

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

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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.