



Vessel Products

Complete Product Catalog

Catalog: 06-1196BE

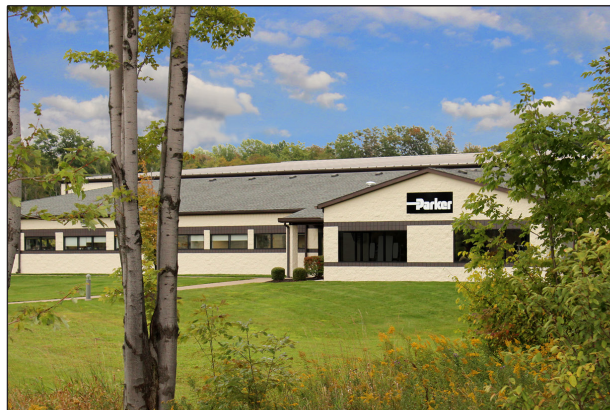
April 2018

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

Parker Autoclave Engineers



Based in Erie, Pennsylvania, Parker Autoclave Engineers is an operation of the Instrumentation Products Division of Parker Hannifin Corporation.

Parker Autoclave Engineer Research was founded by Fred Gasche in 1945 to fill a gap in the world of high pressure and high temperature technology. Parker Autoclave Engineers has created and produced many novel pressure vessel designs as well as significant breakthroughs in high pressure technology such as the MagneDrive®, a magnetically coupled agitator. We have made these developments through commitments to constant innovation and providing the best standards in product quality and service.

Applications include:

Downhole simulation, catalyst research, gas dispersion, liquid blending, solid suspension, monitoring and control of pressures, temperatures, mixing speed, gas flow, reactor functions, high-pressure pumping and much more.

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Mini-Reactor

50 ml and 100 ml



Principle of Operation:

The Parker Autoclave Engineers' Mini-Reactor is a highly capable design incorporating all features found in a full size laboratory reactor at reduced internal volumes. The low cost of full features makes the Mini-Reactor ideal for parallel studies. A lower volume reduces both reactant requirements and disposal costs, while a smaller foot print reduces costly laboratory and fume hood requirements. The 50 and 100 ml volumes share the same closure geometry and the vessel bodies are interchangeable. The elastomer seal allows the Mini-Reactor to achieve high pressure with a finger-tight seal.

General Specifications:

Maximum Allowable Working Pressure: (MAWP)
2,900 psi @ 600°F (200 Bar @ 315°C) Note
Maximum Recommended Operating Pressure:
2,500 psi @ 527°F (172 Bar @ 275°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C

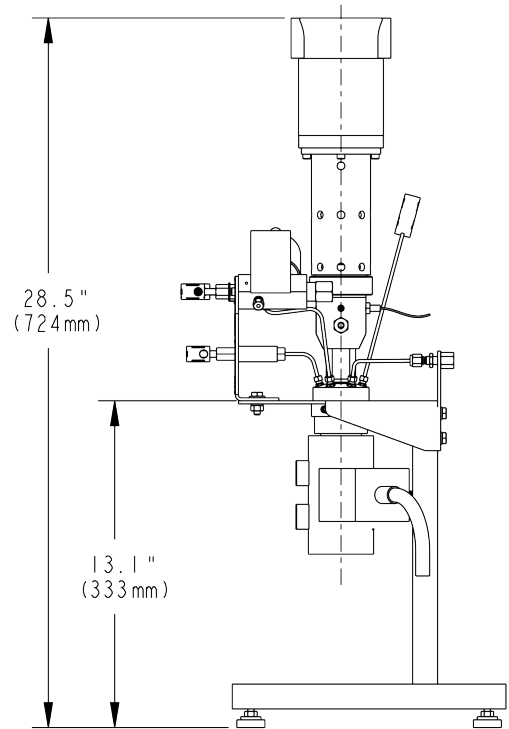
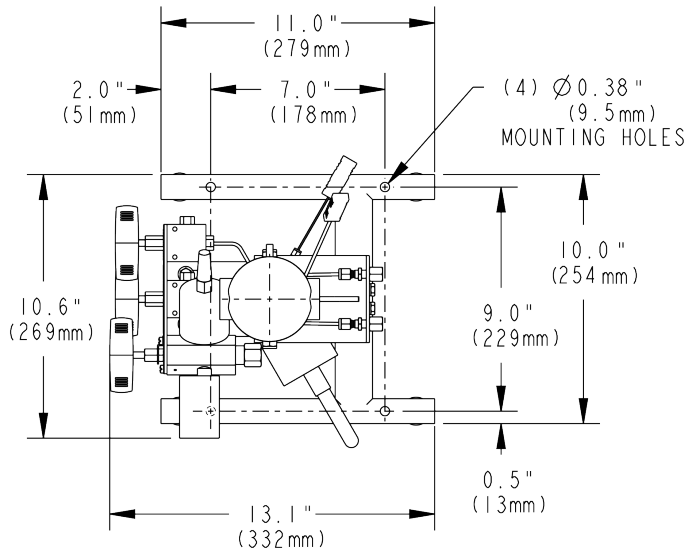
Standard/Optional Unit Features:

- 50 and 100 ml volumes with common closure geometry
- Elastomer seal with finger tight closure make-up
- Easy removal electric heater with over-temperature thermocouple
- Process thermocouple
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 psi gauge, 0-5000 psi pressure transducer)
- Vessel Stand

- Optional: 50 and 100 ml volumes with common closure geometry
- Optional: In-line MagneDrive with 1/8 hp motor, speed sensor, and Dispersimax impeller
- Optional: ASME code stamp or CE Mark



Drawing Details:



Ordering Information:

Part Number Example	PH-M	100	SS	—	MM	NS
Category		1	2		3	4

Example: PH-M100SS-MMNS

Description: 100 ml Mini-Reactor, 316 Stainless Steel with Drive, No Code Requirements

1 - Vessel Volume Code (*)	
050	50 ml
100	100 ml

2 - Material Code (#)	
SS	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer Code	
NS	No Mixer
MM	In-Line MagneDrive Mixer

4 - Pressure Code Requirement (unit voltage)	
NS	No Code (120 VAC)
AS	ASME Code Stamped (120 VAC)
CE	CE Marked (240 VAC)
NE	Export with CRN (240 VAC)

¹ MT = Maximum Temperature. Temperature limits are suggested. Actual performance will vary with chemical compatibility.

² Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

³ Purebon® is a registered trademark of Morgan AM&T

Hastelloy® C is a registered trademark of Haynes International, Inc.

Notes The user should be aware that the 600°F (315°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

Option Kits (purchased separately):

Model #	Description
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Seal Kits (Fluorocarbon supplied with vessel)	
PH-MSE	Ethylene Propylene - MT 300°F (149°C) ¹
PH-ESK	Parafluor Ultra - MT 527°F (275°C) ¹
PH-ESN	Nitrile (Buna N) - MT 250°F (121°C) ¹
PH-ESS	Silicone - MT 450°F (232°C) ¹
PH-EST	PTFE Encapsulated Fluorocarbon - MT 400°F (204°C) ¹
PH-ESV	Fluorocarbon - (MT 450°F (232°C) ¹

Bearing Kits (Purebon 658RCH supplied with vessel) - Quantity 15	
PH-VB#	Fluoropolymer with graphite fiber ²
PH-PB#	Purebon 658RCH (spare) ³

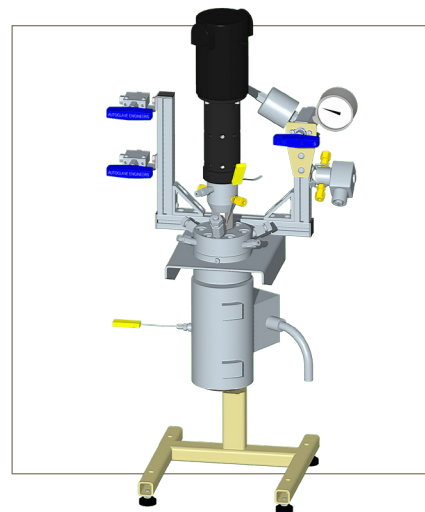
Internal Tube Kits (Sample Tube supplied with vessel)	
PH-MTB*#	Blow Pipe (gas inlet or replaces sample tube)
PH-MTF*#	Sample Tube with Filter

Cooling Components (Cooling Coil supplied with vessel)	
PH-MCM	Manual Cooling Valve
PH-MC1	Solenoid Cooling Valve (120 VAC)
PH-MC2	Solenoid Cooling Valve (240 VAC)

* = Vessel volume code | # = Vessel material code

Bench Top EZE-Seal Reactors

150 ml and 300 ml



Principle of Operation:

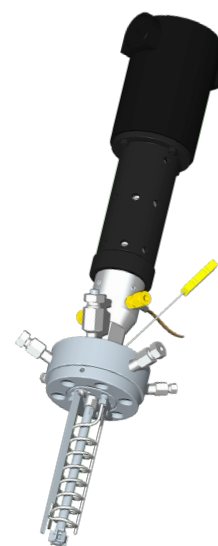
The Parker Autoclave Engineers' EZE-Seal Reactor has been designed for reliable high pressure operation, yet requires low torque for sealing. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The EZE-Seal stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as solvothermal reactions.

General Specifications:

Maximum Allowable Working Pressure: (MAWP)
2,900 psi @ 850°F (200 Bar @ 454°C) Note
Maximum Recommended Operating Pressure:
2,500 psi @ 750°F (172 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C

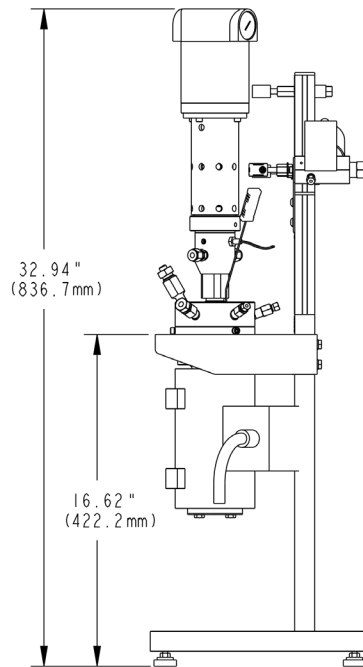
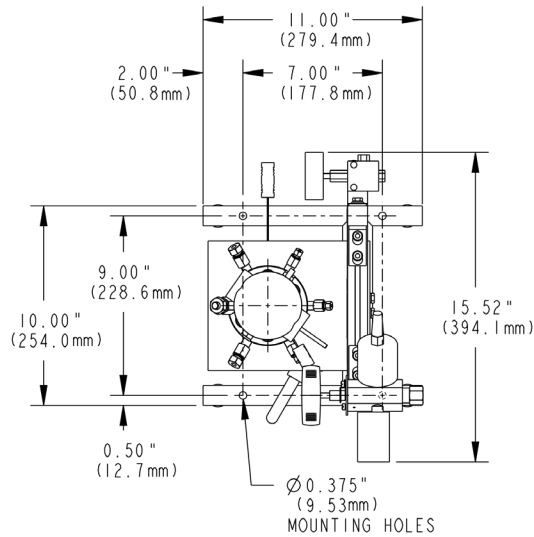
Standard/Optional Unit Features:

- Low torque metal seal
- Electric heater with over-temperature thermocouple
- Bench top stand
- Process thermocouple
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI pressure transducer)
- Solids charging port
- Optional: ASME code stamp or CE mark
- Optional: 150/300 ml companion volumes with common closure geometry
- Optional: Elastomer seal for lower temperature operation
- Optional: i2Mag in-line MagneDrive with 1/8 hp motor with Dispersimax Impeller



300 ml EZE-Seal Reactor
Internals

Drawing Details:



Ordering Information:

Part Number Example	PH-E	030	SS	—	MM	NS
Category		1	2		3	4

Example: PH-E030SS-MMNS

Description: 300 ml EZE-Seal Stirred Reactor, 316 Stainless Steel with Drive, No Code Requirements

1 - Vessel Volume Code (*)	
015	150 ml (Vessel Size Code, Small, != S)
030	300 ml (Vessel Size Code, Small, != S)

2 - Material Code (#)	
SS	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer Code	
NS	No Mixer
MM	In-Line MagneDrive Mixer

4 - Pressure Code Requirement (unit voltage)	
NS	No Code (120 VAC)
AS	ASME Code Stamped (120 VAC)
CE	CE Marked (240 VAC)
NE	Export with CRN (240 VAC)

¹ MT = Maximum Temperature. Temperature limits are suggested. Actual performance will vary with chemical compatibility.

² Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

³ Purebon® is a registered trademark of Morgan AM&T.

Hastelloy® C is a registered trademark of Haynes International, Inc.

Note The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

Option Kits (purchased separately):

Model #	Description
Seal Kits (Fluorocarbon supplied with vessel)	
PH-E ! SE	Ethylene Propylene - MT 300°F (149°C) ¹
PH-E ! SK	Parafleur Ultra - MT 527°F (275°C) ¹
PH-E ! SN	Nitrile (Buna N) - MT 250°F (121°C) ¹
PH-E ! SS	Silicone - MT 450°F (232°C) ¹
PH-E ! ST	PTFE Encapsulated Fluorocarbon - MT 400°F (204°C) ¹
PH-E ! SV	Fluorocarbon - (MT 450°F (232°C) ¹

Bearing Kits (Purebon 658RCH supplied with vessel) - Quantity 15

PH-VB#	Fluoropolymer with graphite fiber ²
PH-PB#	Purebon 658RCH (spare) ³

Internal Tube Kits (Sample Tube supplied with vessel)

PH-STB*#	Blow Pipe (gas inlet or replaces sample tube)
PH-STF*#	Sample Tube with Filter
PH-STS*#	Sparge Tube (gas inlet)

Cooling Components (Cooling Coil supplied with vessel)

PH-SCM	Manual Cooling Valve
PH-SC1	Solenoid Cooling Valve (120 VAC)
PH-SC2	Solenoid Cooling Valve (240 VAC)

Charging Port Components (supplied plugged with vessel)

PH-CPMSS	Manual Charge Valve
PH-CPCSS	20cc Charging Cartridge

Tool Kit

PH-ETK*	Tool kit including torque components
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* = Vessel volume code | # = Vessel material code | != Vessel size code

Floor Stand EZE-Seal Reactors

500 ml, 1000 ml, 2000 ml, and 4000 ml

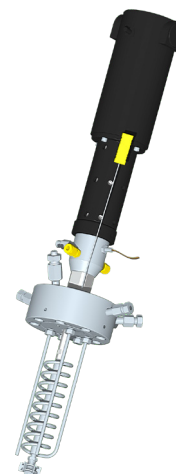


Principle of Operation:

The Parker Autoclave Engineers' EZE-Seal Reactor has been designed for reliable high pressure operation, yet requires low torque for sealing. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The EZE-Seal stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as solvothermal reactions.

General Specifications:

Maximum Allowable Working Pressure: (MAWP)
2,900 psi @ 850°F (200 Bar @ 454°C) Note
Maximum Recommended Operating Pressure:
2,500 psi @ 750°F (172 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C



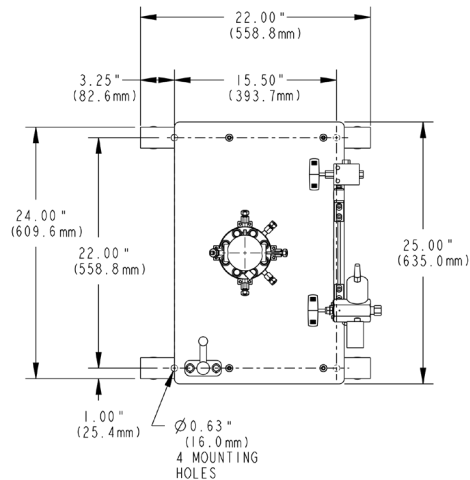
1000 ml EZE-Seal Reactor
Internals

Standard/Optional Unit Features:

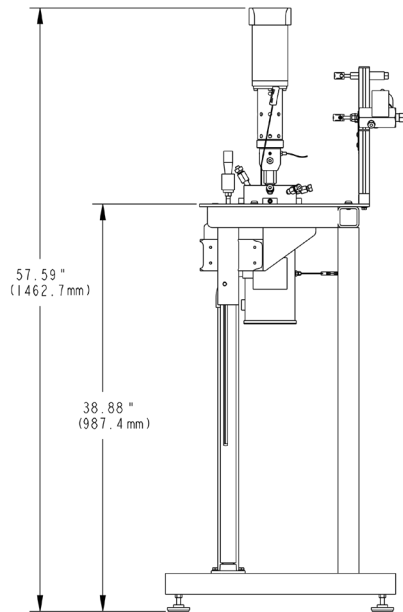
- Low torque metal seal
- Electric heater with over-temperature thermocouple and easy body removal
- Floor stand with swing-away body lift
- Process thermocouple
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI pressure transducer)
- Solids charging port

- Optional: Mini flush valve
- Optional: ASME code stamp or CE mark
- Optional: 500/1000, and 2000/4000 ml companion volumes with common closure geometry
- Optional: Elastomer seal for lower temperature operation
- Optional: i2Mag in-line MagneDrive with 1/3 hp motor speed sensor with Dispersimax Impeller

Drawing Details:



1000ml EZE-Seal



Ordering Information:

Part Number Example	PH-E	400	SS	—	MM	NS
Category		1	2		3	4

Example: PH-E400SS-MMNS

Description: 4000 ml EZE-Seal Stirred Reactor, 316 Stainless Steel, With Drive, No Code Requirements

1 - Vessel Volume Code (*)	
050	500 ml (Vessel Size Code, Medium, != M)
100	1000 ml (Vessel Size Code, Medium, != M)
200	2000 ml (Vessel Size Code, Large, != L)
400	4000 ml (Vessel Size Code, Large, != L)

2 - Material Code (#)	
SS	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer	
NS	None
MM	In-Line Magnedrive Mixer

4 - Pressure Code Requirement (unit voltage)	
NS	None (240 VAC)
AS	ASME Code (240 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)

¹ MT = Maximum Temperature. Temperature limits are suggested. Actual performance will vary with chemical compatibility.

² Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

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Note The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

Option Kits (purchased separately):

Model #	Description
Seal Kits (Fluorocarbon supplied with vessel)	
PH-E ! SE	Ethylene Propylene - MT 300°F (149°C) ¹
PH-E ! SK	Parafleur Ultra - MT 527°F (275°C) ¹
PH-E ! SN	Nitrile (Buna N) - MT 250°F (121°C) ¹
PH-E ! SS	Silicone - MT 450°F (232°C) ¹
PH-E ! ST	PTFE Encapsulated Fluorocarbon - MT 400°F (204°C) ¹
PH-E ! SV	Fluorocarbon - (MT 450°F (232°C) ¹

Bearing Kits (Purebon 658RCH supplied with vessel) - Quantity 15	
PH-VB#	Fluoropolymer with graphite fiber ²
PH-PB#	Purebon 658RCH (spare) ³

Internal Tube Kits (Sample Tube supplied with vessel)	
PH-STB*#	Blow Pipe (gas inlet or replaces sample tube)
PH-STF*#	Sample Tube with Filter
PH-STS*#	Sparge Tube (gas inlet)

Cooling Components (Cooling Coil supplied with vessel)	
PH-SCM	Manual Cooling Valve
PH-SC2	Solenoid Cooling Valve (240 VAC)

Charging Port Components (supplied plugged with vessel)	
PH-CPMSS	Manual Charge Valve
PH-CPCSS	20cc Charging Cartridge

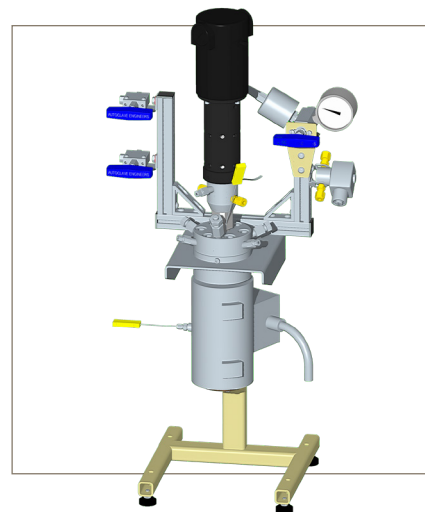
Flush Valve Port Component (supplied plugged with vessel)	
PH-FV#	Flush Valve

Took Kit	
PH-ETK*	Took kit including torque components

* = Vessel volume code | # = Vessel material code | != Vessel size code

Bench Top Bolted Closure Reactors

150 ml and 300 ml

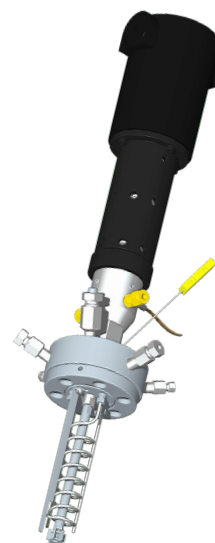


Principle of Operation:

The Parker Autoclave Engineers' Bolted Closure Reactor has been designed for reliable high pressure operation. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The bolted closure stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as materials research.

General Specifications:

Maximum Allowable Working Pressure: (MAWP)
5,000 psi @ 850°F (344 Bar @ 454°C) Note
Maximum Recommended Operating Pressure:
4,300 psi @ 750°F (296 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C



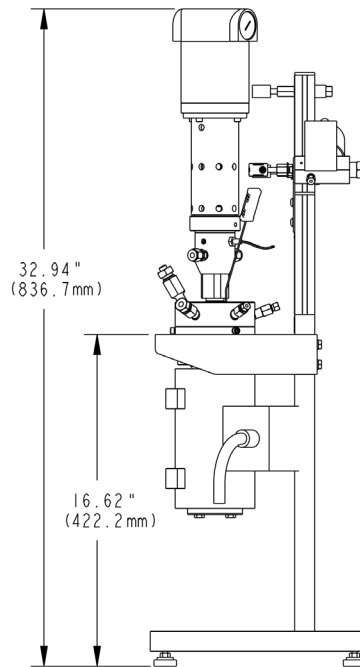
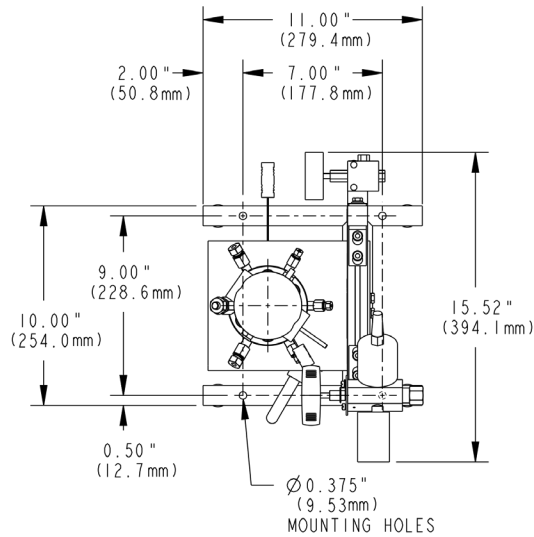
300 ml Bolted Reactor Internals

Standard/Optional Unit Features:

- 150/300 ml companion volumes with common closure geometry
- Electric heater with over-temperature thermocouple
- Bench top stand
- Process thermocouple
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-7500 PSI gauge, 0-5000 PSI pressure transducer)
- Solids charging port

- Optional: ASME code stamp or CE mark
- Optional: Elastomer seal for lower temperature operation
- Optional: 150/300 ml companion volumes with common closure geometry
- Optional: i2Mag in-line Magedrive with 1/8 hp motor with Dispersimax impeller

Drawing Details:



Ordering Information:

Part Number Example	PH-B	015	SS	—	MM	NS
Category		1	2		3	4

Example: PH-B015SS-MMNS

Description: 150 ml Bolted Closure Stirred Reactor, 316 Stainless Steel, No Code Requirements, with Drive

1 - Vessel Volume Code (*)	
015	150 ml (Vessel Size Code, Small, != S)
030	300 ml (Vessel Size Code, Small, != S)

2 - Material Code (#)	
SS	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer Code	
NS	None
MM	In-Line Magnedrive Mixer

4 - Pressure Code Requirement (unit voltage)	
NS	None (120 VAC)
AS	ASME Code (120 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)

¹ MT = Maximum Temperature. Temperature limits are suggested. Actual performance will vary with chemical compatibility.

² Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

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Note The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

Option Kits (purchased separately):

Model #	Description
Seal Kits (Fluorocarbon supplied with vessel)	
PH-B ! SE	Ethylene Propylene - MT 300°F (149°C) ¹
PH-B ! SK	Parafleur Ultra - MT 527°F (275°C) ¹
PH-B ! SN	Nitrile (Buna N) - MT 250°F (121°C) ¹
PH-B ! SS	Silicone - MT 450°F (232°C) ¹
PH-B ! ST	PTFE Encapsulated Fluorocarbon - MT 400°F (204°C) ¹
PH-B ! SV	Fluorocarbon - (MT 450°F (232°C) ¹

Bearing Kits (Purebon 658RCH supplied with vessel) - Quantity 15	
PH-VB#	Fluoropolymer with graphite fiber ²
PH-PB#	Purebon 658RCH (spare) ³

Internal Tube Kits (Sample Tube supplied with vessel)	
PH-STB*#	Blow Pipe (gas inlet or replaces sample tube)
PH-STF*#	Sample Tube with Filter
PH-STS*#	Sparge Tube (gas inlet)

Cooling Components (Cooling Coil supplied with vessel)	
PH-SCM	Manual Cooling Valve
PH-SC1	Solenoid Cooling Valve (120 VAC)
PH-SC2	Solenoid Cooling Valve (240 VAC)

Charging Port Components (supplied plugged with vessel)	
PH-CPMSS	Manual Charge Valve
PH-CPCSS	20cc Charging Cartridge

Tool Kit	
PH-ETK*	Tool kit including torque components

* = Vessel volume code | # = Vessel material code | != Vessel size code

Floor Stand Bolted Reactors

500 ml, 1000 ml, 2000 ml, and 4000 ml

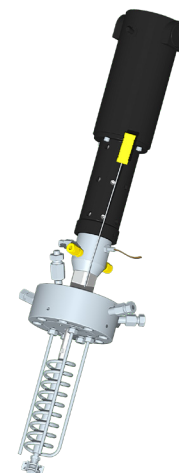


Principle of Operation:

The Parker Autoclave Engineers' Bolted Closure Reactor has been designed for reliable high pressure operation. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The bolted closure stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as materials research.

General Specifications:

Maximum Allowable Working Pressure: (MAWP)
5,000 psi @ 850°F (344 Bar @ 454°C) Note
Maximum Recommended Operating Pressure:
4,300 psi @ 750°F (296 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C



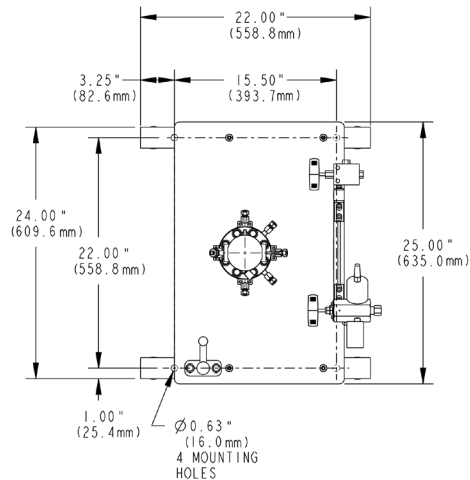
1000 ml Bolted Reactor Internals

Standard/Optional Unit Features:

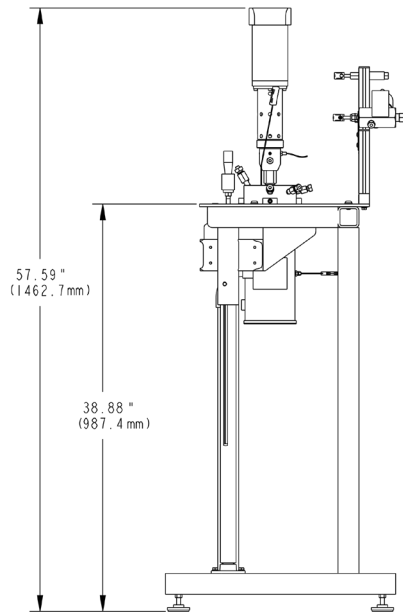
- Electric heater with over-temperature thermocouple and easy body removal
- Floor stand with swing-away body lift
- Process thermocouple
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-7500 PSI gauge, 0-5000 PSI pressure transducer)
- Solids charging port

- Optional: Mini flush valve
- Optional: ASME code stamp or CE mark
- Optional: Elastomer seal for lower temperature operation
- Optional: 500/1000, and 2000/4000 ml companion volumes with common closure geometry
- Optional: i2Mag in-line Magdrive with 1/3 hp motor speed sensor with Dispersimax impeller

Drawing Details:



1000ml Bolted



Ordering Information:

Part Number Example	PH-B	400	SS	—	MM	NS
Category		1	2		3	4

Example: PH-B400SS-MMNS

Description: 4000 ml Bolted Closure Reactor, 316 Stainless Steel, With Drive, No Code Requirements

1 - Vessel Volume (*)	
050	500 ml (Vessel Size Code, Medium, != M)
100	1000 ml (Vessel Size Code, Medium, != M)
200	2000 ml (Vessel Size Code, Large, != L)
400	4000 ml (Vessel Size Code, Large, != L)

2 - Material Code (#)	
SS	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer Code	
NS	None
MM	In-Line Magnedrive Mixer

4 - Pressure Code Requirement (unit voltage)	
NS	None (240 VAC)
AS	ASME Code (240 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)

¹ MT = Maximum Temperature. Temperature limits are suggested. Actual performance will vary with chemical compatibility.

² Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

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Note The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

Option Kits (purchased separately):

Model #	Description
Seal Kits (Fluorocarbon supplied with vessel)	
PH-B ! SE	Ethylene Propylene - MT 300°F (149°C) ¹
PH-B ! SK	Parafleur Ultra - MT 527°F (275°C) ¹
PH-B ! SN	Nitrile (Buna N) - MT 250°F (121°C) ¹
PH-B ! SS	Silicone - MT 450°F (232°C) ¹
PH-B ! ST	PTFE Encapsulated Fluorocarbon - MT 400°F (204°C) ¹
PH-B ! SV	Fluorocarbon - (MT 450°F (232°C) ¹

Bearing Kits (Purebon 658RCH supplied with vessel) - Quantity 5 sets

PH-VB#	Fluoropolymer with graphite fiber ²
PH-PB#	Purebon 658RCH (spare) ³

Internal Tube Kits (Sample Tube supplied with vessel)

PH-STB*#	Blow Pipe (gas inlet or replaces sample tube)
PH-STF*#	Sample Tube with Filter
PH-STS*#	Sparge Tube (gas inlet)

Cooling Components (Cooling Coil supplied with vessel)

PH-SCM	Manual Cooling Valve
PH-SC2	Solenoid Cooling Valve (240 VAC)

Charging Port Components (supplied plugged with vessel)

PH-CPMSS	Manual Charge Valve
PH-CPCSS	20cc Charging Cartridge

Took Kit

PH-ETK*	Took kit including torque components
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Flush Valve Port Component (supplied plugged with vessel)

PH-FV#	Flush Valve
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* = Vessel volume code | # = Vessel material code | != Vessel size code

Floor Stand Zipperclave® Reactors

500 ml, 1000 ml, 2000 ml, and 4000 ml



Principle of Operation:

The Parker Autoclave Engineers' ZipperClave® Reactor has been designed to provide the researcher with a reliable quick-opening closure. The main seal of the reactor is an O-ring available in many different materials. The 500 ml, and 1000 ml share the same cover design as well as the 2,000 ml and 4,000 ml units are identical in design except for the depth of the reactor. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover.

General Specifications:

Maximum Allowable Working Pressure: (MAWP)
2,200 psi @ 450°F (151 Bar @ 232°C) Note
Maximum Recommended Operating Pressure:
1,900 psi @ 350°F (131 Bar @ 176°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C

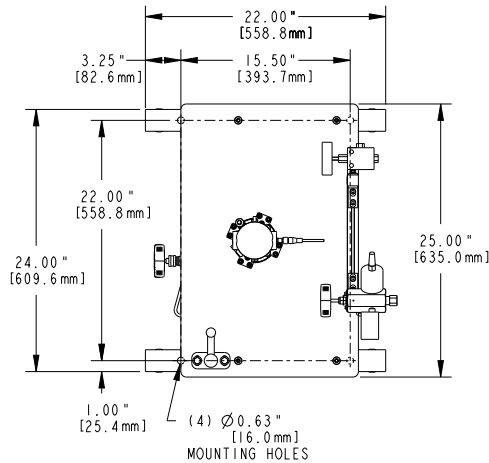


1000 ml Zipperclave® Reactor
Internals

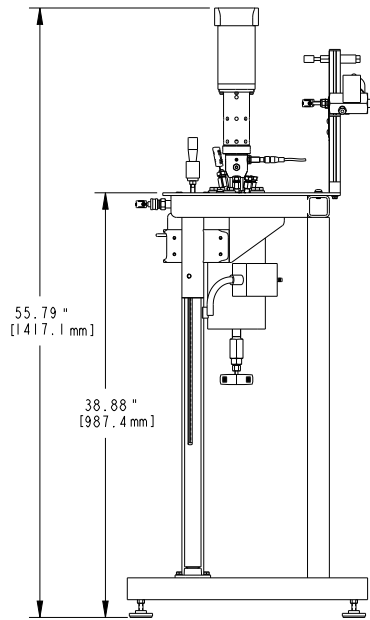
Standard/Optional Unit Features:

- Electric heater with over-temperature thermocouple and easy body removal
- Floor stand with swing-away body lift
- Process thermocouple
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI pressure transducer)
- Solids charging port
- Optional: Mini flush valve
- Optional: CE mark
- Optional: 500/1000, and 2000/4000 ml companion volumes with common closure geometry
- Optional: Elastomer seal for lower temperature operation
- Optional: i2Mag in-line MagneDrive with 1/3 hp motor speed sensor with Dispersimax impeller

Drawing Details:



1000ml Zipperclave®



Ordering Information:

Part Number Example	PH-Z	400	SS	—	MM	NS
Category		1	2		3	4

Example: PH-Z400SS-MMNS

Description: 4000 ml Zipperclave® Reactor, 316 Stainless Steel, With Drive, No Code Requirement

1 - Vessel Volume Code (*)	
050	500 ml (Vessel Size Code, Medium, != M)
100	1000 ml (Vessel Size Code, Medium, != M)
200	2000 ml (Vessel Size Code, Large, != L)
400	4000 ml (Vessel Size Code, Large, != L)
2 - Material Code (#)	
SS	316 Stainless Steel
HC	Hastelloy® C
3 - Mixer Code	
NS	None
MM	In-Line Magnedrive Mixer
4 - Pressure Code Requirement (unit voltage)	
NS	None (240 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)

¹ MT = Maximum Temperature. Temperature limits are suggested. Actual performance will vary with chemical compatibility.

² Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

³ Purebon® is a registered trademark of Morgan AM&T.

Hastelloy® C is a registered trademark of Haynes International, Inc.

Note The user should be aware that the 450°F (232°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

Option Kits (purchased separately):

Model #	Description
Seal Kits (Fluorocarbon supplied with vessel)	
PH-Z ! SE	Ethylene Propylene - MT 300°F (149°C) ¹
PH-Z ! SK	Parafleur Ultra - MT 527°F (275°C) ¹
PH-Z ! SN	Nitrile (Buna N) - MT 250°F (121°C) ¹
PH-Z ! SS	Silicone - MT 450°F (232°C) ¹
PH-Z ! ST	PTFE Encapsulated Fluorocarbon - MT 400°F (204°C) ¹
PH-Z ! SV	Fluorocarbon - (MT 450°F (232°C) ¹

Bearing Kits (Purebon 658RCH supplied with vessel) - Quantity 15

PH-VB#	Fluoropolymer with graphite fiber ²
PH-PB#	Purebon 658RCH (spare) ³

Internal Tube Kits (Sample Tube supplied with vessel)

PH-STB*#	Blow Pipe (gas inlet or replaces sample tube)
PH-STF*#	Sample Tube with Filter
PH-STs*#	Sparge Tube (gas inlet)

Cooling Components (Cooling Coil supplied with vessel)

PH-SCM	Manual Cooling Valve
PH-SC2	Solenoid Cooling Valve (240 VAC)

Charging Port Components (supplied plugged with vessel)

PH-CPMSS	Manual Charge Valve
PH-CPCSS	20cc Charging Cartridge

Tool Kit

PH-ETK*	Tool kit including torque components
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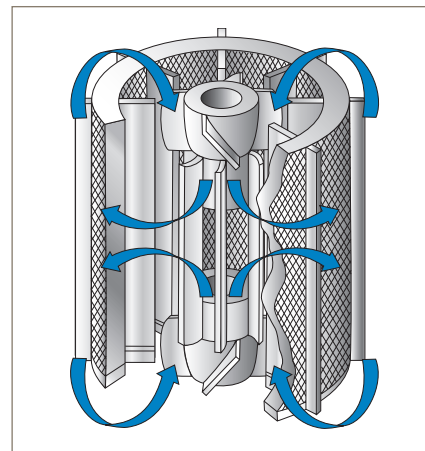
Flush Valve Port Component (supplied plugged with vessel)

PH-FV#	Flush Valve
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* = Vessel volume code | # = Vessel material code | != Vessel size code

Robinson-Mahoney Stationary Catalytic Basket Kit

Use in 300, 500, and 1000 ml
Eze-Seal, Bolted Closure, and Zipper-Clave



General 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 long duration circulation capability for multiple phases has made the Robinson-Mahoney the most widely used design for supported, heterogeneous catalyst research with liquids.

Typical Reactions: Liquefaction, Hydro-Treating, Catalyst Testing

Basket Screen: 14x14 mesh, 0.020" wire with nominal opening size of 0.051"

Use in Reactors: 300 ml, 500 ml, and 1000 ml (EZE-Seals, Bolted Closures, and Zipperclaves®)

Material of Construction: 316 Stainless Steel or Hastelloy C

300 ml Reactor Basket Volume: 40 cc

500 ml and 1000 ml Reactor Basket Volume: 100 cc

Basket for a 300 ml reactor part number 316 Stainless Steel: **PH-BASKET-ST-300-SS**

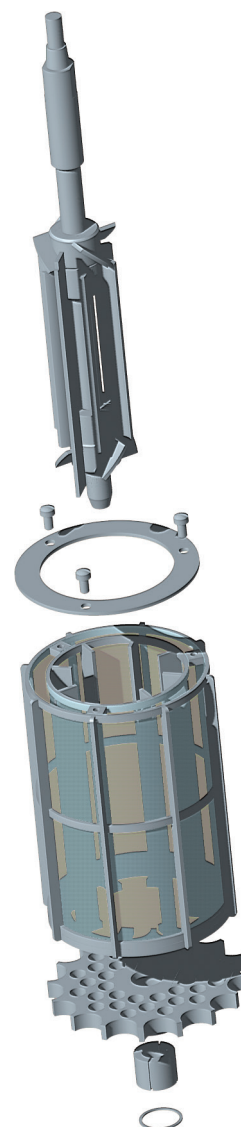
Basket for a 300 ml reactor part number Hastelloy C: **PH-BASKET-ST-300-HC**

Basket for a 500 ml reactor part number 316 Stainless Steel: **PH-BASKET-ST-500-SS**

Basket for a 500 ml reactor part number Hastelloy C: **PH-BASKET-ST-500-HC**

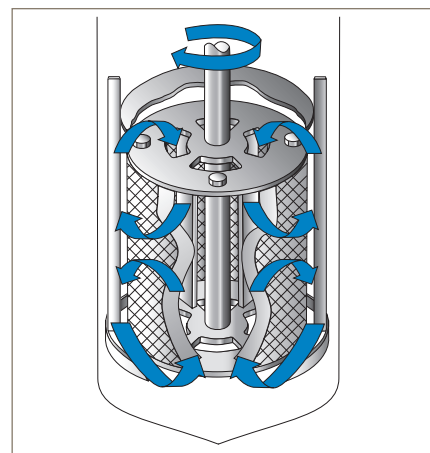
Basket for a 1000 ml reactor part number 316 Stainless Steel: **PH-BASKET-ST-1000-SS**

Basket for a 1000 ml reactor part number Hastelloy C: **PH-BASKET-ST-1000-HC**



Mahoney-Robinson Spinning Catalytic Basket Kit

300, 500, and 1000 ml
EZE-Seals, Bolted Closures, and Zipperclaves



General Specifications:

The annular catalyst basket is rotated on a shaft to move the catalyst through the reactants. Baffles inside the basket and fixed baffles outside the basket direct reactant flow.

Typical Reactions: Hydrocarbon, Petroleum Studies, Hydro-Liquefaction, Catalyst Testing

Basket Screen: 14x14 mesh, 0.020" wire with nominal opening size of 0.051"

Use in Reactors: 300 ml, 500 ml, and 1000 ml (EZE-Seals, Bolted Closures, and Zipperclaves®)

Material of Construction: 316 Stainless Steel or Hastelloy C

300 ml Reactor Basket Volume: 20 cc

500 ml and 1000 ml Reactor Basket Volume: 110 cc

Basket for a 300 ml reactor part number 316 Stainless Steel: **PH-BASKET-SP-300-SS**

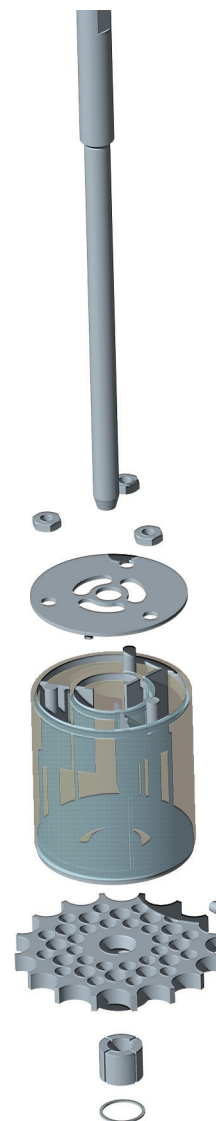
Basket for a 300 ml reactor part number Hastelloy C: **PH-BASKET-SP-300-HC**

Basket for a 500 ml reactor part number 316 Stainless Steel: **PH-BASKET-SP-500-SS**

Basket for a 500 ml reactor part number Hastelloy C: **PH-BASKET-SP-500-HC**

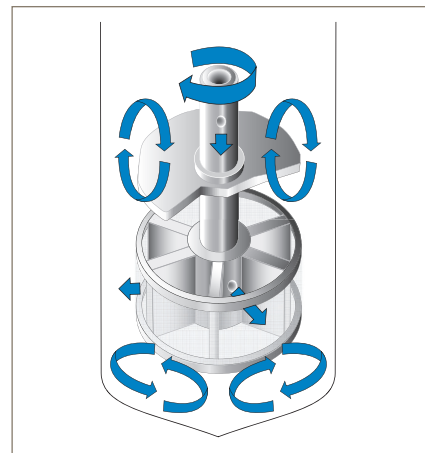
Basket for a 1000 ml reactor part number 316 Stainless Steel: **PH-BASKET-SP-1000-SS**

Basket for a 1000 ml reactor part number Hastelloy C: **PH-BASKET-SP-1000-HC**



Dispersimax™ Mini Basket Kit

Use in 50 - 100 ml Mini-Reactor



General Specifications:

The spinning Dispersimax™ catalyst basket impeller is designed for gas/liquid/solid (GLS) phases where the catalyst cannot be suspended or the researcher wants the catalyst in a basket. The Dispersimax™ spinning catalyst basket impeller, apart from being a catalyst basket, works exactly as a standard Dispersimax™, allowing gas to be drawn down the hollow shaft and to promote a positive flow through the hole in the impeller for dispersion. This will allow the catalyst contained to have a positive flow of gas over it, or entrained. It also offers the effect of re-circulating the gas again down the shaft.

Typical Reactions: Hydrogenation, Fischer-Tropsch, Catalyst Testing

Basket Screen: 720 X 150 mesh (18-21 microns)

Use in Reactors: 50 – 100 ml Mini-Reactor

Material of construction: 316 Stainless Steel or Hastelloy C

0.75 inch diameter basket volume: 0.08 in³ (1.3 cc)

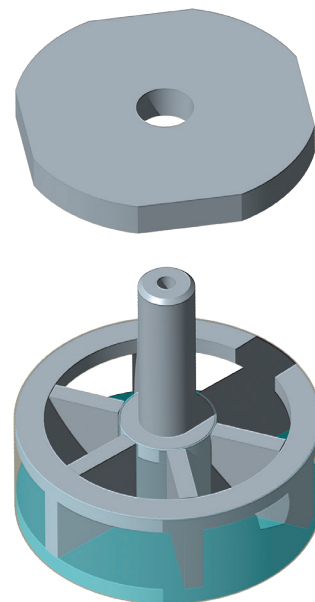
1.00 inch diameter basket volume: 0.16 in³ (2.7 cc)

0.75 inch diameter basket part number 316 Stainless Steel: **PH-BASKET-DIS-075-SS**

0.75 inch diameter basket part number Hastelloy C: **PH-BASKET-DIS-075-HC**

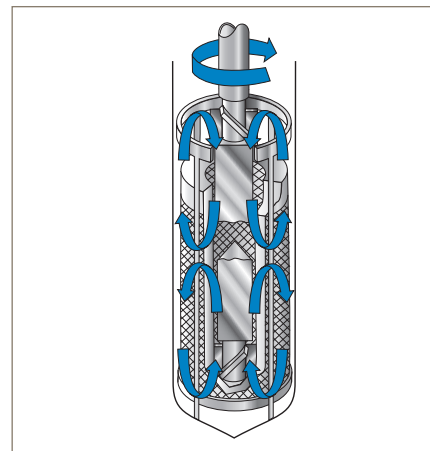
1.00 inch diameter basket part number Stainless Steel: **PH-BASKET-DIS-100-SS**

1.00 inch diameter basket part number Hastelloy C: **PH-BASKET-DIS-100-HC**



Robinson-Mahoney Mini Catalytic Basket Kit

Use in 100 ml Mini-Reactor



General 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 multiple phases has made the Robinson-Mahoney the most widely used design for catalyst research with liquids.

Typical Reactions: Liquefaction, Hydro-Treating, Catalyst Testing

Basket Screen: 50x50 mesh, 0.009" wire

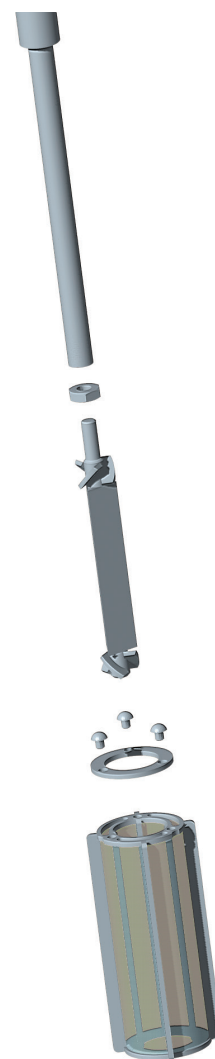
Use in Reactor: 100 ml Mini-Reactor

Material of Construction: 316 Stainless Steel

100 ml Reactor Basket Volume: 15.4 cc

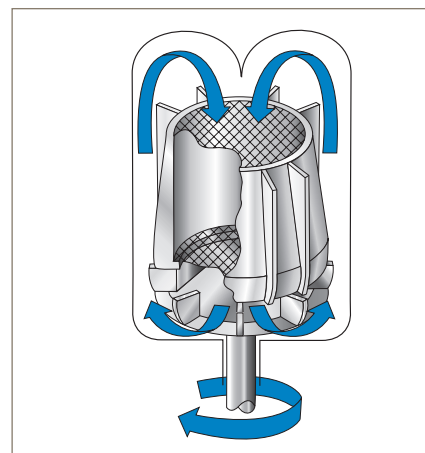
Basket for a 100 ml reactor part number 316 Stainless Steel: **PH-BASKET-MINI-100-SS**

Basket for a 100 ml reactor part number Hastelloy C: **PH-BASKET-MINI-100-HC**



Bench Top Berty Catalytic Reactor

3" and 5" Vessels



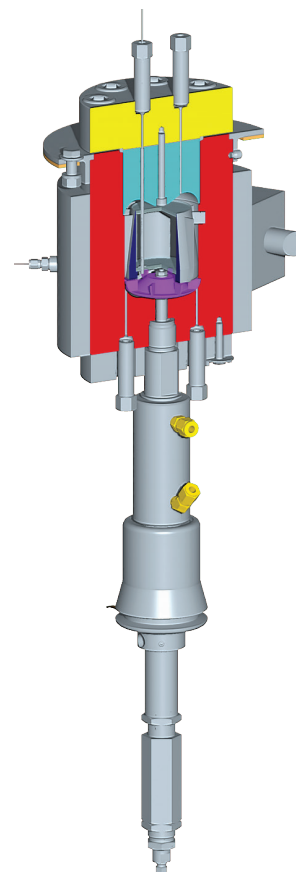
General Specifications:

This internal recycle reactor is designed with a fixed, circular, screened catalyst bed and a bottom mounted vane type blower. Fluid circulation is directed upward along the vessel wall and deflected downward through the catalyst bed. Large diameter designs are used in applications with high pressure drop across the catalyst bed or that have very low gas density. The predictable gas/vapor circulation of the Berty design has made it the most widely used gas phase catalyst research tool.

Typical Reactions: Gas/Solid, Gas/Liquid/Solids, Liquid/Solids, Vapor/Solids

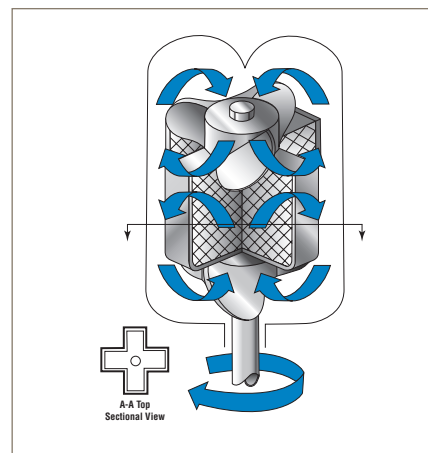
Material of Construction: 316 Stainless Steel

	3" (76.2 mm) Inside Diameter (Standard)	3" (76.2 mm) Inside Diameter (Hi-Temp)	5" (127 mm) Inside Diameter
Basket Volume (5" design includes internal spacers for three volumes)	6.1 in. ³ (100 cm ³)	6.1 in. ³ (100 cm ³)	9.8 in. ³ (160 cm ³) 18.4 in. ³ (303 cm ³) 31.2 in. ³ (511 cm ³)
Free Volume	17 in. ³ (280 cm ³)	17 in. ³ (280 cm ³)	88.5 in. ³ (1,450 cm ³)
Maximum Allowable Working Pressure	5,800 psig (400 Bar)	2,450 psig (169 Bar)	3,700 psig (255 Bar)
Temperature	650° F (343°C)	1,200° F (649°C)	650°F (343°C)
Maximum Blower Speed	2,500 RPM	2,500 RPM	2,500 RPM (Gas Service) 1,500 RPM (Liquid service with special impeller for liquids) 500 RPM (Liquid service using standard gas impeller)
Catalog Number Prefix	BC0010SS06AM26D	BM0010SS04AM26D	BC0043SS04AK26D



Bench Top Carberry Catalytic Reactor

3" and 5" Vessels



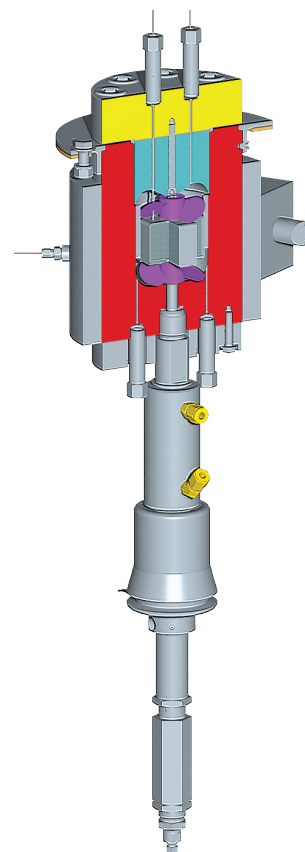
General Specifications:

The catalyst basket has a “cruciform” cross-section. The test catalyst is placed in the cruciform basket and rotated on a shaft. Each arm of the cruciform acts as a differential reactor sweeping through the fluid reactants at high speed. Propellers are mounted above and below the cruciform to direct fluid flow.

Typical Reactions: Gas/Solid, Gas/Liquid/Solids, Liquid/Solids, Vapor/Solids

Material of Construction: 316 Stainless Steel

	3" (76.2 mm) Inside Diameter (Standard)	3" (76.2 mm) Inside Diameter (Hi-Temp)	5" (127 mm) Inside Diameter
Basket Volume	2.5 in. ³ (41 cm ³)	2.5 in. ³ (41 cm ³)	6.3 in. ³ (103 cm ³)
Free Volume	18 in. ³ (295 cm ³)	18 in. ³ (295 cm ³)	88 in. ³ (1,442 cm ³)
Maximum Allowable Working Pressure	5,800 psig (400 Bar)	2,450 psig (169 Bar)	3,700 psig (255 Bar)
Temperature	650°F (343°C)	1,200°F (649°C)	650°F (343°C)
Maximum Impeller/Basket Speed	2,500 RPM (gas) 1,000 RPM (liquid)	2,500 RPM (gas) 1,000 RPM (liquid)	2,500 RPM (gas) 1,000 RPM (liquid)
Catalog Number Prefix	BC0006SS06AM26D	BM0006SS04AM26D	BC0012SS04AK26D



Agitator/Mixers

Providing Tools for Research and Industry

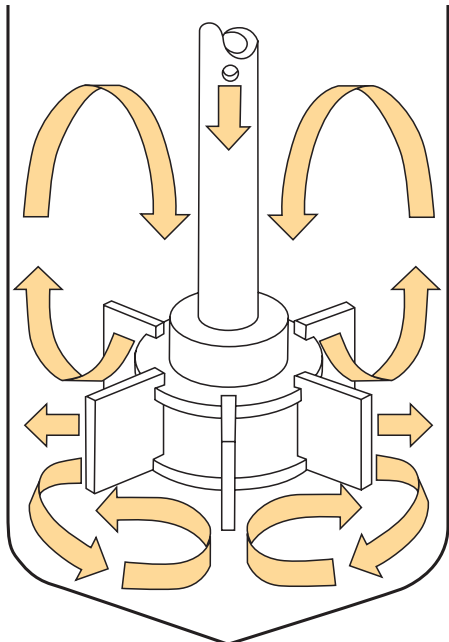


Parker Autoclave Engineers first introduced the Dispersimax™ Turbine to the research industry in 1955, followed in 1958 by the MagneDrive® for contamination-free, packless agitation. Since then, several other impeller designs have been developed to satisfy specific industry needs.

At a Glance:

- Several Standard Designs
- Materials to Match the Vessel
- Suitable for Gas, Liquid, and Supported Solids
- Wide Range of Viscosity and Speed

Dispersimax™ Turbine

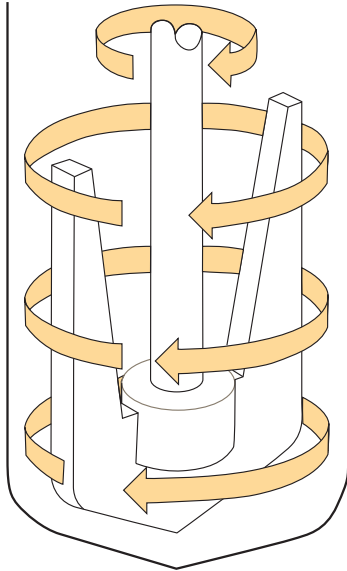


Parker Autoclave Engineers' patented Dispersimax™ Turbine type impeller is well suited for gas/liquid reactions. It provides high speed radial flow stirring, while drawing head space gas down a hollow shaft and dispersing the gas through the impeller ports, for effective entrainment of the gas into the liquid. This is generally for low viscosity applications.*

***Vessel baffling is required for optimum performance.**

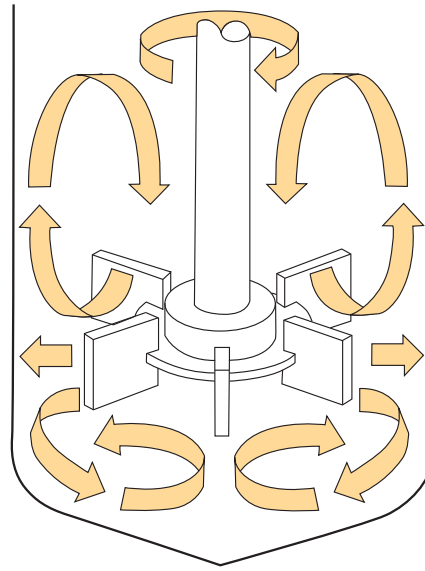


Anchor Impeller



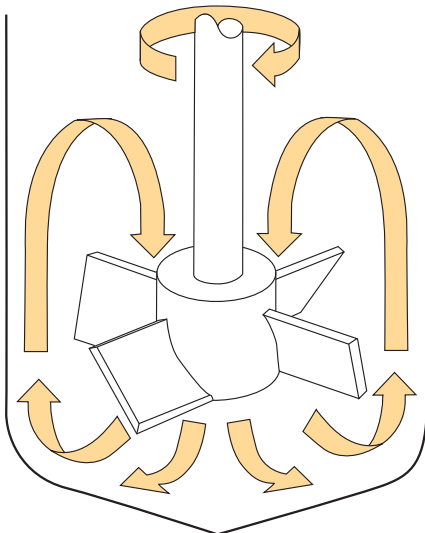
Best suited for high viscosity fluids (5,000-50,000 cp). This impeller provides radial flow and improved heat transfer at relatively low speeds. It generally provides minimal radial clearance between it and the vessel wall.

Straight Blade Turbine



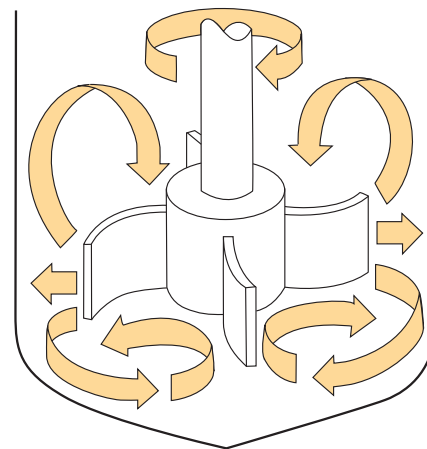
Formerly known as the “Rushton Turbine”, this impeller, like the “AE Dispersimax™ Turbine”, is suited for gas/liquid applications requiring fairly high shear at high speeds.* The impeller also promotes radial fluid flow. ***Vessel baffling may be required for optimum performance.**

Pitched Blade Turbine



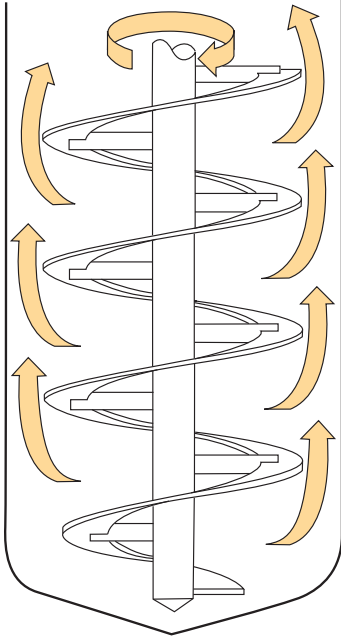
Sometimes termed an “axial flow impeller”, the Pitched Blade Turbine is especially suited for high speed liquid/solid applications where tank baffles may be impractical. Direction of fluid flow can be up or down depending on the pitch.

Curved Blade Turbine



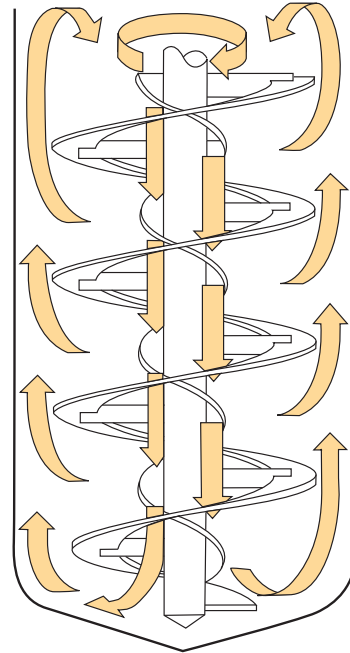
Often referred to as a “backswept turbine”, this impeller can be used in very viscous mixtures where power consumption can be of concern or in liquid/friable solid applications.* It provides reduced shear and a radial flow pattern. ***Vessel baffling may be required for optimum performance.**

Helical Impeller



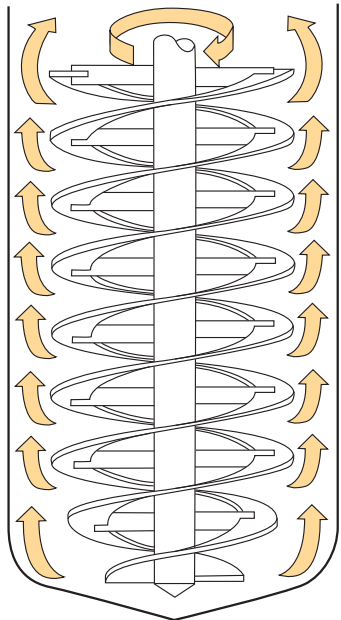
(1 Outer Flight)

Helical Impeller



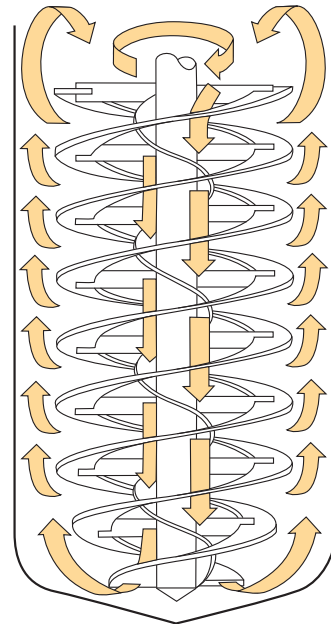
(1 Inner Flight, 1 Outer Flight)

Helical Impeller



(2 Outer Flights)

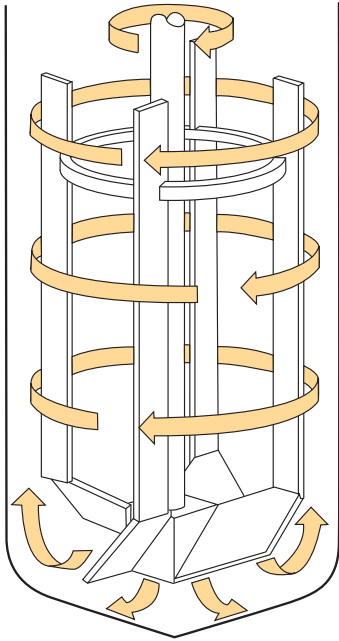
Helical Impeller



(1 Inner Flight , 2 Outer Flights)

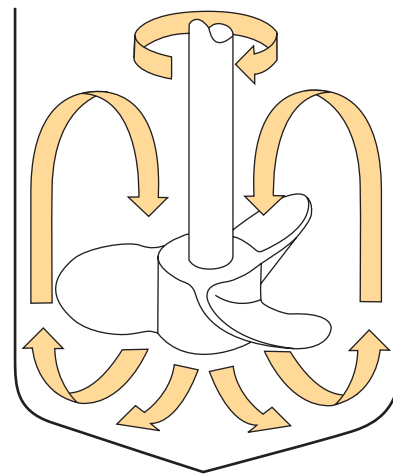
Helical impellers are used primarily in applications involving very viscous materials. They operate with minimal clearance at the vessel wall and provide axial flow at low speed. Their construction can be single or double outer flight with or without an inner flight. The outer flight provides upward pumping action while the inner flight pumps in the downward direction. (The inner flight does not add to impeller performance in the case of Newtonian fluids.) These impellers, like the Anchor, provide improved heat transfer in a viscous fluid system.

Elongated Paddle



The Elongated Paddle impeller provides a combination of axial upward and radial fluid flow. It, like the Anchor and Helical Impellers, operates in close proximity to the vessel wall.

Marine Propeller



The Marine Propeller is an axial flow impeller generally pitched for downward pumping action, however, upward pumping is also available. This impeller provides a high, uniform discharge and therefore is best suited for low viscosity liquid blending applications.

***Vessel baffling may be required for optimum performance.**

Ordering Information:

Mini-Reactor Impeller Kits

PH-MIT#	Turbine Straight Blade Impeller
PH-MID#	Pitched Blade Axial Down Impeller
PH-MIU#	Pitched Blade Axial Up Impeller
PH-MIX*#	Dispersimax

150-300 ml Vessels Impeller Kits

PH-SIT*#	Turbine Straight Blade Impeller
PH-SID*#	Pitched Blade Axial Down Impeller
PH-SIU*#	Pitched Blade Axial Up Impeller
PH-SIC*#	Curved Blade Impeller
PH-SIM*#	Marine Propeller
PH-SIX*#	Dispersimax

500-2000 ml Vessels Impeller Kits

PH-SIT*#	Turbine Straight Blade Impeller
PH-SID#	Pitched Blade Axial Down Impeller
PH-SIU*#	Pitched Blade Axial Up Impeller
PH-SIC*#	Curved Blade Impeller
PH-SIA*#	Anchor Impeller
PH-SIHA*#	Helical Impeller 1 Outer Flight
PH-SIHB*#	Helical Impeller 1 Inner & 1 Outer Flight
PH-SIHC*#	Helical Impeller 2 Outer Flights
PH-SIHD*#	Helical Impeller 1 Inner & 2 Outer Flights
PH-SIE*#	Elongated Paddle
PH-SIM*#	Marine Propeller
PH-SIX*#	Dispersimax

* = Vessel volume code | # = Vessel material code

URC II & URC II mini

Universal Reactor Controller



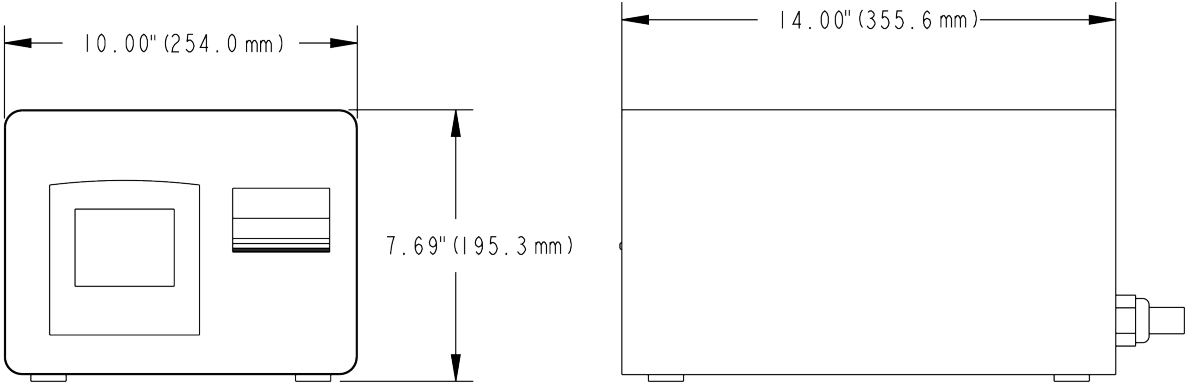
Principle of Operation:

The URC II and URC II Mini Controllers are an integrated package utilizing a Programmable Logic Controller (PLC) for all process control, monitoring and coordination in conjunction with a touch screen operator display unit. The URC II and URC II Mini provide the operator with a concise point of control for all processes related to a reactor system. The unit controls and monitors the reactor's external and internal temperatures, the speed of the mixture, and the pressure within the reactor.

Features and Benefits:

- Electric Heat Control
- 3-1/2" Diagonal Color Touchscreen user interface
- Two (2) Type 'K' Thermocouples degree C or degree F readout
- Non-Latching overtemp control action
- Closed Loop DC motor speed control
- Pressure Indication Range up to 689 bar (10000 psi). [Set at 0 "zero" at factory, user adjustable in the field.]
- RJ11 connector for RS232 communication
- CE marked
- UL/CUL listed
- Can be used for all Parker Autoclave units, from 50 ml to 4,000 ml volumes.

Drawing Details:



Ordering Information:

Product	Product Description	Part Number	Supported Vessels
URC II	240 VAC, 30 A, Single Phase	URC-II	500-4000ml
URC II Mini	120 VAC, 15 A, Single Phase	URC-II-Mini-120	300ml and below
	240 VAC, 15 A, Single Phase	URC-II-Mini-240	

i2MAG075 Inline

MagneDrive® II Series



General Specifications:

Minimum Static Torque:	10 inch-lbs. (1.23 N-mm)
Material of Construction:	316 Stainless Steel
Maximum Recommended Operating Pressure: (MROP)	6,000 psi @ 850°F (413 bar @ 454°C)

Ordering Information:

Part Number Example	i2MAG075	SS	BP	033
Category		1	2	3

Example: i2MAG075SSBP033

Description:

i2MAG075, 316 Stainless Steel, Purebon 658RCH Bearings, 1/3 HP General Purpose Motor

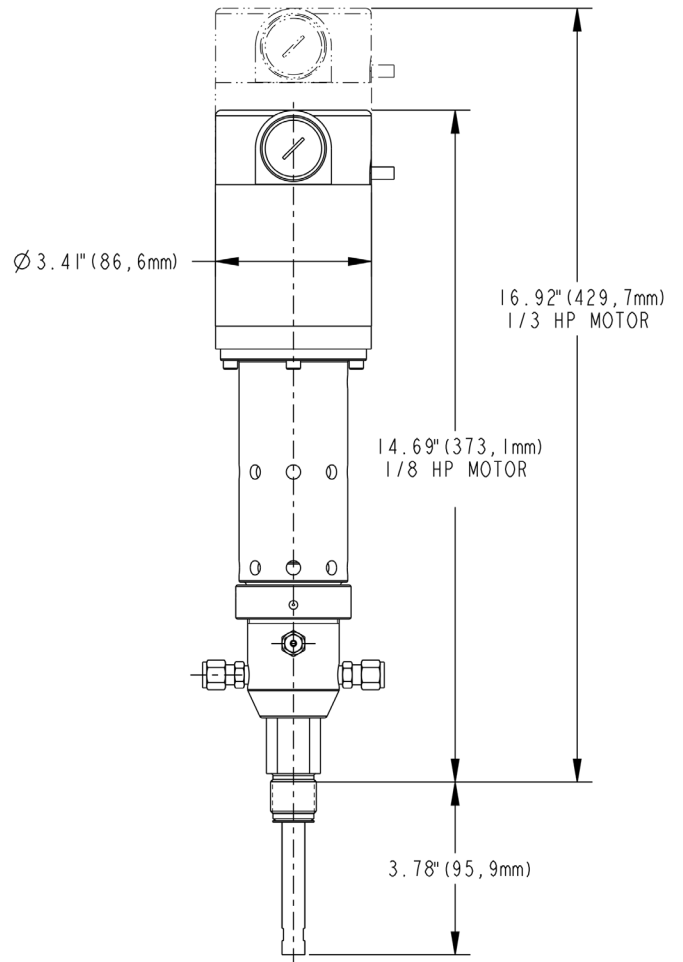
1 - Material	
SS	316 Stainless Steel
HC	Hastelloy® C
1 - Bearings	
BP	Purebon 658RCH ¹
BV	Fluoropolymer with Graphite Fiber ²
2 - Motor	
012	1/8 HP General Purpose Motor
033	1/3 HP General Purpose Motor

¹ Purebon® is a registered trademark of Morgan AM&T.

² Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

Hastelloy® C is a registered trademark of Haynes International, Inc.

Tool Kit: PH-MTK



Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further information call 1-800-C-Parker.

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 <p>PNEUMATICS</p>	<p>Aerospace Conveyor & Material Handling Factory Automation Life Science & Medical</p> <p>Machine Tools Packaging Machinery Transportation & Automotive</p>	<p>Air Preparation Brass Fittings & Valves Manifolds Pneumatic Accessories Pneumatic Actuators & Grippers Pneumatic Valves & Controls</p> <p>Quick Disconnects Rotary Actuators Rubber & Thermoplastic Hose & Couplings Structural Extrusions Thermoplastic Tubing & Fittings Vacuum Generators, Cups & Sensors</p>
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