

Series Number:

4590

Type:
Micro

Stand:
Bench Top

Mounting Style:
**Moveable or
Fixed Head**

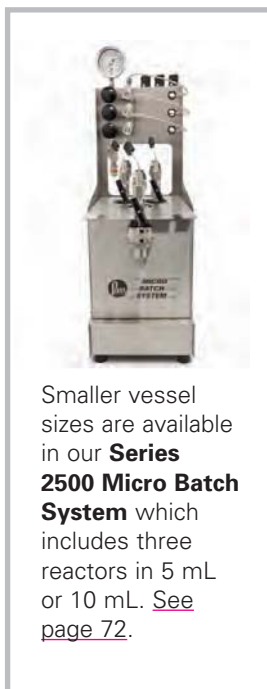
Vessel Sizes, mL:
25, 50, 100

Standard Pressure
MAWP Rating, psi (bar):
3000 (207)

High Pressure (HP)
MAWP Rating, psi (bar):
5000 (345)

Standard Maximum
Operating Temp., °C:
225 w/ FKM O-ring
300 w/ FFKM O-ring
350 w/ PTFE Flat Gasket

High Temperature (HT) /
High Pressure (HP)
Maximum Operating
Temperature, °C:
500 w/ FG Flat Gasket
(Fixed Head Only)



Smaller vessel sizes are available in our **Series 2500 Micro Batch System** which includes three reactors in 5 mL or 10 mL. [See page 72.](#)

Series 4590 Micro Stirred Reactors, 25-100 mL

These are Parr's smallest individual Stirred Reactors. They are a good choice for chemists working with very expensive materials, materials only available in small amounts, or those chemists working with hazardous materials. Use of the Series 4590 Reactors helps minimize the quantities of waste products created which may require special disposal procedures. The 4590 systems are now available in high pressure (5000 psi) or high pressure/high temperature (500 °C) versions.

These micro reactors have been designed to provide as many of the features of the larger vessels as possible in the limited space available. All of the standard head fittings are provided, with optional cooling now available with aluminum block heaters with cooling capability, welded jackets or internal cold fingers.

These systems are offered in both fixed head and moveable head vessel styles with choices of a self sealing FKM O-ring for temperatures up to 225 °C or with FFKM O-ring for temperatures to 300 °C or with a flat PTFE gasket for temperatures to 350 °C, or with an Flexible Graphite gasket for temperatures to 500 °C with the HP/HT option (for fixed head versions only). A split-ring closure is standard.

All three volumes use the same ceramic fiber heater.

These micro reactors can be easily converted from one size to another by simply substituting a larger or smaller cylinder and the corresponding internal fittings. The support system can also be readily adapted to accept any of the vessels from the 4560 Mini Reactor Series. The opportunity to modify these small reactors is restricted because of the limited head space available.



4598 HP/HT Micro Reactor, 100 mL with Fixed Head.

4590

Series 4590 Pressure Reactor System Specifications						
Shaded bar indicates specifications that change within series.						
Model Number	4591	4592	4593	4596	4597	4598
Approximate Volume, mL	25	50	100	25	50	100
Maximum Pressure (MAWP)	3000 psi (207 bar, 200 bar for CE orders)					
HP, HP/HT Max. Pressure (MAWP)	5000 psi (345 bar)					
Maximum Temperature						
with FKM O-ring	225 °C					
with FFKM O-ring	300 °C					
with PTFE Flat Gasket	350 °C					
with FG Flexible Graphite Flat Gasket (HP/HT)	500 °C					
Reactor Details						
Mounting Style	Moveable			Fixed Head		
Stand type	Bench Top					
Closure	Split-Ring (6 Compression Bolts for Flat Gasket, No Compression Bolts for O-ring)					
Valve Connections	1/8" NPT Male, 1/4" NPT Male for HP, 1/4" NPT Female for HP/HT					
Magnetic Stirrer, Model No.	A1120HC6					
Maximum Torque	16 Inch-Pounds					
Impeller, 4-Blade	1 (.81" dia.)					
Stirrer Motor	1/8 hp Variable Speed					
Pressure Gage, Size	3.5 inches					
Range	0-3000 psi (207 bar), 0-5000 psi (345 bar) HP, HP/HT					
Temperature Measurement	Fixed Thermocouple (Thermowell for special alloys)					
Cooling (optional)	Cold Finger					
Bottom Drain Valve	1/4" NPT (Not available on HP or HP/HT models)					
Heater Style	Ceramic Fiber Heater					
Heater Power, Watts	700					
Electrical Supply						
Volts, AC	115 / 230					
Maximum Load, amps, 115 / 230	7 / 4			7 / 4		
Maximum Load, amps, HP/HT, 115 / 230	N/A			7 / 4		
Cylinder Dimensions						
I.D. x Depth, inches	1.0 x 2.0	1.3 x 2.3	1.3 x 4.6	1.0 x 2.0	1.3 x 2.3	1.3 x 4.6
Vessel Assembly Weight, pounds	18	18	19	19	19	20
Cylinder Weight, pounds	3.5	3.1	4.2	3.5	3.1	4.2
Reactor/Stand Dimensions						
Width x Depth w/o Controller, inches	12 x 18					
Height, inches*	27	35	27	35	27	35
Weight, pounds	55	56	56	56	57	57
Spare Parts Kit	4599M (4599HPHT for High Temperature)					
* Add 8-inches to height for Aluminum Block Heater options.						
Other options available. See Ordering Guide, visit www.parrinst.com , or call for more information. Weights and dimensions are estimated from the base model. Final weights and dimensions will vary based on options selected.						

Series 4590 Micro Stirred Reactors, 25-100 mL

Index to Options

Option	Page
Certification	8
Materials of Construction	10
Magnetic Drive	14
Gaskets & Seals	18
Stirrer Motor	118
Rupture Disc	124
Pressure Gage	125
Cooling Coil	129
Bottom Drain Valve	131
4848 Reactor Controller	102
4871 Process Controller	109
A2110E Motor Controller	114

Custom Option	Page
Stirrers	120
Heaters	116
External Valves & Fittings	138
Solids Charging Ports	128
Condensers	123
Electrical Glands	137
Catalyst Addition Device	128
Catalyst Baskets	122
Relief Valves	125
Windows	136
Gear Drives	119
Explosion Proof Options	134
Liquid Sampling	130

Accessories	Page
Liners	129
Spare Parts Kits	137
Pressure Hoses	133
Check Valves	125
Liquid Pipettes	127
Gas Burettes	126



Model 4598 HP/HT stirred vessel, 100 mL with fixed head.



4590 vessels (left to right): 25 mL, 50 mL, and 100 mL.

Series 4590 Ordering Guide

The Order No. for the Base System is: **459__-T-SS-M-115-VS.12-3000-4848**

A composite identification number to be used when ordering a 4590 Series Reactor can be developed by combining individual symbols from the separate sections below. For more information on how to use this ordering guide, [please see page 27](#).

A Base Model

Model	Size	Vessel Style
4591	25 mL	Moveable Head
4592	50 mL	Moveable Head
4593	100 mL	Moveable Head
4596	25 mL	Fixed Head
4597	50 mL	Fixed Head
4598	100 mL	Fixed Head

B Pressure / Temperature Options

-No Symbol	3000 psi (207 bar) / 350 °C
-HP	5000 psi (345 bar) / 350 °C
-HP/HT*	5000 psi (345 bar) / 500 °C

* Fixed Head Only

C Gasket / Maximum Temperature

-OV	FKM O-ring, 225 °C
-OK	FFKM O-ring, 300 °C
-T	PTFE Flat Gasket, 350 °C
-FG	Flexible Graphite, 500 °C (HP/HT option only)

D Material of Construction

-SS	T316 Stainless Steel
-MO	Alloy 400*
-IN	Alloy 600
-HB	Alloy B-2 / B-3*
-HC	Alloy C-276
-CS	Alloy 20*
-TI2	Titanium Grade 2*
-TI4	Titanium Grade 4*
-ZR702	Zirconium Grade 702*
-ZR705	Zirconium Grade 705*

* Maximum temperature and/or pressure limited.
See [page 10](#) or [24](#) for complete list of available alloys.

E Stirrer Drive

-M	General Purpose Magnetic
----	--------------------------

F Mag. Drive Material of Construction

-MOC Symbol	Indicate Material of Construction
-------------	-----------------------------------

G Electrical Supply

-115	115 VAC
-230	230 VAC

H Motor Option

-VS .12	Variable Speed, 1/8 hp
-VS .25	Variable Speed, 1/4 hp
-XP .25	Explosion Proof Variable Speed, 1/4 hp
-XP .25X	ATEX Explosion Proof Variable Speed (.18 KW, 0-1300 rpm)
-AM .25	Air Motor, 1/4 hp

I Pressure Gage

-5000	5000 psi / 345 bar
-3000	3000 psi / 207 bar
-2000	2000 psi / 138 bar
-1000	1000 psi / 69 bar
-600	600 psi / 40 bar
-200	200 psi / 14 bar
-100	100 psi / 7 bar

J Bottom Drain Valve

-BDV	Bottom Drain Valve (Not available on HP models)
------	---

K Controller

-4848 (included in base system)	PID Control, Ramp & Soak Programming, Motor Speed Control, and Data logging with Software. (RS-485 to USB cable not included) For use with up to three additional display modules.
-4848B	Same as above but for use with up to six additional display modules.
-A2110E	Motor Controller
-4871	Process Controller (for enhanced control options)

See [Chapter 6](#) for a complete list of controllers and options.

L 4848 Controller Options

-TDM	Tachometer Display Module
-MCM	Motor Control Module w/Tachometer
-PDM	Pressure Display Module
-HTM	High Temperature Cut Off Module
-ETLM	External Temperature Limit Module
-MTM*	Motor Torque Module
-SVM	Solenoid Valve Module (for cooling control)
-A1925E4	RS-485 to USB Cable for 4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controller (must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848

* The MTM must be installed in conjunction with the MCM.

M Custom Options (List All Desired)

-GE	Gas Entrainment Stirrer
-BF	Removeable Baffle Set
-XCAD	External Catalyst Addition Device
-SCP	Solids Charging Port (Ball Valve)
-RC	Reflux Condenser
-RTC	Reflux/Take-Off Condenser
-WJ	Welded Jacket
-ABH	Aluminum Block Heater with Cooling Channels

See [Chapter 7](#) for a complete list of optional accessories.

N Certifications

-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification

O Spare Parts Kit

-4599M	Spare Parts Kit for 4590 Series
-4599HPHT	Spare Parts Kit for 4590HPHT Series

Please note that all options and combinations are not compatible with all models.