

50 ml Micro Robinson-Mahoney Catalytic Packless Reactor:

Volume: 50 ml

Vessel MAWP*: 5,000 psi @ 650°F (345 bar @ 343°C)
5,000 psi @ 1,000°F (345 bar @ 538°C)

Material of Construction: Hastelloy® C276 / Body, Housing, Basket

* Maximum Allowable Working Pressure



Principle of Operation:

The Parker Autoclave Engineers' 50 ml Micro Robinson-Mahoney Catalytic Packless Reactor is designed to provide all the benefits of small scale chemical research. It allows the research scientist to work with small quantities of catalyst and feedstocks which may be expensive and/or limited in availability. Reduced volumes are safer to work with and minimize waste disposal. In addition, the reactor has reduced dead volume, which minimizes side thermal reactions. The role of the catalyst thus may be more clearly tested.

The catalyst basket design lends itself to easy loading and discharge of catalyst pellets. It is patterned after the larger proven Robinson/Mahoney basket currently available in 300 ml and 1000 ml capacity vessels. The multi phase reactor design is used for time based, laboratory, high temperature and high pressure heterogeneous catalysis experiments with gas/solid phase reactants. Use internal recycle reactors and vary reaction time for catalyst studies in activation, regeneration and durability.

Features:

- Mixer speeds to 5,000 rpm
- Operating pressures as high as 5,000 psi (345 bar) and temperatures as high as 1,000°F (538°C)
- Reduced catalyst and dead volumes
- Available worldwide to meet codes such as ASME, CE (PED), and CRN



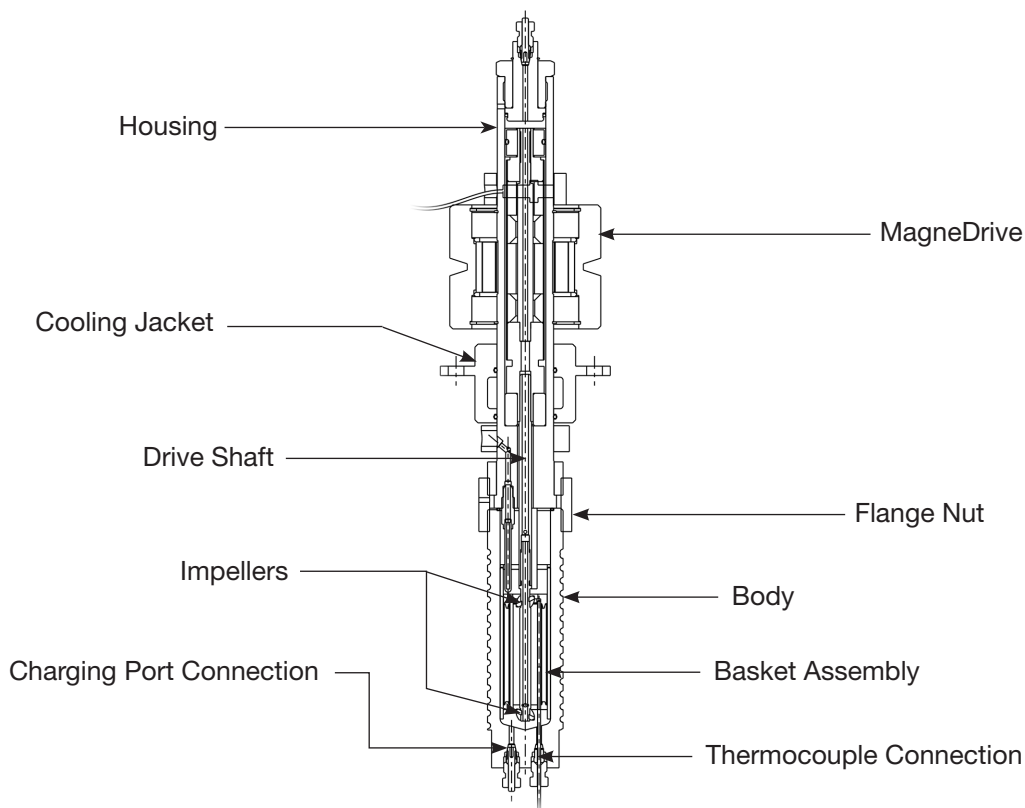
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Standard Equipment:

The micro catalytic reactor internal parts are designed to be used in a standard MicroClave[®] assembly with minimal changes. A complete assembly is available as a standard unit or a retrofit package can be purchased to convert an existing MicroClave[®] into a catalytic reactor.

Micro Reactor Vessel:	Confined gasket closure employs a flange nut to lock body and housing. Body, housing, and flange nut are Hastelloy C-276
Sealing Gasket:	Confined gasket of silver-plated Inconel-X750
Cover:	Cover is integral with the MagneDrive housing. All external body/cover openings except thermowell have SW125 connections (650°F units) or SF250CX connections (1000°F units)
Connection Collar Openings:	Standard openings include: <ul style="list-style-type: none">• One connection for safety head and pressure gauge• One thermowell• One sample tube• Two inlet/outlet connections
Body Bottom Openings:	<ul style="list-style-type: none">• Thermocouple connection (internal bottom temperature)• Process connection
Purge Connection:	1/8" (SW125) gas connection at top of MagneDrive allows for introduction of gas into the vessel.
Pressure Gauge:	Constant reading gauge has 2-1/2" diameter dial with Monel Bourdon tube. Dual face dial reads 0-7500 psi and 517 bar.
Safety Head Assembly:	Hastelloy-C safety head (upstream) uses 3/16" flat rupture disc rated 4,750-5,000 psig @ 72°F, with 1/8" NPT female vent connection through top of bench stand to atmosphere.
Furnace:	External band-type electric furnace. 120 or 240VAC single phase.
Cooling Coil:	External cooling coil can be used for water or air cooling. Stainless Steel coil permits rapid vessel cooling and temperature control.
Thermocouples:	Sheathed thermocouples for direct temperature measurement at the following locations: <ul style="list-style-type: none">• Basket (Catalyst) Temperature• Process temperature above basket• Body OD (over temperature)
Thermowell:	Hastelloy-C tubing thermowell is located inside vessel for direct response to process reactant temperatures. Designed for easy removal.
MagneDrive Packless Drive System:	The AE Micro-Robinson-Mahoney features a packless MagneDrive system. Rare earth magnetics provide high torque mixing capability. Packless magnetic-drive system eliminates leakage, contamination and packing heat generation problems of conventional mixers. It provides continuous high speed rotary agitation without the danger of leakage or the downtime to change worn packing.
Mixing System:	MagneDrive rotary impeller system. Static torque 6 in-lbs; net mixing 0.5 HP @ 5,000 rpm. Special impeller for maximum dispersion.
Available with electric or air motor:	Electric: Variable speed rated 1/4 HP @ 3,450 rpm. 90VDC or 180VDC. Air: 1.7 HP @ 3,000 rpm. Required air pressure 100 psig @ 72 cfm maximum.

50 ml Catalytic Packless Reactor with Micro Robinson-Mahoney Basket:



Technical Specifications:

The fixed annular catalyst basket has baffles inside and outside to control vortices. The rotating shaft is equipped with two impellers that draw fluid into the center of the annulus at the top and bottom and outward through the catalyst bed. The gradient-free design and a long duration circulation capability for the multiple phases has made the Robinson-Mahoney the most widely used design for supported catalyst research with liquids.

Reactants: Liquid/Solids, Gas/Liquid/Solids, Vapor/Liquid/Solids

Typical Reactions: Liquification, Hydro-treating, Catalyst Testing

Basket Screen: 50x50 mesh, 0.009" (0.23 mm) wire and a nominal opening size of 0.011" (0.28 mm)

Inside Diameter: 1" (25.4 mm)

Basket Volume: 0.436 in.³ (7.15 cm³)

Free Volume: 3.05 in.³ (50 cm³)

Design Pressure: 5,000 psig (345 bar)

Maximum Agitator Speed: 5,000 RPM

Version: High Temperature - 1,000°F (538°C)

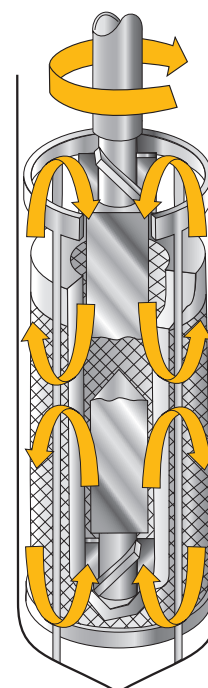
Catalog Number Prefix: CRAHT5HC

Standard Temperature - 650°F (343°C)

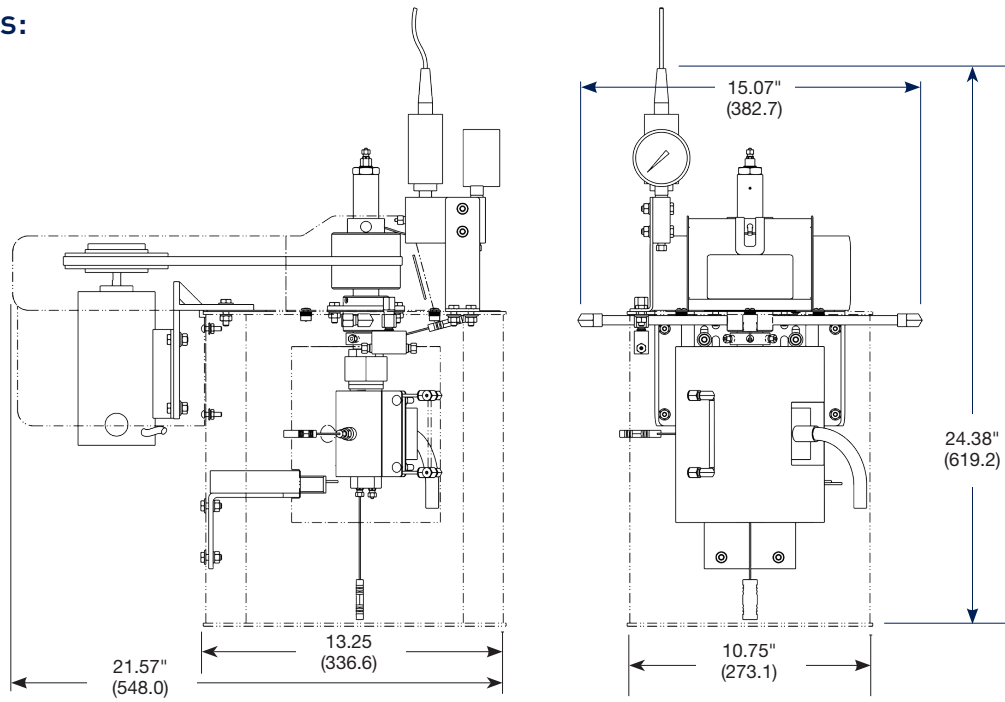
Catalog Number Prefix: CRA5HC

Common Customization: Special wire mesh size, special materials, specific pressure/temperature ratings. ASME code stamp (or CE mark for pressure equipment Directive)

Standard Material: Hastelloy® C-276



Dimensions:



Ordering Guide:

The following reactor assemblies include motor, thermocouples, and electrically heated 1,400°F (760°C) maximum furnace (for the voltage specified in the table). Be advised, motor controls, tachometer display, furnace controls and the display for the thermocouple are purchased as separate items. The Specifications and descriptions found in the drawings referenced in the table below supercede the specification information found in this guide. Consult factory for more information.

Catalog Number	Description SS=ANSI 316 Stainless Steel HC=Hastelloy® C-276	Motor	Power Source	Temperature Rating	Drawing Number	Weight lbs.
CRA5HC05ZH16A	Micro Robinson-Mahoney 50cc HC	Air	120V	650°F (343°C)	40A-3159	77
CRA5HC05ZH16D	Micro Robinson-Mahoney 50cc HC	DC	120V	650°F (343°C)	40A-3160	71
CRAHT5HC05ZH16D	Micro Robinson-Mahoney 50cc HC	DC	120V	1000°F (538°C)	40C-1130	86
CRA5HC05ZH26A	Micro Robinson-Mahoney 50cc HC	Air	240V	650°F (343°C)	40A-3159	77
CRA5HC05ZH26D	Micro Robinson-Mahoney 50cc HC	DC	240V	650°F (343°C)	40A-3160	71
CRAHT5HC05ZH26D	Micro Robinson-Mahoney 50cc HC	DC	240V	1000°F (538°C)	40C-1130	86

NOTES:

The circulating pressure generated by the impellers in the "Micro Series" reactors is low.

Parker Autoclave Engineers makes no claims about the ability to scale-up or correlate "Micro Series" catalytic reactors with any other process equipment.

WARNING

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