

# **J-KEM** Scientific Instruments for Lab Automation **Custom Robotics**

Custom Robotic Systems  
for \$30,000

**& Accessories**



## **Laboratory Automation Products**

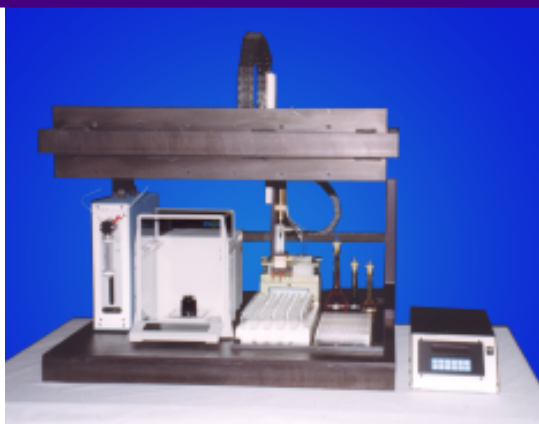
### **Robotic Workstations**

- Phoenix-WT** Weighing Workstation
- Phoenix-LS** Synthesis/Dissolution Workstation
- Phoenix-SPS** Solid Phase Synthesis Workstation
- Phoenix-SPE** Solid Phase Extraction Workstation
- Phoenix-Custom** Creativity Workstation  
Designed to your specifications

### **Automated Instruments**

- Robotic Shaker**  
Homes to within  $\pm 0.01$  inches
- Filtration Station**  
Temperature regulated filtrations
- SPE Station**  
Independent control of elution  
from every column

# Phoenix Robotic Workstations



## Phoenix-WT Weighing Workstation \$29,800 without balance

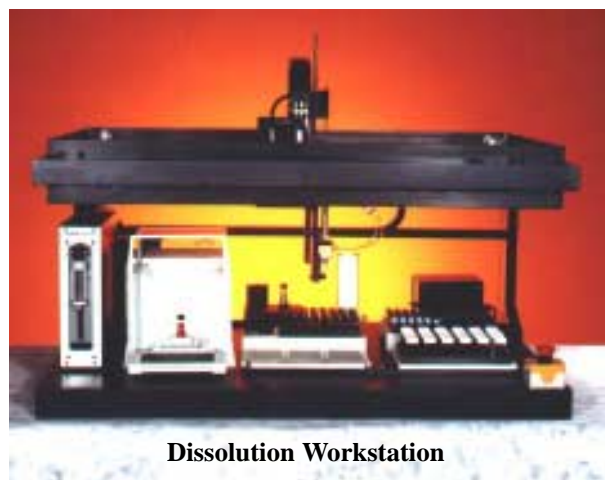
The Phoenix-WT comes configured to perform your custom weighing application. Includes J-KEM's Robotic Command Language.

- \* Grippers to transport vials or tubes
- \* Frame size selected to fit user application
- \* Rack locators to position either J-KEM or user supplied racks
- \* Software for multiple weighing applications
- \* Excel data table input and output
- \* Optional bar code reader

## Phoenix-LS Synthesis/Dissolution Workstation \$35,250 without balance

The Phoenix-LS is a multi-purpose liquid handling workstation configurable for many different applications including solution phase synthesis, reagent preparation, a variety of dissolution and reformatting tasks (see reformatting workstation below).

- \* Combine with J-KEM's **KEM-Prep solution phase reactor** for automated reaction setup, synthesis (-80 to 130° C), extraction, and sample preparation.
- \* **Dissolution station** performs a variety of sample preparation, reformatting and customized daughter plate preparation tasks.
- \* Optional vortexer, bar code, shaker, filters, pipettes, needles.
- \* **Includes:** Syringe pump with 8 solvent valve, septum penetrating needle, vial or plate gripper, wash station, alignment racks, software. Excel data table input & output.



Dissolution Workstation

## Phoenix-SPS Solid Phase Synthesis Workstation

(Not pictured)

\$33,470 without SPS reactor

- \* Multistep SPS reaction setup with automated resin washing
- \* System addresses 6 wash solvents and multiple reagents
- \* Operates 3rd party SPS reactors
- \* **Includes:** Syringe pump with 8 solvent valve, stainless steel cannula, alignment racks, software. Excel data table input & output.



Reformatting Workstation

Dissolve and reformat between any style plates or racks

## Phoenix-SPE Solid Phase Extraction Workstation

(Not pictured)

\$32,280 without SPE station

- \* Fully automated, unattended SPE extractions.
- \* Software controls times and volumes for:
  - \* Cartridge conditioning
  - \* Sample addition
  - \* Washings and sample collection

Combine with J-KEM's SPE station (see back cover). System optically monitors each column and individually controls solvent height, preconditioning and development times for outstandingly reproducible SPE.

- \* Optional *elution rate* control

**Customize** any Phoenix Workstation

The Phoenix workstation is easily customized to meet the needs of virtually any automated task. Start from a basic design and add a plate gripper, shaker, multiple cannula, or any other module.

# Custom Automation Solutions

J-KEM's engineers are experts in **custom automation solutions**, from miniature robotics that fit in glove boxes to multi-axis, multifunction workstations. The flexibility of the Phoenix workstation results from the synergy of innovative software and versatile hardware.



Sample of J-KEM's Z-axis plate with two septum penetrating needles, vial gripper, and septum penetrating analytical syringe.

## Hardware

The uniqueness of the Phoenix system starts with the most basic component of any workstation, the *probe* that performs the operations of the workstation. Rather than a traditional arm that performs a single function, the Phoenix system uses a Z-axis plate capable of holding multiple workstation probes. Any probe mounted to the Z-plate can be used in the workstation's procedure, including:

- \* Septum penetrating, argon purging needles
- \* Disposable pipettes
- \* Grippers
- \* Multichannel dispensers
- \* Homogenization probe
- \* pH, temperature, or any other sensor

## Software

J-KEM's Robotic Command Language uses English-style text strings making procedures easy to write, edit and understand because of the intuitive meaning of each command. J-KEM's Robotic Command Language is provided free with every workstation.

<p><b>Typical program segment using J-KEM's Robotic Command Language</b></p> <hr style="width: 50%; margin: 5px auto;"/> <p>This segment selects a vial and places it on the balance for weighing</p>	<pre>MOVE(X,100) MOVE(Y,320) MOVE(Z,450) GRIPPER(CLOSE) MOVE(Z,0) BALANCE(TARE) BALANCE(MOVETO) BALANCE(WEIGHT?)</pre>
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## Robotic Controller



J-KEM's Robotic Controller is the heart of the Phoenix workstation.

Features of the robotic controller include:

- \* Four built-in serial ports (16 optional) to interface with pumps, balances, spectrometers, bar code readers, temperature controllers, and just about any third party instrument.
- \* Eight analog input channels read temperature, pH, pressure, and other analog sensors. The analog interface allows the workstation to directly read and control solution pH, temperature, flow rate, and pressure.
- \* Four analog output channels
- \* Digital I/O senses switch position, controls valves, turns instruments On/Off, and provides Start/Stop signals

Data handling is simplified by using Excel tables to both read data into and record data collected from a procedure.



### Sample Data Collection Table

```
Start Time: 14:20:00 7/14/01
File Name: Run128.txt
Program Name: TrackDifference.exe
*****
Pos  Rack#  Sample ID  Weight Empty  Weight Full  Volume
1    Rack-96  A12082    12.3971       14.8831      2.4860
2    Rack-96  A12045    12.5534       14.6110      2.0576
3    Rack-96  A12055    12.7984       14.9934      2.1950
4    Rack-96  A12078    12.8282       14.9157      2.0875
-----
95   Rack-96  A13167    12.3343       14.5396      2.2053
96   Rack-96  A13177    12.7821       14.9982      2.2161
```

## Task Defined Vs. Non-Task Defined Workstations

Most manufacturer's workstations perform a defined task such as weighing, synthesis, solid phase extraction, etc. The disadvantage of this design is that once the workstation is configured to perform its original task, it can't be reconfigured to perform new tasks either because the hardware is not replaceable, or the software lacks the flexibility to control instruments that were not originally supplied with the workstation. The static design of these workstations results in their premature obsolescence when they can't be reconfigured to perform new tasks required by changing research needs.

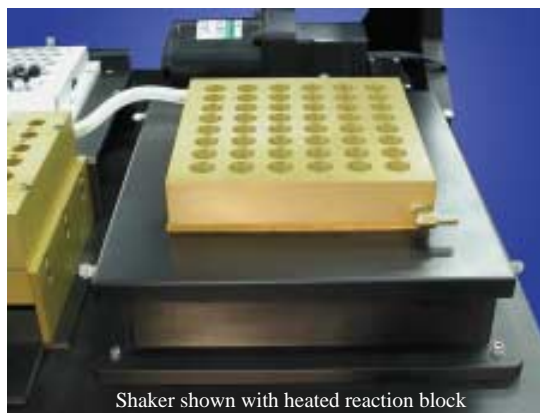
In contrast, the Phoenix system provides complete freedom over hardware and software changes. For example, a Phoenix workstation originally made to run solid phase synthesis can be reconfigured to a weighing workstation in 2-3 days including hardware changes and software development. The freedom to change the task performed by the workstation as the need for automation changes is the distinguishing characteristic of J-KEM's *non-task defined* Phoenix workstation.

# Accessories for Robotic Systems

## Robotic Shaker

- \* **Shaker returns to HOME location when stopped.**  
Home accuracy of 0.01" on X & Y axis
- \* **Low Profile shaker fits on any robotic deck.**  
Just 3" tall. Capacity of 60 pounds
- \* **Features:** Rotational speed: 40-650rpm  
Motion: Orbital or linear

**Price**  
**\$4720**



## Filter Station

- \* **Filter by gravity or by nitrogen gas pressure**  
24 and 48 position stations
- \* **Immediate sampling of filtrate**  
Filtrate access port provides immediate access to filtrate
- \* **Temperature controlled filter chamber**  
Filters sample at user set temperature  
Range: -40 to 100° C

**Price**  
**\$3860**



## Parallel Syringe Pump

- \* **Multi-position syringe pumps**  
Systems with 4, 6, 8, 12, 24, & 48 syringes
- \* **Multiple syringe sizes from 10µl to 50ml**  
Glass and Teflon syringes
- \* **Fully programmable**  
Withdrawal & dispense rates  
\* Volumes \* Cycle repeat counts \* Custom features

**8-Position \$6400**  
**48-Position \$17,300**



## SPE Station

### Fully automated Solid Phase Extractions

- \* The solvent height of each column is monitored by built-in optical sensors which close individual reactor outlets when the solvent reaches a pre-programmed height. Independent control of each reactor provides total flexibility and outstanding reproducibility of SPE analyses.

**Price \$20,200**  
**for 24-position**

- \* Programmed steps for column pre-conditioning, sample application, column washing and elution.



**J-KEM<sup>®</sup> Scientific**  
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