

Genizer

www.Genizer.com

Genizer

SOLUTIONS FOR NANOMATERIALS

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WHAT WE OFFER

Genizer™ is committed to provide best in advanced nano-equipment to meet the needs of the pharmaceutical, cosmetic, biotechnology and nanomaterial industries.



AROUND THE WORLD

Located in Los Angeles, serving the world



Genizer™ was founded in 2009 by pharmaceutical scientists with more than 10 years professional experience in nanotechnology and biotechnology. With a mission to support more scientists and engineers worldwide, Genizer is committed to supplying high quality and best advanced high pressure homogenizers and liposome extruders, as well as other nanotechnology equipments and services with the best value to meet the needs of the pharmaceutical, cosmetic, fine chemistry, food, beverage, nutrition, biotechnology and nano-material industries.

COPROATE

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HIGH PRESSURE MICROFLUIDIZATION HOMOGENIZER NANOGENER

LABORATORY

POPULAR MODEL

NanoGenizer™ is a specialized device in the field of nanotechnology that utilizes dynamic high-pressure microjets, ultrahigh-frequency shear, high-energy impingement (high-speed jet collision), and cavitation effects to achieve nanoscale particle size reduction and accomplish goals such as uniform dispersion, fragmentation, emulsification, and encapsulation of active substances.

It is applicable to various fields such as pharmaceuticals, cosmetics, food, and new energy for the preparation of liposomes, nanodroplets, microspheres, nanomicelles, albumin nanoparticles, collagen proteins, conductive catalysts, and novel nanomaterials.



ABOUT THE NANOGENER

NanoGenizer™ utilizes mature and stable high-pressure microjet technology to process liquid or solid-liquid suspension materials. Under the action of an intensifier pump, the material is pressurized, and accurate pressure regulation ensures that the material reaches a set pressure value ranging from 20 MPa to 300 MPa. The pressurized material is then propelled through a diamond microchannel with a fixed geometry, generating a supersonic microjet. Within this specific geometric channel, the material undergoes millions of physical shears per second, enabling nano homogenization, ultra-micro emulsification, nano dispersion, and disruption effects to be achieved.

Intense shear force

NanoGenizer™ offers an unmatched shear rate, ensuring uniform particle size distribution and excellent homogenization performance.



Max. Flow Rate	60 ~ 120mL/min
Min. Sample	1mL
Max. Pressure	15,000 ~ 45,000psi
Weight	~ 35 kg (77 lbs)
Max. Temp.	80°C (176°F)
Power	110V/220V/230V
Cleaning	Flush to Clean



HP Microfluidics
Diamond IV Chamber Technology

Performance
Strong performance up to 45,000 psi

Uniform
Uniform particle size distribution

Efficient
Eco-Friendly low sample volume

Scalable
Compatible with Liposome Extruder

Smart
Touch screen interface
More info in P211

Plug & Play
Using electrical power

Cooling Unit
Real-time cooling Unit

Compact
Movable and Light weigh

Compliance
CE & RoHS Certs

CORE TECHNOLOGY

Genizer high pressure homogenizers excel at reaction chamber technology.

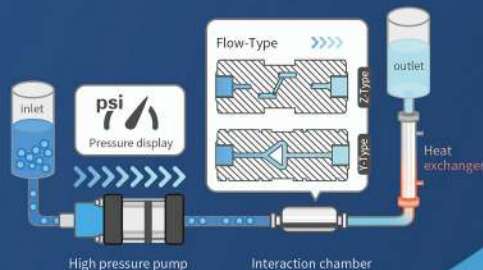
Fixed-geometry micro-channels inside the diamond interaction chamber.



Diamond Interaction Chambers Core Part of Genizer's Homogenizers

NanoGenizer™ utilizes a diamond interaction chamber with a 316L stainless steel exterior and a diamond interior. This design ensures no metal contamination under high pressure.

Materials passing through the diamond interaction chamber of NanoGenizer™ experience ultrasonic microjets generated by diamond microchannels. These microjets, ranging in size from hundreds of microns, reach supersonic speeds of over 500 m/s at ultra-high pressures (up to 400 MPa), surpassing the speed of sound (340 m/s). Within the diamond microchannels, materials undergo intense shear, oscillation, collision, cavitation effects, and impingement, leading to physical, chemical, and structural changes. This process refines and evenly distributes particle sizes, greatly enhancing properties like emulsification, solubility, stability, and transparency.



Technical Advantages

Full Replacement

Full replacement for the chamber of MPC processors



Cooling Option

Real time cooling option for temp sensitive materials



Electro-Polish

Electro-polishing and inner passivation for pharmaceutical applications



High Shear Forces

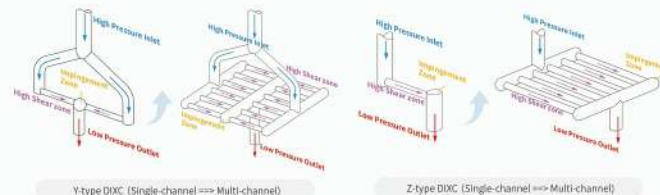
The high-speed jets inside the diamond micropores are subjected to thousands of times more shear than a million times per second



Scale-up

The diamond interaction chamber has two types: "Y" and "Z" (based on the internal diamond channel shape). The microchannels remain constant, ensuring consistent treatment of 1 mL of material per pulse. This yields high repeatability and a narrower particle size distribution.

Microjet technology is scalable, replicating lab results in pilot and production scales. Scaling involves duplicating diamond microchannels while maintaining forces. Increasing flow rate in the same time frame amplifies production while maintaining consistency between lab and factory.



Recommendations



Y-TYPE DIXC

The "Y" Type is more suitable for the treatment of liquid-liquid materials such as emulsification, drug encapsulation and liposome preparation.

Z-TYPE DIXC

The "Z" type is more suitable for the treatment of solid-liquid materials such as cell disruption or nano-dispersion, degranulation, particle size reduction, and mechanical peeling.

Suitable for	Chamber	Pressure suggestions	Suitable for	Chamber	Pressure suggestions
Liposomes (water-in-oil)	F12Y / F20Y	(15,000 - 30,000 psi)	Liposomes (oil-in-water)	H30Z	(3,000 - 8,000 psi)
Emulsions (water-in-oil)	F12Y / F20Y	(15,000 - 30,000 psi)	Emulsions (oil-in-water)	H30Z	(3,000 - 8,000 psi)
Animal cell disruption	H30Z	(2,000 - 5,000 psi)	Algal cell disruption	H10Z	(20,000 - 30,000 psi)
Bacterial cell disruption	H10Z	(10,000 - 25,000 psi)	Yeast cell disruption	H10Z	(20,000 - 30,000 psi)
Nanosuspensions	F12Y / H10Z	(10,000 - 30,000 psi) (15,000 - 30,000 psi)	Nanodispersion	H10Z	(10,000 - 30,000 psi)

APPLICATION AND INDUSTRIES

Genizer™ uses knowledge and experience to give formulation development experts more alternatives and capacities for cell disruption, emulsification and particle size reduction quickly and easily. Our team is ready to be working with you helping on the best nano material solution — employing the appropriate high pressure equipment and optimal processing parameters — for your unique and favorable formulation.

Genizer™ high pressure homogenizer are capable of achieving consistent and scalable results in the areas of nanoemulsions, liposome, dispersion, cell rupture and nano particle size reduction. Our high-pressure homogenizers are used extensively by leading companies in the pharmaceutical, biotechnology, chemical, energy, cosmetic/cosmeceutical and food/nutraceutical industries.



Nanoemulsions

Superior interaction chamber technology to nano-size the particles and yield extremely small nanoemulsions



Particle Size Reduction

Genizer™ high pressure homogenizers stand alone in their ability to achieve uniform particle size distribution



Liposomes

Genizer™ technology successfully processes Liposomes in a quick and mild way for liposomal formulation



Cell Disruption

Achieve efficient cellular lysis and disruption, which allows for easiest purification in the downstream



Lipid Nanoparticles

Genizer™ is capable of manufacturing Lipid Nanoparticles (LNP)



Polymer Nanoparticles

The optimized technology for producing nano-scale, and filterable Polymer Nanoparticles



NUTRACEUTICAL



BIOTECHNOLOGY



FOOD



ENERGY



GRAPHENE



VACCINE



COSMETICS



LIPOSOMES



FAT EMULSION



INK

ADVANTAGES IN COSMETIC PROCESS DEVELOPMENT

Cosmetic formulations often suffer from poor compatibility, greasiness, irritation, oxidation, low absorption, and unsatisfactory skin feel.

High-pressure homogenization reduces particle size to the submicron scale, creating stable nanoemulsions and suspensions with precise control. The result is long-lasting stability, a finer texture, and visually appealing forms—transparent, gel-like, bluish, or milky—that help products excel in a competitive market.



High Shear



Nutrient Recovery



Nano Delivery



Fine Dispersion

Ultra-high shear achieves nano-scale dispersion for finer texture.

Breaks cells to release actives like Bifida ferment lysate and plant extracts.

Encapsulates vitamins, peptides, and antioxidants in lipid carriers.

Protects proteins and passes 26G micro-needles without clogging.



We offers expert nano-carrier technology and formulation support for fast cosmetic product development and commercialization.



Content	7-14% lemon oil, and various other essential oils
Composition	Essential oils, phospholipids, polyols, water, etc.
PSD	Average particle size 130-200 nm

Content	6% ceramide
Composition	Phospholipids, polyols, edge activators, oils, water, etc.
PSD	Average particle size 85.3 nm, PI = 0.248

HIGH PRESSURE MICROFLUIDIC MIXING-TEC HOMOGENIZER MIXGENIZER

LABORATORY

DUAL PUMPS

MICROMIXING

MixGenizer has a dual pump head functionality, allowing two separate homogenization process pipelines to prevent cross-contamination between different materials. This feature is beneficial for applications such as CMP polishing fluids, hydrogen fuel cell catalysts, cosmetic emulsions, and make-up, effectively providing the capabilities of two NanoGenizers in one device.



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Max.Flow Rate	100mL/min
Min. Sample	1mL
Design.Pressure	30,000psi
Mixing Accuracy	1%
Mixing Arrange	25%-100%
Weight	~ 58kg (128lbs)
Max. Temp.	80°C (176°F)
Power	110V/220V/230V
Cleaning	Flush to Clean
Warranty	1 year



 MicroMixing HP Microfluidic Mixing Technology	 Performance more than 100 mL/min at 30,000 psi	 Uniform Uniform particle size distribution	 Efficient Eco-Friendly low sample volume	 Scalable Compatible with Liposome Extruder
 Smart Touch screen interface	 Plug & Play Using electrical power	 Cooling Unit Real-time cooling Unit	 Compact Movable and Light weight	 Compliance CE & RoHS Certs

Y-TYPE DIAMOND MIXING CHAMBER

Special designed DIX chamber for MixGenizer

Microfluidics and high-pressure microjet technology integrate for precise mixing and nanosizing. Two-phase samples enter micro-scale diamond microchannels in a "Y"-shaped chip, undergoing shearing and pressure collision for optimal results.

- The microfluidic chip controls minimal contact between phases, preventing heat release or explosive reactions.
- Proportional injection and reaction avoid phase saturation.
- The process achieves high-pressure nanosizing and mixing in a single step.



DUAL PUMPS FOR PILOT SCALE ELECTRIC PILOTGENIZER

PILOT - SCALE

DUAL PUMPS

STAINLESS STEEL

MASSIVE FLOW

PilotGenizer is designed for pilot-scale production at ultra-high pressure and features a microfluidics Diamond Interaction Chamber in the product path. The maximum working pressure is up to 3,000 bar (45,000 psi), with output flow rate up to 30L/hr.

Genizer also provide the Production Scale High pressure homogenizer with **Dual pumps** and Manufacture Scale High pressure homogenizer with **Quadra pumps** for constant pressure.

The Production Scale High press homogenizer can produce flow rate as much as 120L/hour. The Manufacture Scale High press homogenizer can produce flow rate as much as 500L/hour.



ABOUT THE PILOTGENIZER

Using the Diamond Interaction Chamber technology, the PilotGenizer is capable of generating high shear level, and achieving significant particle size reduction and uniform particle distribution.

No moving parts in the core interaction chamber, the PilotGenizer ensures that the every milliliter get the same high shear treatment from your laboratory to pilot plant.

PRODUCT PARAMETERS

Max.Flow Rate	30L/hr (45kpsi) 70L/hr (20kpsi)
Min. Sample	200mL
Max.Pressure	45,000psi
Weight	~ 350kg.
Max. Temp.	80°C (176°F)
Power	380V/430V
Cleaning	Flush to clean/CIP/SIP



Microfluidics
Diamond IX Chamber Technology



Performance
Strong performance up to 45,000 psi



Uniform
Uniform particle size distribution



Efficient
Eco-Friendly low sample volume



Safety
Chemical sanitary material



Smart
Touch screen interface
More info in P21



Cooling Unit
Real-time cooling Unit



Scalable
Compatible with Liposome Extruder



FDA Compliant
Compliance with FDA Audit Standards



Regulated
Pharma Regs: CIP/SIP/IQ/OQ

PRODUCTION-GRADE WILL-SERIES

PRODUCTION-GRADE

HIGH-CAPACITY

STABLE

CUSTOMIZABLE

The WILL series high-pressure homogenizer is designed for pilot and large-scale production, using sanitary-grade 316 stainless steel, ceramic, and PTFE to ensure clean, safe operation. Running at up to 45,000 psi with interaction chamber technology, it achieves optimal results in a single pass. With continuous or batch modes, it meets high-volume needs while ensuring reproducible results for industries such as pharmaceuticals and food additives.



APPLICATIONS AND ADVANTAGES ANALYSIS

This breakthrough high-pressure homogenization system provides precise particle size control for pharmaceutical, biotech, and specialty materials industries. With over 200 rigorous tests, it ensures stable operation in harsh conditions. We deliver end-to-end solutions from development to large-scale production, enabling product upgrades and smart manufacturing.

FUNCTIONS:

Immiscible Emulsification

Nano Suspension

Submicron Size Reduction

De-Agglomeration

INDUSTRY:

Pharmaceuticals

Biotech

Chemical

Coatings

Cosmetics

Food Additives

KEY PERFORMANCE

- ✓ **Particle Size:** Uniform submicron distribution
- ✓ **Temperature:** Built-in sanitary heat exchanger
- ✓ **Hygiene:** 316L stainless steel, GMP-compliant
- ✓ **Automation:** PLC control, multiple cycles
- ✓ **Diamond Chamber:** Enhanced pressure resistance

ADVANTAGES OVERVIEW

- 🔧 **Pressurized Feed:** High-Viscosity Optimized
- 🛠️ **Smart Backflush:** Prevents clogging
- 🛡️ **Compliance:** Audit trails, access control
- 📦 **Sample Saving:** Low-Residue Piping
- 📈 **Scalable:** Lab-to-production linear transfer

Type

Type	WILL-120L	WILL-240L	WILL-480L
Capacity	120 L/hr	240 L/hr	480 L/hr
Min. Sample	2 L	4 L	6 L
Pressure	30,000 psi	30,000 psi	30,000 psi
Weight	~1000 kg	~1300 kg	~2200 kg
Core Part	Multi-channel Diamond Interaction Chamber		
Power	18kW	37 kW	55 kW
Plunger Pump	Single	Dual	Dual
Requirements	Hydraulic oil heat exchanger, cooling water for material heat exchanger, compressed air (50-150 psi, 1 scfm @ 50 psi)		



MICROFLUIDIC NANO MIXING SYSTEM

NANOMIXER

LAB MODEL

PRECISE RATIO

VISIBLE MIXING

SERVO DRIVE

NanoMixer is a high-precision microfluidic mixing platform tailored for nucleic acid delivery and nanomedicine R&D.

It enables the preparation of nanoformulations with **precise structure, uniform particle size and high batch repeatability** using micro samples.

Leveraging advanced microfluidic micromixing technology, combined with multi-channel precision structure and programmable parameter control, the platform efficiently and controllably produces mRNA, DNA, siRNA and lipid nanoparticles (LNP).

The entire process requires no vortex or ultrasound assistance, featuring gentler preparation and superior reproducibility.

With GMP-oriented design, it is compatible with various lipid systems, accelerates condition screening and greatly shortens the R&D cycle. It delivers an optimal solution from laboratory basic research to preclinical process development.



Channels	2/3/4 Multi-group Control
Min Sample	0.5 mL
Pressure	200 psi (1.38 MPa)
Flow Range	0-20 mL/min
Max Flow Ratio	1:100
Flow Accuracy	±1.0% RD
Weight	16kg (35lbs)
Working Temp	4-80°C
Limit Temp	-20-121°C
Voltage	110V/220V/230V
Dimension	36(L)×41(W)×48(H) cm
Maintenance	Flush to clean
Warranty	1 year



Uniform, Controllable Size High Batch Stability

Adopting visualized 316L stainless steel microfluidic chips and passive micromixing, it ensures gentle, efficient micro-mixing. It steadily generates 50-200 nm mRNA, DNA, siRNA and LNP. With PDI < 0.15, encapsulation rate > 90% and batch CV < 3%, it meets high-grade formulation R&D standards.

Modular Multi-channel Formulation Compatible

It supports 2/3/4-channel intelligent multi-component control and 2-channel continuous mixing. Flexible modes of A+B, A+B+C and A+B+C+D are optional. Applicable for liposome and multi-component nucleic acid formulation development, it accelerates process screening and boosts R&D efficiency.

Precise Flow, Low Residue Sample Saving

Built with independent precision syringe pumps, it achieves 0.01 mL/min flow accuracy and stable ratio control. Low dead-volume flow path ensures system residual ≤ 150 µL. Integrated auto reversing valve prevents backflow and suck-back for high sample utilization. Minimal 0.5 mL loading volume cuts costly sample consumption.

Wide Precise Temp Optimize Lipid Transition

The system features wide temperature control of 4 °C-80 °C, suitable for lipid phase transition sensitive systems. It precisely regulates nucleation and particle growth during LNP formation, improving encapsulation stability, particle size distribution and experimental reproducibility.

HAND DRIVEN HOMOGENIZER HANDGENIZER

LABORATORY

HAND DRIVEN

POTABLE

Portable hand driven homogenizer for concept testing up to 30,000 psi.
Low-cost high pressure homogenizer
Portable design delivers the light weight and small dimensions
Convenient hand driven without compressed gas
A better choice for small-scale formulation screening
An alternative to the high pressure homogenizers driven by compressed air



PRODUCT PARAMETERS

Max. Flow Rate	25mL/min
Min. Sample	1mL
Max. Pressure	30,000psi
Mixing Arrange	25%-100%
Weight	~15kg (32lbs)
Max. Temp.	80°C (176°F)
Power	Hand Driven
Cleaning	Flush to Clean



Microfluidics
Diamond IX Chamber
Technology



Performance
Ultra-high pressure up
to 30,000 psi



Compact
Movable and Light
weight



Efficient
Eco-Friendly
low sample volume



Scalable
Compatible with
Liposome Extruder

EASY TO CONNECT

Compatible with liposome extruders



Combined With DIXC



Combined With DIXC & Online Extruder

DIFFERENT POWER SOURCES LIPOSOME EXTRUDERS

BIOLOGICAL

PHARMACEUTICAL

FOOD

MATERIALS

With the advancement of cosmetics and pharmaceutical formulation technologies, liposome technology is rapidly developing. Particle size control is crucial in liposome research.

Genizer™ offers a range of liposome extrusion devices. These include manual extruders powered by hand-assisted propulsion, pneumatic extruders powered by nitrogen gas, and online extruders that connect to homogenizers to achieve further homogenization effects. These devices provide diverse solutions for particle size control in liposome research.



Hand Driven Liposome Extruder

Designed For Small Samples

Gas Tight Syringes	0.5 to 2.5 mL
Max. Pressure	500 psi
Membrane Size	19 mm
Temp. Control	Optional for Cooling



Jacketed Liposome Extruder

Air Powered Liposome Extrusion Unit

Capacity Range	10 ~ 3,000 mL
Max. Pressure	1,500 psi
Membrane Size	25, 47, 90, 142 mm
Temp. Control	Jacketed thermo barrel



Online Liposome Extruder

Scale Up to Production Level

Capacity Range	25 mL ~ 20 L
Max. Pressure	3,000 psi
Membrane Size	25, 47, 90, 142, 293 mm
Temp. Control	Jacketed thermo barrel



MULTI ONLINE LIPOSOME EXTRUDER SYSTEM

PRODUCTION-GRADE

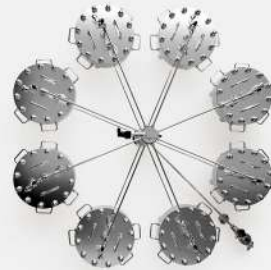
SANITARY

CUSTOMIZABLE

The multi-online liposome extruder system uses multiple pharmaceutical-grade 316L stainless steel units connected by high-pressure tubing and powered by PilotGenizer homogenizers. With PLC control for real-time monitoring of temperature, pressure, and flow, it ensures stable, efficient production. The system produces 10 to 200 liters of liposomes per hour, offering high flexibility and scalability for large-scale manufacturing.

PRODUCT PARAMETERS

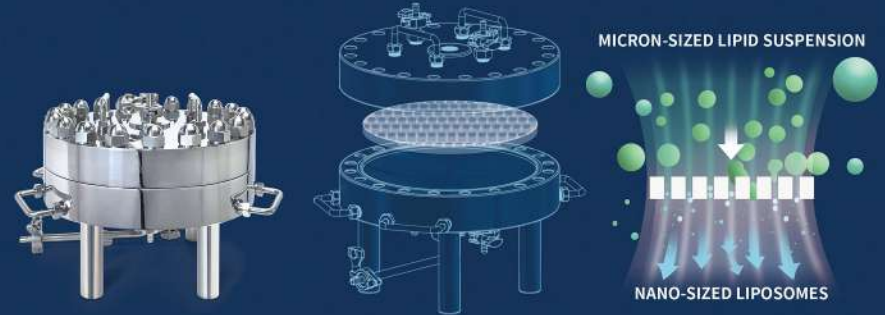
Design Pressure	3,000psi
Final Particle Size	50 - 800 nm
Max. Concentration	200 mg/ml
Operating Capacity	50 - 3,300 ml/min
Operating Temperature	-4°C - 80°C
Product Materials	316L stainless steel
Working Conditions	Connected to HPH
Material Standards	Pharmaceutical-grade



180CM

CORE PART OF THE SYSTEM

This unit is the core of the system, featuring key components such as the feed inlet, extrusion membrane, filter support, and outlet. All parts in contact with materials are made of pharmaceutical-grade 316L stainless steel to ensure high hygiene standards during nanoformulation. Materials pass through the precisely sized extrusion membrane and undergo multiple extrusion cycles for uniform particle size refinement.



DUAL LASER SOURCES DLS TECHNIQUE PARTICLE SIZE ANALYZER

HIGH PRECISION

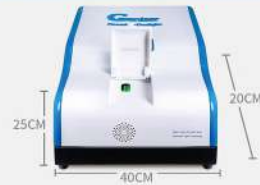
DLS DUAL-WAVELENGTH

DYNAMIC MONITORING

WIDE APPLICABILITY

Laser particle sizer with dual wavelength especially designed for submicron and nano particle size testing. High detection sensitivity, accurate precision and rapid measurement. Blue laser and green laser for more applications. Real-time detection of dynamic changes of the sample, Fully automatic operation.

Size Range	1nm-10 μ m
Concentration Range	0.1 mg/mL-100 mg/mL
Temperature	0°C-79.9°C \pm 0.1°C
Sampling Time	Less than four minutes
Detector	Photomultiplier tube (PMT)
Weight	15kg



Assembled DIXCs Unit

Used at industrial scales

Pressure Range	20,000 – 45,000 psi
Sanitary	316L stainless steel, diamond
Cooling Option	Real-Time Cooling system

The fixed geometry within the DIXC is intended to create a uniform processing profile so that all materials will be processed with equal disruptive forces. Single-slotted interaction chambers have a single microchannel and are ideal choices for small batch research, while the multi-slotted interaction chamber comprises multiple microchannels in parallel, which can be used at industrial scales, by increasing the flow rate through the DIXC but with equal processing forces.



Sanitary Heat Exchanger

Highly efficient designs

High pressure sanitary shell and tube heat exchangers. Highly efficient designs, with shell diameters ranging from 3/4" to 2" produce heat transfer rates up to 60kW with flow rates up to 1000L/hr.

Max. Pressure	5,000 psi
Sanitary	316L stainless steel
Transfer Area	20-56 cm ²



Dual-Parameter Transmitter

Temperature - Pressure Transmitter

Incorporating both a temperature sensor and pressure sensor into a single transmitter package, providing customers with significant cost reductions. Furthermore, it saves installation time and space, especially suitable for those high pressure applications in which dual measurements are required.

Temperature Range	0-150°C (300°F)
Pressure Range	0-20,000psi (150Mpa)



HIGH - PRESSURE PROGRAMMING CONTROL SYSTEMS®

PLC SYSTEM

The PLC system is a real-time user-friendly intelligent system specially developed for the Genizer homogenizer.

It is used to help customers more intuitively view the changes in temperature, pressure and other data during the operations.

It's available for operators to adjust operational parameter, including the stroke volume and circulation passes according to the needs of customers to better complete the experiment.



-  Touch screen control panel
-  Display of flow rate and time
-  Pressure control
-  Auto stop on volume time or pressure
-  Precision volume control
-  Overload protection

SPARES



Inlet & Outlet Check Valves



High Pressure Fittings



Bearings for Plunger



Plunger Seal Ring Sets



Track-Etch Membranes



Pressure Gauges