TECHMI Group

Global solutions for a growing world

TECHMI BIO PILOT

FERMENTER FOR PILOT PLANT



INDEX

- *1-INTRODUCTION (3)*
- *2-COMPONENTS AND CHARACTERISTICS (4-7)*
- *3-TECHNICAL SPECIFICATIONS (8)*
- *4-SCALABILITY (9)*
- *5-TANK (10)*
- *6-SOFTWARE (11)*
- *7-SENSORS (12)*
- *8-AUTOMATION (13)*
- *9-SERVICES (14)*

TECHMI BIO PILOT

STEEL FERMENTER FOR PILOT PLANT

The **TECHMI BIO PILOT** is the ideal solution for scaling up and validating biotechnology processes. It combines a hygienic stainless steel design with an advanced control system that precisely regulates pH, temperature, DO, agitation, and aeration. Equipped with sensors, automatic peristaltic pumps, and CIP/SIP systems, it guarantees reproducible and safe conditions for every batch. Perfect for pilot plants, process development, and pre-industrial production.



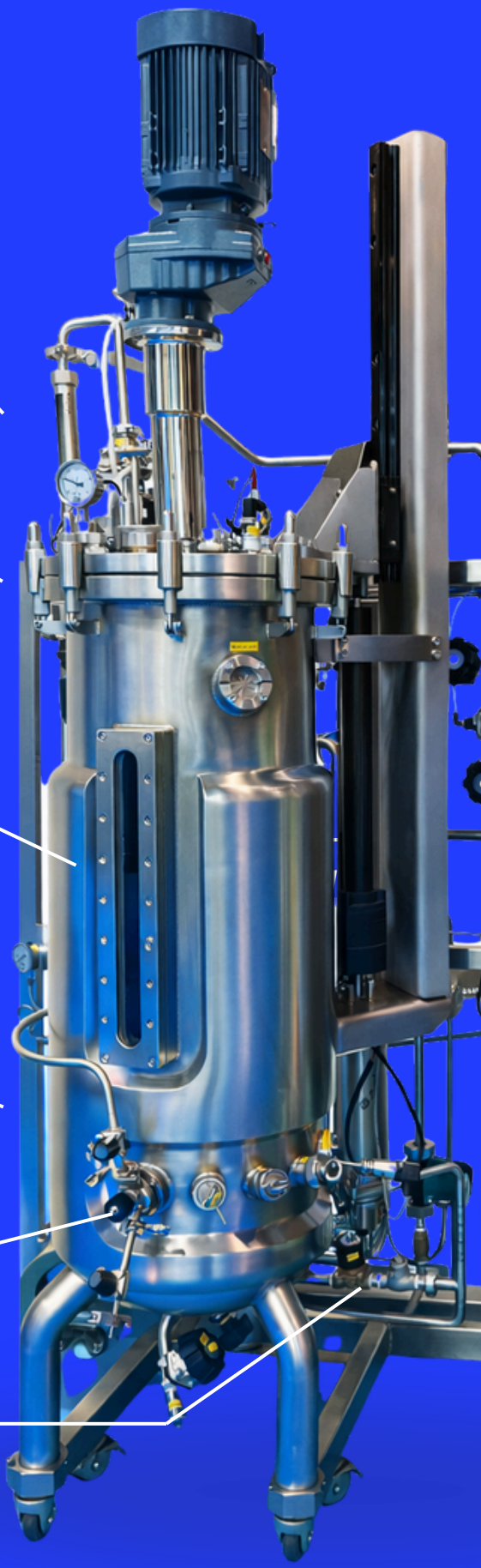
Applications:

TECHMI Group's pilot-scale fermenters, with capacities from 20 to 100 liters and manufactured from 316L stainless steel, are ideal for scaling up processes in biotechnology, pharmaceuticals, food, bioenergy, and chemistry. They offer precise control of temperature, pH, oxygen, and agitation, enabling the optimization of fermentations in intermediate volumes. Their robust and durable design complies with international standards and guarantees reliable data for industrial production, facilitating a smooth transition from the laboratory to large-scale manufacturing.
They are key to:

- Suspension cultures of microorganisms and cells.
- Development and optimization of the cell culture process.
- Biomass production



COMPONENTS AND CHARACTERISTICS



LID LIFTING SYSTEM

Pneumatic system that allows the upper assembly of the reactor to be raised to facilitate cleaning, maintenance and installation of accessories.

AGITATION SYSTEM

Equipped with an industrial motor with adjustable speed and a central stirring shaft that ensures homogeneous mixing of the culture medium, high oxygen transfer and high mixing efficiency, preserving the integrity of the cultures throughout the process.

VIEWING PEEPHOLE

Integrated sanitary window in the reactor body that allows observation of the process without compromising the sterility of the system.

TANK

It is the heart of the bioreactor, where the biological culture develops.
Manufactured from high-quality stainless steel with a sanitary finish, it allows for work in sterile conditions and ensures high reproducibility of the tests.

STERILIZABLE SAMPLING SYSTEM

GAS AERATION AND DISTRIBUTION SYSTEM

A set of pipes, valves, and diffusers that allows sterile air or specific gases to be supplied to the culture.

COMPONENTS AND CHARACTERISTICS



CONTROL PANEL

Centralized control system equipped with HMI touch screen for process monitoring and automation.

SOFTWARE

Centralized control system equipped with HMI touch screen for process monitoring and automation.

PERISTALTIC PUMPS

High-precision dosing modules used for automatic crop feeding and regulation of critical variables.

MOBILE PLATFORM

The assembly is mounted on a robust structure with industrial wheels to facilitate its movement within the laboratory or pilot plant.

COMPONENTS AND CHARACTERISTICS

- Volumen nominal: 20, 30, 50, 100L
- Diameter-to-height ratio: 1:2-3
- Filling coefficient: 70%.
- Material: 316L stainless steel
- Special sampling and discharge valves.
- Transfer tubes and tank liquid level observation glass with wide viewing angle
- 12V Safety Light
- Temperature control
- pH sensor, DO
- Anti-foam system
- Liquid level interface
- Inoculation port
- Power port
- Multiple auxiliary ports
- Design pressure 0.3Mpa
- Cover: design pressure 0.3Mpa
- It adopts an optimized bypass design, which improves exchange efficiency and temperature uniformity in the tank.
- High efficiency mechanical seal
- Inlet sterilization filter
- Exhaust condenser
- Air intake system with air distributor
- Four peristaltic pumps that automatically control the addition of acid, base, antifoam, and culture medium
- Fermenter agitation servomotor
- Direct mechanical stirring with top drive or indirect mechanical stirring with magnetic drive with bottom drive
- Liquid level alarm function and automatic refill
- Foam level alarm function and automatic addition of antifoam
- Alarm recording and verification system
- Speed, temperature, pH, DO, adjustable in automatic and manual modes
- Each parameter has a PID adjustment and display interface that shows the setpoint value, the real-time value, the PID control parameters, the upper and lower limits, as well as the graphical representation of the process curves.
- It allows switching between manual and automatic modes, as well as online parameter adjustment.
- Historical data and trends across multiple parameters can be stored
- Real-time trend curves can be automatically restored after a power outage, ensuring continuity of recording and process monitoring.
- The operating panel incorporates a password protection function with different access levels: operator, user and administrator, ensuring secure management of system configuration and operation.

COMPONENTS AND CHARACTERISTICS

Volume	20L, 30L, 50L y 100L
Workload	30%-70%
Container material	SUS 316L stainless steel
Gases	Standard: one air intake / Optional: multiple air intakes
Gas control	Standard: rotor flow meter (manual) / Optional: mass flow meter (automatic)
Sterilization	In situ sterilization (external steam source)
Basic control	Temperature, rotation speed, pH, DO, pressure, feed.
Bomb peristalsis	Standard: 4 units
Stirring mode	Standard: mechanical stirring

TECHNICAL SPECIFICATIONS

TECHMI BIO PILOT

Weight of the control tower	60 kg
Dimensions of the control tower (width × height × depth)	350 × 680 × 510 mm
Service connections	
Water	• Cooling water pressure: 0.1 ~ 0.3 MPa • Cooling water temperature: 5~30℃ (water)
Gases	• Air inlet pressure: 0.2~0.4 MPa • Air source: 2 4 kg / ㎠ 2
Power supply	• 220 V, 50 Hz • Power: 3.5 KW; (excluding the energy consumption of the air compressor) • Motor 1,5KW
Parameter Range	
Temperature	5~50℃ (± 0,2℃)
Agitation	50~800(± 5) rpm
Airflow	0.4-4 m3/h, mass flow meter: 70 L/min

SCALABILITY



Techmi Group's bioreactors are designed to ensure efficient and reproducible **scalability from laboratory to industrial production,** through an approach based on modular design, advanced automation, and precise control of critical variables. The platform allows for a gradual transition between scales while maintaining operational consistency and bioprocess stability.



In the laboratory, Techmi Bio Lab systems integrate complete control of pH, dissolved oxygen (DO), temperature, and agitation, along with automated dosing via peristaltic pumps and continuous data logging. This same control approach is maintained at larger scales, allowing for the replication of operating strategies and facilitating technology transfer.

The Techmi range covers volumes from 0.25L to 100,000L, incorporating high-precision thermal control (±0.1°C), pH regulation (2.0–12.0), dissolved oxygen control (0–100%), variable agitation (50–1000 rpm), and integrated CIP/SIP systems. The adaptable configuration of ports, valves, and feed systems allows each unit to be tailored to specific process requirements.



This approach ensures a reduction of risks in scale-up, improves process reproducibility and optimizes development and industrialization times, while maintaining traceability and control at all stages of production.

TANK

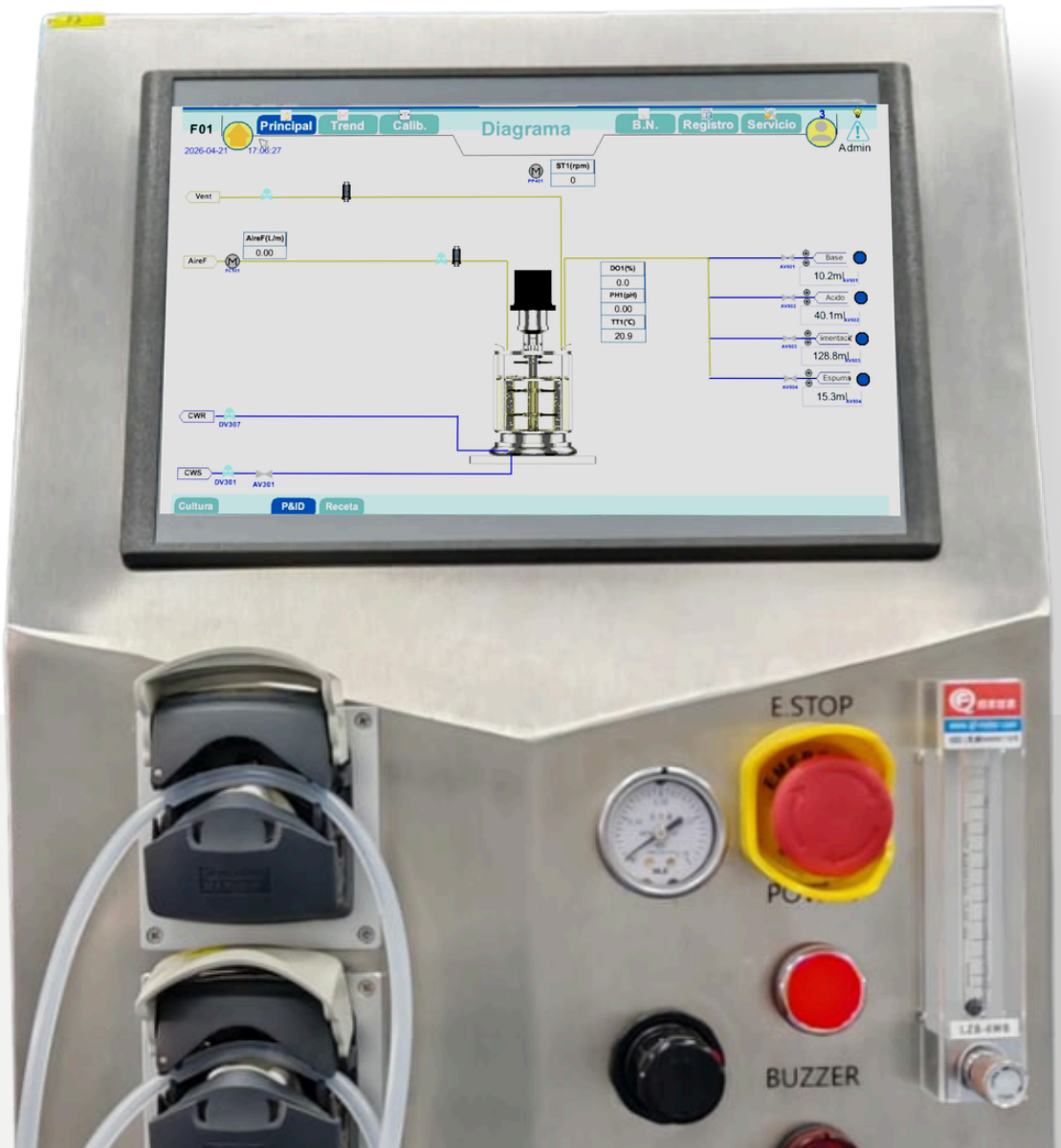
TECHMI BIO PILOT

	50 liters	100 liters
Material	Material: 316L stainless steel	
Sizes [L]	50	100
Working volume [L]	35	70
Space required for installation (height × depth × width) [mm]	1750 x 1000 x 2030	1750 x 1100 x 2250
Net Weight (Kg)	340	360



SOFTWARE

Techmi Group's bioreactor software is designed to offer complete bioprocess control in an intuitive, precise, and scalable way. It allows for real-time monitoring and automation of critical variables such as pH, temperature, dissolved oxygen, agitation, and feed, ensuring more stable, reproducible, and efficient processes.
Thanks to its recipe system, historical data logging, and advanced automation, it facilitates scaling from laboratory to industrial production while maintaining traceability and process control. Its intuitive HMI interface and integration capabilities with industrial systems make the Techmi Bio Lab software a key tool for optimizing productivity and simplifying daily bioreactor operation.



SENSORS

PROCESS CONTROL | SENSORS

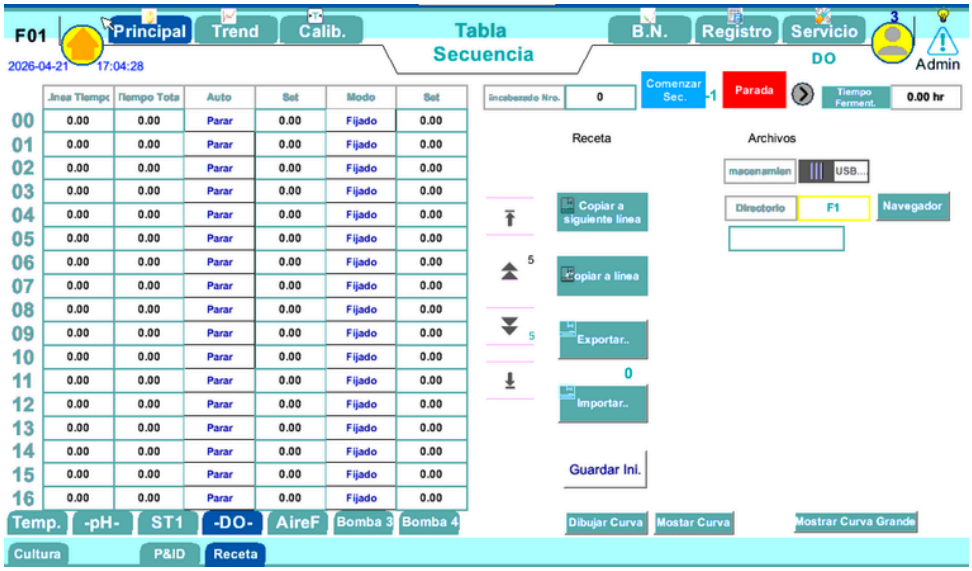
		Sensor | Measurement range | Display accuracy
	Temperature	Pt100 | 0 – 150 °C | 0.1 °C
	Dissolved oxygen	Optical | 0 – 100% | 0.1%
	pH	0 – 14 pH | 0.01 pH
	Foam control	Conductivity
	External signal input	0 – 10 V or 4 – 20 mA
	Pressure	-0.10 to +0.50 MPa
Optional	Redox potential	Electrochemical | −1,000 – 1,000 mV | 1 mV
Optional	Total cell density	Optical | 0 – 200 g/L
Optional	Viable cell density	Capacitance | 10^5 – 10^9 cel/mL
Optional	CO_2 gas	0–10 / 0–25 / 0–50 % vol.
Optional	Glucose	Enzymatic | 0 – 20 g/L
Optional	Load cell	MT1041 50 kg / MT1041 100 kg

OPTIONAL CONFIGURATIONS / SERVICES

- *≥ 2 gas inlet lines*
- *Customized drive system:*
- *Custom driver configuration*
  - *Marine impellers*
  - *Custom tank geometry (flat tank bottom, etc.)*
- *Integration of optional sensors*

AUTOMATION

The bioreactor automation system is based on a programmable digital control that allows for the precise and reproducible definition, execution, and monitoring of operating sequences. Through a graphical interface, the user can configure culture recipes structured in different time stages, each with its own control parameters.



Dissolved oxygen (DO) control using a cascade control strategy. The DO Cascade is a control strategy in which a primary variable (DO) is regulated by sequentially adjusting several secondary variables, such as agitation speed and aeration, to maintain DO at its setpoint, thus optimizing oxygen supply to the culture.



SERVICES

CUSTOM ENGINEERING



At Techmi Group, we develop customized solutions tailored to the needs of each industrial process. Our engineering team designs equipment and complete lines, optimizing productivity, automation, integration, and scalability for sectors such as biotech, chemical, pharmaceutical, and food.

RESEARCH AND DEVELOPMENT

We have an in-house R&D department and laboratory focused on the development, validation, and scaling of processes. We conduct pilot tests and parameter optimization to help our clients transform laboratory ideas and developments into efficient and reproducible industrial processes.



START-UP

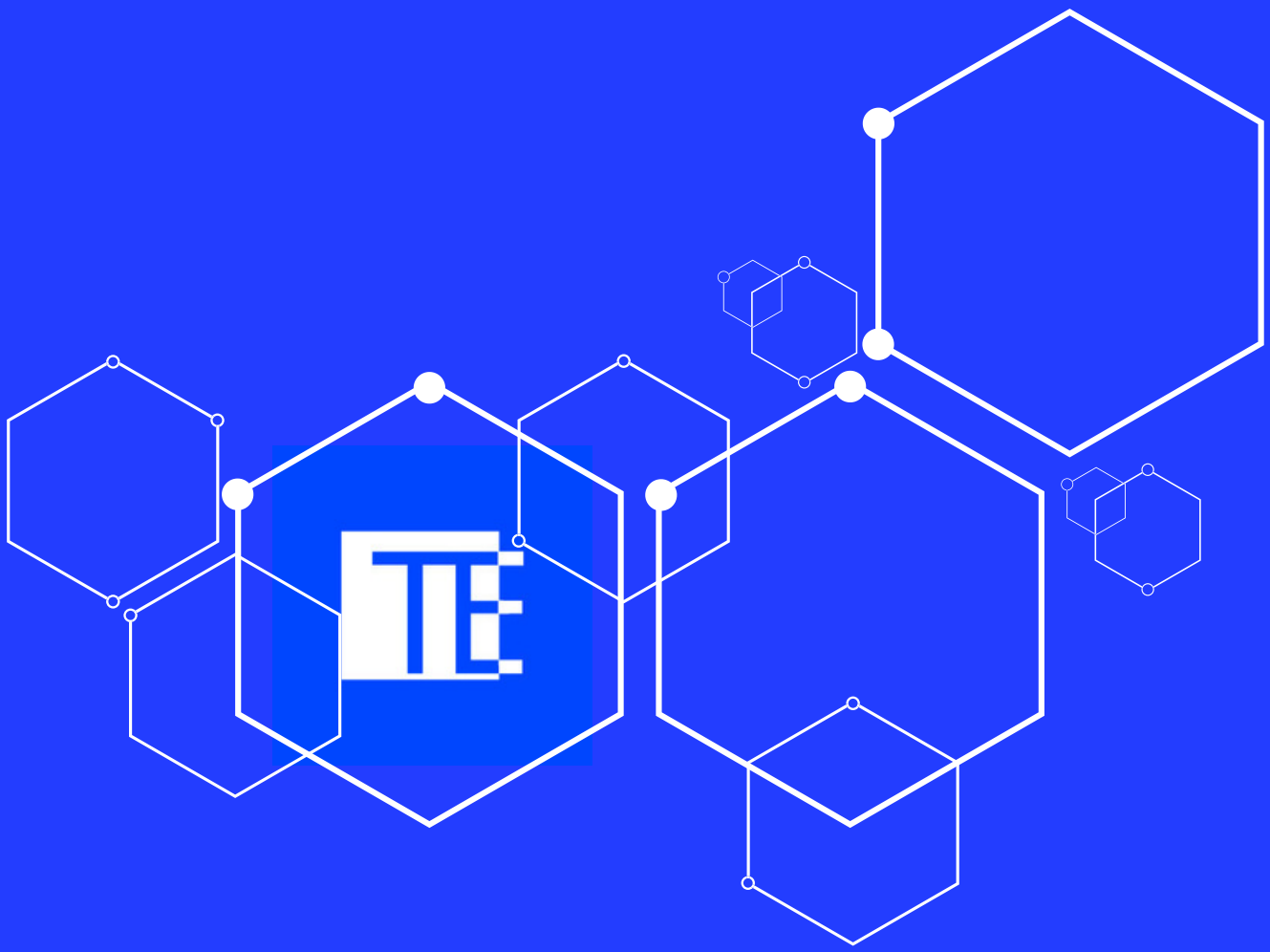


Our specialized technicians perform the installation, configuration, and commissioning of the equipment directly at your facility. We guarantee a safe and efficient integration, validating the correct operation of the system and supporting the client during the start of production.

TECHNICAL SERVICE

We offer specialized technical support and after-sales assistance to guarantee the operational continuity of every installation. Our team provides maintenance, diagnostics, optimization, and rapid technical assistance, both on-site and remotely, ensuring maximum performance of Techmi Group equipment.





EUROPE
Commercial office Carrer del Mas
del Jutge, 57, CP 46909, Torrente,
Valencia, Spain
info@techmigroup.com
techmigroup.com