

# Additel 221A, 222A & 223A Multifunction Documenting Process Calibrators



- Sourcing, simulating and measuring pressure, temperature and electrical signals
- Smartphone-like menu and interface make the operation simple
- HART Communication capability (223A)
- The internal cold junction compensation sensor can be re-calibrated at ice point by user
- Ultra-compact, 3.9" x 7.6" x 2.0", and 1.6 lb (0.7 kg)

## OVERVIEW

This series of highly integrated multifunction calibrators feature several patented technologies. These are an ultra-compact, rugged, and easy to use hand-held device for sourcing, simulating and measuring pressure, temperature, and electrical signals. Their smartphone-like menu and interface make the operation simple. Automation and documentation capabilities make these calibrators a turnkey solution.

### Additel 221A

The Additel 221A is very unique to the multifunction temperature calibrator market. Not only does it provide you with the ability to source, simulate and measure temperature and electrical functions but it also incorporates full documenting capability and many other solutions other products do not provide. As a standalone device, you can create tasks, run tests and store the results. With the use of Additel/Land Software or Additel/Cal software, all saved tasks and data can be downloaded and managed. With its unique internal cold junction compensation sensor, cold junction compensation is very simple and easy.

### Additel 222A

The Additel 222A Multifunction Process Calibrator takes all the functionality of the 221A and adds the ability to measure and source pressure using the ADT160A Intelligent Pressure Modules. With calibration characteristics programmed directly into the ADT160A pressure modules you can simply connect it to the 222A and it will automatically recognize and display the module as the source or measure pressure. For ultimate convenience, one 222A allows for modules to be "hot swapped" with a simple connection at the top of the module.

### Additel 223A

The 223A has all the capability of the 221A and 222A and HART Communication in one small, easy-to-use package. The 223A has a full HART library that allows for the reading of HART-smart devices and also the capability to write to devices. Combined with full task automation and documentation, the 223A is an ideal tool to accomplish many of your important tasks.

## FEATURES

- **Sourcing, simulating and measuring temperature and electrical signals**  
Sources and measures mV, mA, ohms, RTDs, thermocouples, frequency, and pulses  
Simulates and measures 13 thermocouples and 11 RTDs to calibrate transmitters  
Measures and sources pressure using Additel 160A series Intelligent Digital Pressure Modules from -15 psi to 10,000 psi (-1 bar to 700 bar)  
24V loop power supply  
Simultaneous dual reading capability  
Automatic switch test  
Supports square root transmitter  
Pulse frequency output for the calibration of flow totalizer
- **Easy to use**  
Smartphone-like menu and interface make the operation simpler and easier  
Ultra-compact, size 3.9" x 7.6" x 2.0" (100mm x 192mm x 52mm), and weight 1.6 lb (0.7 kg)  
One hand operation
- **Calibrated cold junction compensation (Patented)**  
Cold junction equivalent block in the calibrator  
A calibrated PRT element with flexible leads is installed in the equivalent block for thermocouple cold junction compensation  
This PRT element can be pulled out from the calibrator and re-calibrated and corrected at ice point by users
- **Documenting and automated procedure capability**  
Manage the information of the device under test. Set up automated calibration procedures, and 223A performs the test, calculates the errors, displays and/or stores the results in the memory, and highlights the out-of-tolerance points.  
As-found and As-left functions allow recording and documenting results for quality control.  
Download tasks and upload the results.  
Snapshots allow you to capture and save work.
- **NIST Traceable Cable with data**

- **Built-in temperature readout**  
CVD coefficients of a calibrated PRT can be input into the calibrator for accurate temperature measurement.
- **Multi lingual interface**  
English, German, French, Italian, Spanish, Portuguese, Simplified Chinese  
(Traditional Chinese, Japanese and Russian are available per request)
- **Build-in unit conversion tool**  
Build-in converters for pressure units, temperature units, temperature vs. resistance (RTDs), and temperature vs. millivolt (thermocouples)
- **Warranty:3 years**

## SPECIFICATIONS

### Electrical Specifications

| Measurement Accuracy |   |            |                   |
|----------------------|---|------------|-------------------|
|                      | Range   | Resolution | Accuracy          |
| Voltage DC           | ±75.0000 mV   | 0.1µV      | 0.01%RD + 3.75 µV |
|                      | ±30.0000 V  | 0.1 mV     | 0.01%RD + 1.5 mV  |
| Current DC           | ± 30.0000 mA  | 0.1µA      | 0.01%RD + 1.5 µA  |
| Resistance           | Two-wire 0 to 400.000 Ω   | 1mΩ        | 0.02%RD + 0.02 Ω  |
|                      | Three-wire 0 to 400.000 Ω   | 1mΩ        | 0.02%RD + 0.02 Ω  |
|                      | Four-wire 0 to 400.000 Ω  | 1mΩ        | 0.01%RD + 0.02 Ω  |
|                      | Two-wire 0 to 4000.00 Ω   | 10mΩ       | 0.02%RD + 0.2 Ω   |
|                      | Three-wire 0 to 4000.00 Ω   | 10mΩ       | 0.02%RD + 0.2 Ω   |
|                      | Four-wire 0 to 4000.00 Ω  | 10mΩ       | 0.01%RD + 0.2 Ω   |
| Frequency            | 1 to 50000.0 Hz   | 0.1Hz      | 0.005%RD + 1 Hz   |
| Pulse                | 0 to 999999   | 1          | N/A               |
| Limit Switch         | For the contact with potential, the voltage within the range 3V to 24V. |            |                   |

| Source Accuracy |                     |            |                   |
|-----------------|---------------------|------------|-------------------|
|                 | Range               | Resolution | Accuracy          |
| Voltage DC      | -10.000 to 75.000mV | 1µV        | 0.02%RD + 4.25 µV |
|                 | 0 to 12.0000 V      | 0.1mV      | 0.02%RD + 0.6 mV  |
| Current DC      | 0 to 22.000 mA      | 1µA        | 0.02%RD + 1.1 µA  |
| Resistance      | 1 to 400.00 Ω       | 10mΩ       | 0.02%RD + 0.02 Ω  |
|                 | 1 to 4000.0 Ω       | 100mΩ      | 0.03%RD + 0.4 Ω   |
| Frequency       | 0 to 50000.0 Hz     | 0.1Hz      | 0.005%RD + 1 Hz   |
| Pulse           | 0 to 999999         | 1          | N/A               |
| DC24V           | N/A                 | N/A        | 0.5V              |

### General Specifications

| Environmental Specifications |                      |
|------------------------------|----------------------|
| Operating Temperature        | -10°C to 50°C        |
| Storage Temperature          | -20°C to 60°C        |
| Humidity                     | <90%, non-condensing |

| Safety Specifications |         |
|-----------------------|---------|
| European Compliance   | CE Mark |

| Mechanical Specifications |  |
|---------------------------|--|
| Display                   | 3.5 inch TFT color screen  |
| Electrical Connection     | Ø4mm sockets and flat mini-jack thermocouple socket                            |
| RS232 Interface           | Standard RS232-DB9 socket  |
| Size                      | 3.9" x 7.6" x 2.0" (100mm x 192mm x 52mm)                                      |
| Weight                    | 1.6 lb (0.7 kg)  |
| Power Supply              | Polymer Li-ion rechargeable battery, or 10V DC adaptor                         |
| Battery                   | Rechargeable Li-ion battery (included)   |
| Battery Life              | 15 hours uninterrupted use<br>Battery life will be reduced when 24V is applied |
| Battery Charge            | 110V/220V external power adapter (included)                                    |

| Pressure Specification(222A & 223A)  |  |
|--|--|
| The 160A series Intelligent Digital Pressure Modules are available for gauge, vacuum and absolute pressure from -15 psi to 10,000 psi (-1 bar to 700 bar). Accuracy from 0.02% FS includes operation over 14°F to 122°F (-10°C to 50°C), one year stability and calibration uncertainty. For detail specification refer to pressure modules datasheet. |  |

- **HART Communication capability (223A)**  
Support HART® instrumentation
- **Display**  
3.5 inch TFT color screen
- **Misuse protection**  
Up to 30V voltage on any two sockets and up to 1A current on current sockets will not damage the calibrator. The calibrator will return to normal condition as soon as the voltage or current is removed.
- **Rechargeable battery**  
Rechargeable Li-ion battery for 15 hours uninterrupted use.  
Battery life will be reduced when 24V is applied.  
The rechargeable battery is replaceable.
- **Temperature Specification**

| Thermocouple Measurement and Source Accuracy |           |                        |               |            |              |              |     |     |
|--|-----------|------------------------|---------------|------------|--------------|--------------|-----|-----|
| Measure and Simulate                         | Standard  | Temperature Range (°C) | Accuracy (°C) |            |              |              |     |     |
|  |           |                        | Measure       | Source     |              |              |     |     |
| S  | IEC 584   | -50 to 1768            | -50 to 400    | 1.0        | 1.1          |              |     |     |
|  |           |                        | 400 to 1000   | 0.6        | 0.6          |              |     |     |
|  |           |                        | 1000 to 1768  | 0.7        | 0.8          |              |     |     |
| R  | IEC 584   | -50 to 1768            | -50 to 200    | 1.4        | 1.4          |              |     |     |
|  |           |                        | 200 to 500    | 0.6        | 0.6          |              |     |     |
|  |           |                        | 500 to 1768   | 0.6        | 0.7          |              |     |     |
| B  | IEC 584   | 0 to 1820              | 50 to 450     | 3.8        | 3.8          |              |     |     |
|  |           |                        | 450 to 800    | 0.9        | 0.9          |              |     |     |
|  |           |                        | 800 to 1820   | 0.6        | 0.7          |              |     |     |
| K  | IEC 584   | -270 to 1372           | -250 to -200  | 1.0        | 1.1          |              |     |     |
|  |           |                        | -200 to -100  | 0.4        | 0.5          |              |     |     |
|  |           |                        | -100 to 600   | 0.3        | 0.3          |              |     |     |
|  |           |                        | 600 to 1372   | 0.4        | 0.5          |              |     |     |
|  |           |                        | N             | IEC 584    | -270 to 1300 | -250 to -200 | 1.5 | 1.6 |
|  |           |                        |               |            |              | -200 to -100 | 0.5 | 0.6 |
| -100 to 1300                                 | 0.4       | 0.5                    |               |            |              |              |     |     |
| E  | IEC 584   | -270 to 1000           | -250 to -200  | 0.6        | 0.7          |              |     |     |
|  |           |                        | -200 to -100  | 0.3        | 0.3          |              |     |     |
|  |           |                        | -100 to 0     | 0.2        | 0.2          |              |     |     |
|  |           |                        | 0 to 700      | 0.2        | 0.3          |              |     |     |
|  |           |                        | 700 to 1000   | 0.2        | 0.4          |              |     |     |
|  |           |                        | J             | IEC 584    | -270 to 1200 | -210 to -100 | 0.3 | 0.3 |
| -100 to 1200                                 | 0.3       | 0.4                    |               |            |              |              |     |     |
| T  | IEC 584   | -270 to 400            | -250 to -200  | 0.8        | 0.9          |              |     |     |
|  |           |                        | -200 to 0     | 0.4        | 0.4          |              |     |     |
|  |           |                        | 0 to 400      | 0.2        | 0.2          |              |     |     |
| C  | ASTM E988 | 0 to 2315              | 0 to 1000     | 0.5        | 0.5          |              |     |     |
|  |           |                        | 1000 to 1800  | 0.7        | 0.9          |              |     |     |
|  |           |                        | 1800 to 2315  | 1.0        | 1.4          |              |     |     |
| D  | ASTM E988 | 0 to 2320              | 0 to 100      | 0.5        | 0.5          |              |     |     |
|  |           |                        | 100 to 1100   | 0.4        | 0.5          |              |     |     |
|  |           |                        | 1100 to 2000  | 0.6        | 0.9          |              |     |     |
|  |           |                        | 2000 to 2320  | 0.9        | 1.3          |              |     |     |
|  |           |                        | G             | ASTM E1751 | 0 to 2315    | 0 to 200     | 2.4 | 2.4 |
|  |           |                        |               |            |              | 200 to 400   | 0.5 | 0.5 |
| 400 to 1400                                  | 0.4       | 0.5                    |               |            |              |              |     |     |
|  |           |                        | 1400 to 2315  | 0.7        | 1.0          |              |     |     |
|  |           |                        | L             | DIN43710   | -200 to 900  | -200 to -100 | 0.2 | 0.3 |
|  |           |                        |               |            |              | -100 to 400  | 0.2 | 0.2 |
| 400 to 900                                   | 0.2       | 0.3                    |               |            |              |              |     |     |
| U  | DIN43710  | -200 to 600            | -200 to 0     | 0.4        | 0.4          |              |     |     |
|  |           |                        | 0 to 600      | 0.2        | 0.3          |              |     |     |

\*Accuracy with external cold junction; for internal cold junction add 0.1°C (k=2)

## SPECIFICATIONS

| <b>Measurement Accuracy</b> |                           |                        |             |                 |              |        |
|-----------------------------|---------------------------|------------------------|-------------|-----------------|--------------|--------|
| Measure and Simulate        | Standard                  | Temperature Range (°C) |             | Accuracy (°C)   |              |        |
|                             |                           |                        |             | Measure (2W/3W) | Measure (4W) | Source |
| Pt10(385)                   | IEC 751                   | -200 to 850            | -100 to 200 | 0.65            | 0.60         | 0.65   |
|                             |                           |                        | 200 to 600  | 0.82            | 0.72         | 0.82   |
|                             |                           |                        | 600 to 850  | 0.96            | 0.82         | 0.96   |
| Pt100(385)                  | IEC 751                   | -200 to 850            | -100 to 200 | 0.15            | 0.1          | 0.15   |
|                             |                           |                        | 200 to 600  | 0.26            | 0.16         | 0.26   |
|                             |                           |                        | 600 to 850  | 0.34            | 0.20         | 0.34   |
| Pt100(3916)                 | JIS 1604                  | -200 to 850            | -100 to 200 | 0.15            | 0.1          | 0.15   |
|                             |                           |                        | 200 to 600  | 0.26            | 0.16         | 0.26   |
|                             |                           |                        | 600 to 850  | 0.33            | 0.20         | 0.33   |
| Pt100(3926)                 | Minco Application Aid #18 | -200 to 850            | -100 to 200 | 0.15            | 0.1          | 0.15   |
|                             |                           |                        | 200 to 600  | 0.26            | 0.16         | 0.26   |
|                             |                           |                        | 600 to 850  | 0.33            | 0.20         | 0.33   |
| Pt500(385)                  | IEC 751                   | -200 to 850            | -100 to 200 | 0.20            | 0.16         | 0.36   |
|                             |                           |                        | 200 to 600  | 0.32            | 0.22         | 0.54   |
|                             |                           |                        | 600 to 850  | 0.40            | 0.27         | 0.67   |
| Pt1000(385)                 | IEC 751                   | -200 to 850            | -100 to 200 | 0.1             | 0.05         | 0.25   |
|                             |                           |                        | 200 to 600  | 0.2             | 0.10         | 0.42   |
|                             |                           |                        | 600 to 850  | 0.27            | 0.14         | 0.54   |
| Cu10(427)                   | Minco Application Aid #18 | -100 to 260            | -100 to 260 | 0.61            | 0.56         | 0.61   |
| Cu50(428)                   | GOST 6651-94              | -50 to 150             | -50 to 150  | 0.17            | 0.13         | 0.17   |
| Cu100(428)                  | GOST 6651-94              | -50 to 150             | -50 to 150  | 0.12            | 0.09         | 0.12   |
| Ni120(672)                  | Edison curve #7           | -100 to 260            | -100 to 260 | 0.07            | 0.05         | 0.07   |
| Ni100(618)                  | DIN 43760                 | -100 to 260            | -100 to 260 | 0.08            | 0.06         | 0.08   |

## ORDERING INFORMATION

### Model Number

ADT221A

ADT222A

ADT223A

| <b>Accessories (included)</b> |   |               |
|-------------------------------|---|---------------|
| 9816-X                        | 110V/220V external power adapter                        | 1 pc          |
| 9712                          | Chargeable Li-ion battery                               | 1 pc          |
| 9022                          | Test leads  | 3 sets(6 pcs) |
| 9020                          | Short circuit cable                                     | 1 sets(2 pcs) |
| 9060                          | Pressure module connection cable (only for 222A & 223A) | 1 pc          |
|                               | Manual  | 1 pc          |
|                               | NIST traceable calibration certificate                  | 1 pc          |

| <b>Optional Accessories</b>       |  |
|-----------------------------------|--|
| Model number                      | Description  |
| ADT160A<br>(only for 222A & 223A) | Intelligent Digital Pressure Modules                               |
| 9060<br>(only for 222A & 223A)    | Pressure module connection cable                                   |
| 9050                              | USB to RS232 (DB-9 Male) Adapter                                   |
| 9050-EXT                          | RS 232 (DB9/M) extension cable, 9 feet                             |
| 9080                              | Cable kit (including TC plug, compensation cable, S,R,B,K,J,T,E,N) |
| 9712                              | Spare chargeable Li-ion battery for multifunction calibrator       |
| 9816                              | 110V/220V external power adapter for ADT22X and ADT672 calibrator  |
| 9906                              | Carrying case for multifunction calibrator                         |
| 9510                              | Additel/Cal Task management software for multifunction calibrator  |

\* Additel/Land software can be downloaded for free at [www.additel.com](http://www.additel.com)