packed with two PE outer layers and a box liner cable tied shut
Label	Description, product code, lot number, and expiry date on outer packaging and shipping container
Sterilization	Irradiation (27.5 to 45 kGy) inside outer packaging
Shipping container	Durable cardboard carton
Documentation	Certificate of Conformance (CoC) provided with each lot for each delivery

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Ordering information

Product	Cat. No.
100 L, jacketed, AC motor, sliding window	IM00100.9002
100 L imPULSE S.U.M. BPC, ASI 26/77 film with silicone tubing, 10 ports	HM00287-I
Accessories	
Thermo Scientific pH sensor	SV51147.02
Mettler Toledo pH sensor	SV51147.01
Broadley James pH sensor	SV51147.03
JUMO conductivity sensor	SV51148.01
Mettler Toledo conductivity sensor	SV51148.02
PendoTECH 3/8 in. ID tubing pressure sensor (single use, included in BPC or fluid transfer assembly)	SV20826.05
PendoTECH 1/2 in. ID tubing pressure sensor (single use, included in BPC or fluid transfer assembly)	SV20826.01
Single RTD, PT100, 2M M12 connector	SV50999.12
4 plastic probe clips	SV50177P.01
Heavy-duty tubing clamp (single)	SV20664.01
Heavy-duty tubing clamp (10 pack)	SV20664.04
Autoclave tray (stainless steel with plastic carrying handle)	SV50177.01
Inflate system	SV61401.05

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