Kaye ValProbe®
Wireless process validation and monitoring system
Kaye ValProbe® Wireless process validation and monitoring

Kaye ValProbe® is a wire-free process validation and monitoring system designed around the measurement and reporting requirements of the most intensely regulated industries.

Kaye ValProbe® simplifies access to hostile, remote and hard-to-reach environments by eliminating hard-wired sensors, greatly reducing study setup time and associated costs.

The ValProbe system is ideally suited for applications where high measurement accuracy and regulatory compliance are priorities:

- Pharmaceutical Processing
- Medical Device Sterilization
- Food Processing
- Environmental Monitoring

Built in data processing and reporting capabilities extend the ValProbe systems operating convenience far beyond mere data acquisition. The ValProbe system performs calculations and generates custom user-defined reports for up to 200 sensors at one time. Graph reports can include many sensors and limits for easy review of study data. User calibration and verification is a quick and easy process with the new CTR-40 Temperature Reference. Of course, ValProbe satisfies FDA Regulation 21 CFR Part 11 requirements for electronic signatures and records and complies with EN 554 for saturated steam sterilization.

- RTD technology delivers unrivaled measurement accuracy over a wide operating range
- System downloads up to 10 probes simultaneously
- Easily defined cycle-based data collection, calculation, and reporting from up to 200 sensors
- Enables compliance with FDA Regulation 21 CFR Part 11
- Operates from -85°C to 360°C, and up to 10 BAR absolute
- Designed for easy on-site calibration
- Battery life indicator and field replaceable battery
- Available as a economical validation starter kit complete with software, single reader, two temperature and one pressure logger [P/N V2543].
- Reporting capability enhanced with up to 25 user programmable groups.

The ValProbe family of data loggers provide accurate, convenient and reliable process measurement for a wide range of pharmaceutical, and medical device applications. The wireless design greatly simplifies monitoring and validation of severe and hard-to-reach environments including:

- Sterilizers
- Ovens
- Tunnels
- Lyophilizers
- Stability chambers
- Warehouses
- Temperature chambers
- Cryogenic Chambers
- Fridges; Freezers
Temperature Logger

The ValProbe family of temperature loggers is designed for accurate, convenient and reliable process measurement for pharmaceutical and medical device applications. The wireless design greatly simplifies monitoring and validation of serve and hard-to-reach environments.

Probes are available in rigid, flexible and bendable version.

Features

• RTD technology delivers unrivaled measurement accuracy over a wide operating range
• System downloads up to 10 probes simultaneously
• Easily defined cycle-based data collection, calculation, and reporting from up to 200 sensors
• Enables compliance with FDA Regulation 21 CFR Part 11
• Designed for easy on-site calibration
• Battery life indicator and field replaceable battery
• Reporting capability to merge with a Validator study or a RF ValProbe study

Applications

• Sterilizers
• Ovens
• Tunnels
• Lyophilizers
• Stability chambers
• Warehouses
• Temperature chambers
• ETO

Cryo Temperature Logger

Temperature range to -85°C

The new Cryo Logger provides an extendet temperature range from -85°C to + 140°C and provides a single solution for a variety ultra low temperature applications. RTD Technology delivers unrivalled measurement accuracy and the new logger design improves the battery life by three times. It is fully compatible with existing multi channel and single readers operating seamlessly with the ValProbe 1.5 software.

Features

• Temperature range for complete logger: -85°C to 140°C
• Battery Life Performance - 3 x better than current loggers in the market

Applications

• Cryogenic Vessels
• Freeze Dryer
• Freezers
• Sterilizers
• Incubators
• Warehouses
Combined Temperature/Pressure Logger

The combined Kaye ValProbe Pressure/Temperature Logger provides an integrated solution to small scale sterilizer validation, monitoring and routine control.

Combining with the Kaye Single Reader provides a very cost effective solution to smaller sterilization applications such as bench-top or lab sterilizers, hospital validation and routine control, and other sterilization validation needs in dental offices and other users of medical equipment.

Features
- Combined Pressure and Temperature Logger
- High accuracy Temperature and Pressure measurement to meet regulatory requirements
- 10,000 data sample memory
- Cost Effective field-replaceable battery
- Operator programmable sample rates from 1 sec to 12 hours
- Configurable start, change and stop events
- Enables compliance with ISO-17665, EN 285 and HTM-2010

Applications
- Steam Sterilizer Validation
- Hospital Validation and Routine Control
- Small scale sterilization in dental offices
- Parametric Release applications

Combined Temperature/Humidity Logger

The ValProbe humidity logger is designed for accurate, convenient and reliable process measurement for pharmaceutical, medical device and food processing applications. The wireless design greatly simplifies monitoring and validation of severe and hard-to-reach environments.

Features
- High accuracy humidity and temperature measurement in a single unit
- 10,000 data sample memory
- Economical field-replaceable battery
- Field-replaceable humidity sensor
- Operator programmable sample rate, start, delay and stop function

Applications
- EtO sterilizers
- Stability chambers
- Warehouses
- Temperature chambers
Dual Logger

The Dual Logger is equipped with two high-accuracy temperature sensors, each capable of capturing 10,000 data points. The dual sensor configuration is ideally suited for measuring penetration and distribution parameters form a single instrument. Precision platinum RTD sensors provide exceptional accuracy and durability. The Dual Logger is available with pairs of bendable or flexible probes, or with a single rigid probe paired with either flexible or bendable probe.

Features
- Precision Platinum RTD Sensors
- Broad measurement range
- Economical field-replaceable battery
- Operator programmable sample rate, start, delay and stop function

Applications
- Autoclaves
- Ovens
- Temperature Chambers
- Depyrogenation Tunnels

For the most extreme operating conditions, the Dual Logger is compatible with the low profile Insulating canister.

Insulating Canister

Designed for use with the bendable probes, the Insulating Canister protects the internal electronics and battery for maximum “time at temperature”.

In combination with the 12” bendable Temperature Logger a perfect solution for Dry Heat applications.
ValProbe® Reader Station

The ValProbe system is designed to provide easy access to process and validation study data. Loggers are programmed via a straightforward interface of the ValProbe system software.

The ValProbe USB System high speed Reader2 (10 reader station) accommodates 10 probes at one time for programming and downloading stored data.

The Single Reader serves as the interface between individual loggers and the powerful ValProbe system software. Along with the system software the Single Reader facilitates pre-study programming and data download upon study completion. Its compact design makes it well suited for field use or desktop applications requiring a limited number of measurement points.

Features

- ValProbe system capacity up to 100 loggers/200 sensors
- Compact design for field or desktop operation 2.5 x 2.6 x 5 in (65 x 68 x 126 mm)
- Powered from computer connections – no external power required
- USB or RS232 network connection (Windows 2000 or Windows XP required for USB connectivity)
- LED indicator confirms data communication
- CE, UL certified
- ValProbe system software satisfies international regulatory requirements including FDA 21CFR part 11, EN285, DIN ISO 17665

Compatible with the entire line of high-accuracy temperature, humidity and pressure loggers, the Single Reader is ideal for a wide range of process validation applications including:

Applications

- Hospital sterilizers
- EtO sterilizers
- Warehouses
- Stability chambers
- Depyrogenation tunnels
## Data Loggers Specifications

### Sensing Element
<table>
<thead>
<tr>
<th>Precision Platinum RTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Range and Accuracy</td>
</tr>
<tr>
<td>0°C to 140°C, ±0.1°C</td>
</tr>
<tr>
<td>-45°C to 0°C, ±0.25°C</td>
</tr>
<tr>
<td>-85°C to 0°C, ±0.25°C (Cryo Valprobes)</td>
</tr>
<tr>
<td>-45°C to 0°C, ±0.25°C (Standard Valprobes)</td>
</tr>
</tbody>
</table>

### Environmental
| Temperature |
| -85°C to 140°C (Liquid Nitrogen) |

### Logger Material
| 316L stainless steel |

### Probe Construction

#### Rigid Probe
- **316L stainless steel**
- **12 in (3 mm) diameter with M5 threaded base**
- **Specify probe length (L) in inches**
  - 1 1/2 inch (38mm)
  - 3 inch (76mm)
  - 6 inch (152.4mm)
- **Specify tip configuration (T) as pointed (P) or round (R)**
- **Part number** XVP-L-T (Standard Valprobes) XCVP-L-T (Cryogenic Valprobes)

#### Flexible Probe
- **316L stainless steel**
- **12 in (3 mm) probe tip**
- **Specify flexible PTFE cable length (C)**
  - Standard lengths of 6 in (150 mm), 12 in (300 mm)
  - 18 in (460 mm), 24 in (600 mm) to 120 in (3 m)
- **Specify stainless tip length (L) in inches**
  - Minimum 1.5 in (38 mm)
  - Maximum 9 in (230 mm)
- **Specify tip (T) P or R**
- **Part number** XFVP-C-L-T

#### Bendable Probe
- **316L stainless steel**
- **1 1/2 in (32 mm) pointed stainless steel tip of .12 in (3 mm) diameter**
- **Mineral insulated bendable stem with M5 threaded base**
- **Specify stem length (L) in inches**
  - Minimum 6 in (150 mm)
  - Maximum 60 in (1.5 m)
- **Part number** XBVP-L

### Battery
| Field-replaceable 3.6 V lithium thionyl chloride |

### Sampling Rate
| 1 second to 12 hours |

### Data Storage
| 10,000 samples retained in non-volatile EEPROM memory |

### Calibration
| Factory calibrated (NIST-traceable) with user calibration capability |

### Real Time Clock
| 15 seconds per 24 hours (0.0174%) from -85°C to 140°C |

### Regulatory Compliance
| UL, CE and Intrinsically safe for the -45°C to 140°C versions (Standard) |
Data Loggers Specifications

Pressure Logger Specifications

<table>
<thead>
<tr>
<th>Sensing Element</th>
<th>Absolute pressure sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Range</td>
<td>0 to 5 bar absolute (0 to 73 psia) from 0°C to 140°C</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Temperature Range</td>
</tr>
<tr>
<td></td>
<td>&gt;0°C to 120°C</td>
</tr>
<tr>
<td></td>
<td>&gt;120°C to 135°C</td>
</tr>
<tr>
<td></td>
<td>&gt;135°C to 140°C</td>
</tr>
<tr>
<td>Environmental</td>
<td>Temperature Range</td>
</tr>
<tr>
<td>Pressure</td>
<td>-60°C to 140°C</td>
</tr>
<tr>
<td>Logger Dimensions</td>
<td>1 13/16 in x 1 3/8 in diameter (46 mm x 35 mm)</td>
</tr>
<tr>
<td>Total Height</td>
<td>2 13/16 in (72 mm)</td>
</tr>
<tr>
<td>Logger Material</td>
<td>316L stainless steel</td>
</tr>
<tr>
<td>Battery</td>
<td>Field-replaceable 3.6 V lithium thionyl chloride</td>
</tr>
<tr>
<td>Sampling Rate</td>
<td>1 second to 12 hours</td>
</tr>
<tr>
<td>Data Storage</td>
<td>10,000 samples retained in EEPROM memory</td>
</tr>
<tr>
<td>Calibration</td>
<td>Factory calibrated (NIST-traceable) with user calibration capability</td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>20 seconds per 24 hours (0.0174%) from 0°C to 95°C (32°F to 203°F)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.1°C</td>
</tr>
</tbody>
</table>

Humidity Logger Specifications

<table>
<thead>
<tr>
<th>Sensing Element</th>
<th>Absolute pressure sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Range</td>
<td>0 to 5 bar absolute (0 to 73 psia) from 0°C to 140°C</td>
</tr>
<tr>
<td>Measurement Range and Accuracy</td>
<td>Operating Range 25% to 85% RH (non-condensing)</td>
</tr>
<tr>
<td>Humidity</td>
<td>20 seconds per 24 hours (0.0174%) from 0°C to 95°C (32°F to 203°F)</td>
</tr>
<tr>
<td>Temperature</td>
<td>±0.2% RH at 25°C and 60°C</td>
</tr>
<tr>
<td>Pressure</td>
<td>0 to 10 bar absolute (0 to 145 psia)</td>
</tr>
<tr>
<td>Environmental</td>
<td>Temperature Range 0 to 60°C (with RH sensor)</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 to 100% humidity, condensing</td>
</tr>
<tr>
<td>Pressure</td>
<td>0 to 10 bar absolute (0 to 145 psia)</td>
</tr>
<tr>
<td>Logger Material</td>
<td>316L stainless steel</td>
</tr>
<tr>
<td>Logger Dimensions</td>
<td>1 13/16 in x 1 3/8 in diameter (46 mm x 35 mm)</td>
</tr>
<tr>
<td>Total Height</td>
<td>3 1/8 in (79 mm)</td>
</tr>
<tr>
<td>Battery</td>
<td>Field-replaceable 3.6 V lithium thionyl chloride</td>
</tr>
<tr>
<td>Sampling Rate</td>
<td>2 second to 12 hours</td>
</tr>
<tr>
<td>Data Storage</td>
<td>10,000 samples retained in EEPROM memory for each sensor (humidity and temperature)</td>
</tr>
<tr>
<td>Calibration</td>
<td>Factory calibrated (NIST-traceable) with user calibration capability</td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>20 seconds per 24 hours (0.0174%) from 0°C to 95°C</td>
</tr>
<tr>
<td>Compliance</td>
<td>UL, CE and Intrinsically Safe</td>
</tr>
<tr>
<td>Part Number</td>
<td>X2520</td>
</tr>
</tbody>
</table>
Dual Logger Specification

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensing Element</td>
<td>Precision Platinum RTD</td>
</tr>
<tr>
<td>Measurement Range and Accuracy</td>
<td>0°C to 140°C, -45°C to 0°C, ±0.1°C, ±0.2°C</td>
</tr>
<tr>
<td>Insulating Canister</td>
<td>Proprietary insulating materials provide for a compact, low profile design, making the insulating canister suitable for the most demanding thermal validation applications including depyrogenation tunnels and dry heat ovens. For use with Kaye ValProbe bendable and dual readable temperature loggers.</td>
</tr>
<tr>
<td>Features</td>
<td>- Proprietary insulating material greatly extends ValProbe operating range</td>
</tr>
<tr>
<td></td>
<td>- Low profile design for use in space-restrictive applications (45mm dia. X 149mm long)</td>
</tr>
<tr>
<td></td>
<td>- Robust 316 SS construction</td>
</tr>
<tr>
<td>Features 1.5˝ rigid sensor w/ bendable probe specify length</td>
<td>1.5˝ rigid sensor w/ bendable probe (specify length)</td>
</tr>
<tr>
<td>Features Two bendable probes (specify length)</td>
<td>Two bendable probes (specify length)</td>
</tr>
<tr>
<td>Features 1.5˝ rigid sensor w/ flexible probe specify length</td>
<td>1.5˝ rigid sensor w/ flexible probe (specify length)</td>
</tr>
<tr>
<td>Features Two flexible probes (specify length)</td>
<td>Two flexible probes (specify length)</td>
</tr>
<tr>
<td>Performance</td>
<td>- Sensing Element: Precision Platinum RTD</td>
</tr>
<tr>
<td></td>
<td>- Measurement Range and Accuracy: 0°C to 140°C, -45°C to 0°C, ±0.1°C, ±0.2°C</td>
</tr>
<tr>
<td></td>
<td>- Environmental Temperature: -45°C to 140°C</td>
</tr>
<tr>
<td></td>
<td>- Humidity: 0% to 100% humidity, condensing</td>
</tr>
<tr>
<td></td>
<td>- Pressure: 6 Pa to 10 bar absolute</td>
</tr>
<tr>
<td></td>
<td>- Logger Material: 316 stainless steel</td>
</tr>
<tr>
<td></td>
<td>- Battery: Field-replaceable 3.6 V lithium thionyl chloride</td>
</tr>
<tr>
<td></td>
<td>- Sampling Rate: 1 second to 12 hours</td>
</tr>
<tr>
<td></td>
<td>- Data Storage: 10,000 samples per sensor retained in EEPROM memory</td>
</tr>
<tr>
<td></td>
<td>- Calibration: Factory calibrated (NIST-traceable) with user calibration</td>
</tr>
<tr>
<td></td>
<td>- Real Time Clock Accuracy: 20 seconds per 24 hours (0.0174%) from -45°C to 140°C</td>
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<tr>
<td></td>
<td>- Regulatory Compliance: UL, CE and Intrinsically Safe</td>
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<tr>
<td>Environmental Temperature</td>
<td>-45°C to 140°C</td>
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<tr>
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<td>Pressure</td>
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<td>Regulatory Compliance</td>
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</table>

Dual Logger Configuration
Electronic Records, Secure Audit Trail, and Electronic Signature

The Kaye ValProbe is specifically designed to enable compliance with FDA 21 CFR Part 11. All recorded data, including calibration offsets, set-up parameters, and administrative tasks are saved in secure, encrypted, tamper-proof electronic records in a format accessible only through the system software.

In addition to passwords now being centrally managed in a network-installed version, users can explicitly set permissions for each user.

With the network capability, audit trails have been improved to allow centralized management, searching and printing of department-wide audit trails from any connected PC. The sort and find utilities allow system administrators to perform thorough audits of their ValProbe users; for example, a list of all failed login attempts within a specified time period across all networked computers.

There is notification to the user and logged entries in the audit trail if files are tampered with or deleted from within Windows Explorer™.

Three levels of authorization protect access to the system—assigning users, making changes to tests, or running tests.

Each person has a unique signature, as defined by a user ID and password. This signature is required for any action that can affect data—at the ValProbe or PC—whether you are in Set-up, calibration or qualification mode.
Study Set-Up

Intuitive and Versatile

The software, provided with all Kaye products, permits set-up, running of a qualification, calibration, generating validation reports and enables compliance with regulations including Part 11 and EN norms.

The Kaye ValProbe was designed to help you get the data you want from a validation study quickly and easily. It starts with the ValProbe software that allows you to set up and customize sensor calibration, qualification, and report generation.

You can customize reports right down to header information and user comments for each group. In addition, you can enter summary comments that relate to the entire study.

The Kaye ValProbe software provides flexibility in other ways. You can define sensors individually—creating your own labels and detailed descriptions, or applying an individual sensor definition to a range of sensors.

Featuring interval calculations and monitored events, the Kaye ValProbe provides more information about your study. You can calculate maximum, minimum and average for each sensor during cycles.

Users can add unlimited cycles, separating qualification data into separate process phases, and up to 25 groups, with their own calculations and graphs during reporting, often eliminating the need for post-processing in Excel®.

Set up or modify lethality calculations by defining base temperature, Z, and D values. Select conditions when you want to calculate lethality.
Reports

The Kaye reporting Software includes an intuitive, yet powerful reporting utility for generating Set-Up, Calibration, Qualification and Calibration Verification reports to document validation study results. Reports are generated from secure data files that can only be read by the system software. Upon study completion, process cycles to be analyzed are defined using the intuitive system graphic feature.

Features

- Common reporting software for Validator®, ValProbe® and RF ValProbe® gives added flexibility and convenience in merging data files from multiple Kaye devices.
- Powerful graphing tool during reporting with report wizard shows all sensors and samples through a complete study.
- Report wizard allows to select lethality calculation during reporting. Lethality parameters can be changed.

Post Qualification Reporting

The flexible and user-friendly Kaye ValProbe reporting system allows users to add unlimited cycles and up to 25 groups during the reporting phase.

Cycles are like events—the qualification data is separated into distinct phases and summary reports can be generated for each cycle.

Cycle Headers

The user can generate regulatory-accepted reports including detailed and summary reports by group and cycle (interval data). Graph reports have been improved, allowing more inputs and better access to graph properties such as colors and data limit lines.

Report templates are automatically created, allowing the user to reprint an exact copy of the report at a later date, or save to a template for use in subsequent validation studies—a significant time savings for system operators.
Merged Reporting

Users have the ability to combine or merge reports from several Validators or ValProbes, providing the validations were run concurrently. A typical example would be during a freeze dryer validation where two ValProbes are needed, or if a ValProbe pressure logger is used alongside ValProbe temperatures.

For qualification reporting, the software provides more capability to analyze your study. Using various selections—calculations, intervals, events, conditions, elapsed time, specific groups—you can answer questions about your study that could only be done previously in an exported spreadsheet application.

If you need to perform additional analysis, simply open our validation file in another application. The original data is not modified.

Summary report

Graphing

A powerful graphing utility within the system software greatly simplifies process analysis and reporting. Sliding vertical axes enable the operator to flag and define process transition points, eliminating unnecessary reporting and streamlining the review process. The graph utility features increased flexibility for graph customization, including specifying X and Y axis ranges, background colors, line styles and labeled limit lines.
Kaye ValProbe® Series

Temperature Calibration and Reference

Features
• Operates on standard line voltage
• Positions for two IRTD standards

Fluid Baths
• Wide operating range covers most common application requirements
• CTR-40 stability to ±0.005°C or CTR-80 stability to ±0.01°C
• Rapid cool down from ambient to −40°C
• Very low noise
• Modest footprint with floor cart available for portability
• Quick drain spout simplifies fluid change
• 120 minute cool-down from ambient to −80°C
• Mounted on casters for portability

Dry Wells
• HTR and LTR Series dry wells
• Rapid response time with no oils or fluids
• Stability of ±0.02°C to ±0.05°C for temperatures exceeding 300°C
• Lightweight yet rugged design for portability

Temperature Calibration

CTR–40
The CTR–40 is a portable temperature bath designed to meet the calibration and validation needs of the ValProbe system. Combined with the Intelligent RTD (IRTD) and ValProbe software, the CTR–40 provides pre-study and post-study verifications, as well as ValProbe temperature sensor calibration.

The advanced design combines excellent temperature stability and uniformity with a broad temperature range −40°C to 150°C to address most ValProbe applications. The generous nine liter tank and specially designed ValProbe immersion basket accommodate up to eight ValProbe loggers, making calibration or verification a quick and easy process.

The portable tabletop design easily fits onto a benchtop without consuming precious space. An optional floor cart, with locking casters, raises the unit to a convenient operating height and allows easy transport within your facility.

Intelligent RTD Standard
The IRTD Temperature Standard (IRTD 400) is a National Industry of Standards and Technology (NIST) traceable instrument calibrated from −195°C to 420°C with 0.025°C accuracy over the entire range. This completely self-contained measurement system serves as the secondary standard providing traceability for ValProbe calibration or verification. By interfacing with the ValProbe software, the IRTD 400 eliminates the potential for human error, ensuring accurate and traceable measurements.

Stable Uniform Heat Sources
Kaye temperature references are designed for easy operation while delivering the highest level of temperature stability possible. These stable uniform heat sources combine rapid heat-up and cool-down with large sensor capacity to minimize overall calibration time. Multiple calibration set points are programmed via the easy-to-use operator panel and displayed (set point or well temperature) to 0.01 degree accuracy. These references provide fully automated sensor calibration when used with GE’s Kaye Validator® 2000 and traceable IRTD temperature standard.
HTR and LTR Series Dry Wells
The HTR and LTR Series dry wells are specifically designed for calibrating sensors used for process validation. These are the most advanced reference units on the market, featuring fast heat-up and cool-down, large well capacity to accommodate 18 to 24 thermocouples, and they use no messy oils or fluids.

The HTR 400 is ideal for high-temperature applications such as autoclaves, dry heat ovens and sterilizer tunnels. The LTR models offer low-temperature performance for applications including freezers, cold rooms, incubators and autoclaves. The LTR model selection should be based on the application’s low-temperature point.

CTR–80 Cryo Temperature Bath
Operating from –80°C to 30°C, the CTR delivers fast response, high stability, and automated sensor calibration for the most severe cold-temperature applications. A generous 3.7 liter tank is heated and cooled quickly and quietly by a two-stage refrigeration system (R507 and R508B). The CTR–80 is the ideal unit for calibrating temperature sensors used in freeze dryer, freezer, and cryo unit validation.

ValProbe Series
Specifications
CTR-40

Temperature Range
-40°C to 150°C

Ambient Operating Range
15°C to 25°

Set-Point Accuracy
0.5°C

Temperature Stability
- ±0.005°C at -40°C
- ±0.005°C at -25°C
- ±0.005°C at -150°C
**CTR-80**

**Temperature Range**
-80°C to 100°C

**Ambient Operating Range**
15°C to 25°C

**Set-Point Accuracy**
0.5°C

**Temperature Uniformity**
±0.01°C

**Typical Cool-Down Time**
25°C to -80°C, 20 minutes

**Access Opening**
86 mm x 114 mm with positions for (two) IRTDs and (three) 11 mm diameter x 203 mm deep calibration wells

**Display**
LED with 0.01°C resolution

**Computer Interface**
RS232

**Dimensions (h x w x d)**
762 mm x 305 mm x 610 mm

**Weight**
57 kg

**Power**
115 VAC 60 Hz, 16 A or 230 VAC 50 Hz, 8 A 1700 W

**Fault Protection**
- Oven temperature limits (user can set)
- Low voltage cutout
- Automatic refrigeration turn off
- Electrical fuse

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**Temperature Uniformity**
±0.01°C

**Typical Cool-Down Time**
25°C to -40°C, 110 minutes

**Access Opening**
94 mm x 172 mm with positions for IRTD and up to eight ValProbe data loggers with immersion basket

**Display**
LED with 0.01°C resolution

**Computer Interface**
RS232

**Off Cart Dimensions (h x w x d)**
584 mm x 305 mm x 622 mm

**On Cart Dimensions (h x w x d)**
819 mm x 305 mm x 622 mm

**Volume**
9 liters

**Recommended Bath Fluids**
- -40°C to 130°C, Silicone oil type 200 (five centistoke viscosity)
- -30°C to 150°C, Silicone oil type 200 (10 centistoke viscosity)

**Weight**
32 kg

**Power**
115 VAC 60 Hz, 16 A or 230 VAC 50 Hz, 8 A 1700 W

**Fault Protection**
- Oven temperature limits (user can set)
- Low voltage cutout
- Automatic refrigeration turn off
- Electrical fuse
ValProbe Series
Specifications

**IRTD-400**

**Temperature Range**
-195°C to 420°C

**Accuracy Over Range**
0.025°C
Accurate for one year, 0°C to 60°C ambient. Includes calibration certificate with traceability to NIST.

**Resolution**
0.001°C

**Sensor Element**
200 Ω platinum RTD sensor

**Sheath Material**
Inconel 600

**Immersion Depth (Minimum)**
101.6 mm

**Calibration**
±0.01°C
GE provides a re-certification service for calibrating the temperature standard.

**Power Probe**
- Unregulated DC, 10 to 25 V
- 850 mW at 15 V for first probe
- 550 mW for each additional probe

**Power Supply**
115 VAC US-style adaptor or 230 VAC VDE-approved adaptor
Power supply is not required for use with the ValProbe system.

**Measurement Rate**
One reading per second

**Environmental**
- Ambient temperature range 0°C to 60°C
- Humidity 0 to 95% non-condensing

**Overall Dimension Length**
603 mm

<table>
<thead>
<tr>
<th></th>
<th>HTR 400</th>
<th>LTR –25/140</th>
<th>LTR –40/140</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature Range</strong></td>
<td>25°C above ambient to 400°C</td>
<td>–25°C to 140°C</td>
<td>–40°C to 140°C</td>
</tr>
<tr>
<td><strong>Ambient Operating Range</strong></td>
<td>5°C to 50°C</td>
<td>5°C to 50°C</td>
<td>5°C to 50°C</td>
</tr>
<tr>
<td><strong>Set-Point Accuracy</strong></td>
<td>0.2°C to 300°C</td>
<td>0.2°C to 300°C</td>
<td>0.2°C</td>
</tr>
<tr>
<td><strong>Temperature Stability</strong></td>
<td>0.02°C to 300°C</td>
<td>0.02°C</td>
<td>0.02°C</td>
</tr>
<tr>
<td><strong>Transfer Calibration Accuracy</strong></td>
<td>50°C to 150°C: ±0.1°C</td>
<td>–25°C to 80°C: ±0.1°C</td>
<td>–40°C to –25°C: ±0.15°C</td>
</tr>
<tr>
<td><strong>IRTD Standard to Thermocouples</strong></td>
<td>50°C to 250°C: ±0.2°C</td>
<td>80°C to 130°C: ±0.15°C</td>
<td>–25°C to 80°C: ±0.1°C</td>
</tr>
<tr>
<td><strong>Typical Heat-Up Time</strong></td>
<td>Ambient to 90°C: 5 minutes</td>
<td>Ambient to 80°C: 6 minutes</td>
<td>Ambient to 80°C: 6 minutes</td>
</tr>
<tr>
<td><strong>Well Configuration</strong></td>
<td>Reference wells (2): 6.7 mm diameter x 127 mm deep</td>
<td>Reference wells (2): 6.7 mm diameter x 155 mm deep</td>
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</tr>
<tr>
<td><strong>Calibration Wells</strong></td>
<td>Calibration wells (8): 9 mm diameter x 155 mm deep</td>
<td>Calibration wells (6): 9 mm diameter x 155 mm deep</td>
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</tr>
<tr>
<td><strong>Display</strong></td>
<td>LED w/0.01°C resolution</td>
<td>LED w/0.01°C resolution</td>
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</tr>
<tr>
<td><strong>Computer Interface</strong></td>
<td>RS232</td>
<td>RS232</td>
<td>RS232</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>343 mm x 198 mm x 317.5 mm</td>
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</tr>
<tr>
<td><strong>Weight</strong></td>
<td>8.2 kg</td>
<td>13.6 kg</td>
<td>13.6 kg</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>115 VAC 60 Hz, 6 A or 230 VAC 50 Hz, 3 A</td>
<td>700 watts</td>
<td>115 VAC 60 Hz, 6 A or 230 VAC 50 Hz, 3 A</td>
</tr>
<tr>
<td><strong>Fault Protection</strong></td>
<td>Sensor burnout protection, over temperature thermal cutout, electrical fuse</td>
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</tr>
</tbody>
</table>

*Transfer calibration accuracy is the difference between the thermocouple tip and the sensor of the IRTD temperature standard. This accuracy includes well to well uniformity.*

**Grip**
89 mm x 32 mm

**Sensor Sheath**
457 mm x 6.35 mm