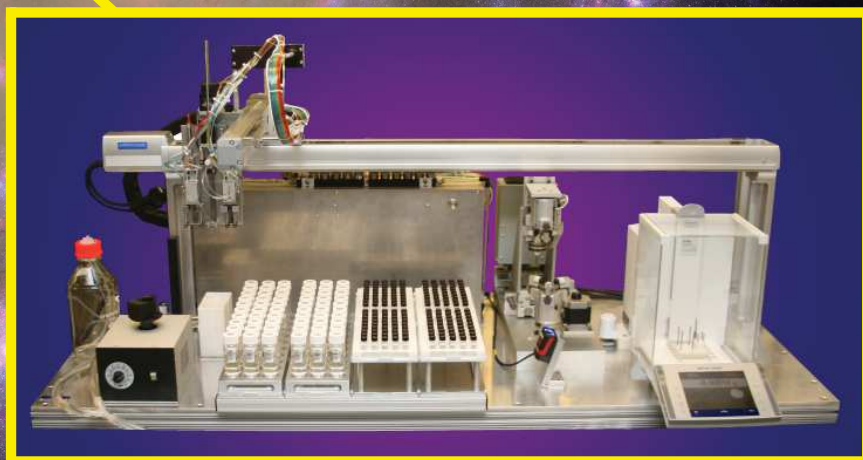


## Temperature Control



## Reaction Automation



## Custom Robotics



# Product Highlights

## Digital Temperature Controllers

### Precision Temperature Controllers for Research

- Regulate volumes from 100  $\mu$ L to 22 L

### High Power & High Safety Controllers

- Reactors up to 100 L

### Economy Temperature Controllers



**NEW** in  
**2014**

on all 200-Series controllers

- USB Communications
- Free Data logging and Control Software
- KEM-IO External Instrument Control
- 0.1° C Regulation  
< 1° C Over-shoot

## Digital Vacuum Regulator

- Digital Control of Vacuum Pressure from 760 to 0.1 torr
- Regulate Vacuum to 0.1 torr
- Multi-step vacuum ramps



## Parallel Synthesis & Lab Automation Equipment

### Automated Lab Reactors

- Multi-step programs for:
  - Temperature control
  - Reagent addition
  - pH & Oxygen levels
  - Stirring & Reactor pressure
- Safety
  - User definable alarms
  - Automated shutdown
- Data logging
- Custom software



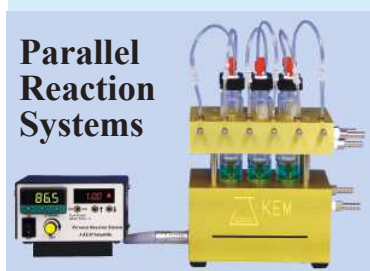
### Syringe Pumps

- Automatically refills to **delivery any volume from any syringe**
- Automates multi-reagent & multi-reactor delivery programs
- Addition rates from 1  $\mu$ L/min to 200 ml per minute
- From 1 to 48 independent pumps



### Parallel Reaction Systems

- Compact
- Magnetically stirred
- Temperature controlled
- Inert atmosphere



### Reaction Block Systems

- Heat, cool, & reflux
- Multiple vial sizes
- Custom designs



- Multiple Temperature Zones

## Custom Robotic Workstations

### Robotic Solutions

- Custom hardware and software
- Weighing • Dissolution • Reforming
- Solid & Solution phase Synthesis
- Cherry picking • Solid phase extraction

### User Programmable

- All robots include the original source code

**NEW - Endeavour Robots**  
priced from \$9000



Capping/Uncapping  
Station

# Index

<b>Adapters, Thermocouple</b>	39	<b>Oil baths, Instatherm</b>	40	<b>Syringe Pump</b>	
<b>Automation Instruments</b>		<b>Parallel Synthesis Reactors</b>		Single & Multi-Channel	18
Robotics	3-9	Solution Phase	17, 20, 24	Custom	19
Fraction Collectors	10	Solid Phase	24	<b>Temperature Controllers</b>	
Continuous Flow Reactor	11	<b>Personal Reaction Station</b>	17	Research Controllers	32-36
Infinity Controller	12	<b>Pressure Regulator, Digital</b>	31	Multi-Channel	34
Reaction Controller	14	<b>Reaction Blocks</b>		Safety	35
Fermentation Controller	15	Single Temperature Zone	20	High Power	35
Custom Instruments	16	Multi-Temperature Zone	22	Oil Bath Controller	36
<b>BioReactor</b>	15	Custom	23	Economy	36
<b>Chiller, Circulating</b>	25	<b>Reaction Controller</b>	14	Custom	27, 37
<b>Centrifuge, Robot</b>	9	<b>Robotics</b>		Safety Limit Controller	28
<b>Continuous Flow Reactor</b>	11	Instruments	3-7	Power Controller	29
<b>Custom Instruments</b>	13, 16, 27	Accessories	8-9	<b>Temperature Monitor</b>	29
<b>Evaporators</b> See Solvent Evaporators		<b>Safety Equipment</b>		<b>Thermocouples</b>	
<b>Fermentation Controller</b>	15	Lab Safety Controller	28	Single Element	38-39
<b>Fraction Collector</b>	10	Water Flow Monitor	28	Dual Element	39
<b>Heating Mantles</b>	40	Digital Limit Controller	28	Glass Coated	38
<b>Hand-Held Meters</b>	29	Digital Temperature Monitor	29	Teflon Coated	38-39
<b>Infinity Controller</b>	12	Temperature Controllers	35	Hypodermic Needle Probe	39
<b>KEM-Lab Reactors</b>	24	<b>Shakers</b>		Thin Wire	39
<b>KEM-Prep Reactor</b>	24	Bench top, Reaction Block	21	Cords and Accessories	38
<b>KEM-Vap Evaporator</b>	24	KEM-Lab	24	<b>Trinity Power Controller</b>	29
<b>Kugelrohr Distillation</b>	26	Robotic	8	<b>USB Network Extenders</b>	37
<b>Monitors</b>		<b>Solid Phase Synthesis Reactor</b>	24	<b>Vacuum Regulator, Digital</b>	30
Lab Safety	28	<b>Solvent Evaporators</b>		Monitors	30
Temperature	29	KEM-Vap	24	Precision Regulator	31
Vacuum	30	Microtiter Plate	24	<b>Variac, Solid State</b>	29
Water Flow	28	Reaction Block	20	<b>Water Flow Monitor</b>	28
<b>Nitrogen Gas Heater</b>	29	<b>Stirrer, Miniature Overhead</b>	27	<b>Who We Are</b>	41

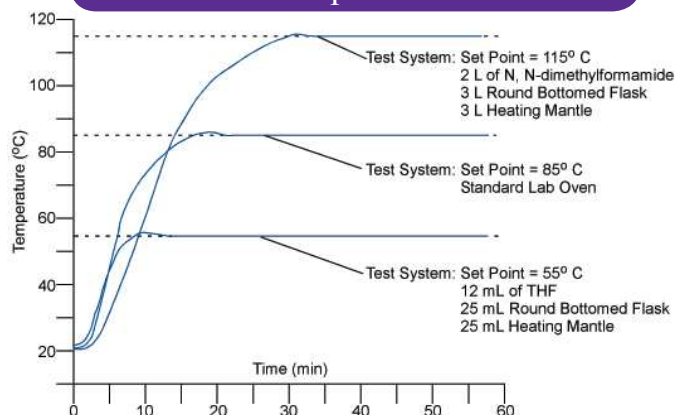
## Temperature Control



Model 210 controller shown with power control computer

J-KEM's patented power control computer provides the safety that naturally results from consistent, precise control. No overshoot of the entered temperature, and 0.1° C regulation.

### Heating Profile of J-KEM's 200-Series Temperature Controllers



## Ordering Information

**J-KEM® Scientific, Inc.**

J-KEM Scientific, Inc.  
6970 Olive Blvd.  
Saint Louis, MO 63130  
USA

Phone: (314) 863-5536  
(800) 827-4849  
FAX: (314) 863-6070  
Email: [info@jkem.com](mailto:info@jkem.com)  
On-line Catalog: <http://www.jkem.com>

### The J-KEM® Guarantee

All J-KEM products are guaranteed to be the highest quality and most accurate instruments available. Any J-KEM product not meeting your expectations can be returned within 30 days for a full refund.

Robert Elliott / President





# New Products & Instrumentation

## The Infinity Controller



The Infinity Controller is the result of 3 years of innovation and collaboration with researchers to design one instrument with the versatility to automate virtually any laboratory task, from the simplest to the most complex.

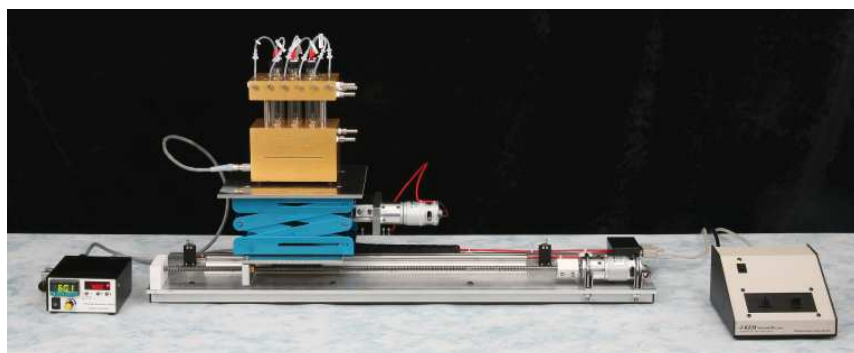
See examples on pages 12-15.

- Regulate pressure to 0.1 torr
- Control solution pH to 0.001
- Record and control temperature to 0.01C
- Eight high precision analog inputs read:
  - \* Thermocouple \* RTD \* pH \* transducers
  - \* dissolved oxygen \* any analog input
- Four serial ports control instruments like:
  - \* Pumps \* Stirrers \* Chillers \* Balances
- High power outputs (14) control:
  - \* Valves \* motors \* heaters

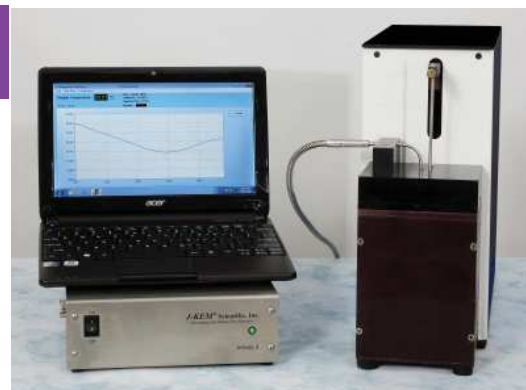
## Custom Instruments

p. 14-16

Take advantage of J-KEM's expertise in fluid delivery, motion, temperature, and pressure control to design an instrument for your unique task. Custom software and hardware solutions.



Automated labjack with motorized X- and Y-axis control for use in a hot cell.



Automated titer point determination for fatty acids

- Automate repetitive tasks for precise, repeatable results.
- Automate critical processes to improve lab safety.
- Automate time consuming tasks to run in parallel for improved efficiency.

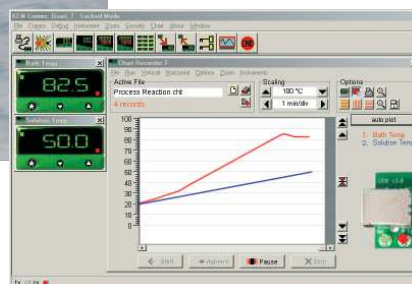
## Research Temperature & Vacuum Control

### Precision & Safety

The foundation of the uncompromised safety of J-KEM's temperature and vacuum controllers is accuracy of control. No over-shoot and 0.1° C regulation of the entered temperature provides predictable performance critical to laboratory safety.



**New Technologies** New KEM-IO allows the controller to operate other instruments (pumps, stirrers, valves) as a function of temperature and time (see p.37)

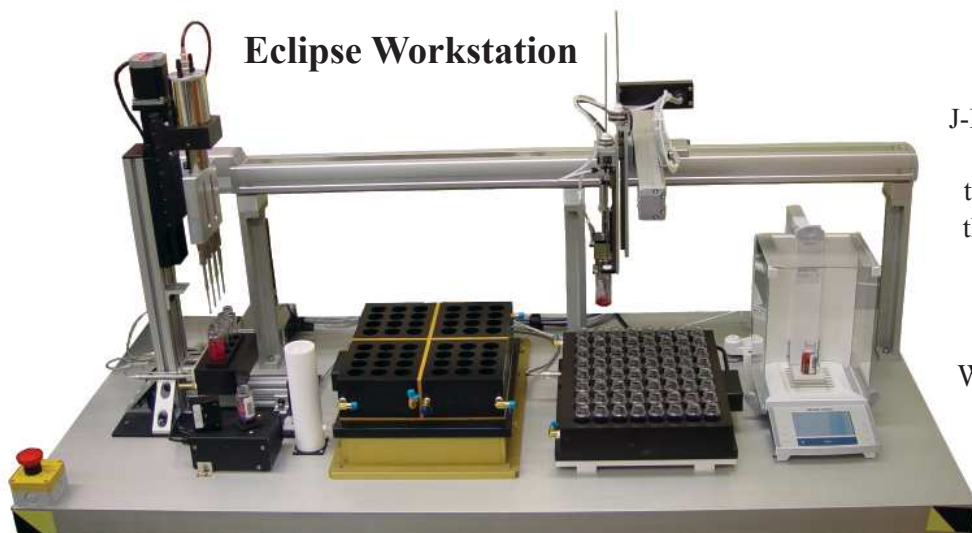


### Feature Rich

- USB input for data logging, multi-step ramps, and remote automation.
- Automatic exotherm detection
- Third generation Power Control Computer

# Advantages of J-KEM Robotics

## Eclipse Workstation



## Custom Solutions

J-KEM offers complete hardware and software solutions for almost any lab automation task. Every workstation is customized with the features and software needed to run your specific application.

## Workstations for:

Weighing • Dissolution • Synthesis  
Sorting • Crystallization • SPE  
Cherry picking • SPS  
Spectroscopy

**Polymer Compounding Robot** Modules: 4-Temperature zone reaction block, balance, bar code reader, heated & cooled reagent block, cooled 4-position sonicator, precision syringe pump with 16 reagent ports, 6-zone temperature controller, and needle wash station.

**Affordable Solutions** - Eclipse base price \$22,000

## Value

J-KEM's custom robotics are a fraction of the price of other companies' *one-size-fits-all* alternative. Combining the creative integration of commercially available modules (balances, bar code readers, pumps) and custom designed components results in a workstation that is modular, versatile, and affordable.

## Custom Design

While others start from an existing design, then try to make your application fit their instrument, every J-KEM workstation is designed from scratch to perform your automation task efficiently and with an eye towards future expansion. J-KEM's experience in lab automation, including temperature control, reactor design, fluid delivery, quality control, solid and solution phase synthesis is invaluable when optimizing the design of custom robotics.

## One-of-a-kind support

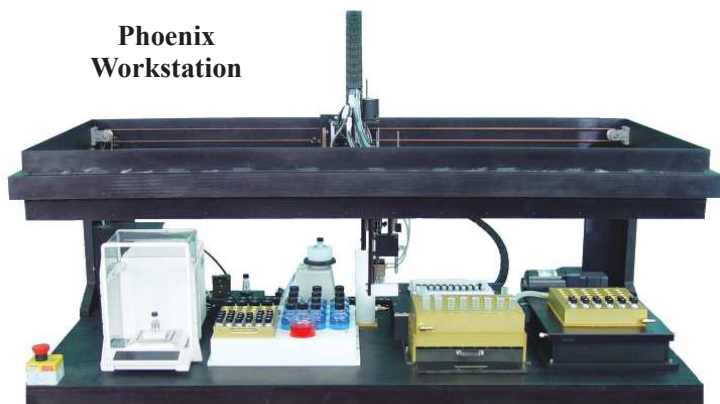


With a single phone call, you can talk to the engineer that designed your robot, the programmer who wrote the code, and the engineer that installed it and trained your staff.

## You Own the Solution

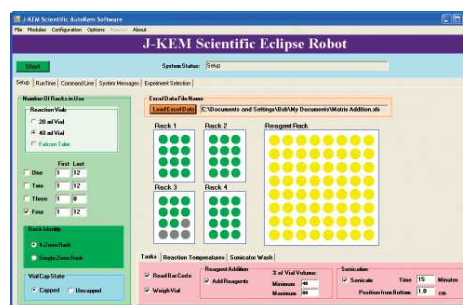
J-KEM believes that you should not only own the instrument, but you should own the solution itself. That's why J-KEM is the only company that releases the original source code with every robot. This makes it possible to write new, or modify existing procedures as automation needs change. With J-KEM's extensive software libraries and description program language adding a new rack or changing the sequence of a procedure is simple.

## Phoenix Workstation



**Crystallization Robot** - Studies diastereomeric crystal formation as a function of temperature. Automates filtrations and filtrate analysis by HPLC.

## Custom Software



Every robot includes software written specifically for your application. You define how experiments are set up, what choices are presented on the user interface, data access, and the sequence of operations.



# Eclipse Robotic Workstations

The Eclipse workstation uses modular X- and Y-axis rails combined with a wide selection of automated tools such as grippers, multi-position needles, and custom probes. The open design of the Eclipse provides easy access to the entire workstation deck.

## Affordable:

Starting at \$23,000, the Eclipse robot creates new opportunities for lab automation. For example, a weighing station with bar code scanner and 0.01 mg resolution balance is under \$30,000.

## Features:

- Speed: 400 mm/sec
- Positional Accuracy:  $\pm 0.02$ mm
- Z-Axis Force: 10 pounds



## Examples of Eclipse Workstations

### Test Tube Weighing

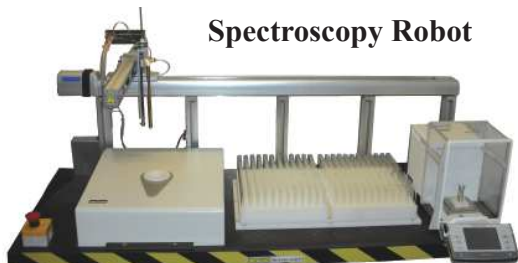


### Solid Phase Extraction Station



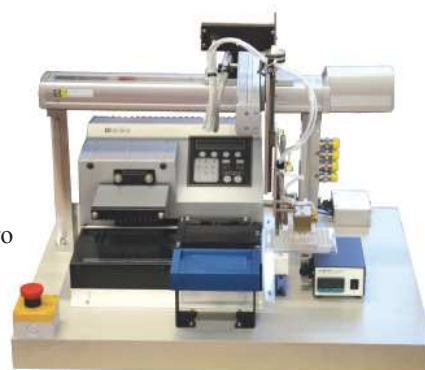
- 24 Columns developed in parallel
- Controls elution flow rate
- Solvent level in each column is optically monitored and flow is stopped when the solvent front reaches the top of the packing

### Spectroscopy Robot



- Automated spectroscopic analysis of 200 samples

### Plate Washer with Heated Reaction Station



See the Eclipse  
in action at:  
[www.jkem.com/videos](http://www.jkem.com/videos)

- Multi-step synthesis run in micro titer plate cells
- Plate gripper
- Temperature controlled reactor

### Derivatization Station

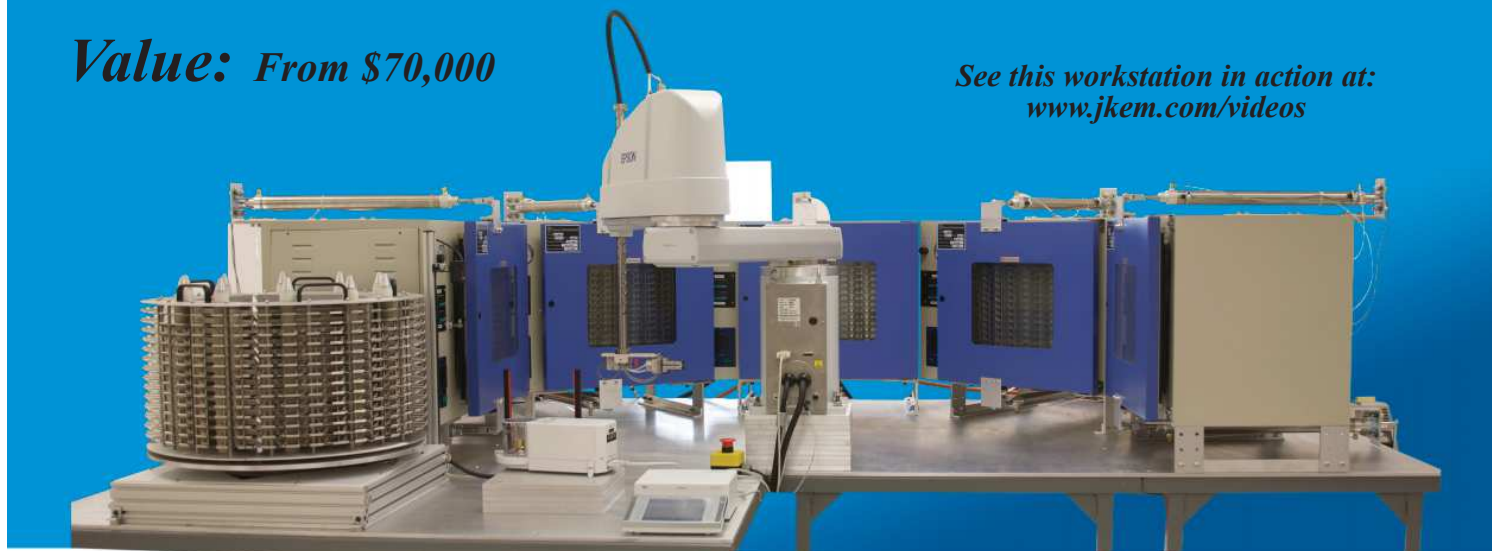


- Reagent addition to septum vials
- Heated reactor with mixing
- Reaction mixtures sampled at user set times to GC vials

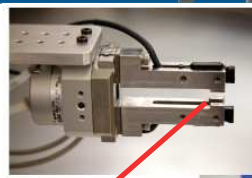
# SCARA Robotic Workstations

**Value:** From \$70,000

See this workstation in action at:  
[www.jkem.com/videos](http://www.jkem.com/videos)



**Filter weighing station.** Runs five parallel groups of samples. Vacuum dries filters analyzing weight changes with microgram resolution, over the course of multiple days.



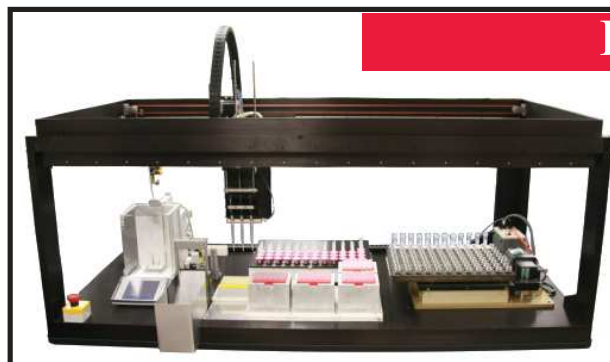
Optically guided gripper images the filters edge assuring the filter is picked up at the exact same location every time.



**Organics extraction station.** Extracts soluble organics from a series of input samples.

- Six different extraction solvents
- Vortex mixing
- Sample centrifugation to break up emulsions for clean solvent layer separations
- Interface to corporate data base to track samples

4-Axis SCARA and 6-axis articulating arm robots perform intricate motions to load, pour, mix, or otherwise manipulate samples with the dexterity of a human hand.



## Phoenix Robotic Workstations

1. Large deck size that allows access to multiple racks and modules such as shakers, balances, and filter stations.
2. Multiple *Z-probe tools*. This robot has simultaneous access to three 2.5 mL disposable tip probes, three 200  $\mu$ L disposable tip probes, a septum penetrating needle, a vial gripper, three stainless steel cannula, and a pressure plate to filter samples using positive pressure.
3. The Z-axis can develop over 100 pounds or force, enough to penetrate any septum or seal any reactor.

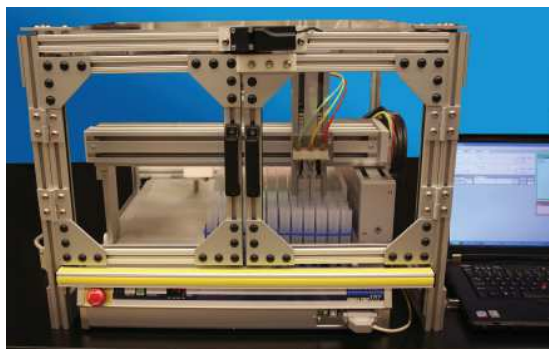


# Endeavour Robotic Workstations

## From \$12000

The Endeavour is J-KEM's most compact and affordable system, an ideal choice when either bench space or budgets are limited. The Endeavour is also a great choice for researchers who want to develop their own automation instruments.

Combined with J-KEM's software, the Endeavour can be programmed to run complex motion control programs, even 3-axis arc interpolations, in a matter of hours. The Endeavour is servo motor controlled to provide rapid and precise motions with positional accuracies of 0.02mm.



**Tissue Extraction Workstation**



**Smart Fraction Collector** Switches between titer plates and 50 ml tubes under program control

- Solution & Solid phase synthesis
- Compact weighing station
- Sample prep and dissolution



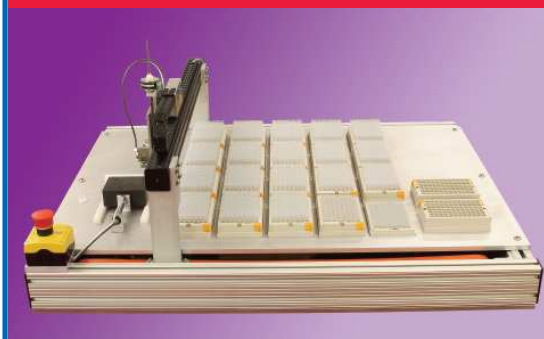
**Proof-of-Concept Robot** Because of its affordable price, and rapid software development tools, this Endeavour was used to validate and develop non-covalently bound surface chemistries before building the full-scale robot.



**Solid Phase Extraction Station**  
Runs 10-step elution program

The Endeavour workstation is available in 2-axis (X, Y) and 3-axis (X, Y, Z) configurations with addressable bed space of 200 x 200 mm or 400 x 400 mm. The Endeavour can be ordered fully configured and programmed to solve your automation need out-of-the-box, or as a blank deck with J-KEM's AutoKEM software to support a rapid, user designed robotic solution.

## Voyager Workstations



The Voyager workstation is optimized for weighing and sorting glass or plastic vials in 96 position tube racks. The Voyager integrates an analytical balance with 10  $\mu$ g resolution, a 2D bar code imager, and high speed X, Y, & Z drives. Combining world-class hardware with intuitive software makes the Voyager the finest workstation available for tube weighing, sorting, and cherry picking.



Tube gripper



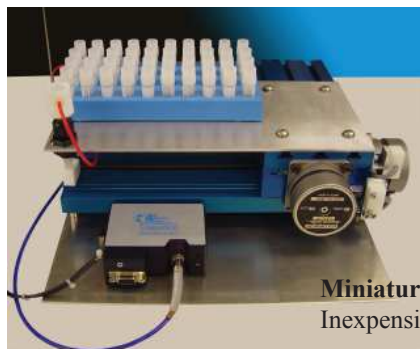
Microtube gripper



**Endeavour robot for pipetting oil samples**

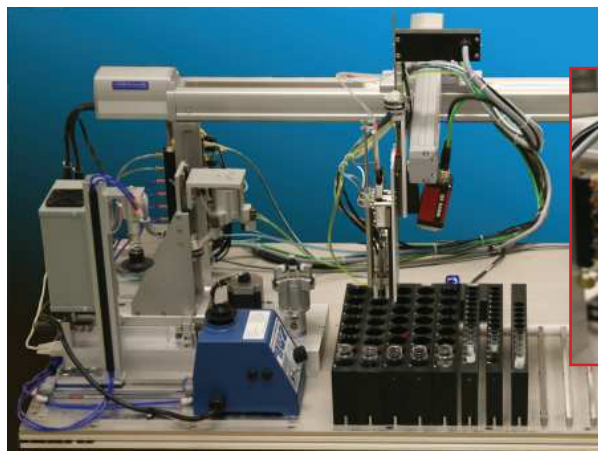


# Custom Robotics & Components



**Miniature X-, Y-robot for flow-cell UV spectroscopy.**  
Inexpensive: < \$2000 + spectrometer

**Single axis for solid phase oligonucleotide synthesis.**  
Temperature controlled synthesis stage.  
Automated reagent introduction and resin washing.



**Sample analysis and compounding**

- Integrated vision system recognizes the type and positioning of racks and vials.
- Capping/Decapping
- Vortex mixing
- Integrated ultrasonic dissolution

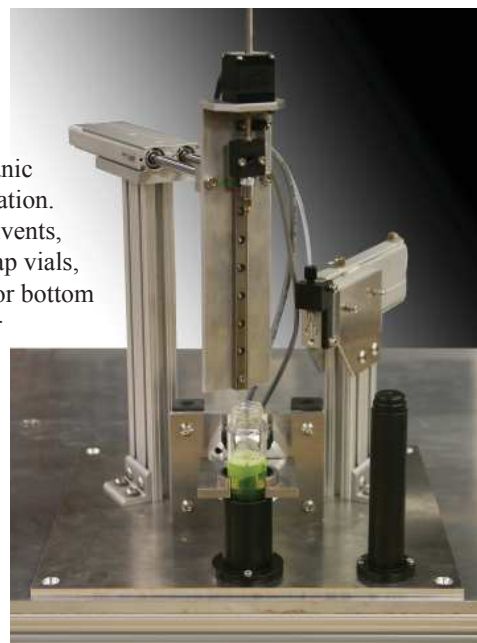


Noninvasively measures flow rate by counting precision formed drops



Inside of a SPE controller showing flow rate control and solvent front optical detector electronics

Volatile organic extraction station.  
Dispense solvents, cap and uncap vials, remove top or bottom solvent layer



UV probe for real-time reaction analysis



## Multi-function probes

Robotic arms equipped with grippers, septum penetrating needles, and cannulas



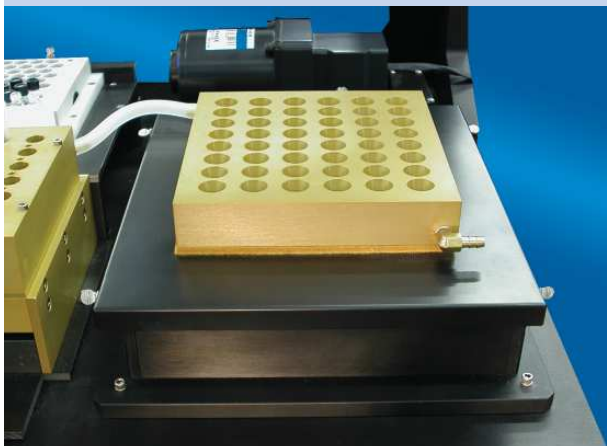
Four position ultrasonic probe to promote dissolution of polymers



Capping/Uncapping module

# Robotic Workstation Accessories

## Robotic Shaker



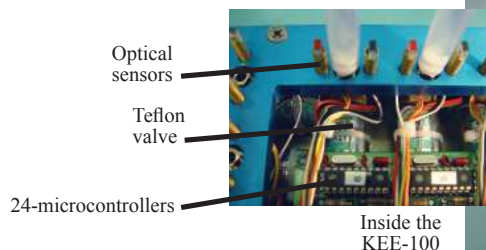
Specially designed for robotic applications, this low profile shaker is less than 5" tall. The key feature of the RS2000 is its ability to home to an absolute X- and Y-coordinate when stopped with accuracies better than 0.1mm in both the X and Y dimensions. Homing to a known coordinate allows the robot to reliably access modules attached to the shaker's mounting plate. Triple eccentric drives provide vigorous mixing of loads up to 60 pounds.

<b>Specifications:</b>	Dimensions:	12.25" x 20" x 4.75" (WxDxH)
	Rotational speeds:	40 - 525 rpm
	Maximum load:	60 pounds
	Shaking motion:	Orbital or linear
	Orbital radius:	0.4" Can be customized
	Communications:	USB, RS232, RS485, binary, manual

Catalog #	Price
RS2000	\$6,260.00

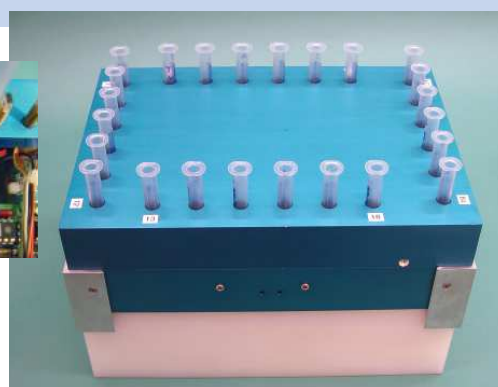
## Solid Phase Extraction Station

The KEE-100 automates 24-positions of solid phase extraction. The KEE-100 works by regulating the solvent flow rate and optically monitoring the position of the solvent front above the top of the column packing in each column individually. When the solvent front reaches the top of the packing, a Teflon valve closes preventing the packing from going dry. Individual control of solvent flow rate and position ensure reproducible results. SPE columns can be developed either by vacuum or positive pressure.



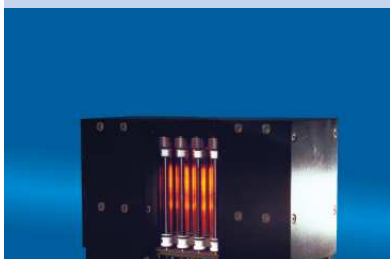
### Specifications:

24 Positions  
Column diameter: 1/8 to 1"  
Solvent compatibility: Organic & aqueous  
Flow rates: 0.05 to 4mL/min  
**Includes:** SPE station and computer controller



**KEE-100 Price: \$25,200**

## Multi-Position Syringe Pumps



16-Position Parallel Delivery



8-Position independent syringe pump

J-KEM offers custom syringe pumps with 2 to 48 independent positions. Pumps can be operated in parallel, in groups, or independently. Independent flow rates and the ability to deliver any volume from any syringe size make these systems ideal for research and production applications. Syringe sizes from 10  $\mu$ L to 50 mL.

See page 18 for additional syringe pump options



## Custom Modules



Multiple independent needles



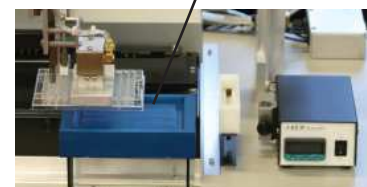
Homing vortexer

Returns to home position when it stops



Temp. Controlled Filter Station

Heated and Cooled Reactors for incubations and crystallizations





## Capping & Uncapping Station



J-KEM's capping module automates the removal and replacement of caps from sample vials. The capper removes, then replaces one cap at a time eliminating the possibility of cross contamination. The top and bottom grippers automatically adjust to caps with diameters from 8 mm to 26 mm (2 mL to 20 mL vials) with no tooling changes, and can be adjusted for cap diameters up to 35 mm and vial heights of 125 mm. Vial diameter, thread pitch, and capping force are all software programmable. Available with RS232 or USB.



**Price \$13,750**

The capping station mounted to a J-KEM weighing robot

See the capper in action at:  
[www.jkem.com/videos](http://www.jkem.com/videos)

### Capping Station Features:

- Automatically adjusts for
  - Cap diameter
  - Vial height
  - Thread pitch
- Adjustable capping force
- No limit on the number of turns

## Robotic Centrifuge



- Automatically homes to first tube position when stopped.
- Access any tube in the rotor.
- Speed: 0-5500 rpm; multiple rotor options
- \$ 19,800 complete.

# Fraction Collectors

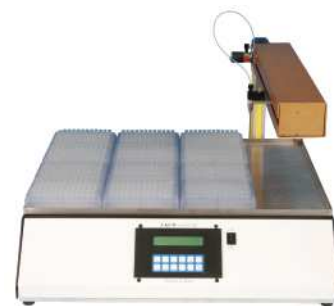
Septum penetrating needle dispenses to both capped and open mouth vials



J-KEM manufactures custom fraction collectors for any research application.

## Features:

- Collect to a single or multiple racks
- Fractions taken as a function of:
  - Time or volume
  - Output from UV or other detector
  - Input voltage
  - User specified parameter
- User defined inputs/outputs to interface with other instruments



Fraction collector holds 12 titer plates

The Endeavour's affordable price makes it a perfect "intelligent fraction collector." Program it to collect fractions based on any input parameter or collection sequence.

**For example:** 1) Place the leading and falling edge of a peak in one common test tube, but place the center cut of each peak into a GC vial for analysis.

2) Collect each peak to a single tube. After the fractionation process is done, go back and transfer 1mL of each collected peak to a GC vial for analysis.

## Custom fraction collectors for any research need



Fraction collector with 12 independent parallel racks

- Radiation hardened to fractionate radioactive lanthanides
- Measures the volume of collected samples

## Fraction collector measures flow rate and total volume

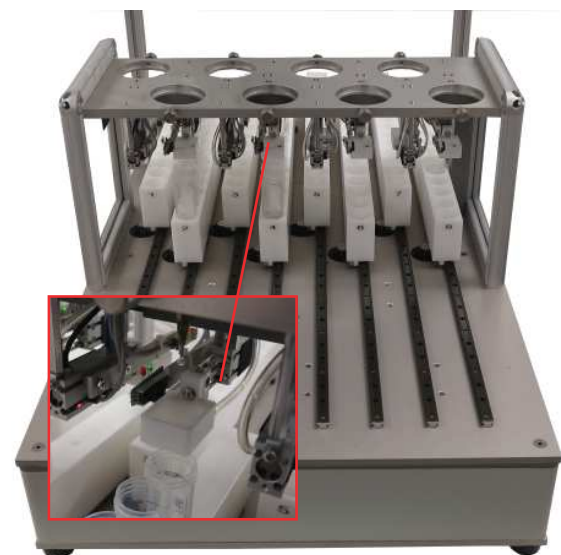
Eight parallel racks form independent fraction collectors servicing eight chromatography columns simultaneously. Sensors measure the total volume eluted from each column, then fractionate specific volumes into specific tubes. Built in waste station disposes of unwanted segments of the solvent stream.

## Fraction Collector for 20 & 40 ml vials



Custom program collects from continuous solvent stream for 10 minutes every 2 hours.

Collect samples from the beginning, middle, and end to detected peaks.





# Continuous Flow Reactor



J-KEM's Continuous Flow Reactor offers all standard flow chemistry capabilities plus new features available on no other reactor, like creation and quenching of reactive intermediates. Intelligent design allows the reactor to be used as an R&D tool to run 128 scouting reactions, or as a process tool to synthesis gram quantities of a single product.

## Scouting Flow Chemistry

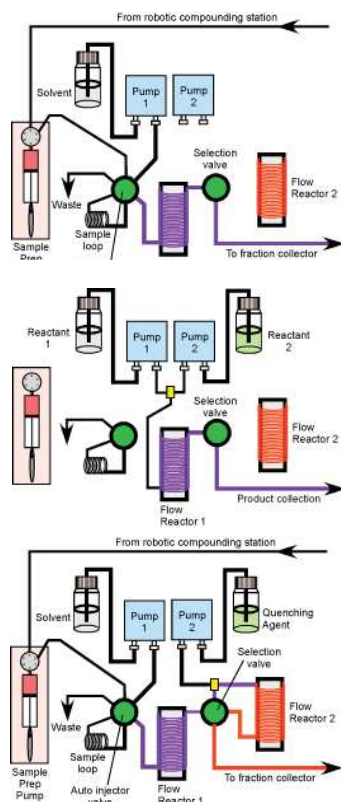
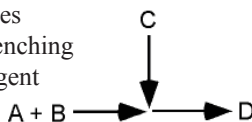
When combined with the sample prep fraction collector, 1 to 128 sequential reactions can be staged. Up to 4 reagents can be mixed and automatically injected into the reactor. KEM-Flow software coordinates sample injection and product collection for each reaction.

## Preparative Flow Chemistry

Gram scale quantities of a single product can be made by continuously reacting the appropriate ratio of two reagents.

## Sequential Flow Chemistry

Two state synthesis allows one product to be formed in flow reactor 1, then immediately reacted with an additional reactant in a second reactor. Ideal for forming a short lived, reactive species (reactor 1), then quenching it with a second reagent (reactor 2).



## Reactor Features

### Fully Automated

- Select between experiments in software, no plumbing changes required.
- Reagent mixing, injection, and product collection are fully automated.

### Affordable

The high cost of flow reactors has limited their usefulness as a routine synthesis tool. At a fraction of the cost of other reactors, J-KEM places flow chemistry within the budget of many research programs.

### Practical Design

- Two stage, sequential reactions
- Stage 128 scouting reactions with product collection.
- 150 psi pump pressures

## New Research Capabilities

J-KEM's two stage flow chemistry expands research opportunities. Reactor 1 is used to run the first reaction, or synthesize a reactive intermediate. Additional reagents are added to the reactive intermediate which then passes into a second reactor, completing a two step reaction in a single flow system.

## Reactor Features

- Multiple reactor options:
  - Stainless steel, Inconel, PEEK, PTFE
  - Tube OD's of 1/16" and 1/8"
  - Tube ID's from 0.02" to 0.14"
  - Reactor volumes from 1 mL to 30 mL
- Flow rates from 0.01 to 5.0 mL/min
- Heated and Cooled reaction coils
  - Heated: ambient to 300° C
  - Cooled: -78° C to ambient
- Dual reactor pumps (150 psi max)
- Manual or fully automated operation

### Continuous Flow Reactor

Description	Cat #	Price
<b>Continuous Flow Reactor System</b> Basic configuration includes two high pressure continuous flow pumps, sample preparation pump, auto-injector and column selection valves, two flow reactors, and back pressure valve. KEM-Flow software included.	CFR-100	\$26,400
<b>Sample Preparation and Fraction Collection Robot</b> Stages 128 scouting reactions. Positions for reagent and fraction collection vials. Contact J-KEM for rack specification.	CFR-FC20	\$16,200
<b>Continuous Flow Columns</b> Column materials include Teflon, Peek, copper, stainless steel, and custom options. Column lengths and internal diameters adjusted to user specification. Contact J-KEM for options.	Inquire	
<b>Continuous Flow Column Spindle</b> Empty column spindle allows user to create their own proprietary column.	CFC-ES	\$550.00

# Lab Automation Instruments

The Infinity Controller is the cornerstone of J-KEM's custom instrument program, based on a completely new concept for lab automation instrumentation.

**The Infinity Concept** J-KEM Scientific specializes in making one-of-a-kind custom instruments. What we know after 25 years, is that it's very expensive to make a custom instrument by building a custom piece of hardware. The vision of the Infinity controller is to have a single, versatile hardware interface that can be made into virtually any custom instrument by means of software.

The novel concept of the Infinity controller is that new instruments are not made in hardware, but *software*. For example:

- Connect a thermocouple to the Infinity controller, and it becomes a temperature controller.
- Connect a pressure transducer to the Infinity controller and it becomes a vacuum regulator.
- Connect a stirrer, chiller, syringe pump, and vacuum pump to the Infinity controller and it becomes a reaction controller.
- Connect a syringe pump, oxygen sensor, and pH probe to the Infinity controller and it becomes a fermentation controller.

The Infinity concept is to create custom instruments in software, similar to LabView, but with two significant advantages.

**Better Hardware** - Ultra-high resolution inputs, serial and digital interface components needed for laboratory and process control.

**Better Software** - Written in VB.net and designed specifically for your application. Using the dot.net languages removes many programming limitations, and since J-KEM releases the original source code, every software application truly becomes YOUR custom software.

**Expandable** - Add additional sensors, inputs and outputs, connect new instrumentation, and add software functionality as required by changing research needs.

## The Infinity Controller



### Technical Specifications:

**Analog Inputs** To read pressure, pH, temperature, ion and oxygen levels

Eight 24-bit inputs, collection rates from 1-64,000 points per second.

One 12-bit input

One 4-20 ma input.

**Analog Outputs** To control proportioning valves and instrument control

Two 12-bit analog outputs,

One 4-20 ma output

**Digital Outputs** To control valves, motors, instruments, and external signaling

Fourteen high current outputs,

Five PWM outputs

High voltage (120 Vac) outputs

**Digital Inputs** Reads the state of switches, sensors and external events

Sixteen digital, and high voltage inputs

**Serial Communications** To operate stirrers, balances, pumps, or virtually any lab instrument

USB

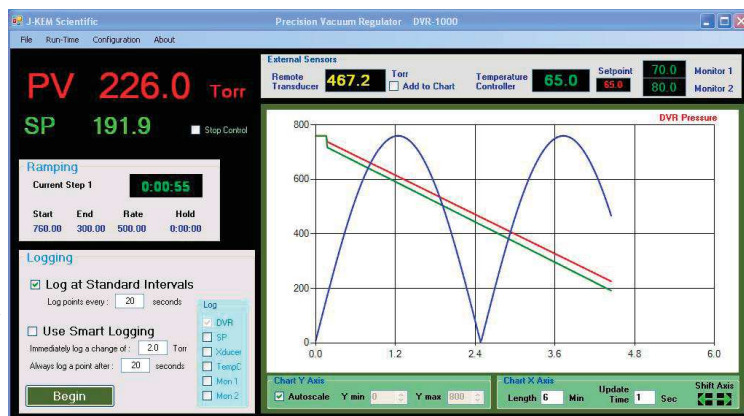
Four serial ports (RS-232 & RS-485)

**Infinity DLL** Read, write, and process data from networks and 3rd party software

Connection to network databases and servers

Connection to Excel and other software

Control of all PC ports



### Pricing

The price of an Infinity system depends on its configuration and the number and type of input sensors, and other control hardware required. Basic systems start about \$2000.

The design process is simple - call, or send an email describing the procedure you want to automate. List important features of the instrument, the process to control, data collection, and safety requirements and a design engineer will contact you.

**Let J-KEM make the exact instrument you need**



# Examples of Custom Infinity Controllers

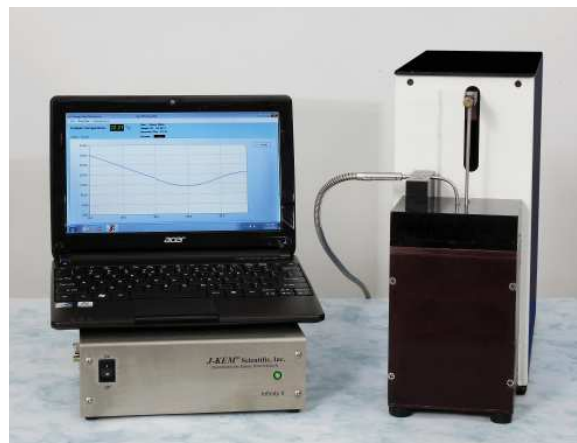


## Vacuum Distillation Controller

Regulates the vacuum in a distillation flask according to a 12-step pressure ramp. Monitors both pot and head pressures and adjusts distillation parameters to match a defined profile. Controls and monitors temperature at three process points. Real-time graphics, data logging, and system alarms.

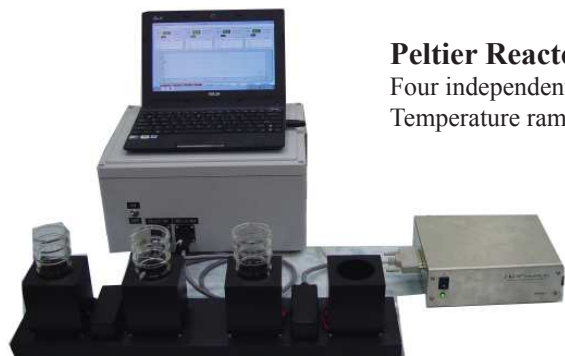
## Titer Point Determination

A *titer* point is the exact opposite of a melting point, and is used to determine the purity of fatty acids. The temperature at which a fatty acid crystallizes is a characteristic of its purity. The titer device removes energy (not temperature) from the sample at a controlled rate. As the sample crystallizes, the heat of crystallization causes a temperature rise, this peak temperature is the titer point. The Infinity controller regulates the rate of energy transfer, stirs the sample, and measures the titer point with 0.01C accuracy, then saves the data to a corporate server.



## Peltier Reactor

Four independently thermostated reaction positions (-20 to 100C) using solid state Peltier cells. Temperature ramping, data logging, and real-time graphics



## pH Stat / Bioreactor

Regulates the temperature and pH in four independent reaction flasks. Add modules for nutrient addition, dissolved oxygen, stirring, air and solution recirculation, and pressure control.



## Precision Vacuum Controller

Controlled distillation rate by adjusting heater power input in order to maintain a constant differential pressure between the pot and takeoff head.



Bob, Mr. Infinity, and Melissa holding the last two 1<sup>st</sup> generation Infinity Controllers made by J-KEM. (They're smiling because these were hard to make!)

**The Infinity Controller**  
**For a one-of-a-kind, custom instrument**

# Reaction Controller

## Automate Reaction Control

### Simplicity

Control reaction variables from a single Excel-like interface.

- Multi-step ramps for
  - \* Reaction temperature
  - \* Reagent addition
  - \* Mixing
- Solution pH control
- Add multiple reagents based on
  - \* Time \* Temperature \* pH \* Pressure



### Safety

- \* User definable alarms for all reaction parameters. Define alarm response, including emergency shutdown.

### Versatile

- Ideal for methods development and reaction optimization.
- Exactly reproduce reaction conditions for production runs
- Methods storage and recall

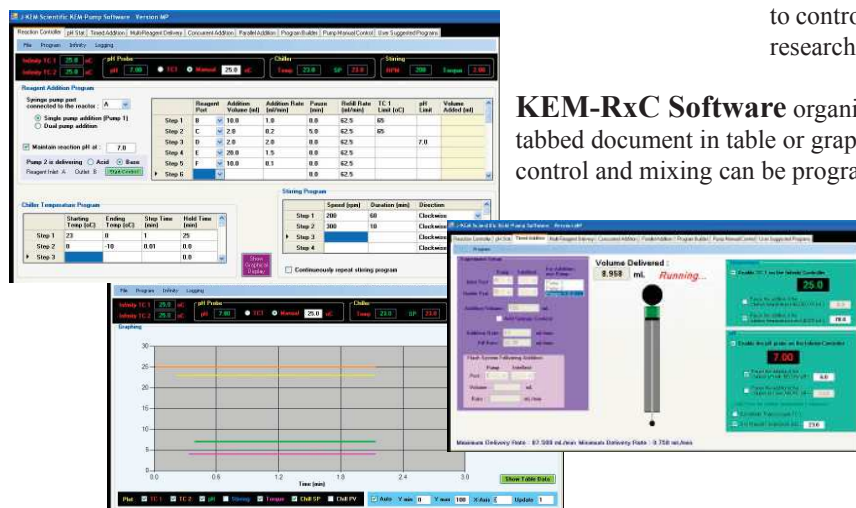
Automates the reaction process by controlling reagent addition, temperature control, stirring, data collection and any other required parameter through a single interface. The Reaction Controller consolidates the control of various lab instruments such as recirculating chillers, stirrers, and pumps into a single graphical interface. Additionally, the Reaction Controller data logs system parameters such



as temperature and solution pH. Adding a syringe pump to the Reaction Controller provides all the functionality of the SYR-1200 pump (p. 18) and automates the addition of multiple reagents to the reaction as a function of time, temperature, and pH.

**The genius** of the Reaction Controller is that the sensors it's configured to read (pH probe, thermocouple, etc.) and the instruments it's configured to control (chillers, stirrers, pump, etc.) can be changed by the user as research needs change.

**KEM-RxC Software** organizes the controls of the Reaction Controller in a single tabbed document in table or graphical form. The addition of up to six reagents, temperature control and mixing can be programmed by the user and adjusted in real time.



KEM-RxC Software can be customized to meet virtually any reaction or process control requirement.

**Sensors** - Read any analog sensor to monitor and control pressure, flow rate, oxygen or ion concentrations.

**Instruments** - Automate other instruments, such as UV spectrometers, fraction collectors, pumps, and balances by placing them under the control of KEM-RxC software.

**Digital** - Monitor for external events or control external valves, motors, or virtually any other device.

## Process Controller

A special implementation of the Reaction Controller is as a process controller to map the reaction space around a specific chemical reaction. The Reaction Controller can be customized to run multiple, sequential reactions with easy setup and data logging of all reaction parameters. J-KEM also customizes the user interface to present the controls needed for your unique application.

### Automate:

- Liquid pumps
- pH control
- Circulators
- Pressure/Vacuum control
- Balances
- Solid addition
- Valves

### Sensors:

- Temperature
- pH
- Pressure
- Turbidity
- Dissolved oxygen
- UV and in-line sensors

### Custom Features:

- Import reaction conditions from Excel.
- Log reaction conditions and all run-time data to a customized output file.
- Periodically sample the reaction mixture.



## Programmable Reaction Controller

Description	Cat#	Price
<b>Reaction Controller with KEM-RcX Software</b> Standard Reaction Controller configuration includes 2 thermocouple inputs (type T), 1 pH input, 3 user configurable RS232 serial ports, 4 high current outputs (digital or PWM), and 4 digital inputs.	INF-RC	\$3940.00
<b>Reaction Controller with Single Position Syringe Pump and KEM-RcX Software</b> All of the features of the standard reaction controller, plus the ability to add multiple liquid reagents at user specified volumes and rates. Implements all of the single position Syringe Pump programs (p. 18) Requires the selection of a pump syringe and valve (p. 19) which are sold separately.	INF-SP1	5940.00
<b>Reaction Controller with Dual Position Syringe Pump and KEM-RcX Software</b> All of the features of the standard reaction controller, plus the ability to add multiple liquid reagents at user specified volumes and rates. Implements all of the single and dual position Syringe Pump programs (p. 18) Requires the selection of two pump syringes and valves (p. 19) which are sold separately.	INF-SP2	7840.00
<b>PC Controller with Pre-loaded KEM-RcX software</b> Netbook PC with 10.1" screen preloaded with KEM-RcX software and Infinity drivers.	Discovery	390.00
<b>Digital Vacuum/Pressure Monitor.</b> Monitors reactor pressure in the range of full vacuum to +15 psi. Data logging, real-time display, and user configurable alarms. Other pressure ranges available.	RC-Px30	720.00
<b>Digital Temperature Controller.</b> Add a digital temperature controller channel to regulate temperature using heating mantles or other electric heaters. 120Vac, 1200 watts.	RC-TC1	720.00

### Options

J-KEM customizes both the Reaction Controller hardware and KEM-RxC software. Contact J-KEM for information.  
 Up to 16 syringe pumps \* Motor driver output for powder addition funnel \* Voltage and current outputs to peristaltic pumps \* RS485 communications \* Additional thermocouples, pH, pressure, ion, flow rate, UV inputs \* Custom Read/Write options to data bases and Excel

# Bioreactor/Fermentation Controller

## Custom Design

Design the instrument around your research needs

- Analog inputs for pH, dissolved oxygen, temperature, or any needed probe
- Controls for gas flow
- Instrument control for mixing, balances, and reagent addition



Screen shot of 6-position fermentation controller



J-KEM's BioRx controller includes sensors for pH, dissolved oxygen, temperature and flow control. Additional ports provide control of stirrers, balances, pumps, and circulating chillers.

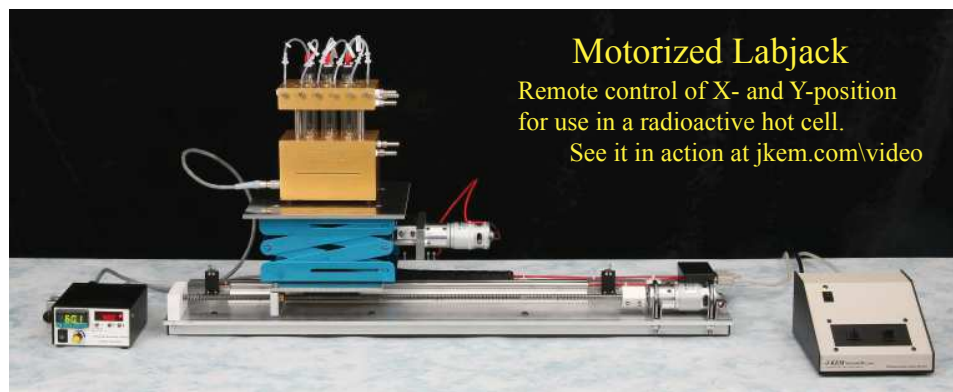
BioRx operates from 1 to 16 syringe pumps allowing control of multiple, parallel reactors. A dual-position pump is used to feed media/nutrient solution and maintain pH in up to 6 parallel reactors.

## Fermentation Controller

Description	Cat #	Price
<b>Bioreaction Controller with Dual Position Syringe Pump and KEM-Zyme Software</b> Standard controller includes 2 pH inputs, 3 user configurable RS232 serial ports, 4 high current outputs (digital or PWM), and 4 digital inputs. KEM-Zyme software preloaded on a netbook PC controller. The syringe pump includes 10 ml glass and Teflon syringes and 4-port Teflon distribution valves.	FrCnt	\$7860.00
<b>Two Additional Fermentation Channels</b> Add 2 additional channels enabling the Fermentation Controller to run 4 independent fermentations in parallel. Upgrade syringe pump valves to 6-position Teflon valves.	FC-CH2	1000.00
<b>Four Additional Fermentation Channels</b> Add 4 additional channels enabling the Fermentation Controller to run 6 independent fermentations in parallel. Upgrade syringe pump valves to 8-position Teflon valves.	FC-CH4	2000.00
<b>PC Controller with Pre-loaded KEM-RcX software</b> Netbook PC with 10.1" screen preloaded with KEM-RcX software and Infinity drivers.	Discovery	490.00

# Custom Instruments

J-KEM partners with research scientists to design and make one-of-a-kind instruments. Hardware, software, R&D, and methods development. Below are examples of simple and sophisticated instruments made for other researchers, what can we make for you?



## Motorized Labjack

Remote control of X- and Y-position for use in a radioactive hot cell.

See it in action at [jkem.com/video](http://jkem.com/video)



## Trinity Power Controller

Made for Trinity University. Solid state variac installed in every teaching lab hood.



## Six Temperature Zone SPS Reactor

Solid phase reactors are sealed in a liquid tight filtration base. Six zone heater allows reactions to be run at six independent temperatures.

## High Pressure Parallel Reaction System



- 16 Parallel reactors with real-time reaction analysis
- Magnetically coupled mechanical stirring.
- Automates 128 sequential reactions
  - Charges and runs the reaction
  - Collects reaction product
  - Cleans, then recharges with a new set of reaction conditions.



## Non-Contact Flow Rate Monitor

Optical detector measures the drop rate from a radioactive ion exchange column. The drop rate is correlated to elution rate and volume.

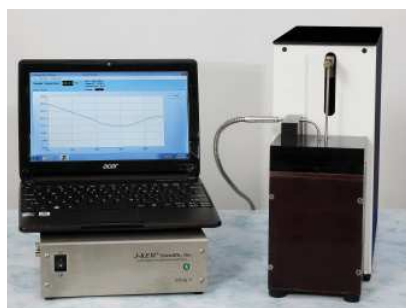


## Chemlab Block

Aluminum block holds a 50 ml and 100 ml round bottom flask on a hot plate. Made for the University of Michigan organic lab.



**GMP Compliant Data Logger** Records heater and pot temperature to an Excel file and prints in real-time.



## Automated Titer Point Determination

What's a Titer Point? It's the opposite of a melting point. It's the temperature of a fat sample when it crystallizes.



## Polymer Synthesis Station

Automated reactor runs four parallel reactions. PC control of stirring, temperature (-20 to 100° C), and the addition proportions and rate of 20 different monomers and solvents.



# Personal Reaction Station

## Heat, Cool, Reflux

- Add reagents
- Sample reactions in an inert atmosphere

## Built-in Magnetic Stirring

## MedChem Synthesis in a Parallel Format

The Personal Reaction Station has every feature needed for lead development and high throughput applications. The reactor provides precise temperature control, powerful magnetic stirring, and an inert atmosphere for each reaction tube. Reactions are run in 50 mL glass tubes that fit inside a heated and cooled reactor base. Six built-in

Remove individual reactions without disturbing the atmosphere in any other tube

magnetic stirrers provide uniform stirring even for viscous and heterogeneous reactions. A reflux condenser plate surrounds the midsection of each reaction tube providing for a continuous reflux with no cross contamination or solvent loss. Reactors connect to an inert gas manifold through separate needle valves and quick disconnect fittings, allowing individual reactors to be removed without disturbing the atmosphere in other reactor. All reactors have Teflon septum needle ports for adding reagents and for sampling the reactor's content.



Custom reactor with inputs for thermocouple and reagent addition tube for each reactor.

For reaction volumes from 0.5 to 8 mL, J-KEM offers a limited volume reactor and heat transfer ring. Provides homogeneous heating and reflux for small volume reactions.



### Personal Reaction Station

Description	Cat #	Price
<b>Personal Reaction Station</b> Includes reactor with built-in magnetic stirrers, twelve 50 mL glass reaction tubes, six Teflon reactor plugs, septum fittings and magnetic stirring bars. (Dim - 7.5"x4"x9.5". WxDxH) Requires Model PRS-T digital temperature/stirring controller.	<b>120 Vac</b> version: PRS-120R	\$2785.00
	<b>230 Vac</b> version, CE: PRS-230R	2795.00
<b>Digital Temperature and Stir Rate Controller</b> for Personal Reaction Station. Controller adjusts both the stirring rate and reaction temperature. Digital controller provides precise temperature regulation ( $\pm 0.1^\circ$ C), temperature ramping, and J-KEM enhanced RS232 serial communications for remote controller and data logging applications.	<b>120 Vac</b> version: PRS-T-120	684.00
	<b>230 Vac</b> version, CE: PRS-T-230	694.00
<b>Reduced Volume Kit</b> Tapered glass reaction tubes for solution volumes from 0.5 to 8 mL. Reduced volume tube fits in a heat transfer ring for homogeneous heating. Includes six glass reaction tubes and six heat transfer rings.	PRS-RDK	230.00
<b>50 mL Glass Reaction Tubes</b> Glass reaction tubes with Teflon lined caps. (Package of 36)	KPS50-GT	197.50
<b>10 mL Glass Reaction Tubes</b> Reduced volume glass reaction tubes with Teflon lined caps. (Package of 6)	PRS10-GT	187.50
<b>Evaporator Head for Personal Reaction Station</b> Evaporator injects streams of nitrogen gas into each reaction tube.	PRS-VAP	780.00
<b>External Temperature Probe</b> Insert Teflon probe into one reactor to regulate solution temperature.	PRS-RTD	122.00
<b>Replacement Teflon Septa</b> for syringe injection port. (Package of 48)	PRS-SEP	32.00
<b>Replacement Septum Fittings</b> Threaded fitting secures Teflon septum into reaction head. (Package of 12)	PRS-SF	28.50
<b>Replacement Reactor Plug</b> Teflon plug fits inside reaction tube forming an air tight seal. Includes cap	PRS-TP	57.50
<b>Replacement Inert Gas Lines</b> Inert gas delivery lines and quick connect fittings. (Package of 6)	PRS-IL	15.00
<b>Teflon Stirring Bars</b> Teflon coated 'star' stirring bar optimized for PRS tubes. (Package of 6)	PRS-MSB	79.50

#### Reactor Specifications:

Temperature range:  $-80$  to  $130^\circ$  C  
Stirring speed: 60-1000 rpm

Temperature variation:  $\pm 0.5^\circ$  C  
Condenser efficiency: 2% loss of  $\text{CH}_2\text{Cl}_2$  after 7 days at reflux

# Programmable Syringe Pumps

## Single Position Syringe Pump

- Flow rates from 0.5 mL/min to 200 mL/min
- Syringe automatically refills to deliver any volume from any syringe size
- PC control and data logging with KEM-Pump software
- Closed system for reactive and pyrophoric reagents

## Dual Position Syringe Pump

The **SYR-1200** is the most versatile syringe pump available for research. Available in both a single and dual pump configurations, the SYR-1200 dispenses fluids with sub-microliter precision as either a single injection or continuous flow. KEM-Pump software, included with each pump, implements seven syringe pump programs that meet virtually any fluid delivery need.

Key features of the syringe pump include:

- Multi-port distribution valve delivers 14 reagents to one reactor, or 1 reagent to 14 reactors, or any combination in between.
- 100% glass and Teflon fluid path stable to acids, bases, and organic solvents.

**KEM-Pump Software** implements seven fluid delivery programs that automate virtually any reagent delivery or sampling application.



### Program 1 - Timed Addition

Continuous delivery of any volume at a user entered flow rate.

### Program 2 - Sequential Addition

Sixteen step program sequentially delivers up to 14 different reagents to multiple reactors. Independent volume and flow rates for each step.

### Program 3 - Parallel Addition

Adds a single reagent to multiple reactors (up to 7) in parallel with independent volume and flow rates.

### Program 4 - Concurrent Addition

Simultaneously adds two reagents to a single reactor at independent rates and volumes. Twelve step addition program. Dual syringe pump systems only.

### Program 5 - Program Builder

Drag-and-drop any sequence of pump commands to perform virtually any fluid delivery program. Includes I/O and temperature control methods. Remove control from PC or LabView.

### Program 6 - Manual Control

Allows manual control of the pump in a point-and-click interface.

### Program 7 - Autosampler

Aspirate samples at user set times to sample vials.

### Program 8 - Custom

J-KEM provides one custom program, written to accomplish your unique task at no charge. Contact J-KEM for details.

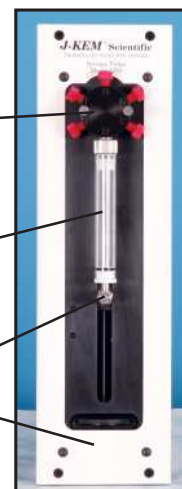
**Demo software at:** [www.jkem.com/syringepumps](http://www.jkem.com/syringepumps)

Automated distribution valve fills and dispenses from up to 8 ports

Glass and Teflon syringe

Delivery rates from 0.5  $\mu$ L/min to 200 mL/min

Up to 32 pumps can be combined into a single system



KEM-Pump is open source code. Written in VB.net, J-KEM invites users to customize or add features unique to their applications. KEM-Pump.dll allows researchers to build the pump system into robotics or other lab automation equipment.

## J-KEM's Technologies Work Together



Connect a J-KEM temperature controller into the PC running KEM-Pump and the controller becomes part of the syringe pump program.

Control additions based on time, temperature, pressure, or pH. See p 14.



## Programmable Syringe Pumps with Netbook PC Controller

Includes the syringe pump and a netbook PC with KEM-Pump pre-loaded and ready to run

<b>Single position syringe pump</b> with netbook PC controller.	Input: <b>120 Vac</b>	SYR-1200	\$2895.00
Requires the selection of one syringe and valve for operation (below).	Input: <b>230Vac</b> , CE approved	SYR-1240	2895.00
<b>Dual position syringe pump</b> with netbook PC controller.	Input: <b>120 Vac</b>	SYR-2200	4985.00
Requires the selection of two syringes and valves, one for each pump (below).	Input: <b>230Vac</b> , CE approved	SYR-2240	4985.00

## Programmable Syringe Pumps with Software

Netbook controller not included. KEM-Pump software supplied

<b>Single position syringe pump</b> with KEM-Pump software.	Input: <b>120 Vac</b>	SYR-1200-PC	\$2565.00
Requires the selection of one syringe and valve for operation (below).	Input: <b>230Vac</b> , CE approved	SYR-1240-PC	2565.00
<b>Dual position syringe pump</b> with KEM-Pump software.	Input: <b>120 Vac</b>	SYR-2200-PC	4635.00
Requires the selection of two syringes and valves, one for each pump (below).	Input: <b>230Vac</b> , CE approved	SYR-2240-PC	4635.00

## Syringe Pump Options

**I/O Package.** Includes 3 high current outputs (170 mA, 24 Vdc), 3 digital TTL inputs, 1 analog input (8 bits, 0-5 Vdc). SYR-I/O 390.00  
Control solenoid valves or read input sensors, all under program control. Includes internal power supply.

**Programmable 120 V outlet.** Turns equipment On/Off under program control. 3 amps @ 120 Vac (12 amp available) SYR-120V 175.00

## Custom Syringe Pumps

### Four Position Temperature and pH Controller



Pump with 4 independent temperature controllers. Maintains the temperature and pH in 4 independent reactions. Custom software with data logging, program storage and recall.



Pump with connections to 22 reagents and reactors.



16-Position with half-sized pumps

Sixteen pump system provides continuous delivery of 8 reagents at independent rates.



Custom pump drives 96 syringes in parallel.



Microfluidic reaction system delivers 24 reagents to a heated reactor. PC control automates 1000 reaction combinations

### Syringes (one needed for each syringe module)

Description	Cat #	Price
25 $\mu$ L glass syringe with Teflon plunger	SPGS-25	185.00
50 $\mu$ L glass syringe with Teflon plunger	SPGS-50	150.00
100 $\mu$ L glass syringe with Teflon plunger	SPGS-100	150.00
250 $\mu$ L glass syringe with Teflon plunger	SPGS-250	150.00
500 $\mu$ L glass syringe with Teflon plunger	SPGS-500	150.00
1.0 mL glass syringe with Teflon plunger	SPGS-1000	150.00
1.25 mL glass syringe with Teflon plunger	SPGS-1250	150.00
2.5 mL glass syringe with Teflon plunger	SPGS-2500	150.00
5 mL glass syringe with Teflon plunger	SPGS-5000	150.00
10 mL glass syringe with Teflon plunger	SPGS-10000	150.00
25 mL glass syringe with Teflon plunger	SPGS-25000	195.00
50 mL glass syringe with Teflon plunger	SPGS-50000	232.25
Shatterproof plastic coating on glass syringe barrel	SPGS-CMS	30.00

### Teflon Distribution Valves (one needed for each syringe module)

3-Port distribution valve (syringe + 3 addressable ports)	SPDV-3	\$169.30
4-Port distribution valve (syringe + 4 addressable ports)	SPDV-4	184.95
6-Port distribution valve (syringe + 6 addressable ports)	SPDV-6	234.00
8-Port distribution valve (syringe + 8 addressable ports)	SPDV-8	268.15

### Teflon Tubing & Fittings

Startup Kit. 20 feet 1/8" OD tubing, 12 nuts & ferrules	SP-SK1	\$120.00
Startup Kit. 100 feet 1/8" OD tubing, 24 nuts & ferrules	SP-SK2	380.00
Startup Kit. 20 feet 1/16" OD tubing, 12 nuts & ferrules	SP-SK3	92.00
Startup Kit. 100 feet 1/16" OD tubing, 24 nuts & ferrules	SP-SK4	290.00
Startup Kit. 20 ft of 1/16" & 1/8" tubing, 24 nuts & ferrules	SP-SK5	194.00

Dimensions: SYR1200 12"x3.5"x13" (HxWxD) Flow rates: 0.5  $\mu$ L/min to 200 mL/min  
SYR2200 12"x7"x13" (HxWxD) Accuracy: 0.33% CV, full stroke  
Pressure Limit: 60 psi Precision: 0.007% full stroke  
Weight: 12 lb (single position), 20 lb (dual position)

# Reaction Blocks

## Reaction Block Index

Single temperature zone blocks	p. 20
Multi-temperature zone blocks	p. 22
Custom reaction blocks	p. 23
Reaction block accessories	p. 21

## Three *Styles* of Reaction Blocks to choose from:



### Heated

Built-in internal heater for rapid and homogeneous heating



### Heated & Cooled

Built-in heater and internally milled coolant flow path surrounding every vial. Cooling is provided by a circulating chiller.



### Reflux

Three layer block. Heated bottom layer, cooled top layer, and insulating middle layer. Cooled top (condenser) maintains reflux in a capped vial. Cooling can be added to the heated bottom layer (optional) to provide heating, cooling, and reflux in the same block.



Reaction blocks are an efficient way to provide uniform heating and cooling for multiple reactions.

- Temperature homogeneity of  $\pm 1^\circ\text{C}$
- Temperature range:  $-80$  to  $130^\circ\text{C}$
- Efficient mixing, even for heterogeneous mixtures

## Reaction Block Evaporators



Evaporators fit on top of the reaction block directing jets of nitrogen gas into each individual vial. Heating and gently shaking the block evaporates solvents in a fraction of the time needed by other methods.

### Heated Reaction Blocks

Description		Cat #	Price
Heated block for <b>2 mL</b> vial size (12 x 32 mm vial).	96 vial positions in an 8 x 12 array	RB-2	\$935.00
Heated block for <b>4 mL</b> vial size (15 x 45 mm vial), 1 dram.	96 vial positions in an 8 x 12 array	RB-4	935.00
Heated block for <b>8 mL</b> vial size (17 x 60 mm vial), 2 dram.	96 vial positions in an 8 x 12 array	RB-8	935.00
Heated block for <b>20 mL</b> vial size (28 x 61 mm vial).	63 vial positions in a 7 x 9 array	RB-20	935.00

### Heated and Cooled Reaction Blocks

Heated and Cooled block for <b>2 mL</b> vial size (12 x 32 mm vial).	96 vial positions in a 8 x 12 array	RBC-2	\$1420.00
Heated and Cooled block for <b>4 mL</b> vial size (15 x 45 mm vial), 1 dram.	96 vial positions in a 8 x 12 array	RBC-4	1420.00
Heated and Cooled block for <b>8 mL</b> vial size (17 x 60 mm vial), 2 dram.	96 vial positions in a 8 x 12 array	RBC-8	1420.00
Heated and Cooled block for <b>20 mL</b> vial size (28 x 61 mm vial).	63 vial positions in a 7 x 9 array	RBC-20	1420.00

### Reflux Reaction Blocks

Note: The vial used with a reflux block is twice the size of the block itself. For example, the 4 mL reflux block (RBR-4) uses an 8 mL vial to provide 4 mL sample volume and 4 mL head space for condensation.			
Reflux block for <b>2 mL</b> vial size (15 x 45 mm vial).	96 vial positions in a 8 x 12 array	RBR-2	\$2580.00
Reflux block for <b>4 mL</b> vial size (17 x 60 mm vial), 1 dram.	96 vial positions in a 8 x 12 array	RBR-4	2580.00
Reflux block for <b>8 mL</b> vial size (21 x 70 mm vial), 2 dram.	63 vial positions in a 7 x 9 array	RBR-8	2580.00
Reflux block for <b>20 mL</b> vial size (28 x 95 mm vial).	63 vial positions in a 7 x 9 array	RBR-20	2580.00
Optional cooling channels added to heated bottom layer. To order, add the suffix "-BCP". Example: "RBR-8-BCP"		-BCP	475.00

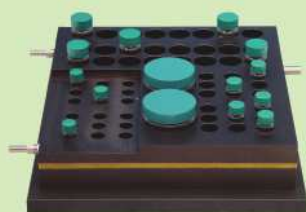
### Evaporators for Reaction Blocks

Evaporator for 96 position blocks. Fits RB-2, RB-4, RB-8, RBC-2, RBC-4, RBC-8, RBR-2, RBR-4	RBV-96	\$995.00
Evaporator for 63 position blocks. Fits RB-20, RBC-20, RBR-8, RBR-20	RBV-63	995.00

**Reaction blocks for custom vial sizes or configurations are available. Contact J-KEM for information.**



## The Complete Reaction Block System Consists of:



1) Any style reaction block

+



2) Bench top shaker

+



3) Reaction block thermocouple

+



4) Temperature controller

## Rotary Shakers

J-KEM offers both a digital and analog shaker specifically designed to handle the high temperatures and weights of our reaction blocks.

**10% discount on shakers when ordered with a reaction block**



Digital BTS-3500

**5 year  
warranty**



Analog BTS-1500

### Rotary Bench Top Shakers

Description	Cat #	Price
<b>Digital bench top shaker</b> for reaction blocks. Digital speed control. Continuous operation or 100 hr. timer, unbalance sensor. 120 V	BTS-3500	\$2595.00
<b>Analog bench top shaker</b> for reaction blocks. Rotational speed set via front panel dial. Continuous operation or 1 hr. timer. 120 V	BTS-1500	1895.00
<b>Analog bench top shaker.</b> Same as BTS-1500, 230 V, CE approved	BTS-1524	1895.00

### Specifications: BTS-3500 BTS-1500

Rotational speed:	15-500 rpm	40-400 rpm
Orbital diameter:	0.75"	0.75"
Load capacity:	35 pounds	35 pounds
Timer duration:	100 hr.	1 hr.
Unbalance sensor:	Automatic stop	None
RS232 serial interface:	Yes	No
Certifications:	UL, cUL, CE	UL, cUL, CE
Dimensions: 17.4" x 13.5" x 6.4"	Weight: 35 lb.	

## Temperature Controllers

All J-KEM controllers precisely regulate reaction block temperatures. The 200-Series controllers (page 32) are always a good choice providing 0.1° C regulation of any heater, including reaction blocks. The Model 150 controller is an affordable alternative which also provides 0.1° C regulation of reaction blocks. The Model 150 is available with or without a 100 hr. timer to turn heating On/Off at a user set time.



### Digital Temperature Controllers. Model 150

Description	Thermocouple	Range (°C)	Cat #	Price
<b>Model 150 temperature controller</b> with ramp-to-set point digital meter. 120 V, 1200 watts.	Type T	-200 to 250	150-T	540.00
	Type J	0 to 800	150-J	540.00
	Type K	-50 to 1200	150-K	540.00
<b>Model 150/Timer temperature controller</b> with 100 hr. timer to turn heating On/Off at user set time. Ramp-to-set point digital meter. 120 V, 1200 watts.	Type T	-200 to 250	150/Timer-T	660.00
	Type J	0 to 800	150/Timer-J	660.00
	Type K	-50 to 1200	150/Timer-K	660.00

## Reaction Block Thermocouple



### Reaction Block Thermocouples

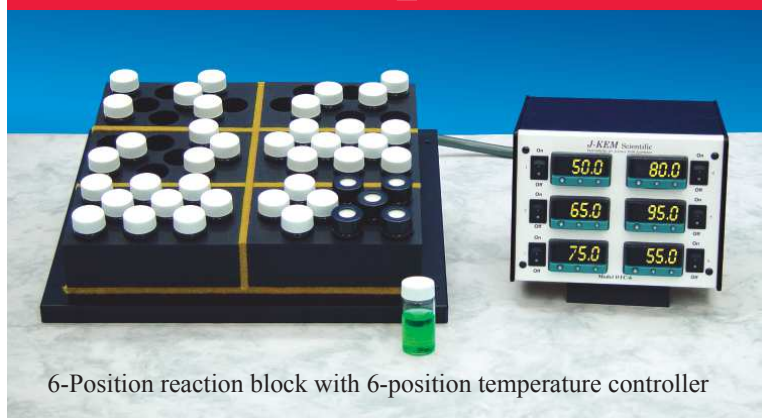
Description	Cat #	Price
Spring loaded bayonet thermocouple connects to mating port on the reaction block providing continuous and reliable temperature readings of shaking blocks.	RBTC-T	68.00
	RBTC-J	68.00
	RBTC-K	68.00

## Recirculating Chillers



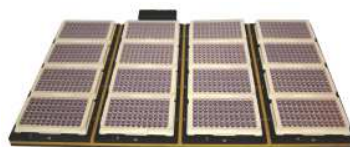
Circulating chillers attach to the cooling ports on cooled reaction blocks to provide temperature regulation when using chilled reactions. Temperature as low as -90° C. See page 25 for a complete selection.

# Multi-Temperature Zoned Reaction Blocks



6-Position reaction block with 6-position temperature controller

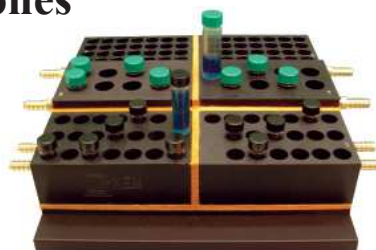
Multi-zoned reaction blocks allow independent temperature control of each block position. The block style (heated, cooled, reflux) for each position can be the same, or different, and can fit different size vials. Multi-zoned reaction blocks are an indispensable tool for parallel synthesis, process development, and formulations research.



4-Zone block heats 4 titer plates each



4-position block with 3 vial sizes



6-zone block for 2 vial sizes.  
4 heated/cooled positions and  
2 heated only positions

- 2, 4, or 6 Independent temperature zones
- Heat, cool, and reflux capability
- Multiple vial sizes

## Ordering a Multi-Zoned Reaction Block

There are literally hundreds of configurations for 2, 4, and 6-position reaction block systems. For this reason, it's necessary to request a quote that assigns a unique product number to your unique block. To receive a quote, call or e-mail a description that answers these questions:

- 1) Do you want a block with 2-, 4-, or 6-temperature zones?
- 2) What size vial does each block (temperature zone) fit?
- 3) What style (heated, heated/cooled, reflux) is each block position?
- 4) Any custom features? Vial spacing, hole depth, special shapes?

E-mail: [info@jkem.com](mailto:info@jkem.com)

Phone: (314) 863-5536 or Fax: (314) 863-6070

## Prices

The price of a multi-zone block depends on the block style selected for each of the temperature zones (the vial size does not matter). The price of a block can be calculated from this price list.

Multi-Temperature Zoned Reaction Blocks		
Description		Price
<b>Two zone reaction block</b>	Base price for two heated zones:	\$1620.00
	For each cooled zone add:	320.00
	For each reflux zone add:	820.00
<b>Four zone reaction block</b>	Base price for four heated zones:	2425.00
	For each cooled zone add:	230.00
	For each reflux zone add:	650.00
<b>Six zone reaction block</b>	Base price for six heated zones:	2765.00
	For each cooled zone add:	230.00
	For each reflux zone add:	650.00

Multi-Position Temperature Controllers		
<b>Two zone</b> digital temperature controller, ramp-to-set point, USB		\$945.00
<b>Four zone</b> digital temperature controller, ramp-to-set point, USB		1840.00
<b>Six zone</b> digital temperature controller, ramp-to-set point, USB		2595.00

## Number of Vial Positions in Each Zone of a Multi-Zoned Reaction Block

The number of vials that fit in each temperature zone depends on the vial size and the block style selected.

	Vial Size:	2 mL	4 mL	8 mL	20 mL
<b>2-Zone Reaction Block</b>	Heated style	96	72	48	32
	Cooled style	96	48	48	24
	Reflux style	48	48	24	24
<b>4-Zone Reaction Block</b>	Heated style	72	42	42	12
	Cooled style	72	42	24	12
	Reflux style	24	24	12	12
<b>6-Zone Reaction Block</b>	Heated style	45	28	28	9
	Cooled style	25	19	19	6
	Reflux style	19	19	8	6

## Multi-Temperature Pocket Blocks

Multi-temperature zoned **pocket blocks** fit aluminum inserts for various vial sizes and microtiter plates.

- Transfer inserts between a robotic deck and the heated pocket block
- Purchase insert blocks for any vial size

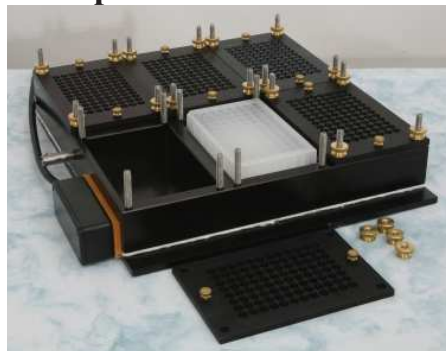




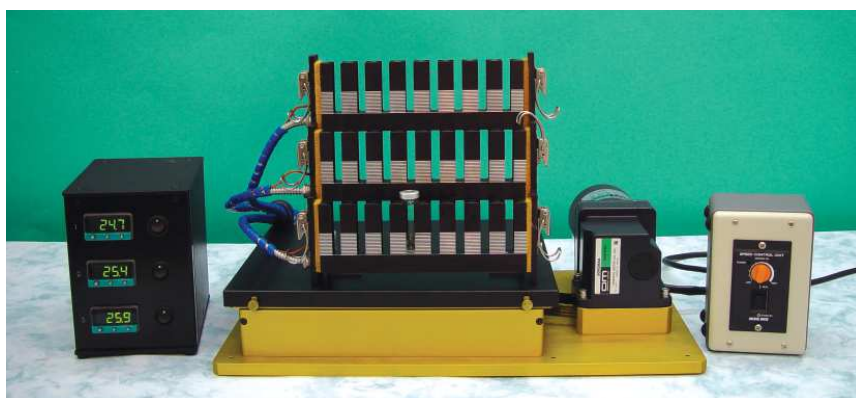
# Custom Reaction Blocks

**J-KEM makes custom reaction blocks for virtually any application.**

**Examples of custom blocks from J-KEM.**



Heated block for six titer plates with sealed, septum covers for robotic additions



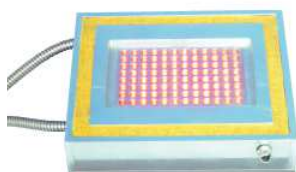
Three temperature zone block (240° C) secured to a low profile shaker. Used to test the effectiveness of surfactants for oil/water separations



High temperature block (300° C) with sideways ports



Round block with built-in magnetic stirring



See-through block studies crystallizations in quartz titer plates



KEM-Lab Reactor (see p. 24) with insert blocks for four vial sizes



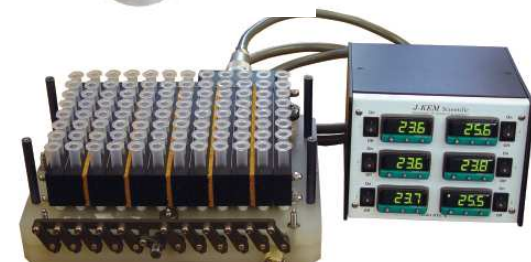
Heated and cooled block to fit round bottom flask inserts for 25-100ml flasks



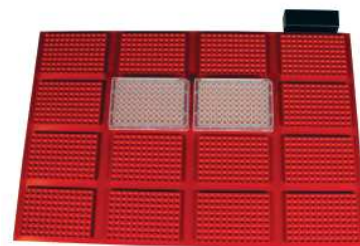
High temperature block (300° C) inside insulating frame with inert gas cover



Large block for 15 quart jars



Six temperature zone block for SPS synthesis



16-position microtiter plate heater



Heated & cooled block inside insulating frame



Heated & cooled block with inserts to fit a selection of vial sizes



Two temperature zone block for reagent and reaction vials



Two heated & cooled pockets built into Gilson rack

# KEM-Lab Parallel Reactors

**Compact \* Convenient \* Precise Temperature Control**  
The perfect tool for synthesis, formulations, and incubations

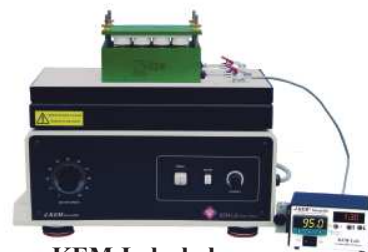


## Three styles of reactors

**Heat \* Cool \* Reflux**

KEM-Lab reactors are an ideal addition to a research laboratory.

- Compact design minimizes bench space
- Temperature ramping
- Temperature range: -80 to 130° C



**KEM-Lab shaker**

Heated				Heated & Cooled				Reflux			
Reactor fits	(vial dim.)	(# of vials)		Reactor fits	(# of vials)			Reactor fits	(# of vials)		
Description			Cat #	Description		Cat #	Price	Description		Cat #	Price
2 mL vial (12 x 32 mm)		(24)	KLS-2-H	2 mL vial (24)		KLS-2-C	\$995.00	2 mL vial (18)		KLS-2-R	\$1640.00
4 mL vial (15 x 45 mm)		(24)	KLS-4-H	4 mL vial (24)		KLS-4-C	995.00	4 mL vial (16)		KLS-4-R	1640.00
8 mL vial (17 x 60 mm)		(20)	KLS-8-H	8 mL vial (20)		KLS-8-C	995.00	8 mL vial (12)		KLS-8-R	1640.00
16 mL vial (21 x 70 mm)		(15)	KLS-16-H	16 mL vial (15)		KLS-16-C	995.00				
20 mL vial (28 x 61 mm)		(12)	KLS-20-H	20 mL vial (12)		KLS-20-C	995.00	20 mL vial (6)		KLS-20-R	1640.00
Shallow well titer plate	(1 plate)		KLS-SW-H	Shallow (1 plate)		KLS-SW-C	995.00	All reactors are for 120 V use. 230 V reactors available on request.			
Deep well titer plate	(1 plate)		KLS-DW-H	Deepwell (1 plate)		KLS-DW-C	995.00				

## KEM-Lab Temperature Controllers and Accessories

**Digital temperature controller** for KEM-Lab reactors. Controller provides 0.1° C regulation of reactor. 120 Vac KLS-150 \$550.00

**Digital temperature controller** with 100 hour timer. Same as the KLS-150 but includes a 100 hr. timer to turn heating Off (or On) at a user set time. 120 Vac. KLS-150/T 698.00

**KEM-Lab bench top shaker** Provides vigorous mixing for KEM-Lab reactors. Specifications: 100 to 2000 rpm. Continuous and pulsed shaking modes. Weight limit: 4 pounds. 120 V. Dimensions: 16" x 7" x 8.75" (WxDxH) KLS-HD 1945.00

**Septum cover plate** provides an air-tight seal and needle access to each cell or vial in a rack. KLS-SC 280.00

## Legacy Products

Legacy Products are instruments whose use has declined due to changing technology. J-KEM still offers and fully supports the instruments shown below. For detailed information and pricing, contact J-KEM.

### Solid Phase Synthesis Reactor



### Fully Automated SPS Reactor

The SPS reactor works by pressurizing the reactor base with nitrogen gas until it exactly offsets the pull of gravity. In this way, solvent can be added to a single reactor with none of it dropping through the frit. Using nitrogen back pressure to hold solvent in the reaction tube eliminates the need for mechanical valves or other mechanical devices which prevent full automation. Reactions are mixed by shaking, or bubbling nitrogen up through the frit mixing the resin and reactants. Can be combined with J-KEM's Eclipse robot for fully automated, multi-step SPS reactions.



Gas pressure used for mixing

### KEM-Vap Evaporator



The KEM-Vap Evaporator uses heated nitrogen and vacuum pressure to rapidly evaporate volatile and nonvolatile solvents, from methylene chloride to DMSO. The evaporator directs a jet of heated gas into each cell of a titer plate or vial for uniform and consistent evaporations.

### Evaporate solvents from:

- Deep well plates
- Vial racks
- Gilson racks



### KEM-Prep Parallel Reactor



### Heat, Cool, Reflux

KEM-Prep reactors for lead development or high throughput applications. Reactions are run in 25 or 50 mL glass reaction tubes which fit inside the heated and cooled reactor base. A reflux condenser plate surrounds the upper portion of each tube creating a reflux zone. Reactors are maintained in an inert atmosphere while reagents are added through a Teflon septum. Mixing is achieved by placing the reactor on a bench top shaker. The KEM-Prep reactor holds 24 reaction tubes while the KEM-Prep Jr. holds 6 tubes.



# Circulating Chillers/Heaters

*Precise temperature regulation  
at a highly affordable price*



J-KEM's circulating chiller/heaters are optimized for use with J-KEM's reaction blocks and other synthesis equipment. With both pressure and suction pumps, these circulators generate higher pumping pressures to provide rapid heating and cooling of attached equipment. All circulators have digital temperature entry, PID control for 0.01° C regulation, and over-temperature protection. Serial communications and software allow for remote PC control and data logging.

Seamlessly integrates with the Infinity Controller (p 14) as part of a larger reaction control system.

## Quality in the Details

- Dual pressure & suction pumps provide high coolant flow rates for rapid cooling.
- Intuitive programming
- Large digital display
- PC control & free software
- High and low limit alarms

## Three chiller models to choose from:

### Programmable Controller



### Advanced Digital



### Standard Controller



Programmable - Stores 10 programs of 100 steps each	Yes	No	No
External temperature probe option	Yes	Yes	Yes
Dual display of set point and actual bath temperature	Yes	Yes	Yes
Serial communications: RS232 (control software included)	Yes	Yes	Yes
Serial communications: USB, RS485, Ethernet (control software included)	Yes	Yes	No
Dual pressure and suction pumps	Yes	Yes	No
Temperature stability	0.01° C	0.01° C	0.05° C
Approvals	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE

## Circulating Chillers

Circulator	Temperature Range (° C)	Cooling power at:			Pressure and Suction Pumps	Flow Rate	Bath Capacity	Fluid Connection	Cat #	Price (\$)
		0°	-10°	-30°						
<b>Standard</b>	-20 to 200	120	75	--	No	11 lpm	7 liters	1/4 NPTF	SCS-20	3112.00
	-30 to 200	505	390	90	Yes	11 lpm	15 liters	1/4 NPTF	SCS-30	3995.00
<b>Advanced</b>	-20 to 200	120	75	--	No	11 lpm	7 liters	1/4 NPTF	SCA-20	3837.00
	-30 to 200	505	390	90	Yes	20 lpm	15 liters	1/4 NPTF	SCA-30	4512.00
	-40 to 200	650	540	190	Yes	20 lpm	15 liters	1/4 NPTF	SCA-40	4984.00
<b>Programmable</b>	-20 to 200	120	75	--	No	11 lpm	7 liters	1/4 NPTF	SCP-20	4759.00
	-30 to 200	505	390	90	Yes	20 lpm	15 liters	1/4 NPTF	SCP-30	5193.00
	-40 to 200	650	540	190	Yes	20 lpm	15 liters	1/4 NPTF	SCP-40	5718.00

## Circulating Chillers Accessories

<b>Heat Transfer Fluid.</b> Dynatherm is a low viscosity fluid with a high heat capacity for rapid heat transfer. Compatible with water condensation that contaminates other transfer fluids. Range: -50 to 114° C. 4 L bottle.	Dynatherm Qty of 3+	\$125.00 \$90.00
<b>Cryogenic Transfer Hose.</b> Flexible cryogenic transfer hose connects chiller to external equipment. Length: 5 feet. Temperature range: -90 to 300° C. Terminal fitting: 1/4" NPTM and 1/8" NPTM. Price per pair.	RC-CTH	\$570.00
<b>Quick Connect Fittings.</b> Stainless steel fittings for rapid connection of cryogenic hose to equipment. Includes a set of 4 fittings (1 each on the ends of the inlet and outlet hoses, and 1 each on the inlet and outlet of the equipment).	RC-QCC	\$294.00

## Chiller Specifications

Series	Dimensions (LxWxH)	Power (@ 120 V)	Weight
-20C	21.3" x 8.7" x 24.3"	1100 watts	90 lb
-30C	22.4" x 14.5" x 26.9"	1100 watts	118 lb
-40C	22.4" x 14.5" x 26.9"	1100 watts	118 lb

### Tech Note

The heat transfer fluid used with the chiller is as important as the chiller itself. A good transfer fluid must remain non-viscous at the lowest possible temperature for efficient cooling. J-KEM's Dynatherm remains non-viscous even at -50° C.

# Kugelrohr Short Path Distillation



## Distillations

## Sublimations

## Sample Drying

- Distill heat-sensitive compounds
- Mildest distillation method
- Programmable stirring rate and angle of rotation
- 10 ml to 2 L flask capacity
- Connection for high vacuum distillations

The **Kugelrohr Short Path Still** quickly distills or sublimates sensitive materials with minimal hold-up and loss. A Kugelrohr thin film evaporator works by continuously rotating the distillation flask to create a thin film of test material over the interior surface of the heated flask. The large surface area of the film promotes rapid volatilization under mild conditions. Once volatilized, the test material is rapidly condensed in the receiving flask only inches away, which is typically submerged in a dry ice bath.

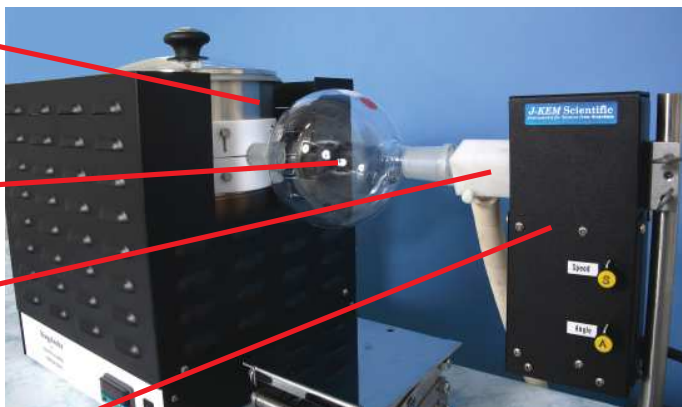
## A Kugelrohr Thin Film Evaporator consists of 4 parts

**1. Hot Air Oven** to heat the surface of the reagent flask uniformly

**2. Receiving Flask** to condense the volatilized compound (ice bath sits under the flask to cool it)

**3. Vacuum Connection**  
Distillations can be performed at atmospheric or full vacuum pressures.

**4. Stirring Unit** to continuously create a thin film of test material in the distillation flask.



The clear cover on the air oven allows for continuous monitoring.



### Features

- Air oven temperature to 230° C
- Top loading for easy access
- Digital temperature control
- Digital stirring module controls stirring speed and angle
- Flask sizes from 10 ml to 2 L
- Stainless steel, seamless oven contains spills
- Advanced PID temperature controller
- Grounded oven prevents electrical shock

### Specifications

- Temperature range: ambient to 230° C
- Power: 120 VAC
- Heater: 600 watts
- Size, Oven: 10" x 10" x 10" (H x W x D)
- Size, Stirring drive: 10" x 4" x 3"
- Rotation speed: 35 to 110 degrees/sec
- Rotation angle:  $\pm 5$  to  $\pm 140$  degrees

### Kugelrohr Short Path Distillation

Description	Cat #	Price
<b>Kugelrohr Short Path Distillation</b> Complete system includes oven, rotary vacuum adapter with 24/40 connection, programmable stirring unit, and 100 ml receiving flask. 120Vac, 5 amps.	KSPD-120	\$3985.00
<b>Receiving Flask, 100 ml</b> Receiving flask with 14/20 male adapter	KDB-100	\$100.00
<b>Receiving Flask, 250 ml</b> Receiving flask with 24/40 male adapter	KDB-250	\$100.00
<b>Receiving Flask, 1000 ml</b> Receiving flask with 24/40 male adapter	KDB-1000	\$188.00
<b>Rotary Vacuum Adapter</b> For 24/40 ground glass joint. Rotary adapter for vacuum distillation connection.	KRA-2440	\$62.30
<b>Rotary Vacuum Adapter</b> For 14/20 ground glass joint. Rotary adapter for vacuum distillation connection.	KRA-1420	\$60.40



# Miniature Overhead Stirrer



Efficient stirring of a 5 L flask

**Power** - More power than stirrers 10 times its size and weight!

**Convenience** - Weighs less than 1 pound!  
- Hand-sized

- The light weight of the motor makes it easy to assemble and align the stirrer with the reaction flask
- Side mount clamp on digital speed controller

**Safety** - Sparkless - Sealed housing  
- 14 Vdc motor

## Compare the Value

Manufacturer	Model	Max Torque	PC Cnt	Weight	Price
<b>J-KEM</b>	<b>OHS-1</b>	<b>91 in-oz</b>	<b>Yes</b>	<b>0.95 pounds</b>	<b>\$975.00</b>
Arrow	Agitator	39 in-oz	No	9 pounds	865.00
IKA	Eurostar 100	57 in-oz	No	10 pounds	1,399.00
IKA	Eurostar 200	142 in-oz	Yes	10 pounds	2,899.00
Glas-Col	HST20	96 in-oz	No	20 pounds	2,311.00



## Overhead Stirrer

Description	Cat #	Price
<b>Complete System.</b> Includes the motor, digital speed controller, and chuck for 10 mm stirring rod.	OHS-1	\$985.00
<b>Motor only</b> for OHS-1 stirrer. Includes 10 mm stirring rod chuck.	OHS-1M	585.00
<b>Digital speed controller only</b> for miniature OHS-1 motor.	OHS-DSC	420.00
Replacement inserts to secure 10 mm stirring rods in motor chuck. (Package of 6)	OHS-P10	12.50
Chuck for 6 mm stirring rods. Chuck replaces the standard 10 mm chuck.	OHS-6C	45.40

## Specifications

Input voltage: 100-240 Vac  
Voltage to motor: 14 Vdc max  
Maximum torque: 91 in-oz  
Rotational speed: 20 - 800 rpm  
Rotational control: 1 rpm  
Motor - Dia= 1.5", Ht= 6"

Free KEM-Torque software for PC control.

# Custom Laboratory Controllers

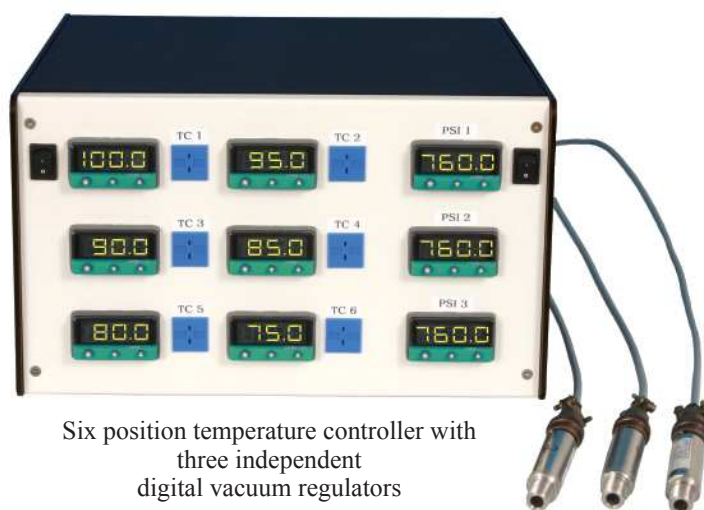
J-KEM makes one-of-a-kind instruments for temperature and pressure control to meet any research need. Shown are examples of recent projects.



Sixteen position temperature controller



Four position temperature controller designed to fit on the front face of a research hood



Six position temperature controller with three independent digital vacuum regulators

# Laboratory Safety Instruments

## Lab Safety Controller



- Protects against:**
- Coolant flow failure
  - Over-temperature condition
  - Under-temperature condition - Protects against flask breaking or TC falling out of the flask.

The Lab Safety Controller combines all the features of J-KEM's Digital Temperature Monitor with our Water Flow Monitor, then adds a temperature limit controller into a single versatile instrument. Plug any piece of equipment into the monitor, then if the water flow rate falls below the user set level, or the reaction temperature goes above or below the set limit, outlet power is disconnected until the controller is manually reset. Also, following recovery from a power failure, power is not applied to the outlet until the controller is manually reset. USB communications and free KEM-Net software provide GLP/GMP data and alarm logging.

Description	TC Type	Cat #	Price
<b>Lab Safety Controller.</b> 120 Vac, 1800 watts. Requires a flow sensor.	T	LS-120T	\$840.00
	J	LS-120J	840.00
	K	LS-120K	840.00
<b>Flow sensor.</b> Flow rate: 0.1 to 2.5 L/min		WFM-01	240.00
<b>Flow sensor.</b> Flow rate: 1 to 10 L/min		WFM-02	240.00
<b>Flow sensor.</b> Flow rate: 2 to 30 L/min		WFM-03	240.00
<b>Water shut off valve.</b> Turns off flow during an alarm		250WV	172.50
<b>Digital Alarm Outlet.</b> Open collector (170 ma) outlet		WFM-OC	35.00

**Specifications:** Dim. 3.25" x 5.25" x 7.25" (H x W x D). USB 2.0



## Temperature Limit Controller

Protects against heating accidents by disconnecting power when an over or under temperature condition occurs. Plug an instrument or heater into the Limit Controller then if the user set temperature limit is exceeded, power is removed until being manually reset.

Description	TC Type	Range (°C)	Cat #	Price
<b>Digital Limit Controller</b> 120 Vac input.	T	-200 to 250	HT120-T	\$555.00
	J	0 to 800	HT120-J	555.00
	K	-50 to 1200	HT120-K	555.00
<b>Digital Limit Controller</b> 230 Vac input.	T	-200 to 250	HT230-T	555.00
	J	0 to 800	HT230-J	555.00
	K	-50 to 1200	HT230-K	5255.00

**Specifications:** 120 or 230 Vac input, 1800 watt control. Dim. 2.5" x 3.75" x 5.4" (H x W x D)

## Water Flow Monitor

Precisely monitors the flow rate of water through a condenser, water bath, or other piece of equipment. If the flow rate falls below the minimum rate set by the user (i.e. loss of pressure, broken hose), power is turned off to the monitor's output receptacle and any equipment plugged into it. Power remains off until being manually reset. The optional water shut off valve stops water flow during an alarm condition preventing a flooded lab.



*Prevents heating accidents due to water flow failures*

- Digital sensor measures actual coolant flow rate
- Optional audible and digital alarms

Description	Cat #	Price
<b>Water flow monitor.</b> 120 V, 1800 watts. Requires a flow sensor.	WFM-120	\$385.00
<b>Water flow monitor.</b> 230 V, 2300 watts. Requires a flow sensor.	WFM-230	385.00
<b>Flow sensor.</b> Flow rate: 0.1 to 2.5 L/min	WFM-01	240.00
<b>Flow sensor.</b> Flow rate: 1 to 10 L/min	WFM-02	240.00
<b>Flow sensor.</b> Flow rate: 2 to 30 L/min	WFM-03	240.00
<b>Water shut off valve.</b> Turns off water flow during an alarm.	250WV	172.50
<b>Audible Alarm.</b> Alarm (70 dB) sounds during under flow condition.	WFM-AA	65.00
<b>Digital Alarm Outlet.</b> High current (170 ma) open collector output.	WFM-OC	35.00

**Specifications:** Dimensions: 2.5" x 3.75" x 5.4" (H x W x D)  
Temperature range: -20 to 100° C



# Laboratory Safety Instruments

USB Communications &  
GLP/GMP software

## Digital Temperature Monitor

Monitors and displays the temperature of an attached piece of equipment on a bright LED display. Built-in USB and free KEM-Net software (page 37) provide remote temperature monitoring and data logging to a GLP/GMP compliant file. Optional audible alarm.

Description	TC Type	Range (°C)	Cat #	Price
<b>Digital Temperature Monitor</b>	T	-200 to 250	DM120-T	\$455.00
120 Vac input. USB communications with KEM-Net data logging software	J	0 to 800	DM120-J	455.00
	K	-50 to 1200	DM120-K	455.00
<b>Digital Temperature Monitor</b>	T	-200 to 250	DM230-T	455.00
230 Vac input. USB communications with KEM-Net data logging software	J	0 to 800	DM230-J	455.00
	K	-50 to 1200	DM230-K	455.00

**Specifications:** 120 or 230 Vac input, 50 watts. Dim. 2.5" x 3.75" x 5.4" (H x W x D)

## Trinity Power Controller

Solid state electronics makes this variac the perfect instrument for research, and is especially useful in teaching labs. Safety features include sparkless solid state regulation of voltage for oil baths, heating mantles, heat lamps, and many other devices. Offered in two configurations, the Trinity-1 replaces an existing receptacle for installation directly in hoods. The Trinity-2 comes in its own case with an attached power cord. Both the Trinity-1 and Trinity-2 are offered with and without a built in voltage meter.



Trinity-1



Installs in hood



Trinity-2

- Replace an existing electrical outlet
- Solid state design
- Convenience of a built-in variac

Trinity Power Controller			
Installs in Hood	Built-in Meter	Cat #	Price*
Yes**	Yes	Trinity-1M	\$186.00
Yes**	No	Trinity-1P	156.00
No	Yes	Trinity-2M	198.00
No	No	Trinity-2P	168.00

**Specifications:** 120vac, 5 amps, 600 watts

\* Academic and volume discounts

\*\* Requires 1.625" junction box depth

## Nitrogen Gas Heater

J-KEM's Nitrogen Gas Heater regulates the temperature of nonflammable gases providing an intrinsically safe heat source for safety critical applications. An ideal

instrument for solvent evaporation or for any heating application where a traditional heater is unsafe or inconvenient to use. Includes a digital temperature controller for 0.5° C regulation of outlet gas temperature. To avoid damage to the heater, an optional flow switch can be built in to turn power off when gas flow falls below a minimum safe level.

*Intrinsically safe heating, even for flammable substances*



Air Flow (L/min)	Maximum Temperature (°C)		
	NGH-120	NGH-130	NGH-230
1	300	300	300
175	300	300	300
225	230	280	300
375	150	175	300

Nitrogen Gas Heater			
Description		Cat #	Price
Heater with digital controller, 120 Vac.	700 watt heater core.	NGH-120	\$2780.00
Heater with digital controller, 120 Vac.	900 watt heater core.	NGH-130	2820.00
Heater with digital controller, 230 Vac.	2000 watt heater core.	NGH-230	2850.00
Accessories			
<b>Flow switch</b> turns heating off if air flow falls below a minimum safe rate.		NGH-FS	610.00

**Specifications:** Temperature range: See chart above  
Minimum flow range: 1 liter per minute  
Fittings: 3/8" female NPT  
Dimensions Heater: 19" x 4.5" x 3"  
Controller: 2.5 x 3.8 x 5.4"  
Weight: 4 pounds

## Handheld Meter & Data Logger

This versatile meter provides convenient temperature readings from a variety of thermocouples. Features include two thermocouple inputs, large dual temperature display, data logging and automatic MIN/MAX temperature storage. Data can be logged to a PC in real-time or after a run is complete.

### Handheld Temperature Meters

Description	Cat #	Price
Dual channel handheld meter	HHM-80	\$345.00

Features	
Thermocouples	T, J, K, E, R, S, N
Resolution	0.1°
Data points stored	16,000
Time/Date stamp with data storage	
USB port for PC control	
Display °F and °C	
Automatic MIN/Max storage	
Built-in stand	



# Digital Vacuum Regulator

## Features: \* No Mercury

- 100% digital pressure entry and control
- Wetted parts are 100% stainless steel and Teflon
- Vacuum ramping feature eliminates *bumping*
- USB port and free software for PC control

**Resists:**

- All organic solvents
- Acids
- Bases
- Water

The Digital Vacuum Regulator is an ideal instrument for laboratory vacuum regulation. Connect the regulator to any vacuum pump or vacuum source and then to any piece of equipment to regulate pressure in most cases to  $\pm 1$  torr. A pressure ramp feature evacuates equipment at a user defined rate to eliminate bumping due to solvent degassing or over-evacuation. The vacuum regulator is ideally suited for large volume distillations, rotary evaporators and vacuum chambers. The DVR-200 is not recommended for small volume distillations or applications which involve a continuous purge with gas. These applications are better performed by J-KEM's Precision Vacuum Regulator, the DVR-1000 (p. 31).

**Recover > 99% of solvent from rotary evaporators**

Solvent	DVR Pressure (mm Hg)	Solvent Volume	Time to Dryness	Percent Recovery
Ether	475 torr	340 mL	14.6 min	99.6%
CH <sub>2</sub> Cl <sub>2</sub>	300 torr	360 mL	21.9 min	99.8%
CH <sub>2</sub> Cl <sub>2</sub>	100 torr	255 mL	5.9 min	99.5%
EtOAc	90 torr	316 mL	17.0 min	99.9%
Toluene	50 torr	273 mL	15.7 min	99.4%

### A Note About Quality

J-KEM uses the highest quality components available. For example, most vacuum controllers use a silicone filled vacuum transducer (because they cost less), but J-KEM uses a stainless steel diaphragm transducer. Also, rather than a standard vacuum valve with Viton seals, J-KEM uses a custom stainless steel valve with Teflon seals. These, and other enhancements provide the chemical resistance needed for lab operations.



## Two Styles of Regulator to Choose From

### DVR-200

The DVR-200 is designed for continuous vacuum sources, such as oil-filled vacuum pumps, aspirators, or systems that are "always on", like in-house vacuum systems. The DVR-200 regulates pressure by opening and closing a valve that separates the vacuum source from the system being evacuated. In most cases, the DVR-200 is the best choice.

### DVR-280

The DVR-280 is designed for use with diaphragm vacuum pumps that regulate pressure by turning the pump On and Off. The DVR-280 doubles the life of diaphragm pumps by starting the pump at atmospheric pressure before connecting it to the vacuum system.

**NEW!! USB +**  
Free KEM-Net software. (see p. 37)

Digital Vacuum Regulators and Monitors			
Description		Cat #	Price
<b>Vacuum Regulator, Model DVR-200.</b>	Includes built-in SS transducer. 120V	DVR-200	\$1325.00
<b>Vacuum Regulator, Model DVR-300.</b>	Same as DVR-200 but for 230V. CE Approved.	DVR-300	1335.00
<b>Vacuum Regulator, Model DVR-280.</b>	SS transducer and pump controller. 120V	DVR-280	1295.00
<b>Vacuum Regulator, Model DVR-380.</b>	Same as DVR-280 but for 230V. CE Approved.	DVR-380	1395.00
<b>Digital Vacuum Monitor.</b>	Continuous display of system pressure, no regulation. 120V	DVM-100	950.00
<b>Digital Vacuum Monitor.</b>	Same as DVM-100 but for 230V. CE Approved.	DVM-140	960.00

### Vacuum Regulator Accessories

<b>Stainless Steel Needle Valve.</b>	Improves regulation in small pieces of equipment.	DVR-PNV	\$138.20
<b>Analog pressure output.</b>	External 0-20 mV analog output. Useful for data logging.	DVR-JH	95.00
<b>Condenser body for dry ice condenser.</b>	35/25 joint. Dimensions: 11" x 5"	JCE-1000	378.00
<b>Condenser receiving flask.</b>	1000 mL flask with 35/25 joint.	MTE-1000	85.00
<b>Condenser receiving flask.</b>	2000 mL flask with 35/25 joint.	MTE-2000	92.00

**Specifications:** 120 & 230 Vac @ 100 watts. Vacuum fittings: 1/8" NPTM. Dim. 3.4" x 5.4" x 7.4" (HxWxD)

\* Academic discounts. Warranty: Electronics: 2 yr; transducer and vacuum valve: 6 mo., but void if damaged by chemical buildup.



Dry ice trap  
JCE-1000



# Precision Vacuum & Pressure Regulators

## 0.1 Torr Regulation No Mercury



## Precise regulation of $\pm 0.1$ torr of volumes as small as 1 mL

- Precision, multi-stage vacuum distillations
- Automatically compensates for leaks in the equipment under test
- Maintains constant precise pressure, even in systems with a continuous gas purge
- Twelve step pressure ramps
- Customizable
  - Add temperature or pressure channels
  - Custom programming for unique applications
  - Define output events based on time, temperature or pressure

J-KEM's vacuum and pressure regulators maintain pressure to 0.1 torr in reactors and equipment with volumes as small as 1 mL. Built from J-KEM's Infinity Controller, these instruments can be customized to automate any laboratory or quality control task involving the regulation of vacuum or pressure. For applications requiring both evacuation and repressurization, a Back-Fill option is available for the DVR-1000. The DVR-1000 regulates vacuums, the DPR-1100 regulates positive pressures, and the DDR-1200 regulates both vacuum and positive pressures.

### Precision Vacuum and Pressure Regulators

Description	Cat #	Price (\$)
<b>Digital Vacuum Regulator.</b> Regulation of vacuum pressures in the range of 0.1 to 760.0 torr (atm pressure). Requires the selection of one PSV valve (below). Includes Netbook PC controller with pre-loaded KEM-Torr software.	DVR-1000	2980.00
Same as DVR-1000, but without Netbook PC controller. Includes KEM-Torr software to load on your PC.	DVR-1000-PC	2630.00
<b>Digital Pressure Regulator.</b> Regulation of positive pressures in the range of 0 psi (atm pressure) to 50 psi. The maximum pressure of the controller is user selectable. Replace the '#' in 'DPR-1100-#' with the desired maximum pressure. Ranges: 1, 5, 15, 30, 50 psi. Requires the selection of one PSV valve (below). Gage transducer is standard, but absolute is available on request. Includes Netbook PC controller with pre-loaded KEM-Torr software.	DPR1100-#	3145.00
Same as DPR-1100, but without Netbook PC controller. Includes KEM-Torr software to load on your PC.	DPR1100-PC-#	2795.00
<b>Dual Range Vacuum &amp; Pressure Regulator.</b> Regulation of both vacuum and positive pressures. The DDR-1200 is built with a dual range pressure transducer capable of accurately measuring pressures from full vacuum to the pressure limit of the transducer selected. The maximum pressure of the controller is user selectable. Replace the '#' in 'DDR-1200-#' with the selected maximum pressure range of 15 or 35 psi (above Atm). Requires the selection of <u>two</u> PSV valves (below), one for vacuum and one for pressure regulation. Contains an absolute pressure transducer. Includes KEM-Torr software to load on your PC.	DDR1200-#	3615.00
Same as DDR-1200, but without Netbook PC controller. Includes KEM-Torr software to load on your PC.	DDR1200-PC-#	3265.00
<b>Back-Fill Option.</b> The DVR-1000 and DPR-1100 can be equipped to operate a second valve used to back fill the evacuated or pressurized reactor. Requires the selection of a second PSV valve (below).	OPT-DV	220.00

### Stainless Steel Proportioning Valves

The optimal PSV value depends on the exact conditions of the procedure. The table below applies to closed systems. For applications with a continuous purge of gas, call J-KEM for assistance.

Cat#	System Volumes	Valve Cv	Price (\$)	Cat#	System Volumes	Valve Cv	Price (\$)
PSV-2	1ml to 2L	0.033	485.00	PSV-5T	>12L	0.37	1097.00
PSV-3	25ml to 4L	0.055	485.00	PSV-6	>20L	0.7	1097.00
PSV-4	100ml to 22L	0.068	485.00	PSV-7	>30L	1.3	1097.00
PSV-5	1L to 50L	0.12	485.00	PSV-8	>40L	2.0	1097.00



Custom DVR-1000 automates a large scale distillation by adjusting vacuum based on the difference between the pot and head temperatures.

### Specifications:

**Transducer**  
Diaphragm: Stainless steel  
Accuracy: 0.1% of displayed value  
Proof Pressure: 200%

### Controller

Resolution (std Xducer): 0.1 torr  
Vapor Path Materials: Stainless steel & Teflon  
Ramp Rates: 100 torr/sec to 0.1 torr/hr.  
**Fittings** 1/4" SS Compression fittings

**Size:** 8" x 3" x 6". **Weight:** 3 lb

The DVR-1000 is optionally available in custom vacuum ranges. Option cost: \$2200.00

Control Range			
Min (torr)	Max (torr)	Min (torr)	Max (torr)
0.0001	1.0	0.01	100.0
0.001	10.0	0.05	500.0
0.002	20.0	0.1	1000.0

### Free KEM-Torr Control & Data Logging Software



Real-time plot of system pressure - 16-step pressure ramp, data logging and remote PC control.

# Digital Temperature Controllers

## Model 210

The Model 210 is J-KEM's most compact, research-grade controller, yet packed with 1200 watts of power. Sufficient for heating mantles up to 5 L in size and most laboratory ovens, hot plates, reaction blocks and other heaters. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

— 0.1° C Regulation & Display —

**230VAC, CE approved  
Model 310 available**

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
210-T	\$840.00	210-T-S	\$935.00	T	-200 to 250
210-J	840.00	210-J-S	935.00	J	0 to 800
210-K	840.00	210-K-S	935.00	K	-50 to 1200
210-Pt	850.00	210-Pt-S	1005.00	RTD	-200 to 400

**Specifications:** 120vac, 10 amps, 1200 watts. Dim. 3.25" x 5.25" x 7.4" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

\$ Complete system includes: controller, Teflon TC, TC cord, and adapter (see p. 38)

## Model 210/Timer

Same power and versatility as the Model 210, but also contains a 100 hour digital timer to turn heating OFF (or ON) at a user specified time. A new safety feature automatically disconnects power from the heater following recovery from a power failure. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

— 0.1° C Regulation & Display —

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
210/Timer-T	\$935.00	210/Timer-T-S	\$1030.00	T	-200 to 250
210/Timer-J	935.00	210/Timer-J-S	1030.00	J	0 to 800
210/Timer-K	935.00	210/Timer-K-S	1030.00	K	-50 to 1200
210/Timer-Pt	945.00	210/Timer-Pt-S	1100.00	RTD	-200 to 400

**Specifications:** 120vac, 10 amps, 1200 watts. Dim. 3.25" x 6.7" x 6" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

\$ Complete system includes: controller, Teflon TC, TC cord, and adapter (see p. 38)

# New in 2014

At the heart of J-KEM's 200-Series controllers is a new, high speed microprocessor that performs 3 functions:

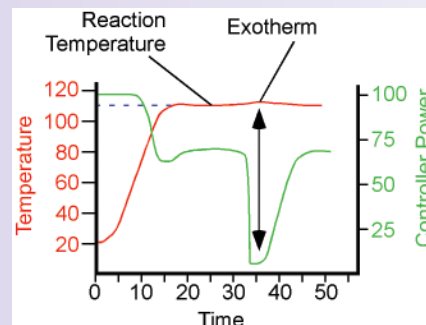
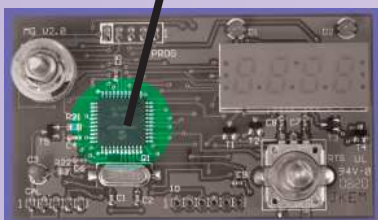
**1. Power Regulation** J-KEM's original power control computer is replaced by a next generation microprocessor. The power control computer is J-KEM's patented technology that adjusts power to the heater 2048 times per second resulting in 0.1° C regulation.

**2. USB Communications** PC communications and free KEM-Net software enable remote PC control, GLP/GMP compliant data collection, and multi-temperature ramps built in an Excel-like table.

**3. KEM-IO** Allows the controller to turn other pieces of equipment On/Off, change the temperature set point, or Start/Stop heating based on external inputs, temperature, or time. See page 37.

### Examples:

- \* Turn heating Off when the hood door is opened. Turn it back on when closed.
- \* Open a 120 Vac cooling valve if the reaction exotherms to 110C.
- \* When the temperature reaches 85C, start a reagent addition pump or stirrer.



Power logging feature detects exotherms



## Model 250

The Model 250 has both heating and cooling outlets for maximum versatility. Two heating outlets supply 1800 watts of power for large equipment and heating mantles up to 22 L. The third outlet (1800 watts), normally used for cooling, is programmable to supply power below, above, or at the set point. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

— 0.1° C Regulation & Display —

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
250-T	\$965.00	250-T-S	\$1060.00	T	-200 to 250
250-J	965.00	250-J-S	1060.00	J	0 to 800
250-K	965.00	250-K-S	1060.00	K	-50 to 1200
250-Pt	965.00	250-Pt-S	1120.00	RTD	-200 to 400

### Model 250 Accessories

Coolant valve turns On/Off flow in cooling applications. Cat# 250WV \$172.50

**Specifications:** 120vac, 15 amps, 1800 watts. Dim. 3.5" x 7.75" x 9.25" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Complete system includes: controller, Teflon TC, TC cord, and adapter (see p. 38)

## Model 260/Timer

Designed for processes requiring an extra measure of safety. The Model 260/Timer disconnects outlet power if the process temperature exceeds the set point by a user specified amount, or following recovery from a power failure. Power remains off until the controller is manually reset. Over temperature is signaled by both an indicator lamp and an audible alarm. Contains a 100 hour digital timer to turn heating OFF (or ON) when the time expires. The Model 260 has two power outlets (1800 watts) for large equipment or heating mantles up to 22 L. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

— 0.1° C Regulation & Display —

**230VAC, CE approved**  
**Model 360 available**

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
260/Timer-T	\$1175.00	260/Timer-T-S	\$1270.00	T	-200 to 250
260/Timer-J	1175.00	260/Timer-J-S	1270.00	J	0 to 800
260/Timer-K	1175.00	260/Timer-K-S	1270.00	K	-50 to 1200
260/Timer-Pt	1175.00	260/Timer-Pt-S	1330.00	RTD	-200 to 400

**Specifications:** 120vac, 15 amps, 1800 watts. Dim. 3.5" x 7.75" x 9.25" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Complete system includes: controller, Teflon TC, TC cord, and adapter (see p. 38)

## The Complete System



1. **Temperature Controller**  
Types T & K have the best Corrosion resistance

2. **Thermocouple Extension Cord**

3. **Teflon Probe Adapter**  
(14/20 joint)

4. **Teflon Coated Thermocouple**

# Multi-Channel Controllers

## Gemini

Features two temperature controllers in a single cabinet to regulate two independent reactions. The Gemini is one of J-KEM's most versatile controllers featuring high power outlets and a 100 hour digital timer (on channel 1) to turn heating OFF (or ON) at a user entered time. Features include: over-temperature protection circuits with audible alarms, dual temperature displays, selectable operating modes, double fused, and 100% solid state design. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

**Controls *TWO* independent reactions!**

— 0.1° C Regulation & Display —

**230VAC, CE approved  
Gemini-CE available**

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
Gemini-T	\$1415.00	Gemini-T-S	\$1605.00	T	-200 to 250
Gemini-J	1415.00	Gemini-J-S	1605.00	J	0 to 800
Gemini-K	1415.00	Gemini-K-S	1605.00	K	-50 to 1200
Gemini-Pt	1415.00	Gemini-Pt-S	1725.00	RTD	-200 to 400

**Specifications:** 120vac, 15 amps, 1800 watts total, 1200 watts maximum per channel. Dim. 3.5" x 7.75" x 9.25" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Includes: controller, plus two each of: Teflon TC, TC cord, and adapter (see p. 38)

## Apollo

Features two independent temperature controllers in a single cabinet to regulate two reactions at the same time. Each temperature controller channel has a high power outlet and a 100 hour digital timer to turn heating OFF (or ON) at a user set time. Features include: over-temperature protection circuits, dual temperature displays, selectable operating modes, double fused, and 100% solid state design. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

**Controls *TWO* independent reactions!**

— 0.1° C Regulation & Display —

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
Apollo-T	\$1565.00	Apollo-T-S	\$1755.00	T	-200 to 250
Apollo-J	1565.00	Apollo-J-S	1755.00	J	0 to 800
Apollo-K	1565.00	Apollo-K-S	1755.00	K	-50 to 1200
Apollo-Pt	1565.00	Apollo-Pt-S	1875.00	RTD	-200 to 400

**Specifications:** 120vac, 15 amps, 1800 watts total, 1200 watts maximum per channel. Dim. 4" x 8.2" x 9" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Includes: controller, plus two each of: Teflon TC, TC cord, and adapter (see p. 38)

## The Quad

Because we've never met a chemist with too much bench space, the Quad packs four independent temperature controllers into a single compact unit. Each of the four controller channels has 1200 watts of power, an independent display, and an over-temperature protection circuit. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

*Think of the Quad as a Model 210 on steroids*

**0.1° C Regulation  
and Display**

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
Quad-T	\$2595.00	Quad-T-S	\$2975.00	T	-200 to 250
Quad-J	2595.00	Quad-J-S	2975.00	J	0 to 800
Quad-K	2595.00	Quad-K-S	2975.00	K	-50 to 1200
Quad-Pt	2595.00	Quad-Pt-S	3220.00	RTD	-200 to 400

**Specifications:** 120vac, 15 amps, 1800 watts total, 1200 watts maximum per channel. Dim. 5.25" x 7" x 7.5" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Includes: controller, plus four each of: Teflon TC, TC cord, and adapter (see p. 38)



# High Safety Controllers

## Model 270

Designed for processes requiring uncompromising safety. The only temperature controller available with a built-in, independent, backup controller to guard against heating accidents from equipment failure. The desired temperature is entered into the main temperature controller which regulates heating, and then a high temperature cut-off is entered into the backup limit controller. If the reaction reaches the high temperature limit or a thermocouple breaks, power is turned off to the heater until the controller is manually reset. Both meters independently monitor the reaction temperature. In the event that one meter fails, the other takes over to prevent a heating accident. J-KEM's design provides independent, 100% redundant control. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.



- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free KEM-Net software, KEM-IO feature (p. 37)

Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
270-T	\$1570.00	270-T-S	\$1720.00	T	-200 to 250
270-J	1570.00	270-J-S	1720.00	J	0 to 800
270-K	1570.00	270-K-S	1720.00	K	-50 to 1200

**Specifications:** 120vac, 15 amps, 1800 watts.  
Dim. 3.4" x 7.75" x 9.25" (HxWxD)

**Requires a dual element thermocouple** (see p. 39)

\* Academic and volume discounts available. **2 Year warranty**

§ Includes: controller, dual element Teflon TC, TC cord, and adapter (see p. 39)

## Model 280/Timer

\* \* 0.1° C Regulation & Display \* \*



The Model 280/Timer incorporates the same advanced safety technology as the Model 270, but features two independent safety controllers in the same cabinet to run two independent reactions. Each channel has a 100 hour digital timer to turn heating Off (or On) at a user entered time. Contains J-KEM's power control computer providing 0.1° C regulation of anything.

**NEW!!**

USB port and free KEM-Net software, KEM-IO feature (p. 37)

Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price	Cat #	Price		
280/Timer-T	\$2685.00	280/Timer-T-S	\$2985.00	T	-200 to 250
280/Timer-J	2685.00	280/Timer-J-S	2985.00	J	0 to 800
280/Timer-K	2685.00	280/Timer-K-S	2985.00	K	-50 to 1200

**Specifications:** 120vac, 15 amps, 1800 watts.  
Dim. 5.5" x 12" x 12.5" (HxWxD)

**Requires a dual element thermocouple** (see p. 39)

§ Includes: controller, dual element Teflon TC, TC cord, and adapter (see p. 39)



## Model HCC

HCC controllers are designed to power large scale equipment with volumes up to 100 L. Built with the same uncompromising commitment to safety as our Model 270, the HCC is available in 3 models for 120 and 230 volt operations. In addition to the features of the Model 270, these high power controllers incorporate a 100 hour timer to turn heating OFF (or ON) at a user set time. The HCC is readily customized to meet unique research or additional safety needs. Call for details. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything. **Requires a dual element thermocouple** (p. 39).

## High Power Controllers

**NEW!!**

USB port and free KEM-Net software, KEM-IO feature (p. 37)

Three Models of HCC to choose from

HCC 130	Voltage: 110-120 V	Power: 30 amps; 3600 watts
Description	Cat #	Price
<b>Model HCC-130 controller only.</b>	HCC-130-T	\$1915.00
Requires a dual element thermocouple and thermocouple extension cord (see p. 39).	HCC-130-J	1915.00
	HCC-130-K	1915.00
HCC 215	Voltage: 208-240 V	Power: 15 amps; 3600 watts
<b>Model HCC-215 controller only.</b>	HCC-215-T	\$1940.00
Requires a dual element thermocouple and thermocouple extension cord (see p. 39).	HCC-215-J	1940.00
	HCC-215-K	1940.00
HCC 230	Voltage: 208-240 V	Power: 30 amps; 7200 watts
<b>Model HCC-230 controller only.</b>	HCC-230-T	\$2045.00
Requires a dual element thermocouple and thermocouple extension cord (see p. 39).	HCC-230-J	2045.00
	HCC-230-K	2045.00
Dimensions: 5.5" x 12" x 12.5" (HxWxD)	Temperature range of all HCC controllers	T -200 to 250° C J 0 to 800° C K -50 to 1200° C

# Oil Bath Controller

**Variable  
Voltage Output**

## Model 410

The Model 410 is designed for heaters that cannot be operated at 120 Vac, such as some styles of oil baths. The maximum output voltage of the Model 410 is selected using the Power Output knob on the front of the controller. Selectable output voltage limits provide precise power and temperature control while protecting low voltage heaters. Contains J-KEM's patented power control computer which provides 0.1° C regulation of anything.

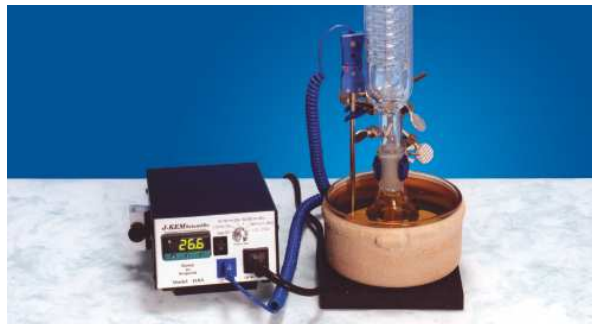
— 0.1° C Regulation & Display —

**Output Voltages of:**  
10, 20, 40, 60, 120 Vac

- NIST traceable
- Advanced PID algorithm

**NEW!!**

USB port and free  
KEM-Net software.  
KEM-IO feature (p. 37)



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
410-T	\$855.00	410-T-PKG	\$925.00	T	-200 to 250
410-J	855.00	410-J-PKG	925.00	J	0 to 800
410-K	855.00	410-K-PKG	925.00	K	-50 to 1200
410-Pt	855.00	410-Pt-PKG	945.00	RTD	-200 to 400

**Specifications:** 120vac, 10 amps, 1200 watts. Dim. 3.25" x 5.25" x 7.25" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Complete system includes: controller, stainless steel TC, and TC cord (see p. 38)

# Economy Temperature Controllers

## Model 150

An ideal controller for applications that don't require the precise regulation of J-KEM's 200-Series controllers. This compact unit packs 1200 watts of power, sufficient for 5 L heating mantles, many ovens, and other devices. Built with J-KEM's state-of-the-art PID process controller, but does not contain J-KEM's power control computer. See comparison below.

- NIST traceable
- Advanced PID algorithm
- Ramp-to-set point feature standard



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
150-T	\$540.00	150-T-S	\$625.00	T	-200 to 250
150-J	540.00	150-J-S	625.00	J	0 to 800
150-K	540.00	150-K-S	625.00	K	-50 to 1200

### Model 150 Options

**RS232 Serial Port** for PC control and data logging. add "-RS232" \$125.00

**High Power Output.** 1800 watts @ 120 Vac add "-HC" 95.00

**Specifications:** 120vac, 10 amps, 1200 watts. Dim. 2.5" x 3.75" x 5.4" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Complete system includes: controller, Teflon TC, TC cord, and adapter (see p. 38)

## Model 150/Timer

Same power and versatility as the Model 150, but also contains a 100 hour digital timer to turn heating OFF (or ON) at a user set time. See comparison to the 200-Series at bottom of page.

- NIST traceable
- Advanced PID algorithm
- Ramp-to-set point feature standard



Controller Only		Complete System \$		Thermocouple Type	Temperature Range (°C)
Cat #	Price*	Cat #	Price*		
150/Timer-T	\$660.00	150/Timer-T-S	\$755.00	T	-200 to 250
150/Timer-J	660.00	150/Timer-J-S	755.00	J	0 to 800
150/Timer-K	660.00	150/Timer-K-S	755.00	K	-50 to 1200

### Model 150 Options

**RS232 Serial Port** for PC control and data logging. add "-RS232" \$125.00

**High Power Output.** 1800 watts @ 120 Vac add "-HC" 95.00

**Specifications:** 120vac, 10 amps, 1200 watts. Dim. 2.5" x 4.75" x 5.5" (HxWxD)

\* Academic and volume discounts available.

**2 Year warranty**

§ Complete system includes: controller, Teflon TC, TC cord, and adapter (see p. 38)

## What's the difference between J-KEM's 200-Series controller and the 150-Series?

Feature	200-Series	150-Series
Temperature regulation	0.1° C	1° C
Smallest regulated volume	0.01 mL	250 mL
USB port & software	Free	No

J-KEM's 200-Series controllers have our patented power control computer with technology that provides 0.1° C regulation of any instrument or volume as small as 10 µL. The 150-Series combines a state-of-the-art PID process controller with solid state circuitry to provide unparalleled performance in its price range. The 150-series is ideal for equipment such as reaction blocks, ovens, or heating mantles 500 mL or larger.





# KEM - IO *Finally, you can control the world*



## How does it work?

KEM-IO works in combination with KEM-Net software (below). Using KEM-Net, the user defines how the controller responds to temperature or external events and when to turn other instruments On or Off.

With KEM-IO, you can add Input, Output, and Serial Channels.

**Inputs** - Allows the controller to detect events that occur outside of the controller, for example, a hood door opening, a loss of cooling water, or a GC making an injection.

**Outputs** - Allows the controller to operate other pieces of equipment when a set of conditions are met. For example, turn on a pump when the reaction temperature reaches 100<sup>o</sup> C, or stop stirring after 3 hours.

**Serial Channels** - Allow the controller to send commands to other pieces of equipment when a set of conditions are met. For example, if an exotherm is detected, 1) stop heating, and 2) send a serial command to a J-KEM chiller (p. 25) to turn on and start cooling to -30<sup>o</sup> C. Or stir at 200 rpm while the reaction temperature is below 80<sup>o</sup> C, then change to 400 rpm when the temperature is above 80<sup>o</sup> C.

I/O Logic Operations						
	Input	State	Action	State	Setpoint	Output Type
If Input	Input 1	Goes Low	Change SP	None	50.0	Latching
If Input	Input 2	Goes High	Output 2	On		Non-Latching
If Input	None					

I/O Temperature Operations						
	Condition	Temp (oC)	Output	State	Action	Suppress
If	Above	130.0	Output 2	Turn On	Latching	<input type="checkbox"/>
If	Below	85.0	Output 2	Turn Off	Non-Latching	<input checked="" type="checkbox"/>
If	Above					

KEM-IO can be configured for custom applications, contact J-KEM for information.

## KEM-IO & Safety

- Respond to exotherms, or heating accidents
- Stop heating if safety zones are violated
- Turn On (Off) heating based on the state of other instruments



With KEM-IO, the controller can turn on pumps, stirrers, chillers or other equipment as part of a temperature program.

### KEM-IO Options

Description	Up to 6 Input/Output channels can be added to a single controller.	Cat #	Price (\$)
<b>Input - Contact Closure.</b>	Input responds to a contact closure of a mechanical switch.	KIO-ICC	100.00
<b>Input - Voltage Input.</b>	Optically isolated input 0-24 Vdc. Off state= < 1Vdc. On state= > 3Vdc.	KIO-IVI	140.00
<b>Output - Open Collector.</b>	Open collector isolated output. 24 Vdc @ 100 ma maximum.	KIO-OOC	140.00
<b>Output - 120 Vac.</b>	120 Vac receptacle turns On/Off under program control. 10 amps @ 120 Vac.	KIO-OAC	180.00
<b>Serial Channel</b>	RS232 serial channel to communicate with laboratory instruments or PC's.	KIO-SER	180.00
<b>Custom</b>	Inquire about custom Input/Output and controller features.	Inquire	
<b>Netbook PC.</b>	KEM-IO requires connection to KEM-Net software. Run KEM-Net on this netbook PC.	Discovery	390.00

## PC Control & Free KEM-Net Software

KEM-NET software is included with all 200-Series temperature controllers and vacuum regulators.

### Features:

- Run 16-step temperature and vacuum ramps
- Easy setup with Excel-like table input
- Enter setpoints and controller parameters remotely
- Real-time graphical display and data logging to Excel
- GLP and GMP compliant.

**Enhanced Lab Safety** - Implements Over, Under, and Band Alarms

### Serial Communication Options and Accessories

Description	Cat #	Price (\$)
<b>Netbook PC.</b> Laptop PC, perfect for lab use. Intel Atom processor, 1G ram, 10.1" screen, wireless, Ethernet	Discovery	390.00
<b>USB Extender, 100-Foot.</b> Amplifier extends USB communications to 100 feet. Includes extender and 100' cable.	USBC-100	118.00
<b>USB 4-Port Hub.</b> Used to connect multiple controllers to a single PC USB port	USBH	36.00
<b>RS-232 Port.</b> Physical RS-232 port substituted for the USB port. Add as a suffix to any controller, Ex: 210-T-RS232	RS232	125.00
<b>RS-485 Port.</b> Physical RS-485 port substituted for the USB port. Add as a suffix to any controller, Ex: 210-T-RS485	RS485	185.00

# Thermocouples & Accessories

**NEW!**  
Glass  
over-coated  
thermocouples



Note: To read temperatures accurately, the **type** of the thermocouple must match the controller's **type**. On a new controller, the type is the letter immediately following the model number:

210 - **K** - S

On an existing controller, the thermocouple type is indicated by the color of the thermocouple receptacle on the front. If the receptacle is:

**BLUE** ---- you must order a type T thermocouple  
**YELLOW** -- you must order a type K thermocouple  
**BLACK** --- you must order a type J thermocouple  
**WHITE** --- you must order a type Pt/100 sensor

Thermocouple Type	Probe Outer Diameter (in.)	Thermocouple Overcoating <sup>1</sup>	Probe Length (inches)
T (\$0)	1/16 (\$33.00)	Uncoated (\$0)	6 (\$0)
J (\$0)	1/8 (\$34.00)	Teflon <sup>2</sup> (\$30.00)	12 (\$0)
K (\$0)	1/4 (\$38.00)	Glass <sup>3</sup> (\$40.00)	18 (\$11)
Pt/100 (\$60.00)			24 (\$15)
			36 (\$28)

1- All sensors are housed in 304 stainless steel sheaths.  
2- FEP coating not for use above 180° C  
3- Borosilicate glass. Available as 1/4" probe only.

Probes of any length are available

Probes are color coded

## To determine the **Catalog Number** of a probe:

1. Enter the thermocouple type (T, J, K, Pt/100)
2. Enter the outer diameter of the probe (1/16, 1/8, or 1/4)
3. Enter the probe over coating (U= Uncoated, T= Teflon, G= Glass)
4. Enter the length of the probe in inches.



**Examples:** T-1/8-U-12 ..... Price: \$0 + 34.00 + 0 + 0 = \$34.00  
K-1/4-G-18 ..... Price: \$0 + 38.00 + 40.00 + 11.00 = \$89.00

**Other Services** Recoat Teflon probe \$35-38  
Recoat Glass probe \$40.00  
Thermocouple calibration certificates (see below)

## To determine the **Price** of a probe:

Total the dollar value associated with each selection made from all four columns

## Thermocouple Calibration

J-KEM offers thermocouple calibration in standard and extended temperature ranges.

Calibrated at three points in the stated range with NIST traceable standards and supplied with a certificate of calibration. Additional calibration points available on request.

Additional calibration points in stated range are \$35.00 each.

Description	# of Points	Temp. Range	Cat #	Price
Thermocouple calibration, standard temperature range	3	0° C to 150° C	STCC	\$105.00
Thermocouple calibration, extended temperature range	3	-35° C to 175° C	ETCC	150.00
Thermocouple calibration, low temperature range	3	-195° C to 300° C	LTCC	240.00

## Thermocouple Extension Cords

### Coiled Cord



Retractable coiled cord saves space in crowded hoods. 26 gauge multi strand wire with PVC insulation.

Coiled Thermocouple Cords (see type and connectors below)			
Catalog Number	Extended Length	SMP	OST
CC-10-(type)-(connector)	10 feet	\$33.80	\$39.80
CC-20-(type)-(connector)	20 feet	67.00	67.00

Straight Thermocouple Cords (see type and connectors below)		
EXT-10-(type)-(connector)	10 feet	\$26.25
EXT-20-(type)-(connector)	20 feet	36.30

### Straight Cord



Teflon insulated wire for superior chemical resistance. 24 gauge single stranded wire.

Select a connector type

Select a connector style

**Type**

Select type: T, J, K. For Pt/100 call. The cord, controller, and thermocouple must all be of the same **type**. Specify: **T** for a blue plug  
**J** for a black plug  
**K** for a yellow plug  
**Pt/100** for a white plug

**Ordering Examples:** CC-10-T-SMP  
EXT-20-K-OST

**Connector**

Select plug style: **SMP** or **OST**



**Style SMP**  
Fits all controllers

**Style OST**  
Fits 250, 260, 270, HCC



## Thermocouples for Model 270, 280 and HCC Controllers



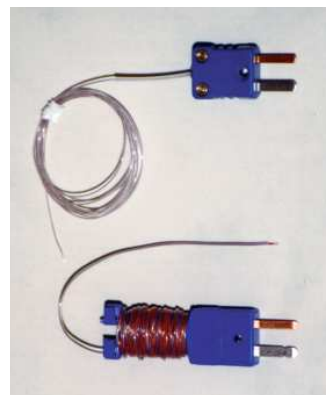
Dual element thermocouples contain two independent thermocouples in a single probe.

Model 270, 280 and HCC controllers require either 1 dual or 2 single-element thermocouples.

Teflon Coated Dual Element Thermocouples					Dual Element Thermocouple Extension Cords		
	Probe Diameter (in.)	Thermocouple Length (in.)	Cat #	Price	Length	Cat #	Price
Probes listed are Teflon coated. Stainless steel and glass probes are also available.	1/8	12	TC270-(*)-18T12	\$103.00	10 ft.	EXT-10-270-(*)	\$59.50
	1/4	12	TC270-(*)-14T12	115.00	25 ft.	EXT-25-270-(*)	94.25
	1/4	24	TC270-(*)-14T24	137.00	* Specify thermocouple type T, J, or K		
	1/4	36	TC270-(*)-14T36	151.00			
Probes of any length are available.							
					* Specify thermocouple type T, J, or K		

## Thin Wire Thermocouples

Flexible yet rugged thermocouples measure difficult to reach spots such as inside heating mantles, ovens, or around curved surfaces. Also useful for measuring volumes as small as 100  $\mu$ L. Adhere to equipment to measure surface temperatures of hot plates, HPLC columns, photolysis or other reactors.



### Teflon Coated

Thin wire thermocouple (30 gauge; 36" long) completely sealed in Teflon for submersion in solution. Excellent for use with small volumes (<100  $\mu$ L). Inserts through rubber septum for airtight seal. 5' and 10' lengths available.

### Exposed Junction

Teflon wire (30 gauge; 72" long) exposed junction is ideal for rapid temperature measurement of solids, air, or heating mantles. Not suitable for liquid contact.

### Teflon Coated Thin Wire Thermocouple

Description	Cat #	Price
Type T Teflon embedded	TEF-30-T	\$118.50
Type K Teflon embedded	TEF-30-K	118.50
Type J Teflon embedded	TEF-30-J	118.50

### Exposed Junction Thin Wire Thermocouple

Type T exposed junction	TWT-T	36.00
Type K exposed junction	TWT-K	36.00
Type J exposed junction	TWT-J	36.00
Longer lengths available on request.		

## Needle Tip Thermocouples

Hypodermic needle thermocouples (17 gauge) are ideal for measuring and controlling the temperature of small volumes and inert reactions. Temperature measuring end of the thermocouple is at the tip, so only the first 2 mm of the probe needs liquid contact for accurate temperature measurement. Forms an air tight seal when inserted through a septum. Needles are sealed on the end for liquid tight applications. Available in 3.5" and 7" lengths. These stainless steel needles are also available with Teflon coating. Each comes with 72 inches of attached Teflon extension wire.

Thermocouple Type	Needle Length	Teflon Coated Needles Catalog #	Price	Uncoated Needles Catalog #	Price
T	3.5"	HN-3.5-T-TEF	\$95.00	HN-3.5-T	\$75.00
	7.0"	HN-7-T-TEF	98.00	HN-7-T	78.00
K	3.5"	HN-3.5-K-TEF	95.00	HN-3.5-K	75.00
	7.0"	HN-7-K-TEF	98.00	HN-7-K	78.00
J	3.5"	HN-3.5-J-TEF	95.00	HN-3.5-J	75.00
	7.0"	HN-7-J-TEF	98.00	HN-7-J	78.00

**NEW** Teflon coated needle thermocouples!

## Teflon Probe Adapters



Forms an air tight seal between thermocouple probes and standard taper joints. Not suitable for high vacuums.

Teflon Probe Adapters			
Probe Diameter	Joint Size	Cat #	Price
1/16"	10/18	1016	\$42.75
1/16"	14/20	1416	49.20
1/16"	19/22	1916	56.00
1/16"	24/40	2416	58.70
1/16"	29/42	2916	66.30
1/8"	10/18	1018	38.75
1/8"	14/20	1418	24.95
1/8"	19/22	1918	62.00
1/8"	24/40	2418	26.95
1/8"	29/42	2918	64.85
1/4"	14/20	1414	24.45
1/4"	24/40	2414	39.95
1/4"	29/42	2914	52.85

## Thermocouple Adapters



Adapts between large (OST) and small (SMP) thermocouple plugs.

OST Male to SMP Female	SMP Male to OST Female	Price
ADP-*	ADA-*	\$12.95
*Replace "*" with thermocouple type T, J, or K		

### Replacement O-Rings\* for Adapters

Internal O-Rings			External O-Rings		
Probe Dia.	Viton (Pk of 12) Cat #	Price	Joint Size	Viton (Pk of 12) Cat#	Price
1/16"	1610R	\$12.00	14/20	1420E	\$9.00
1/8"	1810R	12.00	24/40	2440E	12.00
1/4"	1410R	12.00	29/42	2942E	12.00
			Kalrez (Each) Cat# Price		
				1420EK	\$61.50
				2440EK	66.90
				2942EK	94.20

\* Kalrez and Teflon O-rings available on request.

# Research Heaters

## Heating Mantles

Heating mantles are the safest method of laboratory heating because they avoid the burn hazards associated with other styles of heaters. Heating mantles uniformly heat glassware and remain cool to the touch, even at internal temperatures > 300° C.

Series-OS heating mantles can be placed directly on top of magnetic stirrers providing vigorous mixing using a stirring bar.



Series-TM heating mantles have a self-supporting aluminum shell. The TM mantle is stable on bench tops, and with extra insulation, the exterior remains cool to touch. Maximum internal temperature of 450° C. Not suitable for magnetic stirrers.



Receive a 10% discount on heating mantles when purchased with a temperature controller

Heating Mantle Size (mL)	120 Vac Mantles Catalog #	Price	230 Vac Mantles Catalog #	Price	120 Vac Mantles Catalog #	Price	230 Vac Mantles Catalog #	Price	Wattage
5	OS-5	\$137.00	Not available	-	Not available	-	Not available	-	12
10	OS-10	137.00	Not available	-	Not available	-	Not available	-	20
25	OS-25	148.00	Not available	-	Not available	-	Not available	-	30
50	OS-50	145.00	OS-50/230	\$178.00	TM-50	\$220.00	Not available	-	60
100	OS-100	161.00	OS-100/230	197.00	TM-100	220.00	TM-100/230	\$255.00	80
250	OS-250	178.00	OS-250/230	212.00	TM-250	225.00	TM-250/230	261.00	180
500	OS-500	199.00	OS-500/230	234.00	TM-500	259.00	TM-500/230	292.00	270
1,000	OS-1000	223.00	OS-1000/230	258.00	TM-1000	276.00	TM-1000/230	310.00	380
2,000	OS-2000	244.00	OS-2000/230	277.00	TM-2000	288.00	TM-2000/230	322.00	500
3,000	OS-3000	271.00	OS-3000/230	304.00	TM-3000	343.00	TM-3000/230	377.00	500
5,000	OS-5000	330.00	OS-5000/230	368.00	TM-5000	425.00	TM-5000/230	460.00	600
12,000	OS-12000	670.00	OS-12000/230	703.00	TM-12000	795.00	TM-12000/230	829.00	2@650
22,000	OS-22000	777.00	OS-22000/230	810.00	TM-22000	916.00	TM-22000/230	948.00	2@770
50,000	Not available	-	Not available	-	TM-50000	1452.00	TM-50000/230	1485.00	3@1000
72,000	Not available	-	Not available	-	Not available	-	TM-72000/230	1675.00	2@2000

§ Specify country for correct cord set.

## Instatherm® Oil Baths

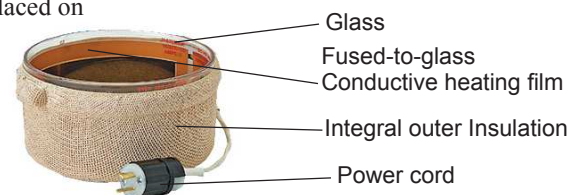
Instatherm oil baths from Ace Glass include features that make them the safest and most reliable oil bath for laboratory use. The metal alloy heating element is fused directly to the surface of the bath and then covered with a tough silicone rubber layer and fabric insulation layer which serves as both a thermal barrier and protects against physical shock. The bottom of the Instatherm is not heated so the bath can be placed on

magnetic stirrers. Instatherm baths operate up to 250° C. A six inch power cord is permanently attached to the bath, so the power extension cord (INS-PC) is recommended for operation.



\* Accommodates a variety of flask sizes and shapes

\* Suitable for magnetic stirrers



For maximum versatility, J-KEM recommends the INS-150 and INS-190 oil baths since they can be used with any 200-Series temperature controller. This allows the flexibility to use these two oil baths or heating mantles with your 200-Series controller.

Bath Size (Dia. x Ht.)	Cap., mL	Max. Applied Voltage (Volts/Amps)	Cat #	Price	Temperature Controller Compatibility
70 x 50 mm	160 mL	20V/5A	INS-70	\$432.26	Low voltage bath compatible with Model 410 (p. 36) and Trinity controller (p. 29)
100 x 50 mm	340 mL	40V/6A	INS-100	468.92	Low voltage bath compatible with Model 410 (p. 36) and Trinity controller (p. 29)
125 x 65 mm	700 mL	40V/8A	INS-125	481.01	Low voltage bath compatible with Model 410 (p. 36) and Trinity controller (p. 29)
150 x 75 mm	1200 mL	120V/5A	INS-150	529.17	Can be used with <b>any</b> J-KEM Digital Controller.
190 x 100 mm	2600 mL	120V/10A	INS-190	619.79	Can be used with <b>any</b> J-KEM Digital Controller.
Price includes both bath and sensor clip.				INS-PC	58.30
					Power cord extension with in-line fuse for all oil baths. 6 foot length.



# The Road We're On *(together)*

## 1988

Incorporated as J-KEM Electronics. Offering one product, the Model 260 temperature controller, we ended our first year with sales of \$784.00.

## 1989

Flush with cash from its first year sales, J-KEM doubles its product line and begins offering the Model 210. Attended the Fall ACS meeting, exhibiting all four of the controllers we owned, then spent sleepless nights worrying how we'd fill orders if they came in.

## 1990

J-KEM's first major customer was Dr. James Zeller of Parke Davis. J-KEM expands its manufacturing area 400% by moving from just the corner to occupy the entire basement (sorry girls about your play house).

## 1992

First international sale. Model 210 to Italy.

## 1993

Moved to our first commercial building. Hired our first full time employee (**Li**, above). Built the first power control computer (8 bits, 4 MHz!!).

## 1994 - Incorporated as J-KEM Scientific

## 1995 - Purchased our first building, a 1930's fire house.

## 1998 - First years sales >\$1,000,000.

## 1999 - First robot sold to Dr. Glass of Zeneca.

## 2000+ - Emphasis in lab automation, parallel reactors, and robotics.

## 2008 - Third generation power control computer

- Second generation Syringe Pumps.

## 2009 - First year robotic and automation sales > \$1,000,000.



J-KEM Scientific's employees gathered around the fire pole of our first facility, the fire house.

J-KEM appreciates the relationship we have with our customers. It's more than just the obvious fact that without you, J-KEM would not be in business. We appreciate the friendships and the ideas we've received from world class scientists that have resulted in many of the instruments we offer today.

## 2011 - 2013 - Designed and built the Infinity controller, the cornerstone of J-KEM's automation program.

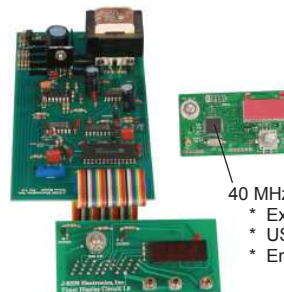
High precision interface between laboratory processes, sensors, PC's and robotics.



# 25 Years of Innovation



The first temperature controller made by J-KEM, sold to Dr. Kurt Moedritzer of Monsanto (Dr. Moedritzer also purchased controller #2. Our first loyal customer!!)



Pictured are the original (left) and new (right) Model 210-Timer circuit boards

In 2008, J-KEM completed the redesign and implementation of the 3rd generation of its power control computer. The new design uses a FLASH programmable microprocessor that can be updated with new controller features from J-KEM's web site.

- \* 40 MHz microprocessor enables
- \* Exo & Endotherm analysis
- \* USB communications
- \* Enhanced safety



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