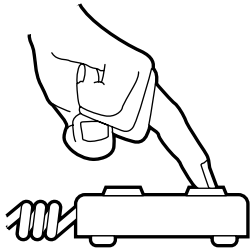


# Zeta-Meter System 4.0

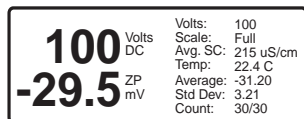


Catalog No. 15

## Proven Value



### Easy to Use



### Detailed LCD Display

### Practical Instrumentation

More than 40 years ago, we pioneered the development of a simple, reliable instrument to measure electrophoretic mobility and zeta potential.

Our Zeta-Meter System 4.0 continues this tradition and makes the determination even more convenient.

### Reliably Simple

The measurement is very direct. The sample is placed in a viewing chamber called an electrophoresis cell. Then an electric field is activated. This causes the colloids to move with a velocity that is proportional to their zeta potential, and a direction that indicates whether their charge is positive or negative.

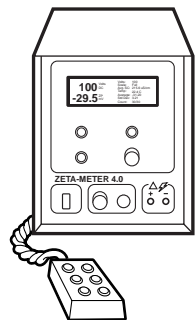
Once your sample is in the cell, you get your first results in a matter of seconds, and complete results in minutes.

### Guaranteed Support

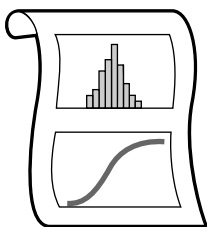
Our instruments are covered by a 2 year limited warranty. In addition, if your Zeta-Meter ever needs servicing and you just can't do without it—don't worry—we'll send you one at no charge. Just pay the freight and insurance and it's yours for as long as we have your system here for repair. In fact, if your unit is under warranty we'll ship the other to you absolutely free. If you are outside the USA we'll ship you easy-to-install replacement parts by express mail or courier service.

We also offer unlimited technical support via telephone (toll-free in the USA), fax or e-mail. We will do everything possible to help you with your Zeta-Meter.

## Zeta-Meter 4.0 Unit



### Zeta-Meter 4.0 Unit



### Graphical Analysis

### Easy to Use

Just fill the cell with your sample, insert the electrodes and connect them to the Zeta-Meter 4.0 unit. It determines the specific conductance of your sample and helps select the appropriate voltage. It also measures sample temperature with an accurate probe.

Energize the electrodes and watch the colloids as they move across a grid in your microscope or video display. Track one by simply pressing a button and holding it down while your colloid moves across the grid. When you release the button, your colloid's zeta potential (or electrophoretic mobility) is instantly displayed.

### Error Free

The Zeta-Meter 4.0 is mistake-proof. It recognizes impractical results and tracking times that are too short.

### Data Display & Review

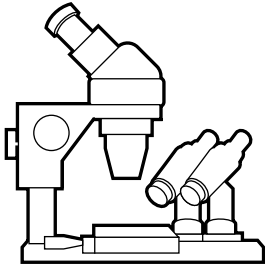
The Zeta-Meter 4.0 constantly displays a summary of your measurements. You can see how many colloids you have tracked, their average zeta potential (or electrophoretic mobility) and the statistical standard deviation of your values. In addition, temperature and average specific conductance are also displayed.

You can review your data in detail at any time by using the keypad to step through each individual tracking value. You can easily scrub inconsistent data.

### Hard Copy

You can feed your data directly into the serial port of a personal computer. Our free software imports your data into a database that lets you store, search, graph, print and review your data.

## Microscope Module



Microscope Module

### Superior Optics

We use a high quality stereoscopic microscope. It features 20X wide field eyepieces in combination with a 4.0X paired objective. Overall magnification is 80X.

This microscope is very adequate for colloids as small as 1.5 microns in size. If your colloids are smaller than this, then a video display is required.

All microscope components – including illuminators, a mirrored cell holder and an accurate positioning stage – are mounted on a common module. We pre-focus the entire assembly to make your initial setup easy.

A basic Zeta-Meter System 4.0 with a stereo microscope is part number Z401.

### Comfortable Viewing

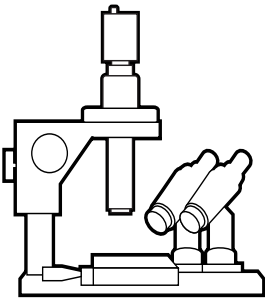
Our viewing technique is called dark field illumination. A sharply focused light beam is reflected diagonally upward by a mirror and passes through the cylindrical tube of the electrophoresis cell. Each colloid in its path reflects light upward into the optics, creating a distinct star-like image on a dark background.

Our illuminators use high intensity LEDs. Their long life means that you will probably never need to replace them and re-focus the assembly.

### Convenient Set-Up

Alignment of the cell and focusing of the microscope is remarkably simple. No need to compute and record dial or micrometer settings. Just focus sharply on a special light pattern created by our illumination technique.

## Direct Video Module



Direct Video Module

### Easier Viewing

Our video displays make it even easier to view and track your colloids. The image is transmitted directly to a camera via optics that are specifically designed for a video display. A monochrome, low light level, video camera captures the image and transmits it to a 17 inch LCD monitor.

It is suitable for colloids as small as 0.5 microns in size.

All components – including camera, optics, illuminators, mirrored cell holder and an accurate positioning stage – are mounted on a common module. We pre-focus the entire assembly to make your initial setup easy.

A basic Zeta-Meter System 4.0 with Direct Video Imaging is part number Z402.

### Star-Like Images

Our dark field illumination technique creates a distinct star-like image on a dark background for each colloid.

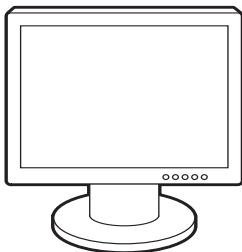
A long life, high intensity, LED in each illuminator means that you will probably never need to replace them and re-focus the assembly.

### No Dials or Micrometers

Alignment of the cell and focusing of the video optics is remarkably simple. Just focus sharply on a special light pattern created by our illumination technique.

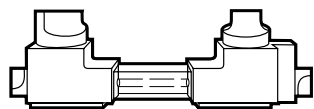
### Instant Re-plays

You can use a video recorder to create a permanent record of your work. Then, if there is a question about your results, you can use your Zeta-Meter 4.0 unit to obtain another set of data by making a “dry run”.



LCD Monitor

## Electrophoresis Cell



### G201

Type GT-2 Cell

### Rugged Yet Precise

Our Type GT-2 electrophoresis cell is rugged, and you can handle it without fear of damage. The cell consists of two Teflon electrode sections and a fused quartz block with an optically polished cell tube. Each cell is individually calibrated and will last a lifetime.

It is immune to attack except by very aggressive reagents which can etch glass, such as hydro-fluoric acid.

### AST Fittings

Teflon AST Fittings adapt the Type GT-2 cell for use with the Automatic Sample Transfer. One set is included with the AST (A200).



### G205

AST Fittings

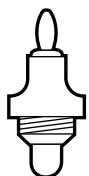
### Easy to Use

Filling is simple. Just pour in your sample and insert the electrode stoppers. No syringes are necessary. Cleaning is also simple. Just remove the end stoppers, rinse the cell, and clean the cell tube with our cell swab.

### Low Volume Cell

Our standard cell requires at least 20 mL of sample. If your sample volume is limited, then we offer an optional Low Volume Type GT-2 Cell (G201L) which reduces the sample size to 5mL.

## Electrodes



### G202

Molybdenum Anode

### Simple by Design

Our standard electrodes are a Molybdenum Anode and a Platinum Cathode. You should also consider an optional Platinum Anode for low conductivity samples.

Each electrode is mounted in a threaded Teflon stopper and is supplied with a detachable electrode lead.

### Molybdenum Anode

This is our standard anode. Molybdenum combines with gaseous oxygen as it evolves from the anode and prevents false colloid motion due to gas bubble expansion. It can be used with all aqueous samples.

### Platinum Cathode

This is our standard cathode. It is a rugged bullet-shaped electrode made of platinum-iridium to minimize interaction with your sample.

### Platinum Anode (optional)

This is similar to our Platinum Cathode. It is suitable for samples with a specific conductance of less than 1000 microSiemens/cm. In this conductivity range, it is easier to use than a molybdenum electrode because it does not have to be cleaned.

We recommend this electrode for all work with organic liquids.

We also recommend it for potable water treatment laboratories.

### Platinum Anode for Low Volume Cell (optional)

Our standard Platinum Anode (G204) cannot be used with our Low Volume Type GT-2 Cell. We offer a Low Volume Platinum Anode (G204L) to fit this cell.



### G203

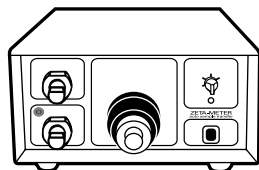
Platinum Cathode



### G204

Platinum Anode  
(Optional)

## Automatic Sample Transfer



**A200**  
Automatic Sample Transfer

### Convenient

The Automatic Sample Transfer (AST) simplifies sample handling. It consists of a recirculating pump and two electric pinch valves. The pump recirculates your sample from a beaker, through the electrophoresis cell and back. This insures sample uniformity, temperature equilibrium and re-suspension of settled colloids. A flip of a switch isolates your sample.

One set of AST fittings (G205) is included. These adapt your cell to the AST unit.

### Resuspend Particles

Large particles or flocs can be difficult to track because they tend to settle out of view. The AST resuspends them and flushes them out during recirculation while it introduces fresh particles for tracking.

### Balance Sample Temperature

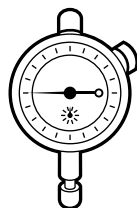
The electric field that is applied during tracking can cause highly conductive samples to gradually increase in temperature. Eventually, thermal currents form in the liquid and the particles begin to move erratically. The AST restores temperature equilibrium by recirculating the sample through the cell.

We recommend the AST when samples have a specific conductance greater than 2500 microSiemens/cm.

### Study Concentration Effects

The AST is very helpful when variations in reagent concentration or pH need to be studied. Each incremental dose is added to the sample beaker. Then, the AST is used to flush out the cell and fill it with fresh sample at the new concentration level.

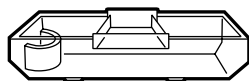
## Other Accessories



**V100**  
Vertical Micrometer

### Vertical Micrometer

Our optical cell alignment technique works with water and with liquids that have an index of refraction close to water. If the index of refraction of your sample is not similar to water, then the focusing pattern will not appear and our Vertical Micrometer is required.



**T100**  
Temperature Control Bath

### Temperature Control Bath

Use this if you want to run samples at elevated or reduced temperatures. Zeta potential determinations are made while the electrophoresis cell is submerged in the bath.

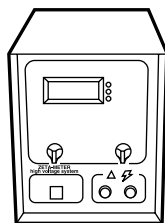
The bath is equipped with inlet and outlet ports and plugs. You supply: a pump, temperature control and interconnecting tubing. Operating range is 5 – 75° C.

### High Voltage Power Supply

High voltage is required when you work with organic liquids that have a low dielectric constant or a high viscosity compared to water. High voltage is necessary to induce reasonable rates of colloid motion. Contact us if you would like an evaluation of whether or not a high voltage supply is required for your application.

The power supply is a precision unit. Voltage is set with a 10 turn dial and both voltage and current are monitored by a digital display.

Special electrode leads to connect the system to your Type GT-2 cell are included.



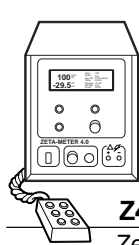
**H200**  
High Voltage Power Supply

# Ordering Guide

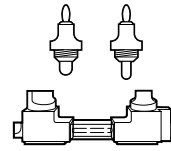
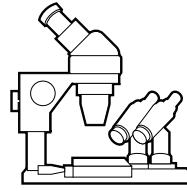
## The Basics

Start with part number **Z401**, or **Z402**. Each is a complete operational system that is ready for you to use. It consists of a Zeta-Meter 4.0 unit, a microscope or video microscope, and a Type GT-2 cell with electrodes.

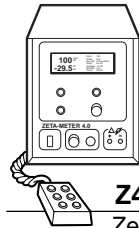
It also includes many other features and items. See our Price List for complete details.



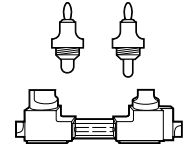
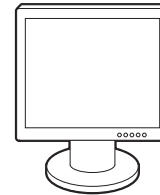
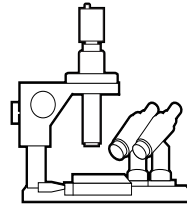
**Z401**



Zeta-Meter System 4.0 with Stereo Microscope & Type GT-2 Cell



**Z402**



Zeta-Meter System 4.0 with Direct Video Imaging & Type GT-2 Cell

## Options & Accessories

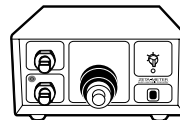
Next, select the options and accessories that you need. You can also order extra cells and electrodes.

Please contact us if you need any help.



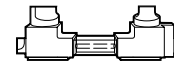
**G204 / G204L**

Platinum Anode /  
Low Volume  
Platinum Anode



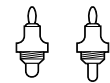
**A200**

Automatic  
Sample Transfer



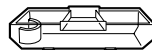
**G201**

Type GT-2 Cell



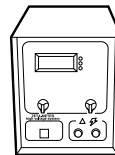
**G202 & G203**

Molybdenum Anode  
Platinum Cathode



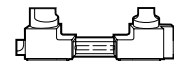
**T100**

Temperature  
Control Bath



**H200**

High Voltage  
Power Supply



**G201L**

Low Volume  
Type GT-2 Cell



**V100**

Vertical Micrometer

# Specifications

## Sample Suitability

Our Zeta-Meter System 4.0 can measure samples which fall within the following ranges:

- Zeta Potential -250 to +250 millivolts
- Electrophoretic Mobility +20 to -20 microns/sec per volt/cm
- Specific Conductance 0 to 60,000 microSiemens/cm
- Temperature 5°C - 75°C
- Concentration 10 mg/L to 80% solids by weight
- Particle Diameter 1.5 to 100 microns (microscope)
- 0.5 to 50 microns (video display)
- Sample Size 20 mL (standard Cell)
- 5 mL (low volume cell)
- Suspending Medium water or organic liquids