



# Series 5500 High Pressure Compact Lab Reactors

**Designing  
and Building  
Quality  
Pressure  
Apparatus  
for Over  
100 Years**



# 5500

# Parr Series 5500 High Pressure Compact Laboratory Reactors

## Familiar Parr Designs

**All of the safety, convenience and reliability** features which have been the hallmark of Parr pressure reaction equipment for more than 50 years have been incorporated into a new line of high pressure, compact laboratory reactors. (HPCL)

**These new Series 5500 HPCL reactors** are based upon our popular micro and mini, Series 4590 & 4560 reactors. There are four principal differences between these new reactors and their original counterparts. These are:

- 1. A smaller, more compact magnetic drive is installed.**
- 2. A smaller, more compact variable speed stirrer motor is directly coupled to the new magnetic drive.**
- 3. The larger support stand, overarm and motor have been eliminated.**
- 4. A temperature controller with reduced expandability has been designed for use with these compact systems.**

**As a result of these changes,** we are now able to offer these new reactors to users who do not require the wide variety of options and expandability provided by our Series 4500 reactors at a significantly lower cost. These new designs will be welcomed by not only investigators with limited space or budgets, but also by investigators building



**Model 5523 600 mL Compact Laboratory Reactor and Model 4836 Programmable Controller with Tachometer Display Module.**

multiple reactor installations for combinatorial chemistry or high throughput investigations.

The reaction vessels used in these new HPCL reactors are identical to the ones furnished in the Series 4590 micro reactors and the Series 4560 mini reactors. HPCL reactors use the popular Parr split ring closure. These vessels are rated for a maximum working pressure of 3000 psi. The maximum operating temperature is dependent upon the seal selected, PTFE gasket for up to 350 °C; with FKM O-ring to 225 °C or FFKM O-ring to 275 °C.

The 25, 50, and 100 mL reactors are equipped with gas inlet and outlet valves, a liquid

sampling valve, pressure gage, safety rupture disc and internal thermocouple in addition to the internal stirrer. The 300, 450 and 600 mL reactors provide an internal cooling loop in addition to these fittings.

In addition to the standard Type 316 stainless steel, the vessels for these new HPCL reactors can also be constructed from any of the standard Parr materials of construction.

These vessels are designed, built and can be certified to the ASME Pressure Vessel Code, European community P.E.D. and other appropriate local codes. Electrical safety is certified by CSA and the EC-CE mark.



**Model 5521 300 mL Compact Laboratory Reactor and Model 4836 Programmable Controller with Tachometer Display Module.**

### **New Magnetic Drive**

To take advantage of the new technology available in magnets today, Parr has designed a new, compact, magnetically-coupled stirrer drive especially for these smaller vessels. Tests show that this new drive is sufficient to stir reactor mixtures with viscosity up to 10,000 centistokes in a 600 mL reaction vessel.

### **Direct Coupled Motor**

A 1/17 hp variable speed motor is incorporated directly into the smaller magnetic stirrer drive installed on these reactors. The motor delivers sufficient torque to drive the magnetic coupling to its limit and provides stirring speeds adjustable from 0 to 1500 rpm. The motors are equipped with

a tachometer pickup to provide a signal to the optional tachometer display module which can be installed in the 4836 Controller.

### **New Heater / Reactor Support**

A new heater that also serves as the vessel support has been designed for the HPCL reactors. This is an aluminum block style heater for excellent thermal uniformity. The cartridge heaters used in this heating block are easily replaceable if required. A stainless steel heat shield is provided around the heating block. This style of heater/reactor support provides a very small footprint, ideal for limited bench space.

### **Model 4836 Temperature Controller**

Parr has developed a compact temperature controller for use with these reactors. It features a PID (proportional integral-derivative) controller with ramp and soak programming for preset temperature profiles. Each controller is furnished with a digital communications port and software for loading operating parameters and temperature profiles from a PC as well as for logging temperature data to the PC.

The controller includes a load relay capable of handling the electrical loads of all the heaters used with the Series 5500 Reactors. It also provides for control of cooling water to the reactor for exothermic reactions when a cooling coil is installed. A lock out relay will shut off all heating if the alarm temperature is reached. A motor speed control is provided for the double speed stirrer motor. An optional tachometer can be installed to display stirring speeds.

### **Alternate Controllers Available**

The Series 4840 Controllers used with the standard Parr line of medium and high pressure reactors are also available for use with these reactors. These offer the user options for cascade control, redundant temperature control, digital pressure read out, stirring speed read out, motor current draw, and analog or digital outputs not available on the 4836 controllers.

Up to eight High Pressure, Compact Laboratory Reactors can be controlled with a single 4870 Process Controller.

Series 5500 Compact Reactor Specifications								
Shaded bar indicates specifications that change within series.								
Model Number	5511	5512	5513	5521	5522	5523	5524	5525
Sizes, mL	25	50	100	300	450	600	160	100
Maximum Pressure	3000 psi (200 bar)							
<b>Maximum Temperature</b>								
with FKM O-ring	225 °C							
with FFKM O-ring	275 °C							
with PTFE Flat Gasket	350 °C							
<b>Vessel Style</b>								
Reactor Mounting	Removable							
Closure (Cap Screws)	Bench Top							
Valve Connections, NPT	Split Ring (6 for Flat Gasket) (0 for Quick Close)							
Magnetic Stirrer, Model No.	1/8" Male							
Maximum Torque, Inch-Pounds	A3040HC*							
Impeller(s), 4-Blade	2.5 (0.28 Nm)							
Pressure Gage, Size	1, 2 on 600 mL only							
Range	3.5 inches							
Temperature Measurement	0-3,000 psi (200 bar)*							
Cooling Coil	Fixed Thermocouple							
Style	NA		Included			Special		
Bottom Drain Valve	NA		Single Loop			Special		
<b>Heater Style</b>								
Heater Power Watts	NA		Aluminum Block					
Stirrer Motor, hp, type	800	1000	800	1000	800	1/17 hp, Variable Speed		
<b>Electrical Supply</b>								
Volts	115 or 230							
Max. Load, amps 115 / 230	8.0 / 4.5	9.7 / 5.4	8.0 / 4.5	9.7 / 5.4	8.0 / 4.5			
<b>Vessel Dimensions</b>								
Inside Diameter, inches	1	1.3		2.5			2	
Inside Depth, inches	2	2.25	4.5	4	6	8	2	
Weight of Vessel, pounds	12		13	15	17	12		
<b>Reactor Dimensions</b>								
Width, inches w/o Controller	8.8							
Depth, inches	9.3							
Height, inches	21.8	23.4	21.8	23.4	25.4	21.8		
Weight, pounds	25		26	28	30	25		
<b>Spare Parts Kit</b>								
	5529SPK							
* Other options available. See Options Section and Ordering Guide								

**Options**

As shown in the ordering guide, a variety of options are available for these Series 5500 Reactors. In addition to the options described here, there are a number of additional options and accessories such as glass or PTFE liners, special stirrers, gages, gas and liquid

feed systems, custom valves, etc., as described in the options section of this catalog.

Please remember that the Series 5500 reactors have been designed and packaged to provide the basic functions of these small laboratory reactors and certainly not all of the options available for the more

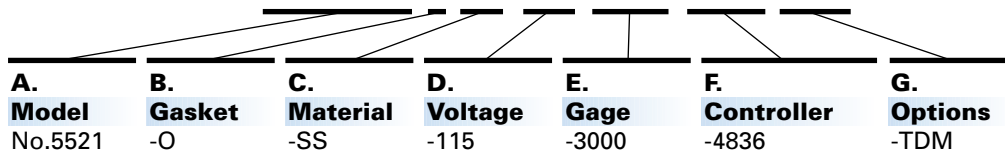
versatile Series 4500 reactors can be incorporated into these units. Investigators who need explosion proof operation, jacketed vessels, bottom drain valves, high torque stirrers, catalyst baskets, etc., will need to start with a Series 4590 micro reactor or a Series 4560 mini reactor.

## Ordering Guide

A composite identification number to be used when ordering a reactor can be developed by combining individual symbols from the separate sections.

**Example:** A 300 mL, O-ring gasket, T316SS reactor, 115V, 3000 psi gage, and programmable PID controller with tachometer display module would be listed as:

**No. 5521-O-SS-115-3000-4836-TDM**



**A. Base Model**

Model No.	Size	Motor/Drive
5511	25 mL	Variable Speed
5512	50 mL	Variable Speed
5513	100 mL	Variable Speed
5521	300 mL	Variable Speed
5522	450 mL	Variable Speed
5523	600 mL	Variable Speed
5524	160 mL	Variable Speed
5525	100 mL	Variable Speed

**B. Gasket / Maximum Temperature**

-O	O-ring FKM, 225 °C
-T	PTFE Flat Gasket, 350 °C

**D. Materials of Construction**

-SS	T316 Stainless Steel
-MO	Alloy 400
-IN	Alloy 600
-HB	Alloy B-2
-HC	Alloy 276
-HC2	Hastelloy C-2000
-CS	Alloy 20Cb3
-TI2	Titanium Grade 2
-TI4	Titanium Grade 4
-NI	Nickel 200
-Zl	Zirconium 702 or 705

**E. Electrical Supply**

-115	115 Volt, 50/60Hz
-230	230 Volt, 50/60Hz

**E. Pressure Gage**

-5000	5000 psi / 347 bar
-4000	4000 psi / 280 bar
-3000	3000 psi / 207 bar
-2000	2000 psi / 140 bar
-1000	1000 psi / 70 bar
-600	600 psi / 40 bar
-200	200 psi / 14 bar
-100	100 psi / 7 bar

**F. Controller**

-4836	Programmable Control, RS232
-4842	PID Controller
-4843	Programmable Control, RS232

**G. Controller Options (List All Desired)**

-TDM*	Tachometer Display Module
-PDM*	Pressure Display Module (4842 & 4843 Only)
-HTM*	High Temp. Cut-off Module (4842 & 4843 Only)
-(*)	Add to above for Analog Output (0-5 or 0-10 VDC or 4-20mA)
-SVM	Solenoid Valve Module

**H. Certifications**

No Symbol	No Certification
-ASME	ASME Certification (metal vessels only)
-CE	European Community Standard (for EMC Compliance)
-CE-PED	European Community PED (metal vessels only)
-Parr	Parr Certification

# The Parr Warranty

**P**arr Instrument Company (Parr) pressure reactors and associated products are designed and manufactured only for use by or under the direct supervision of trained professionals in accordance with specifications and instructions for use supplied with the products. For that reason, Parr sells only to professional users or distributors to such users. Parr produces precision equipment and associated products which are **not intended for general commercial use.**

## Exclusive Warranty

To the extent allowed by law, the express and limited warranties herein are the sole warranties. **Any implied warranties are expressly excluded**, including but not limited to implied warranties of merchantability or fitness for a particular purpose.

## Express Warranties

Subject to the above Conditions, Parr expressly warrants that its products:

Are as described in the applicable Parr sales literature, or as specified in Parr shipping documents.

Will function as described in corresponding Parr sales bulletins, or for specifically engineered assemblies, as stated in the sales proposal and purchase agreement.

Will remain free from defects in materials and workmanship for one year from date of delivery of the product to the original purchaser/user. **Note** that there is no guarantee of a service life of one year after delivery.

## Limitations on the Parr Warranty

As to the original purchaser/user and to the distributors to such users, Parr limits its liability for claims other than personal injury as follows:

**Replacement or repair.** With respect to express warranties herein, Parr's only obligation is to replace or repair any parts, assemblies or products not conforming to the warranties provided herein.

Disclaimer of consequential damages. In no event shall Parr be liable for consequential commercial damages, including but not limited to: damages for loss of use, damages for lost profits, and damages for resulting harm to property other than the Parr product and its component parts.

**Due to their fragile nature, glass parts are not warranted beyond incoming inspection.**



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