ARA

Cell Culture Solution

Fermentation Excellence
Providing a Stable Cultivation Environment

CO_2 Incubator Simplified
Exploring Easy-to-Use Technologies

Tailored Cell Harvesting
Wide Range of Centrifuges for Your Need

ihanil.com

hanil

hanil

Hanil Scientific Inc. has been manufacturing laboratory instruments since 1958, specializing in sample separation, concentration, growing, and storage.

With a focus on craftsmanship and dedication, we produce all key components in-house and uphold strict quality control standards.

Our commitment is to provide reliable and durable tools that support our customers' work and foster strong, lasting relationships.

HANIL SCIENTIFIC INC.

+82-2-3472-0727
sales@ihanil.com
www.ihanil.com

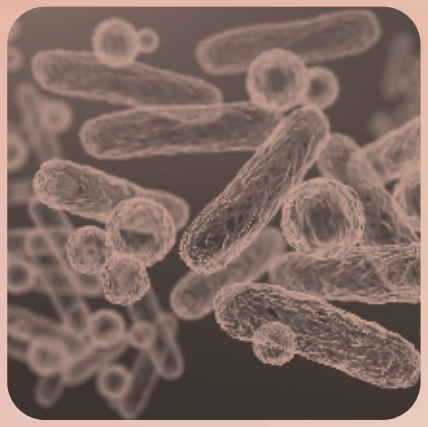
Cell Culture Solution

Cell Culture Solution

LABORATORY EQUIPMENTS

Fermentation Excellence

Fermentor is a device used for cultivating microorganisms or plant cells to either utilize the organisms themselves or produce various metabolic byproducts such as food, biopharmaceuticals (vaccines, antibiotics, medicinal nucleic acids, and proteins), enzymes, vitamins, insecticides, and more.



Introduction to G-FLO, FLS, and FLD

A R A Fermentors

ARA G-FLS

ARA G-FLD

ARA G-FLO

With over 65 years of dedication and trust, Hanil Scientific has been a reliable partner for researchers and laboratories worldwide. Our G-FLO, FLS, and FLD fermentors continue this legacy by providing practical and dependable solutions for microbial and viral cultivation. Designed with a focus on usability, reliability, and consistent performance, these systems are well-suited for a wide range of applications, from entry-level setups to advanced research environments.

Accessible for All Users

ARA G-FL fermentors are designed to accommodate users at all levels, including those new to fermentation processes. Their straightforward operation and clear controls make them easy to use while maintaining the functionality required for more complex applications.

Microbial and Viral Cultivation

The G-FL Series is designed to support both microbial and viral cultivation, providing reliable growth conditions for bacteria, yeast, fungi, and viruses. With robust construction and precise control systems, these fermentors ensure consistent results for research, production, and vaccine development. Their adaptability allows researchers to conduct studies with confidence across a wide range of applications.

Scalable Options

With a range of vessel sizes and configurations, these fermentors are designed to meet the needs of both small-scale experiments and larger production processes. Their scalability ensures they can grow alongside your research requirements.

Pilot-Scale Solutions

In addition to lab-scale fermentors, Hanil Scientific offers scalable solutions, including pilot-scale systems to meet larger production needs. Details on the pilot-scale fermentors can be found on page 17.

Future Mammalian Cell Cultivation

While the current models focus on microbial and viral applications, Hanil Scientific is preparing to introduce systems for mammalian cell cultivation in the near future. This addition will expand the scope of our product offerings to support a broader range of research and production needs.

For over six decades, Hanil Scientific has been committed to delivering quality and reliability that researchers can trust. The G-FLO, FLS, and FLD fermentors are a testament to this commitment, ensuring researchers have the tools they need to achieve their goals with confidence.

ARA G-FLO

Optimized Lab Scale Fermentor, Mastering Microbial Cultures with Controlled Batch Fermentation

Key Advantages of Batch method for Microbial Cultures:

Consistent Microbial Growth

Achieve predictable and dependable culture outcomes with minimized variability. G-FLO's precisely controlled environment ensures reliable, reproducible culture performance, yielding robust data for impactful research and publications.

Optimal Growth Conditions

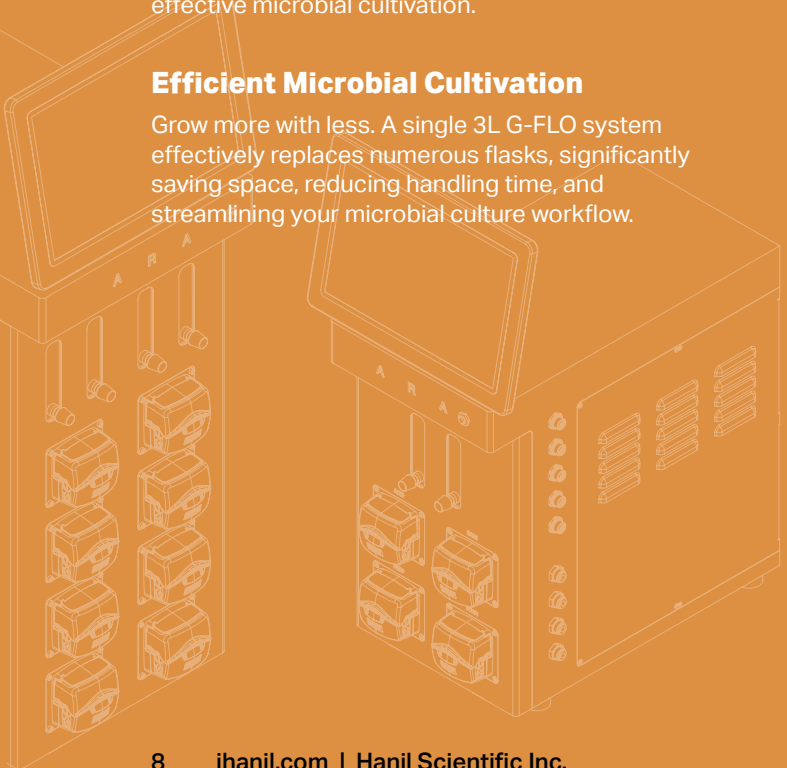
Maintain the ideal pH for thriving microbial cultures with integrated pH sensing and automated acid/base addition, offering a stable, monitored, and reproducible batch environment, guaranteeing consistent microbial culture growth and optimal performance every run.

Simplified Culture Management

Benefit from easy setup and operation focused on core parameters essential for efficient and effective microbial cultivation.

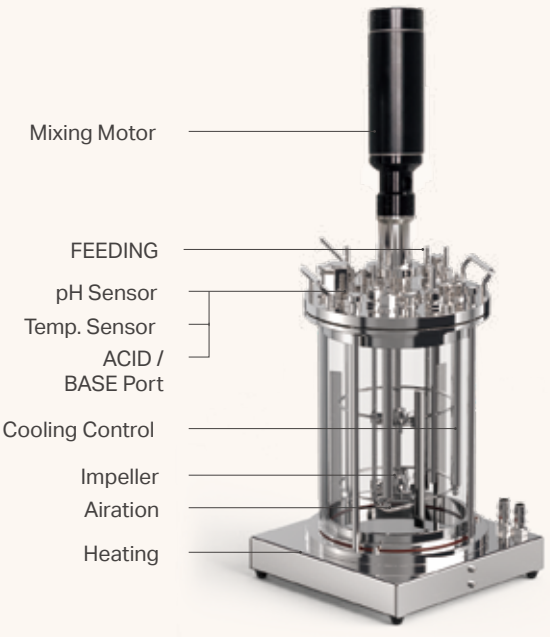
Efficient Microbial Cultivation

Grow more with less. A single 3L G-FLO system effectively replaces numerous flasks, significantly saving space, reducing handling time, and streamlining your microbial culture workflow.



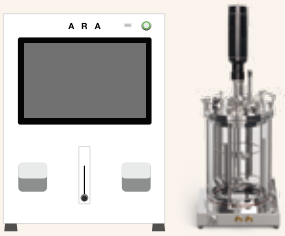
Main Body & Controller

Vessel & Heating Plate



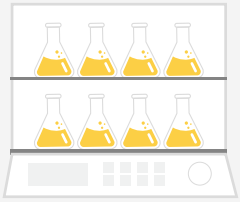
G-FLO is optimized for 3L single flat vessels only.

A single G-FLO is equivalent to
10 batches of 15 flasks, replacing 5 x shaking incubators



G-FLO Fermentation Method
(single 3 L batch)

VS



Shaking Incubator
(15 x 1 L flask capacity)

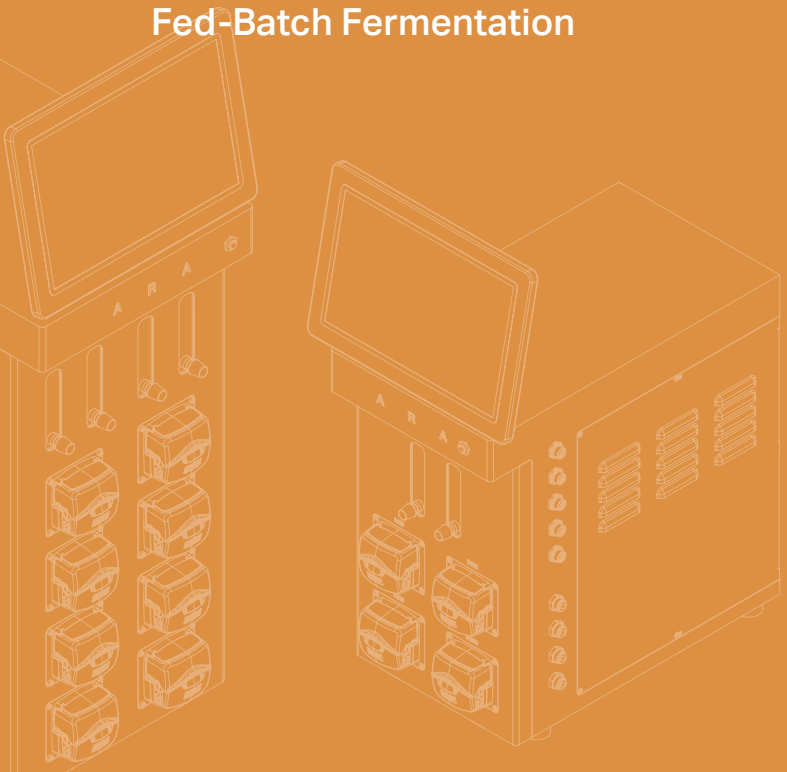
	G-FLO Fermentation Method (single 3 L batch)	Shaking Incubator (15 x 1 L flask capacity)
O.D. per batch	**100 O.D.** → 3L single vessel, 20 hr.	**10 O.D.** → 15 Flasks, 10hr.
Time needed for 100 O.D.	**20 hr** (Single batch of 3L vessel)	**100 hr** (10 batches of 15EA Flasks)
Required Footprint	Approx. **0.2m²**	Approx. **1.2m²**
Reproducibility	**High** Each batch can be managed at same conditions	**Low** reproducibility is low due to variability between flasks and batches
Documentation	Actual sample data of temp. and pH is recorded. Shows in Graphic display, and can be exported through an USB port.	Actual sample data cannot be measured
Labor	**Low** Minimal labor is required	**High** Requires handling and cleaning of many flasks
Result	**G-FLO Fermentation Method** =	**1,000% more efficient** compared to a shaking incubator/batch **1/6 Footprint is required** compared to a shaking incubator

ARA G-FLS

Advancing Microbial Cultivation with Fed-Batch Fermentation

ARA G-FLD

Maximizing Research Output with Dual-Vessel Fed-Batch Fermentation



Key Advantages of Fed-Batch Method for Microbial Cultures

Higher Yields, Extended Productivity

Fed-Batch method continuously feeds microbes, allowing microbes to be productive longer, allowing them to grow more and produce significantly more product.

Advanced Growth Control

Fed-Batch fermentation offers control over microbial cultivation through precise, slow nutrient delivery, ensuring optimal levels are maintained throughout the process. This meticulous approach guides microbial growth and metabolism, leading to improved product quality and specificity.

Greater Overall Efficiency

Fed-batch fermentation with G-FLS becomes more efficient by achieving higher yields and longer production phases.

Key Advantages of Dual-Vessel System for Microbial Cultures

Enhanced Efficiency

The dual-vessel system enables two batches to run simultaneously, optimizing lab space, resources, and operator time. This boosts research efficiency and reduces costs.

Reliable Comparative Studies

G-FLD supports parallel fermentations under identical conditions, enabling precise comparison of strains, media, or process parameters. This minimizes inter-batch variability and ensures consistent results.

Accelerated Process Development

Parallel experimentation shortens development cycles, allowing rapid identification of optimal growth or production conditions and faster scaling from research to application.

ARA G-FLS / FLD

Lab Scale Fermentor for Microbial Growth

Sytem Control

The ARA G-FLS / FLD control system monitors and regulates fermentation processes, allowing researchers to set and maintain desired fermentation conditions. Additionally, the system is equipped with sensors and control devices to manage various parameters such as temperature, pH, agitation speed, air, and oxygen supply.

Temperature Control

Temperature must be regulated to maintain optimal growth and activity of cells or microorganisms. The ARA G-FLS / FLD control system controls the temperature inside of the vessel to be set and maintained at the desired temperature.

pH Control

pH influences the growth and metabolism of cells or microorganisms. The system uses pH sensors to measure and regulate the pH of the fermentation medium, ensuring optimal conditions.

Agitation Speed Control

Maintaining a uniform environment within the medium is crucial during fermentation to support the growth of cells or microorganisms. The agitation speed can be controlled to ensure proper mixing and maintain conditions suitable for the experiment.

Air/Oxygen Supply Control

Certain fermentation processes require oxygen for the growth of cells or microorganisms. The control system regulates air and/or oxygen supply devices to maintain adequate oxygen levels.

Nutrient Supply Control

Based on the user-defined feeding strategy for additional medium, the system detects changes in pH and DO and adjusts nutrient supply using a peristaltic pump. This ensures the maintenance of optimal environmental conditions within the medium, allowing cells or microorganisms to grow under ideal conditions.

ARA G-FLO

Peristaltic Pump

FLS : Max. 4 ea / FLD : Max. 8 ea
Control Range : 1~400 rpm

STANDARD

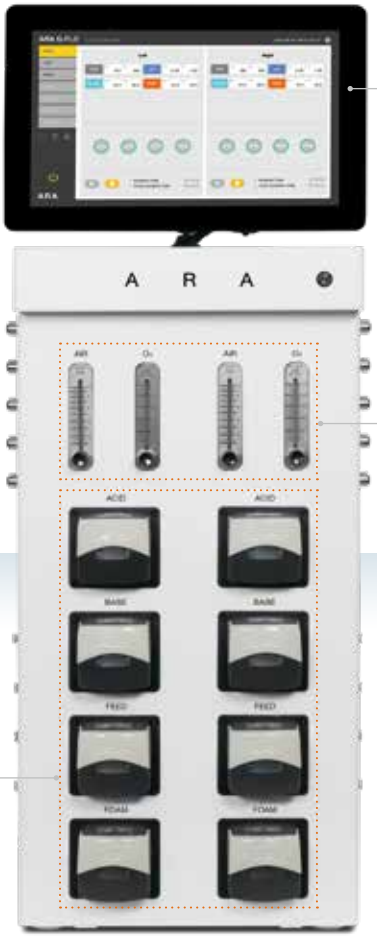
ACID, BASE, FEED, FOAM

Controller Specification

Dimension	FLO : 350W x 200D x 450H, mm FLS : 310W x 450D x 670H, mm (w/o Screen : 449H, mm) FLD : 310W x 455D x 840H, mm (w/o Screen : 619H, mm)
Weight	FLO : 13 kg / FLS : 17 kg / FLD : 24 kg (Only controller)
Power Consumption	FLO,FLS : 850 VA FLD : 1,700 VA

ARA G-FLS

ARA G-FLD



Display & Control UI

12" touchscreen featuring 270° rotation and 90° tilting, along with an intuitive UI for real-time monitoring and control.

Flowmeter

Gas flow can be manually adjusted using a dial with a scale, and for automatic control, a Mass Flow Controller (optional) can be installed.

STANDARD

AIR : Compressor is required.

OPTIONAL

O_2 : Oxygen tanks or liquid oxygen systems is required.

OPTIONAL

Mass Flow Controller (MFC)

The Mass Flow Controller is an automated system that delivers the precise mass of gas into the vessel, controlled by the system. Integrated with the DO sensor and DO cascade system, it ensures consistent dissolved oxygen levels, making it ideal for long duration, oxygendependent cultivation processes.

Supports automated DO cascade system

Pump setup Considerations

For the peristaltic pump, a silicone tubing wall thickness of 1.6 mm is recommended for general use. It is crucial to determine the inner diameter based on the properties of the fluid, and both inner and outer diameters can be selected and replaced to suit the experiment.

Tube bore	100 RPM	400 RPM
0.5 mm	2.2 (mL/min)	9.1 (mL/min)
0.8 mm	4.3 (mL/min)	7.0 (mL/min)
1.6 mm	14 (mL/min)	56 (mL/min)
2.4 mm	29 (mL/min)	115 (mL/min)
3.2 mm	47.5 (mL/min)	190 (mL/min)
4.0 mm	67 (mL/min)	270 (mL/min)
4.8 mm	85 (mL/min)	340 (mL/min)

OPTIONAL

PC Control System

Researchers can monitor and control the fermentation conditions in real-time via a PC, even from a distance. Multiple controllers can be connected at the same time.

ARA G-FLS / FLD

Lab Scale Fermentor for Microbial Growth

Vessels

Fully sealed structure (0% pore) that completely blocks contaminants, enabling easy addition or measurement in a closed environment.
All parts in contact with the medium or additional components are made of high-quality stainless steel, ensuring excellent durability.

The vessel is fully sterilizable and designed for easy assembly and disassembly.

Vessel Type Considerations

Single Flat vessels are the standard vessels.

If other types of vessels are required or cases stated below, please consult our experts to explore alternative vessel options.

- Precise temperature control requirement
- High-viscosity media
- Simultaneous comparative studies
- Specific microbial growth conditions

Sterilization

The vessel, including the motor, must undergo sterilization as a whole, we recommend selecting a size that fits within the autoclave after checking the depth of its internal space.

*The height may vary depending on the condenser installation method.

Temperature control

For basic cell fermentation or seed fermentation that does not require special temperature control, tap water is commonly used.
However, for temperature sensitive samples or cases where there are significant fluctuations in ambient temperature, it is recommended to equip Chillers or Cooling and Heating Circulators to minimize the impact.

Maintenance Essentials

Cultivation experiments are highly sensitive to contamination, so it is crucial to thoroughly clean and dry all components after use before storage.
Each part should be disassembled, cleaned, and completely dried to prevent any residual moisture. For highsalinity seawater, special attention is required as prolonged storage without proper cleaning and drying can lead to component degradation. Use distilled water, clean water, or alcohol for cleaning, ensuring no contaminants remain.

Single Flat Vessel

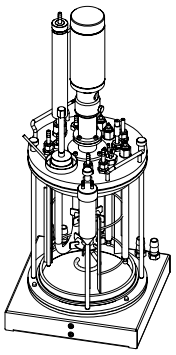
Basic vessel type equipped with a heating plate.

STANDARD

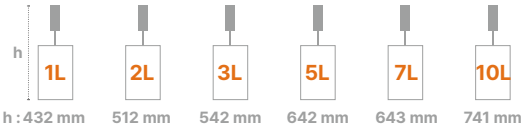
Cold Finger / Condensor / Heater Plate

ADDITIONAL

Chiller



Available Capacities & Heights (Including Condenser)



h : 432 mm | 512 mm | 542 mm | 642 mm | 643 mm | 741 mm

Single Round Vessel

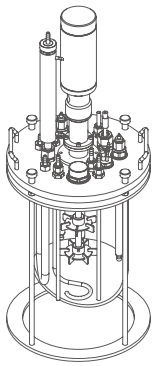
The round-bottom design reduces shear stress with a marine impeller, ideal for sensitive cell cultivation, while temperature is controlled by a heating blanket and chiller.

STANDARD

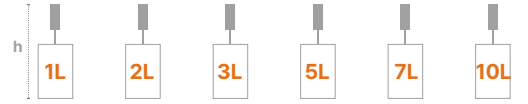
Cold Finger / Condensor / Heating Blanket

ADDITIONAL

Chiller



Available Capacities & Heights (Including Condenser)



h : 499 mm | 553 mm | 603 mm | 653 mm | 653 mm | 775 mm

Double Vessel

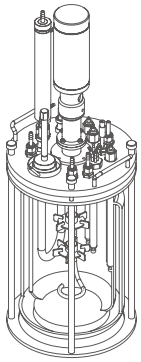
For more precise temperature control utilizing a cooling and heating circulators.

STANDARD

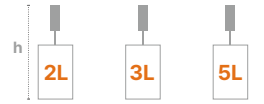
Condensor

ADDITIONAL

Cooling and Heating Circulators



Available Capacities & Heights (Including Condenser)



h : 553 mm | 603 mm | 643 mm

Bowl Vessel

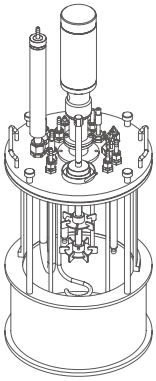
The SUS bottom structure offers the vessel to withstand high mechanical stresses. Also for more precise temperature control utilizing a cooling and heating circulators.

STANDARD

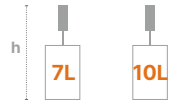
Condensor

ADDITIONAL

Cooling and Heating Circulators



Available Capacities & Heights (Including Condenser)



h : 648 mm | 793 mm

ARA G-FLS / FLD

Lab Scale Fermentor for Microbial Growth

Impellers & Agitators

Impellers are chosen based on the fermentation process and fluid properties, with two installed by default to create the desired flow pattern. Upper and lower impellers can be combined differently if needed.

VARIABLE FLOW TYPE

Rushton Turbine

Radical Flow

Marine

Axial Flow

CONSTANT FLOW TYPE

Varied Rushton

Asymmetric Radical Flow

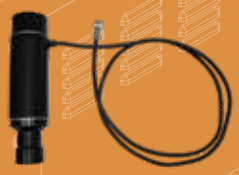
Pitched Paddle

Tangential Flow

The agitator mixes and stirs the culture medium to maintain uniform conditions during experiments. Driven by a motor, it ensures even distribution of oxygen and nutrients through controlled speed and consistent liquid circulation, promoting microbial growth and creating an optimal fermentation environment.

[Agitator Specification]

- 100 ~ 1,200 rpm
- 1~7 L : 60 W / 10 L : 150 W



Rushton Turbine Impeller

The Rushton Turbine Impeller generates a radial flow. It is commonly used in microbial fermentation processes. With its capability for high-speed RPM, it offers excellent power transmission and creates vortices on both sides, enhancing dispersion.

☑ Recommended for standard configurations.

Marine Impeller

The Marine Impeller generates strong axial flow, pushing fluid in a single direction. This characteristic allows it to be used for a wide range of applications, from cell culture to microbial fermentation, by adjusting the rotation speed.

☑ Recommended to use with Rushton Turbine Impeller for high-viscosity fluids.

Varied Rushton Impeller

The Varied Rushton Impeller concentrates radial flow on one side and should be installed with careful consideration of the mixing process characteristics and the properties of the fluid.

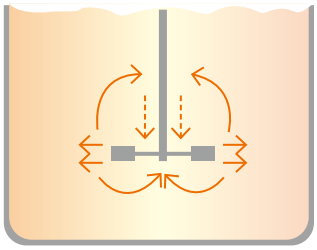
☑ For optimal use, a clear understanding of fluid properties and the mixing process is essential. Consultation is required.

Pitched Paddle Impeller

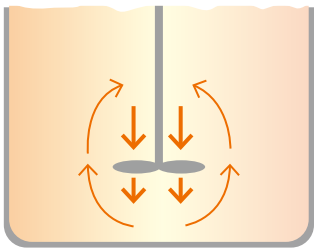
Characteristics combination of the Rushton Turbine and Marine Impeller, generating both radial and axial flows simultaneously. Recommended for environments where media viscosity and mixing are major concerns.

☑ For optimal use, a clear understanding of fluid properties and the mixing process is essential. Consultation is required.

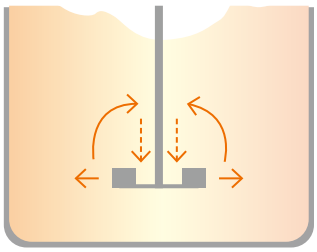
High Shear Forces,
Excellent Oxygen Transfer



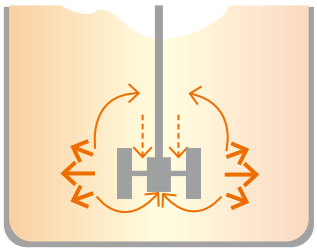
Low Shear for Gentle Mixing,
Minimal Cell Damage



High Mixing Efficiency,
Minimal Energy Consumption.



Generates Gentle Mixing,
Avoids Cell Damage.



Mixing Performance Test

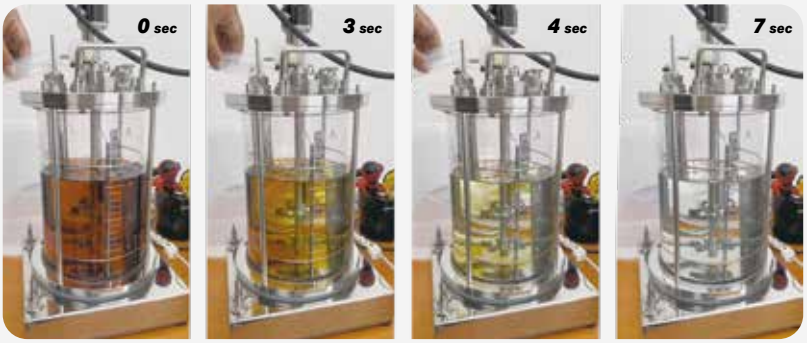


Fig. 1
Experimental images showcasing the turbine's ability to uniformly circulate a specific solution throughout the vessel, including corners, and demonstrating dispersion effectiveness at varying RPM speeds.

Experimental conditions

- Vessel type : 3L Single Flat Vessel
- Impeller type : 56 mm (35%) Rushton Turbine
- Speed : 200 RPM

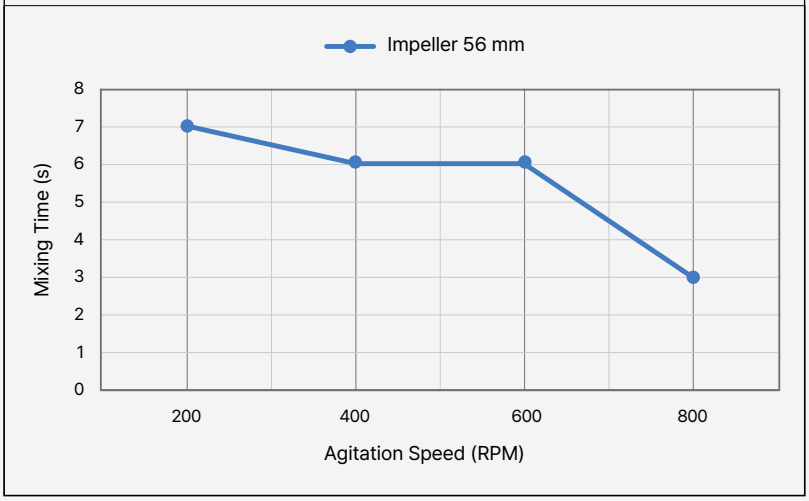


Fig. 2
A graph illustrating the turbine's ability to uniformly circulate a specific solution throughout the vessel, including corners, and showing the dispersion efficiency at different RPM speeds.

What to Consider When Choosing an Impeller

Impeller is a critical component in the cultivation process and should be selected with careful consideration of the culture medium's viscosity and the environmental requirements of the final product.
While the Rushton Turbine is commonly recommended, consulting with a product specialist is advised to ensure uniform mixing and a flow pattern suitable for your specific sample.

ARA G-FLS / FLD

Lab Scale Fermentor
for Microbial Growth

Sensors

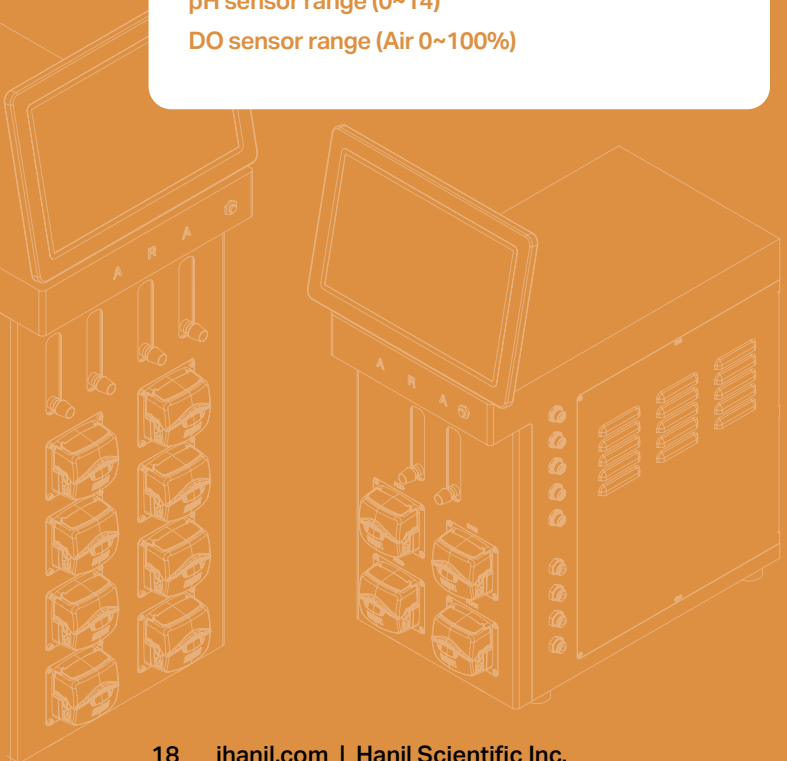
Senseor Selection Considerations

The required sensors pH, temperature, dissolved oxygen (DO), and anti-foam sensors. The first consideration is to select a size that matches the vessel's capacity and the height of the culture medium. The second consideration is to ensure that the measurement range and accuracy of the sensors align with the desired fermentation experiment conditions. Additionally, for experiments requiring high sensitivity, digital sensors such as Arc pH or Arc DO are recommended, as they offer faster response times compared to analog sensors.

Temperature sensor range (8~70°C (±0.5°C))

pH sensor range (0~14)

DO sensor range (Air 0~100%)



pH Electrodes

Length	Analog	Digital (ARC)
120 mm	SF 1 L	
160 mm	SR 1 L	
200 mm	SF 2 L	
225 mm	SF 3 L / SR 2 L, 3 L / DV 2 L, 3 L	
325 mm	SF 5 L, 7 L / SR 5 L, 7 L / DV 5 L / BV 7 L	
425 mm	SF 10 L / SR 10 L / BV 10 L	
Cable, 1 m	K8	VP8
Cable, 3 m		

DO Electrodes

Length	Analog	Digital (ARC H0)
120 mm	SF 1 L	
160 mm	SF 2 L / SR 1 L	
225 mm	SF 3 L / SR 2 L, 3 L / DV 2 L, 3 L	
325 mm	SF 5 L, 7 L / SR 5 L, 7 L / DV 5 L / BV 7 L	
425 mm	SF 10 L / SR 10 L / BV 10 L	
Cable, 1 m	VP6	VP8
Cable, 3 m		

Temperature Electrodes

Length	Analog
160 mm	SF 1 L
220 mm	SF 2 L / SR 1 L
260 mm	SF 3 L / SR 2 L
310 mm	SR 3 L / DV 2 L, 3 L
360 mm	SF 5 L, 7 L / SR 5 L, 7 L / DV 5 L / BV 7 L
450 mm	SF 10 L / SR 10 L
510 mm	BV 10L

Anti Foam Electrodes

Length	Analog
140 mm	Anti foam electrode
1.1 m	Anti foam electrode cable
Order Made	Anti foam electrode * All size available

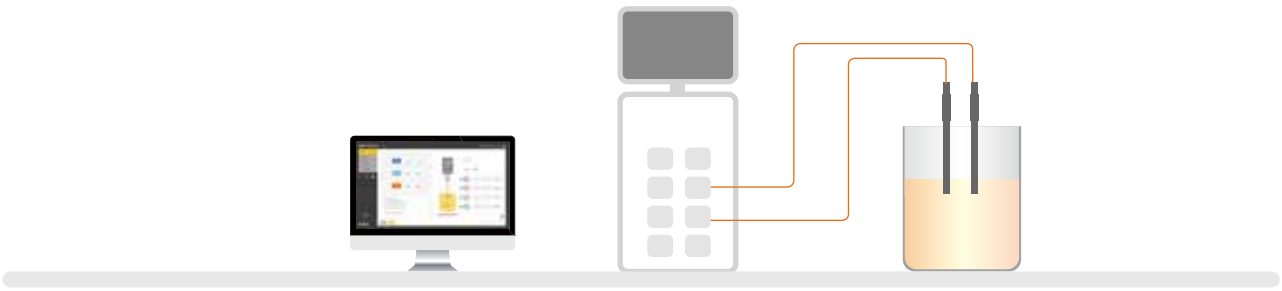
* The length of the anti-foam/temperature sensor is fixed.
* The mounting position of the sensor varies depending on the type and capacity of the vessel, so professional consultation is recommended for selection.

[Vessel Type Notation]

SF : Single Flat **DV** : Double Vessel

SR : Single Round **BV** : Bowl Vessel

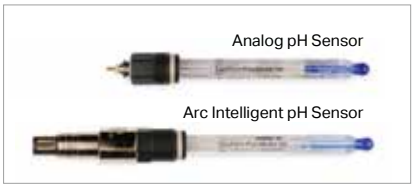
Selection Guide of pH/DO Sensors



1) Sensor Type

Analog Sensor STANDARD

Analog sensors offer cost-effective solutions with stable performance.
Their analog driven operation ensures compatibility with fermentors, making precise selection crucial. To achieve optimal performance when integrated with fermentation equipment, it is essential to verify the controller's functionality and choose accordingly.



Arc Intelligent Sensor OPTIONAL

Arc Intelligent Sensors are cutting-edge solutions designed for precision and rapid response, making them indispensable for experiments sensitive to environmental changes. Despite their premium price, these sensors are a top choice for professionals due to their unmatched performance and versatility.

2) Sensor Size and Cable Length

After selecting the desired sensor type, either Analog or Arc Intelligent, it is essential to choose a sensor and a cable with the appropriate length that match the vessel type and size.

[Example]
Both the pH and DO Electrode should be 225 mm in length for a 3L Single Flat Vessel.

Temperature Control Components

COOLING

STANDARD

Cold Finger / Condensor / Tap Water or Chiller

HEATING

STANDARD

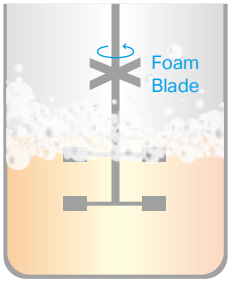
Heater Plate or Heating Blanket

COOLING
HEATING

ADDITIONAL

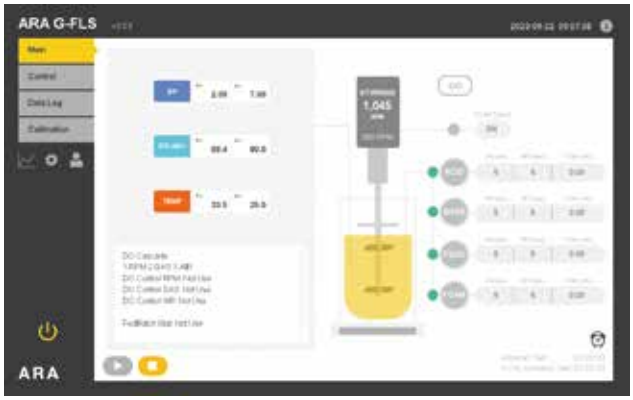
Circulator for Double & Bowl Vessel

Anti-foam Features



To ensure reliable experimental results, controlling foam formation is essential. By using an Anti-foam Sensor, foam inside the vessel can be removed before it overflows, minimizing culture medium loss and preventing contamination.
Additionally, by reducing the impact of the foam layer formed on the surface of the culture medium, the internal environment remains stable, enabling more accurate and precise results.

Intuitive User Interface for Enhanced Convenience

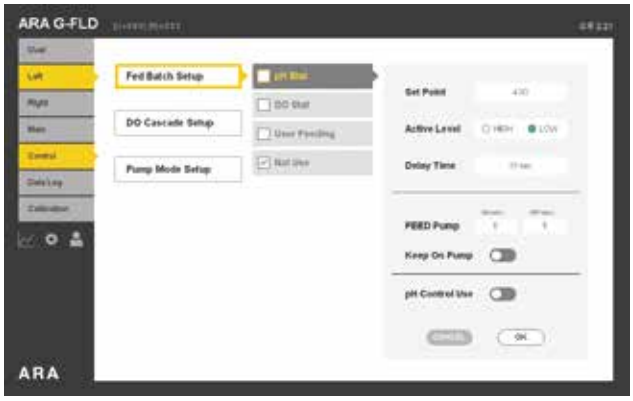


Real-Time Monitoring and Control

Easily monitor and control all key parameters, including pH, DO, temperature, and motor RPM, directly from the main display in real time.

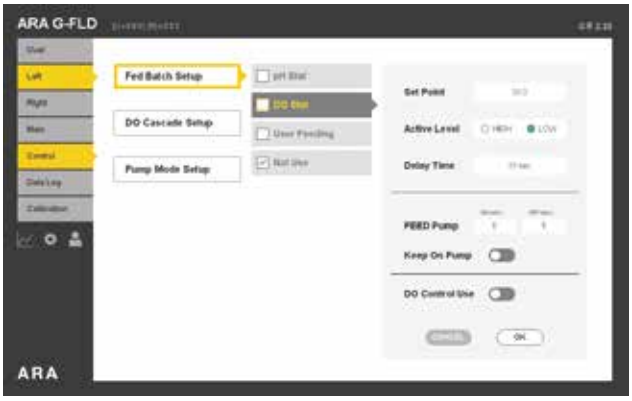
Dual Fermentor Control with G-FLD

When using G-FLD, users can operate and control the settings and current values of pH, DO, temperature, and motor RPM for two fermentors simultaneously on a single screen.



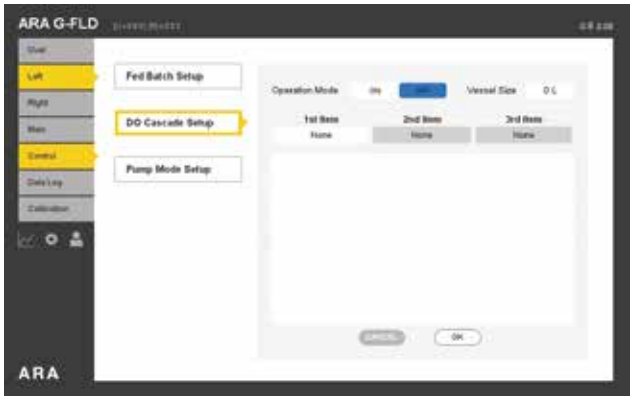
pH-Stat Fed-Batch Functionality

Automatically detects pH changes during cultivation and injects additional media based on metabolic activity. Users can enable or disable the pH-Stat Fed-Batch strategy according to their desired setpoint.



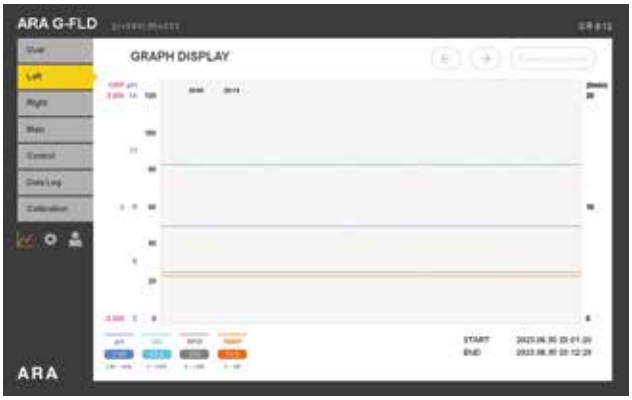
DO-Stat Fed-Batch Functionality

Detects changes in dissolved oxygen (DO) levels during cultivation and supplies nutrients at the appropriate time based on metabolic activity. Users can configure the operation based on their preferred DO setpoint.



DO Cascade Control

Automatically adjusts RPM, airflow, and oxygen supply to maintain the user-defined target DO level. This feature efficiently regulates metabolic processes and can be optimized to suit specific operational goals.

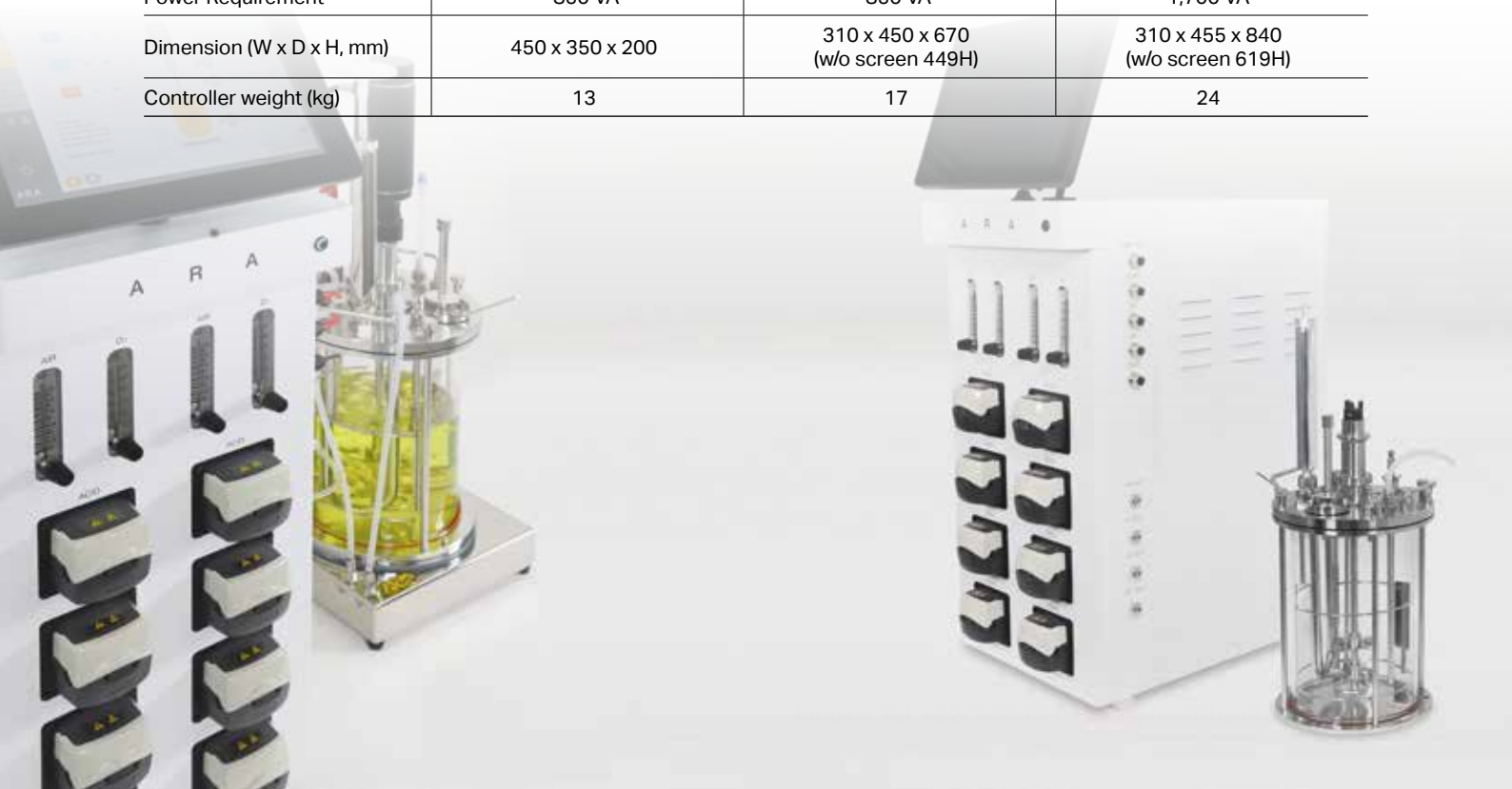


Data Logging and Visualized Graphs

Provides real-time monitoring of changes during the cultivation process with visualized graphs and data logs. This allows users to quickly detect issues, compare with historical data, identify anomalies, and take corrective actions.

Specification

		G-FLO	G-FLS	G-FLD
Main Controller		12'' (30.48 cm) Tablet PC		
Vessel type & Volume		Single Flat 3L	Single Flat (1, 2, 3, 5, 7, 10) L - Standard Single Round (1, 2, 3, 5, 7, 10) L Double Vessel (2, 3, 5) L Bowl Vessel (7, 10) L	
Agitation	Drive	DC Motor (60 W)	DC motor, 1 ~ 5 L Vessel : 60 W / 7 ~ 10 L Vessel : 150 W	
	Display	Digital Display (1 RPM, interval)		
	Range	100~1,200 RPM		
Temperature	Display	Digital display, Graph (0.1°C, interval)		
	Range	Ambient ~ 50°C (8°C with Optional Circulator)	8~70°C (±0.5°C, interval)	
	Sensor	PT100		
pH	Display	Digital display (0.01 pH, interval)		
	Range	pH0~ pH14		
	Sensor	EasyFerm Plus PHI K8	EasyFerm Plus PHI K8 / EasyFerm Plus PHI Arc (Optional)	
DO Sensor	Display	N / A	Digital display (0.1%, interval)	
	Range		Air 0~100%	
	Sensor		OxyFerm FDA VP / VisiFerm DO Arc (Optional)	
Antifoam		N / A	Conductivity type	
Peristaltic Pump		Two Pumps Installed, 1 ~ 400 RPM	Four Pumps Installed, 1 ~ 400 RPM	Eight Pumps Installed, 1 ~ 400 RPM
Impeller Type		Basic : Rushton Turbine (Optional : Pitched-paddle / Marine-blade / Varied Impeller)		
PC Control & Monitoring		N / A	Optional (Max.6 x vessels in one PC)	
Ratings		220-230 V~, 50/60 Hz, Single phase, 110V, 50Hz (Optional)		
Power Requirement		850 VA	850 VA	1,700 VA
Dimension (W x D x H, mm)		450 x 350 x 200	310 x 450 x 670 (w/o screen 449H)	310 x 455 x 840 (w/o screen 619H)
Controller weight (kg)		13	17	24

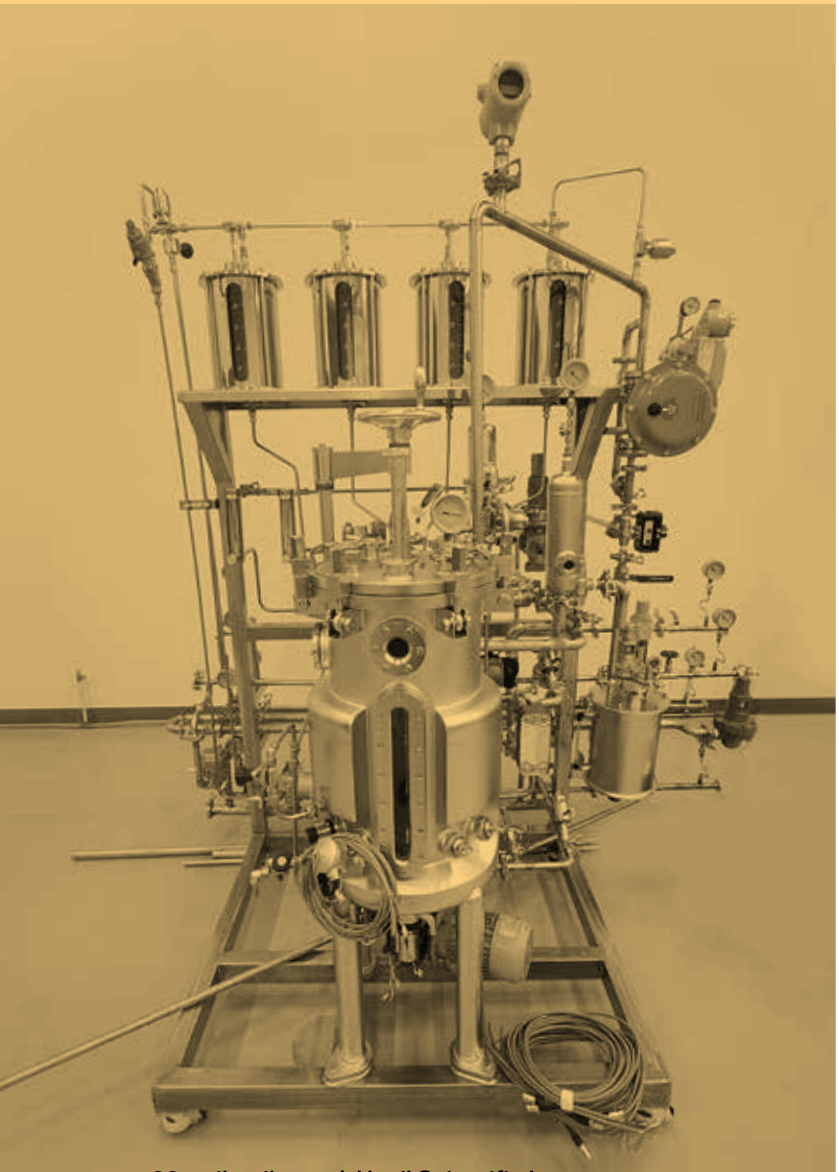


ARA G-FP

Pilot Fermentor for Microbial Growth

User-Customizable System for Convenient Configuration

The ARA G-FP Pilot Fermentor serves as a critical bridge between laboratory-scale and industrial-scale fermentors.
It offers extensive scalability and functionality, creating an optimal environment for effective microbial cultivation.

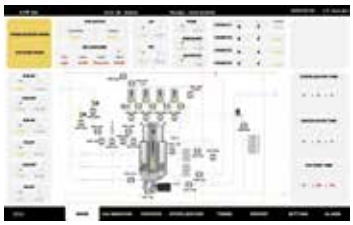


Self-Sterilization System for Complete Sterility

Equipped with a high temperature, high pressure self-sterilization system

Monitoring System for Comprehensive Analysis and Variable Tracking

Track critical variables such as temperature, pH, DO, and agitation speed with a real-time graphical display, enabling thorough analysis and precise monitoring.



User-Friendly Operation with 19" Touchscreen Interface and PC-Based System

Precise and Reliable Environmental Control Through Advanced Sensors

- Stable Temperature Control
- Safe Pressure Control
- pH Measurement and Control (0-14)
- DO Measurement and Control (0-100%)

Real-time observation and adjustment of the internal vessel environment provide optimal cultivation conditions for enhanced results.

Component Features Overview

Vessel

Constructed with medical-grade 316 L stainless steel, the vessel ensures safety, durability, and a stable cultivation environment. Efficiently placed sensors provide precise monitoring and control.

Jacket with View Window

The jacket surrounding the vessel regulates temperature through hot and cold water flow. Equipped with an autoclave function, it enables internal sterilization and temperature control.

Contoller

The 19" PC-based touchscreen allows real-time monitoring and adjustment of cultivation conditions and environmental changes. Designed for user convenience, it features adjustable screen angles, easy mobility, and stable operation.

Feed Tank

For acid, base, feed, and anti-foam solutions

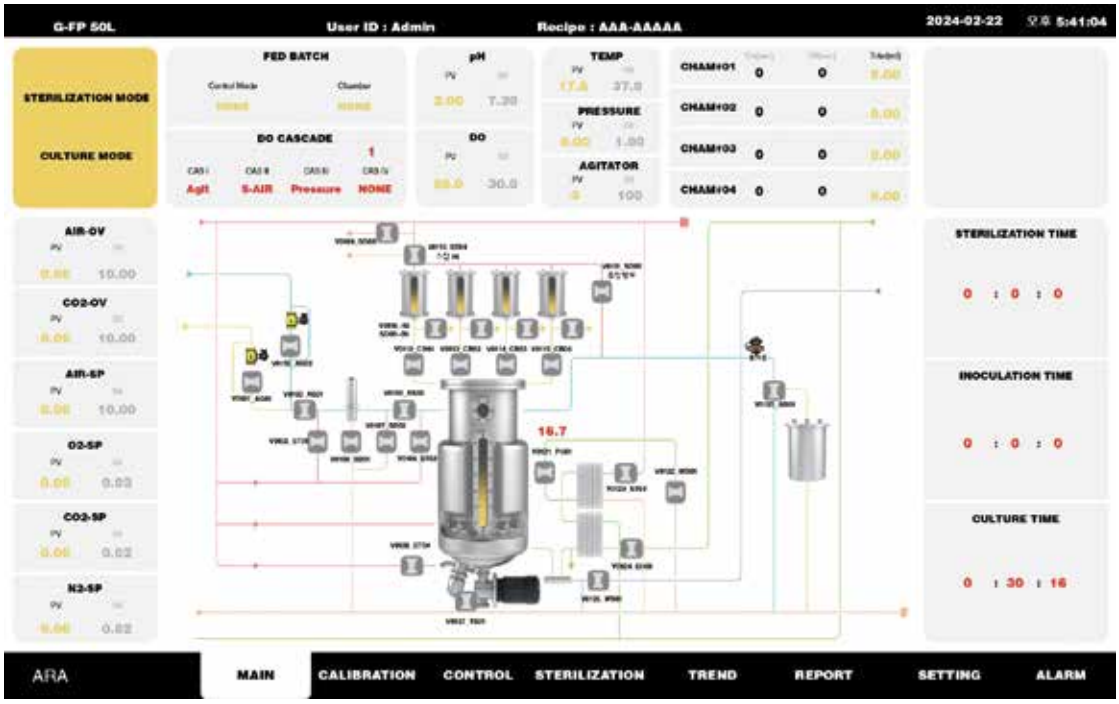
Air Flow

Provides filtered air to microorganisms inside the vessel for optimal growth conditions.

Motor

The agitation motor is placed at the bottom, ensuring easy maintenance and reliable operation.

Control UI



Specification

ARA G-FP Pilot Fermentor	
Vessel Parts	
Total Volume	50 L (Customizable)
Working Volume	35 L (Customizable)
Vessel Size (mm)	Ø 300 x 660 H
Height to Diameter Ratio	2.2 : 1
Vessel / Jacket material	Stainless Steel 316L / Stainless Steel 304
Baffles	3
View Window	Yes
Agitator (Motor)	Automatic magnetic release (MMP ENG), Customizable
Impeller	Disk Turbine, 3 stage, Stainless Steel 316L
Mass Flow Controller (MFC)	Air & O_2 / 7 ~ 70 NL / min
Filter housing	Stainless Steel 316L
Feeding Tank	5 L
Controller Parts	
Controller Board	PLC
Display	19" Touch PC Screen
Feeding Control	Automatic & Manual
Air flow control	Automatic & Manual
Autoclave	Self-sterilization System

* The above specifications are provided for user reference and understanding. The final system performance, including detailed specifications, will be determined through consultation with a professional product manager.

Fermentation Excellence

ARA PBR (All Customized)

Lab Scale / Pilot Scale
Photo Bioreactor

The Photo Bioreactor (PBR) utilizes the photosynthetic process of organisms that absorb carbon and release oxygen to breakdown organic matter.
It is widely used in various industries requiring the growth and production of microorganisms, plants, or algae.
The ARA PBR system is fully customizable and can be tailored 100% to your specific needs through professional consultation.

PBR - Lab Scale

- Type : Vessel
- Illumination : Inner LED Bars

- Type : Vessel
- Illumination : External Octagon LED Panels

PBR - Pilot Scale

- Type : Plate, Pilot Scale
- Illumination : Internal LED Plate

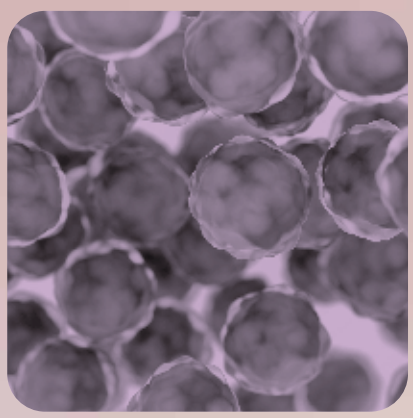
- Type : Plate, Pilot Scale
- Illumination : External LED Plates

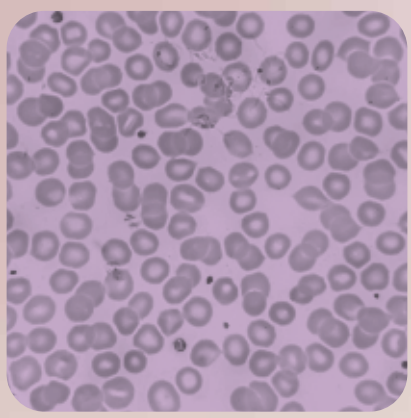
Cell Culture Solution

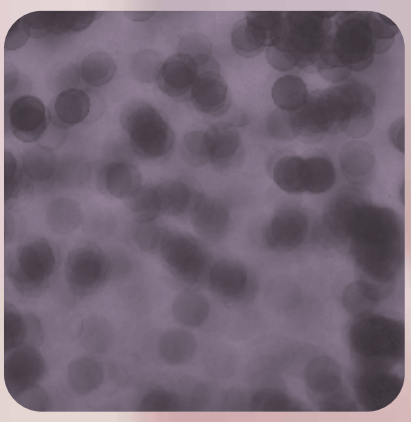
LABORATORY EQUIPMENTS

CO_2 Incubator Simplified

CO_2 incubator provides similar in vivo condition of mammalian animals for optimal cell growth, through the control of temperature, humidity and CO_2 concentration. The small change of these parameters may affect to cell condition. The temperature, CO_2 concentration and humidity may change dramatically when door is opened. The cell damage is minimized through quick recovery of critical cell growth parameters when inner chamber environment is changed.







ARA P150 / P170

Fanless CO_2 Incubator

Visually Simple, Yet Technologically Complex.

ARA P150 / P170 incubators are designed for a wide range of cell culture applications, including mammalian cells. They provide an optimal environment for cell growth through precise control of temperature and CO_2 concentration.

Fanless Design minimizes contamination caused by air circulation inside the incubator and eliminates vibrations during operation. No maintenance is required for internal HEPA filters typically used for fans.

Direct Heating with Advanced Insulation Technology ensures uniform temperature distribution and stable cell culture conditions.

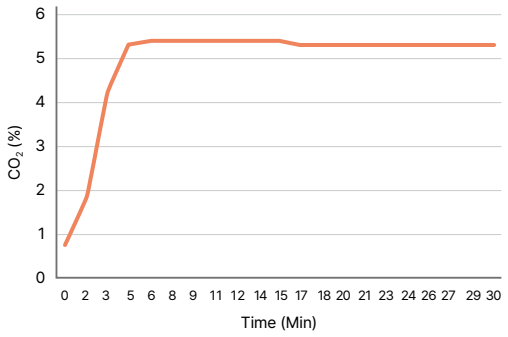
Dual Beam NDIR CO_2 Sensor provides accurate and reliable CO_2 concentration control.

Alarm System alerts users to issues related to temperature, CO_2 concentration, or door openings.

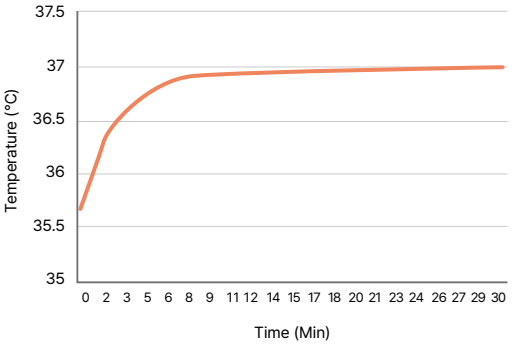
7" LCD touchscreen enables real-time graph monitoring and USB data transfer for seamless data management.

Real-time graph monitoring allows for quick identification of issues.

Rapid return to set values upon CO_2 or temperature changes, ensuring stable experimental conditions.



Graphs demonstrate CO_2 concentration recovery after the incubator door was opened for 30 seconds.



Graphs demonstrates temperature recovery after the incubator door was opened for 60 seconds.

ARA P150

ARA P170

Specification

Model	ARA P150	ARA P170
Capacity	150 L	170 L
Temp. Control System	Microprocessor PID	
Temp. Range	Amb. +5~50°C	
Temp. Accuracy	±0.3°C	
Temp. Uniformity	±0.2°C	
Temp. Recovery Rate	< 10 min	
CO_2 Control	Dual beam NDIR	
CO_2 Accuracy	± 0.1% (at 5%)	
CO_2 Range	0~20%	
CO_2 Recovery Rate	< 7 min	
Humidity Range, %RH	92~98% with Water Pan	
Shelves	3 (Max. 11)	3 (Max. 8)
Door Open Left / Right	Factory installed (Left to Right)	On Site (Basically Left to Right)
Data Tracking / Transfer	Maximum 240 hours continuous (Automatic) / USB (Manual)	
External Dimension (W x D x H)	657 x 741 x 877 mm	720 x 639 x 908 mm
Internal Dimension (W x D x H)	470 x 520 x 610 mm	560 x 470 x 650 mm
Sterilization	-	Dry Sterilization (120°C)

Considerations for Refrigerated / non-Refrigerated Centrifuges

When harvesting microorganisms or other cultured cells, selecting the right centrifuge is critical to maintaining sample integrity and optimizing yield. Cooled centrifuges are ideal for temperature-sensitive samples, as they prevent heat buildup during high-speed centrifugation, safeguarding cell viability and minimizing degradation of proteins, enzymes, or other delicate biomolecules. This makes them indispensable for applications such as DNA/RNA isolation, protein purification, and subcellular fractionation. On the other hand, non-cooled (ventilated) centrifuges are suitable for less sensitive processes where temperature control is not a priority. These centrifuges are efficient and cost-effective for routine tasks, such as harvesting robust microorganisms or separating non-heat-sensitive components. By offering both cooled and non-cooled centrifuge options, we ensure that your laboratory can meet the diverse demands of cell harvesting with precision andreliability.

Optimal average RCF Value of Samples

0 ~ 5,000 xg

Red Blood Cells (RBCs),
Whole cells

6,000 ~ 10,000 xg

Plasmids preps
Nucleic acid preps

12,000 ~ 22,000 xg

Large proteins

24,000 ~ 30,000 xg

Mitochondria

35,000 ~ 55,000 xg

Large Viruses, Bacteriophages,
Exosomes and Microvesicles

Centrifuges that Pairs with Fermentor

1.5L Throughput Cell Harvesting Centrifuge

Supra R17 (Refrigerated)

6 x 250 mL

Max. RPM/RCF
17,000 rpm / 31,050 xg

6L Throughput Cell Harvesting Centrifuge

S12R (Refrigerated)

6 x 1,000 mL

Max. RPM/RCF
12,000 rpm / 22,265 xg

Exosome Centrifuge Supra R30 and Ultra 5.0

The Exosome Centrifuge is a vital tool for isolating high-purity exosomes from fermentation media and CO_2 incubator cell cultures. Designed for seamless integration, it supports microbial and mammalian workflows, enabling efficient exosome production for diagnostics, therapeutics, and advanced research. With high-speed ultracentrifugation it ensures reliable results and enhances your lab's capabilities.

Supra R30 (Refrigerated)
Over 100,000 xg can be applied with 50mL, 15mL tube

Ultra 5.0 (Refrigerated)
Capable of separating cell components at 250,000 xg with 6 x 38.5 mL

Centrifuges that Pairs with CO_2 Incubator

Low Throughput Cell Collection Centrifuges

T04B (Air-ventilated)

8 x 50 mL
12 x 15 mL

Fixed-Angle Rotor
Max. 4,000 rpm / 2,826 xg

Swing-Out Rotor
Max. 4,000 rpm / 2,774 xg

T05R (Refrigerated)

8 x 50 mL
12 x 15 mL

Fixed-Angle Rotor
Max. 5,000 rpm / 3,983 xg

Swing-Out Rotor
Max. 5,000 rpm / 4,218 xg

Large Throughput Cell Collection Centrifuges

Combi 508 (Air-ventilated)

20 x 50mL
64 x 15mL

Fixed-Angle Rotor
Max. 8,000 rpm / 8,279 xg

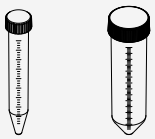
Swing-Out Rotor
Max. 4,000 rpm / 3,515 xg

Combi R515 (Refrigerated)

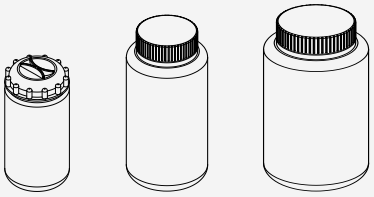
20 X 50ML
64 X 15ML

Fixed-Angle Rotor
Max. 15,000 rpm / 25,353 xg

Swing-Out Rotor
Max. 4,500 rpm / 4,392 xg



15 mL / 50 mL
Conical Tubes



Harvesting Bottles

hanil

68 years of Dedication & Trust
ihanil.com

Centrifuge

Concentrator

Freeze Dryer

CO_2 Incubator

Magnetic Stirrer

Roller Mixer

Shaker

Deep Freezer

Suzhou Jingyun Pharmaceutical & ARA P170 CO_2 Incubator

Partnering for Excellence & Collaboration

Subscribe to
A R A CONNECT.

A R A CONNECT is a collaborative newsletter of GY-ROZEN and Hanil Scientific. We aim to bring our global partners closer together, going beyond product updates to share valuable insights and success stories. Through these stories, we hope to highlight and to inspire new opportunities and strategies within your markets.

Subscribe >

hanil

HANIL SCIENTIFIC INC.
T. +82-2-3472-0727 | F. +82-31-985-9158
sales@ihanil.com | techsupport@ihanil.com
www.ihanil.com

DISTRIBUTION