



**Mechanimix**

# Reactors | RP Series

Professional Mixing Technologies

## RP Series Overview (Using for Lab-Scale or Pilot Plant)

The RP Series is our precise response to the needs of R&D, quality control, and lab-scale production. With a compact, hygienic design, stable temperature and pressure control, and compatibility with vacuum- and overpressure-based processes, these reactors provide a reliable environment for sensitive reactions.

Diverse modular features and an adaptable design enable RP to deliver repeatable, scalable results in both laboratory and pilot settings. Whether you aim to optimize formulations or scale up to industrial production, RP—with its small footprint, high safety, and precise control—stands as your trusted partner at every stage of process development.

Working volume	5-100 (L)
Temperatures	-10 up to 200°C
Pressure	40 mbar to 5 bar
Viscosity	up to 1,000 Pa.s
Motor Power	Up to 10 [kW]
Materials	Stainless Steel 304 and 316, Copper, Brass, Hastelloy, etc.
Sealing options	Single, Double and Dry Running Mechanical Seals, Lip seals and Magnetic Solutions
Industries	Pharmaceutical, Chemical, Food & Beverage, Cosmetic and...

**RP-50**



# General Properties

## Professional Mixing Technologies

### Features

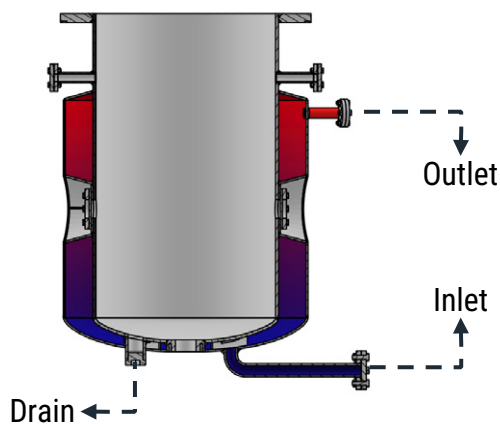
- Modular design – interchangeable vessels and accessories
- Precise temperature & pressure control
- Double jacket for heating/cooling with fast response
- Integrated agitator with VFD speed control
- Optional gas sparging and gas–liquid reaction setup
- Full instrumentation: temperature, pressure, level, pH (optional)
- PLC/HMI control with data logging and recipe management
- CIP/SIP-ready design, hygienic surface finish
- Modular skid frame with manual or motorized lifting system

### Advantages

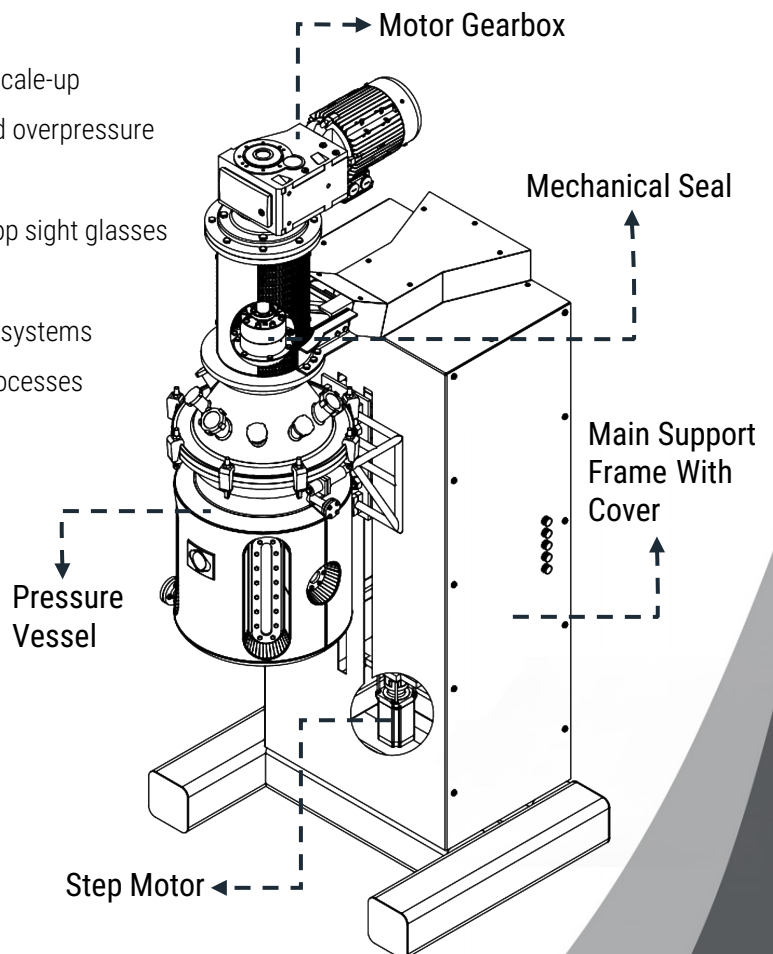
- Compact footprint and ergonomic operation
- Repeatable and scalable process conditions
- Flexible configuration for R&D, formulation, and scale-up
- Safe operation with interlocks, limit switches, and overpressure protection
- High visibility and accessibility – optional side/top sight glasses
- Quick vessel exchange and easy cleaning
- Compatibility with analytical sensors and dosing systems
- Suitable for corrosive, pressurized, or vacuum processes
- Quiet, vibration-free mechanical design
- Long service life and low maintenance

### Applications

- Research & Development (chemical, pharmaceutical, cosmetic, food)
- Process optimization and formulation studies
- Scale-up and pilot preparation
- Gas–liquid and liquid–liquid reactions
- Mixing, homogenization, and emulsification
- Crystallization and polymerization tests
- Temperature- or pressure-dependent synthesis
- Quality control and sample preparation



Heating and Cooling Compartment



# Configuration

## Professional Mixing Technologies

### RP Series Technical Configuration

Model Name	RP-5	RP-25	RP-50	RP-100
Working Volume (L)	5	25	50	100
Total Volume (L)	7	30	60	120
Vessel Weight (Kg)	30	80	140	250
Design Pressure (bar)	5	5	15	15
Explosion-proof 	✓	✓	✓	✓
Vacuum System	✓	✓	✓	✗
Double-wall Jacket	✓	✓	✓	✓
Internal coils	✓	✓	✗	✗
Coaxial options	✗	✗	✓	✓
Near wall agitation	✗	✗	✓	✓

### Customizable Vessel Design Options

Our systems can be supplied with a wide variety of vessel configurations, tailored precisely to process requirements and customer preferences. Each vessel is engineered to ensure optimal performance, durability, and compatibility with the intended application.

### Motor-Gearbox Selection

Various combinations of motor and gearbox power can be utilized in a laboratory reactor setup to meet specific process requirements

<b>Vessel Configuration</b>	Working/Total volume	Net/total ratio per process
	H/D ratio	Optimized for mixing & residence time
	Custom H/Ø	Matches space limits & skid layout
	Internal baffles	Flow control, anti-vortex
	PTFE scraper	Wall cleaning & uniform heat transfer
	Side/Top sight windows	Borosilicate; process visibility

<b>Optional Modules</b>	Condenser & receiver	Solvent recovery/vacuum relief
	Sterile filter	Gas/air line protection
	Vacuum pump	Achieve target vacuum
	Load cells	Accurate batch/charge weighing
	Camera/Lighting	Live process monitoring

# Options

## Professional Mixing Technologies

### Gas Dispersion & Mixing Capability

Our lab-scale reactors are designed to enable simultaneous agitation and gas injection, ensuring efficient mass transfer and enhanced reaction kinetics for gas-liquid or gas-liquid-solid systems. This feature allows precise control of gas distribution, bubble size, and residence time, which are critical for optimized reaction efficiency.

This configuration ensures optimized mass and heat transfer, enhanced process control, and scalability from laboratory units to pilot or industrial-scale systems.

#### Available Gas Mixing Configurations Include

Sparger tube injection	gas introduced through a perforated or sintered tube at the reactor bottom for fine and uniform bubble dispersion.
Hollow-shaft or gas-agitating impeller system	gas is supplied through the agitator shaft or impeller hub for highly efficient dispersion and reduced coalescence.
Gas-inducing impeller	a self-inducing impeller that draws gas directly from the reactor headspace, eliminating the need for external gas feed and simplifying system design.
Multi-point injection system	suitable for larger or high-viscosity reactors to achieve homogeneous gas dispersion across the entire volume.

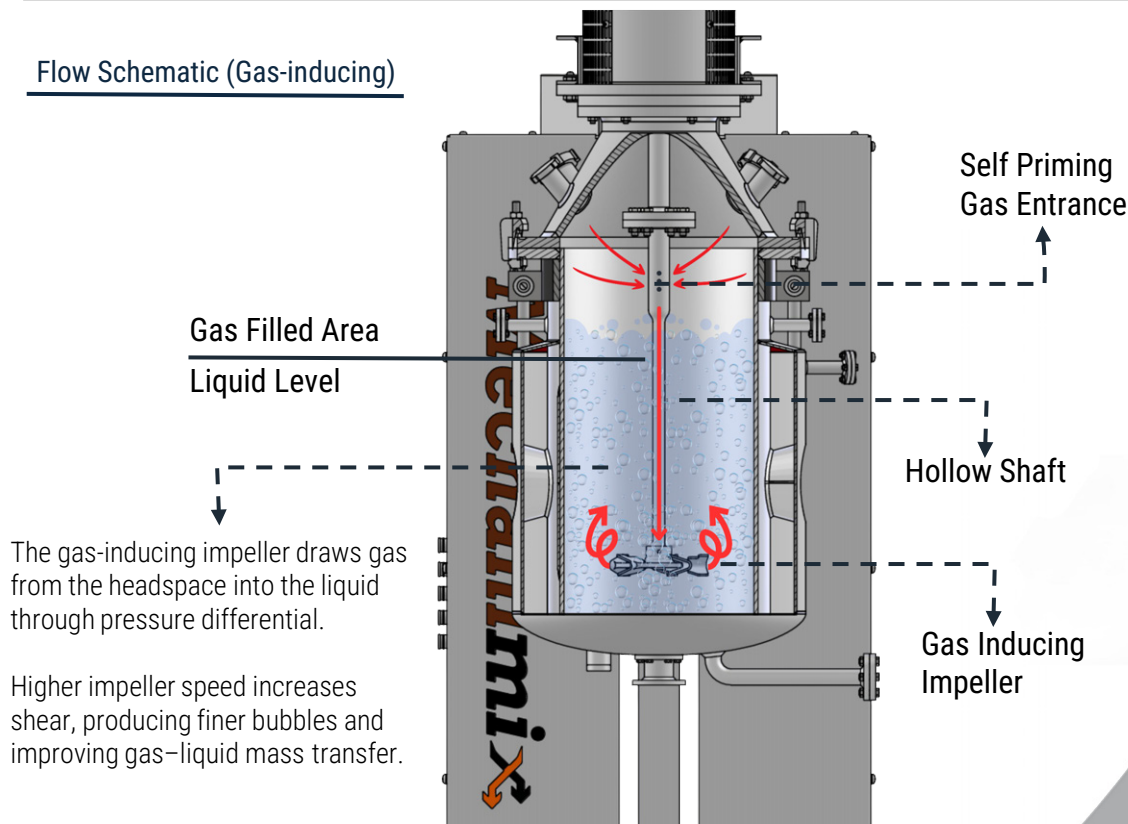
#### ❖ Adjustable flow and pressure control

integrated with flowmeters, regulators, and safety valves for precise gas dosing.

#### ❖ Compatibility with various gases

suitable for inert, reactive, or corrosive gases with materials such as stainless steel or corrosion-resistant alloys.

#### Flow Schematic (Gas-inducing)



# Options

## Professional Mixing Technologies

### Vessel Lifting & Motion Systems

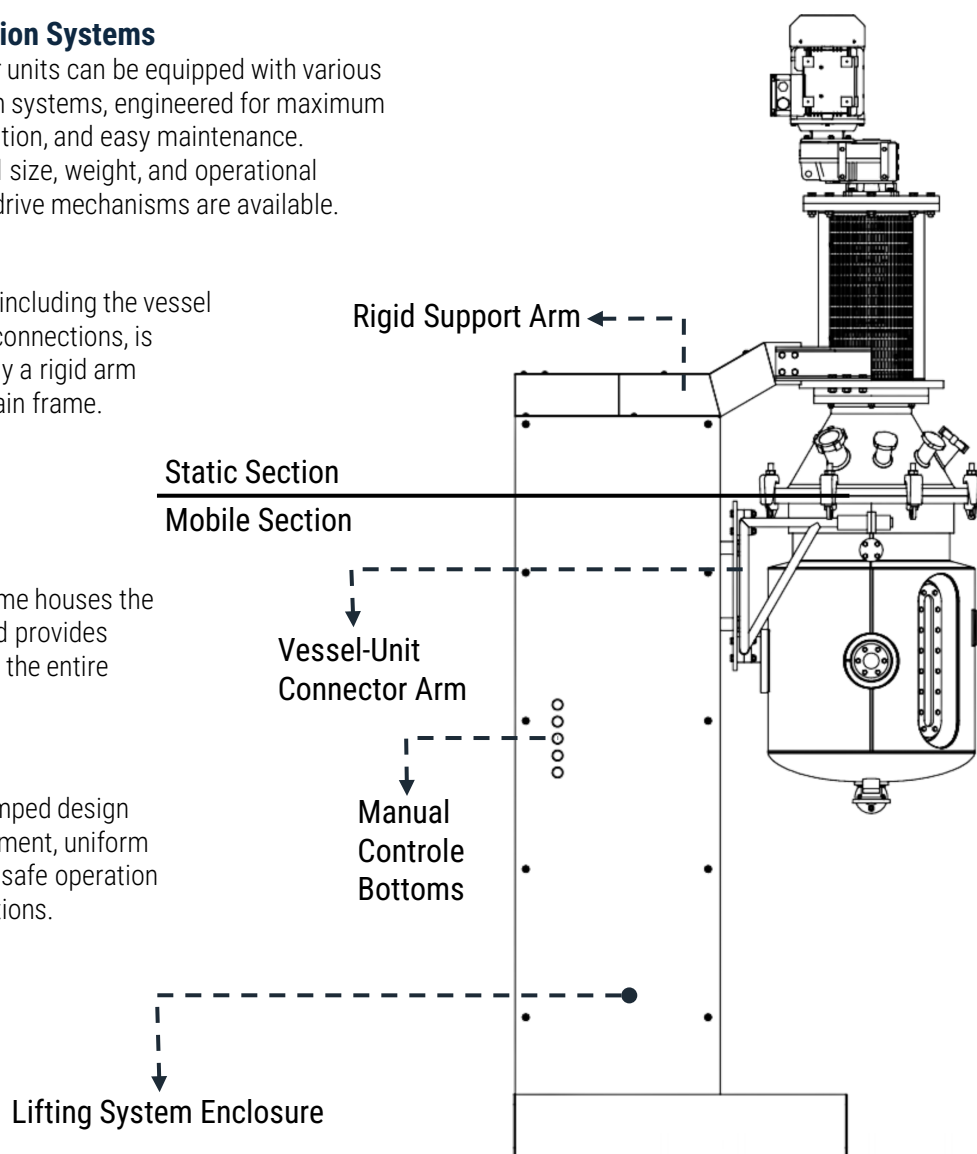
Our lab and pilot reactor units can be equipped with various vessel lifting and motion systems, engineered for maximum safety, ergonomic operation, and easy maintenance.

Depending on the vessel size, weight, and operational requirements, different drive mechanisms are available.

- ❖ The upper assembly, including the vessel head, drive unit, and connections, is statically supported by a rigid arm integrated into the main frame.

- ❖ The main support frame houses the lifting mechanism and provides structural stability for the entire reactor unit.

- ❖ Its rigid, vibration-damped design ensures precise alignment, uniform load distribution, and safe operation under dynamic conditions.



System Type	Principle	Advantage
Cable / Wire-Rope	robust and reliable design using steel wire ropes for transferring high loads with minimal elongation and excellent mechanical durability.	<ul style="list-style-type: none"> <li>– High load capacity with low structural weight</li> <li>– Smooth, quiet motion with distributed lifting points</li> <li>– Works in manual, electric, or hybrid configurations</li> </ul>
Hydraulic	Pressurized fluid in a hydraulic cylinder lifts or lowers the vessel smoothly and steadily	<ul style="list-style-type: none"> <li>– Damped, stable movement under varying loads</li> <li>– Very high lifting capacity for heavy reactors</li> <li>– Manual or motorized pump options</li> </ul>
Lead-Screw	Principle: Vertical motion is generated by a screw-and-nut assembly, operated manually or by a geared motor.	<ul style="list-style-type: none"> <li>– High precision and rigid linear movement</li> <li>– Clean, dry operation (no hydraulic fluid)</li> </ul>

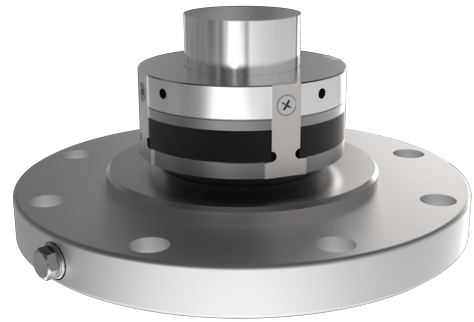
# Sealing Options

## Professional Mixing Technologies

### Sealing Solutions for Reactors

Reliable sealing is essential in reactors to prevent product leakage, maintain pressure integrity, and ensure long-term performance.

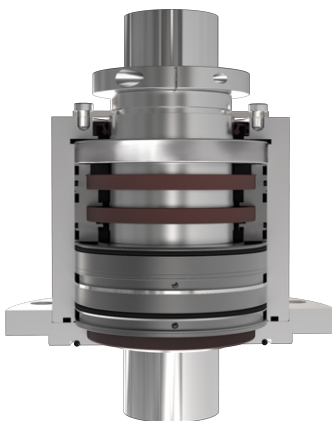
We offer a full range of sealing solutions tailored to process pressure, product characteristics, and operational demands, ensuring compatibility with any process environment – from low pressure blending to high-pressure or vacuum condition, hazardous, or sterile conditions.



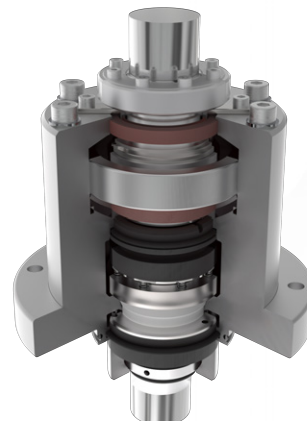
Single-Acting Mechanical Seal

### Mechanimix Offered Seals

Seal Type	Application	Features
Rotary Seal	– For non-pressurized, low-viscosity, and non-hazardous media	– Economical and simple – Minimal maintenance
Single Mechanical Seal	– Moderate duty, low to medium pressure	– Compact, cost-effective – Available with dry run protection – Optional quench or lubrication chamber
Double Mechanical Seal	– High-pressure, hazardous, toxic, or sterile media	– Barrier or buffer fluid supported – Ensures zero leakage to atmosphere – Ideal for pharmaceutical, chemical, or solvent-based processes
Dry-Running Seals	– Advanced applications requiring low product contamination	– Contact-free, low wear – Ideal for clean-in-place (CIP) and sterilize-in-place (SIP) operations
Magnetic Drive Sealing	– Maximum containment for ultra-pure or aggressive media	– No mechanical seal required – Zero leakage design – Higher capital cost, but minimal maintenance



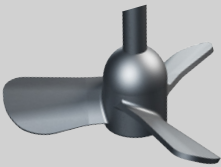
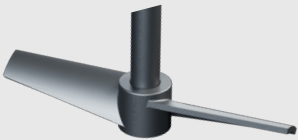
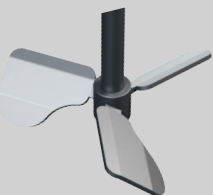

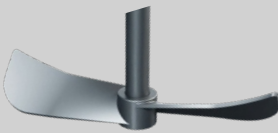

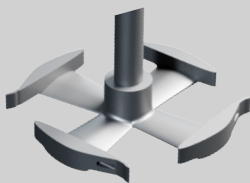
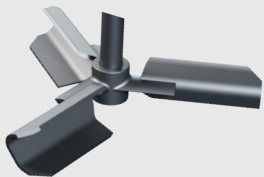
Dry-Running Mechanical Seal



Double-Acting Mechanical Seal

# Advanced Impellers

## Professional Mixing Technologies

Model	View	Features
<b>HWM</b>		<ul style="list-style-type: none"> <li>– Axial Thrust with Wide Blade Impeller</li> <li>– Application in Low and Medium Viscosity Systems</li> <li>– Homogeneous Energy Distribution</li> <li>– Minimum Local Turbulence</li> </ul>
<b>HM</b>		<ul style="list-style-type: none"> <li>– High Flow at Bottom for Solid Suspension</li> <li>– Efficient Mixing in Low/Medium Viscosity</li> <li>– Enhanced Wall Heat Transfer via Axial Flow</li> <li>– Single and Multiple Impeller Arrays</li> <li>– Double, Triple or Quadruple Blade Design</li> <li>– Adjustable Blade Angle</li> </ul>
<b>HWM-B</b>		<ul style="list-style-type: none"> <li>– Low, Internal Cutting Force</li> <li>– High Suspension</li> <li>– Homogenizing Function</li> <li>– Working in Gaseous Environments</li> <li>– Supporting Heat Transfer</li> </ul>
<b>HVM</b>		<ul style="list-style-type: none"> <li>– For High Viscosity or Critical Rheology Fluids</li> <li>– Upward or Downward Pumping as Needed</li> <li>– Ideal for Blending, Heat Transfer, or Solid Incorporation</li> <li>– Mixes to Ensure No Dead Zones Form</li> <li>– Near wall agitation option</li> </ul>
<b>TVM</b>		<ul style="list-style-type: none"> <li>– Application in Low Viscosity Systems or Turbulent Flow Regime</li> <li>– Excellent Axial Thrust Velocities</li> <li>– It Does Not Leave Dead Spots Inside the Tank Inner Wall</li> <li>– Auxiliary impeller enhancing horizontal flow &amp; circulation in tall tanks</li> </ul>
<b>GDM</b>		<ul style="list-style-type: none"> <li>– High Suspension Performance Even at High Gas Flow Rates</li> <li>– Radial Thrust Impeller</li> <li>– Main Gas Distributor Role</li> <li>– Works Easily with Gas in Internal and External Power Supply</li> </ul>
<b>GM</b>		<ul style="list-style-type: none"> <li>– High Gas Supply Capacity</li> <li>– High Contact Surface Area</li> <li>– Specially Shaped Gas Channels</li> <li>– Homogeneous Energy Distribution</li> <li>– Optimum Suction Power</li> </ul>
<b>GDS</b>		<ul style="list-style-type: none"> <li>– Combines Strong Radial and Axial Flows</li> <li>– Excellent Gas Distribution Performance</li> <li>– Fast Mixing</li> <li>– Low Power Consumption</li> <li>– Fully Compatible with <b>Mechanimix</b> GDM</li> </ul>



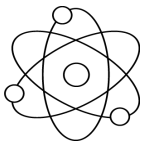
**Mechanimix**

# Scalable Pilot Reactors

Professional Mixing Technologies



Designed for process development, scale-up, and research applications, covering reactor volumes from 5 to 100 L. Handles diverse reaction types, viscosities, and thermal conditions with high accuracy and stability.



**Mechanimix** offers a versatile range of pilot reactor systems engineered for process development, testing, and scale-up across various industries. With multiple configuration and control options, each system delivers the most suitable setup for specific research and process requirements.

