DENVER
INSTRUMENT


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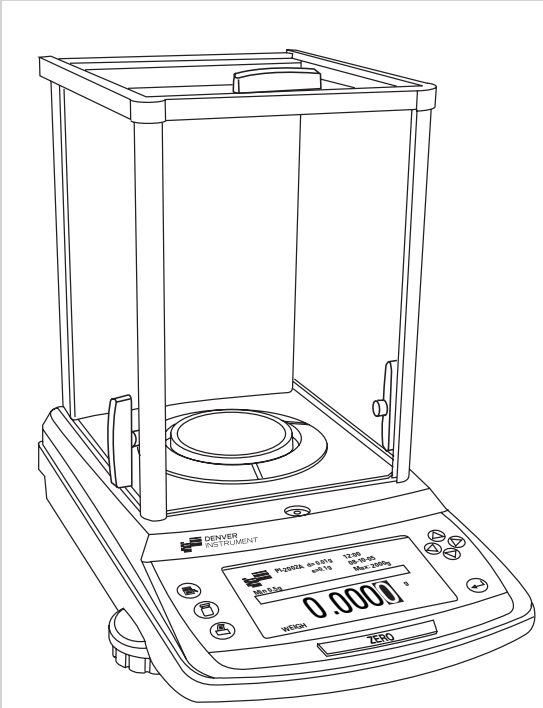
# Pinnacle Series - NTEP Version

## Operation Manual





602719.1 Rev. B.

# Disclaimer

- Changes or modifications not expressly approved by the manufacturer could void the warranty.
- Use of this product in a manner not specified by the manufacturer may impair any safety protection provided by the equipment.
- Do not drop objects on the pan of the balance.
- Never lift balance by the weighing pan as this may cause damage to internal mechanism. Always lift and transport the balance by its base, including removal from packing materials.
- If load exceeds 15% of maximum capacity, damage to the balance may occur.

# Specifications

## Precision Analytical Balance

| Models | PI-114N |
|---|---|
| **Capacity** | 100 g |
| **Readability** | 0.1 mg |
| **Zero Range** | 0 to 100 g |
| **Repeatability, (s)** | 0.1 mg |
| **Linearity** | 0.2 mg |
| **Stabilization Time** | 3 seconds |
| **Pan Size** | 3.1" dia. (79mm) |

## Precision Toploading Balances

| Models | PI-203N | PI-403N | PI-402N | PI-602N | PI-2002N | PI-4002N | PI-6001N |
|---|---|---|---|---|---|---|---|
| **Capacity** | 200 g | 400 g | 400 g | 600 g | 2000g | 4000g | 6000g |
| **Readability** | 0.001 g | 0.001 g | 0.01g | 0.01g | 0.01 g | 0.01g | 0.1g |
| **Zero Range** | 0 to 200 g | 0 to 400 g | 0 to 400 g | 0 to 600 g | 0 to 2000g | 0 to 4000g | 0 to 6000g |
| **Repeatability, (s)** | 0.001 g | 0.001 g | 0.01 g | 0.01 g | 0.01 g | 0.01g | 0.1g |
| **Linearity** | 0.002 g | 0.002 g | 0.02 g | 0.02 g | 0.02 g | 0.02g | 0.2g |
| **Stabilization Time** | 3 seconds | 3 seconds | 3 seconds | 3 seconds | 3 seconds | 3 seconds | 3 seconds |
| **Pan Size** | 4.5 " dia. (114mm) | 4.5 " dia. (114mm) | 4.5 " dia. (114mm) | 4.5 " dia. (114mm) | 7.0 x 7.0" (178 x 178mm) | 7.0 x 7.0" (178 x 178mm) | 7.0 x 7.0" (178 x 178mm) |

**Common Specifications**

| | |
|---|---|
| **Dimensions (LxWxH) Analyticals:** | 14.6 x 9.4 x 13.3" (371 x 239 x 338mm) |
| **Dimensions (LxWxH) Toploaders:** | 14.6 x 9.4 x 3.8" (371 x 239 x 97mm) |
| **Weighing Chamber Dimensions:** | 8.3 x 8.0 x 9.8" (211 x 203 x 249mm) |
| **Operating Temperature:** | 20° - 35°C (68° - 95°F) |
| **Storage Temperature:** | -10° - 35°C |
| **Humidity:** | < 90% RH |
| **Net Weight (Analyticals):** | 15 lbs (6.80kg) |
| **Net Weight (Toploaders):** | 10 lbs (4.54kg) |
| **Electrical Requirements:** | AC: 115V 50/60Hz, other voltages available<br>DC: +5V 2.5A<br>+15V 0.5A<br>-15V 0.3A |

**CAUTION!**
Use AC adaptor supplied with unit only!
Contact Denver Instrument for replacement.

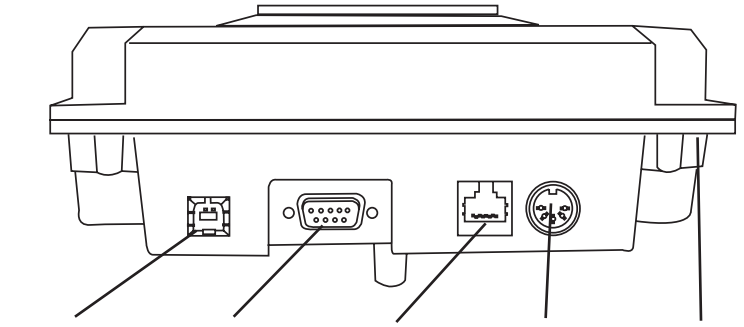
# Installation Instructions

When choosing a location to set up your new balance, observe the following conditions to optimize ease and speed of use:

- Set up the balance on a stable, rigid and level surface.
- Avoid locations subject to extremes in heat or direct exposure to sunlight.
- Room temperatures above 95°F (35°C) or below 68°F (20°C) could affect balance operation and accuracy.
- Protect the balance from direct exposure to drafts.
- Protect the balance from aggressive chemical vapors.
- Avoid strong magnetic fields present from other devices.
- Avoid locations subject to vibration.
- Avoid exposing the balance to excessive moisture for extended periods.
- For best results, allow the balance to adjust to room temperature before connecting to power source, for at least two hours.
- Line voltage to the balance should be reasonable constant and free from fluctuations.

**Connecting the Balance to AC Power**

When your balance has reached room temperature, simply plug the AC adapter into the rear of the balance and plug into an appropriate AC outlet. The balance will turn on automatically. To avoid extended warm-up periods, the balance should be left plugged in and “on” at all times.




Back Panel

**Leveling Your Balance**

It is neces sary to level the balance whenever the balance is moved.
Make sure that all feet are touching the countertop.
Adjust the leveling feet until the bubble is centered in the level vial.
The number of feet varies on each model:

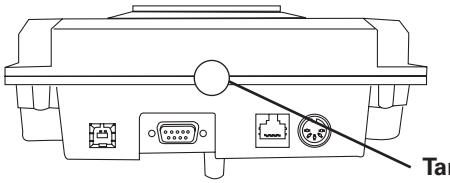
**Analytical models**: 2 front feet
**Toploading models with round pan:** 2 front feet
**Toploading models with square pan**: 4 feet, one in each corner

## Legal for Trade Verification and Device Sealing

This procedure explains the application of the physical seal for security against unauthorized tampering with the metrological aspects of the device.

Note: Before the weighing instrument may be used in legal metrology, it is calibrated and adjusted at the place of manufacture using the built in weight.

After verification of the device performance, a tamper evident seal is affixed on the rear surface of the device, as shown below.




## Calibration

Your balance was calibrated at the factory; however, it is necessary to re-calibrate upon setup and on a regular basis thereafter.

**Internal Calibration Procedure**

1. Remove all items from the balance.
2. Press ▶ **0** ◀ .
3. Press the **Calibration** key.
4. The unit will display “CAL internal” and perform calibration.
5. When calibration is complete, the unit willl return to measurement mode.

Note: Error mes sage will be displayed if calibration cannot be completed. See Troubleshooting Guide for more information.





**Denver Instrument Company**
**Non-Computing Scale**
**Model: Pinnacle Series**

**Application:** General purpose analytical or top loading balance for weighing.

**Identification:** The manufacturer’s identification, model number, and serial number are on a pressure sensitive, selfdestructive label located on the left side of the scale.

| Model | Capacity (g) | $n_{max}$ | e (g) | d (g) | Platform (mm) |
|---|---|---|---|---|---|
| PI-114N | 100 | 100,000 | .001 | .0001 | 79 dia. |
| PI-203N | 200 | 20,000 | .01 | .001 | 114 dia. |
| PI-403N | 400 | 40,000 | .01 | .001 | 114 dia. |
| PI-402N | 400 | 4,000 | .1 | .01 | 114 dia. |
| PI-602N | 600 | 6,000 | .1 | .01 | 114 dia. |
| PI-2002N | 2,000 | 20,000 | .1 | .01 | 178 x 178 |
| PI-4002N | 4,000 | 40,000 | .1 | .01 | 178 x 178 |
| PI-6002N | 6,000 | 6,000 | 1 | .1 | 178 x 178 |

**Sealing:** The scales are sealed with a tamper evident label secured over the case seam at the rear of the scale to indicate disassembly and possible tampering with the calibration mechanism.

**Test Conditions:** This certificate supersedes Certificate of Conformance Number 05-068 and is issued to correct the model information in the table above. No additional testing was deemed necessary. Previous test conditions are listed below for reference.

**Certificate of Conformance Number 05-068:** The Models PI-114N, PI-2002N, and PI-6002N were submitted for evaluation. The emphasis of the evaluation was on device design, performance, and compliance with influence factor and permanence requirements. The scales were tested over a temperature range of 20 °C to 35 °C (68 °F to 95 °F). Tests were conducted over a voltage range of 100 VAC to 130 VAC. A load of approximately one-half capacity was applied to the scale more than 100,000 times. Increasing/decreasing load and shift tests were conducted periodically during this time.

**Evaluated By:** K. Jones (CA)

**Type Evaluation Criteria Used:** NIST Handbook 44, 2005 Edition; NCWM Publication 14, 2005 Edition

**Conclusion**: The results of the evaluations and information provided by the manufacturer indicate the devices comply with applicable requirements.

**Information Reviewed By:** S. Patoray, L. Bernetich (NCWM) 05-068, 05-068A1

**National Conference on Weights and Measures**

15245 Shady Grove Road, Suite 130 • Rockville, MD 20850

Certificate Number: 05-068A1



***National Type Evaluation Program***
***Certificate of Conformance***
***for Weighing and Measuring Devices***

| **For:** | **Submitted by:** |
|---|---|
| Non-Computing Scale<br>Bench Scale, Analytical or Top Loading Balance<br>Digital Electronic<br>Model: Pinnacle Series<br>For $n_{max}$ , $e_{min,}$ Capacity,<br>Platform Size: See Page 2<br>Accuracy Class: II | Denver Instrument Company<br>6542 Fig Street<br>Arvada, CO 80004<br>Tel: (303) 403-4690<br>Fax: (303) 431-4540<br>Contact: Doug Biette |

**Standard Features and Options**

"The counting feature is not legal for trade" is labeled on the front of the scale

Counting and percent weighing
Semi-automatic zero setting mechanism (push-button)
Automatic zero setting mechanism (AZSM)
Initial zero setting mechanism (IZSM)
RS-232 serial interface
USB and Ethernet connections
AC/DC adapter
Level indicator
Motion annunciator
Full screen LCD matrix display

The Model PI-114N is an analytical balance with a draft shield enclosure
All other models are top-loading balances
The weighing mechanism on all models is an electronic controlled force motor system
Each scale has semi-automatic calibration utilizing an internal calibration weight

Temperature Range: 20 °C to 35 °C (68 °F to 95 °F)

This device was evaluated under the National Type Evaluation Program (NTEP) and was found to comply with the applicable technical requirements of Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages.

Don Onwiler
Chairman, NCWM, Inc.

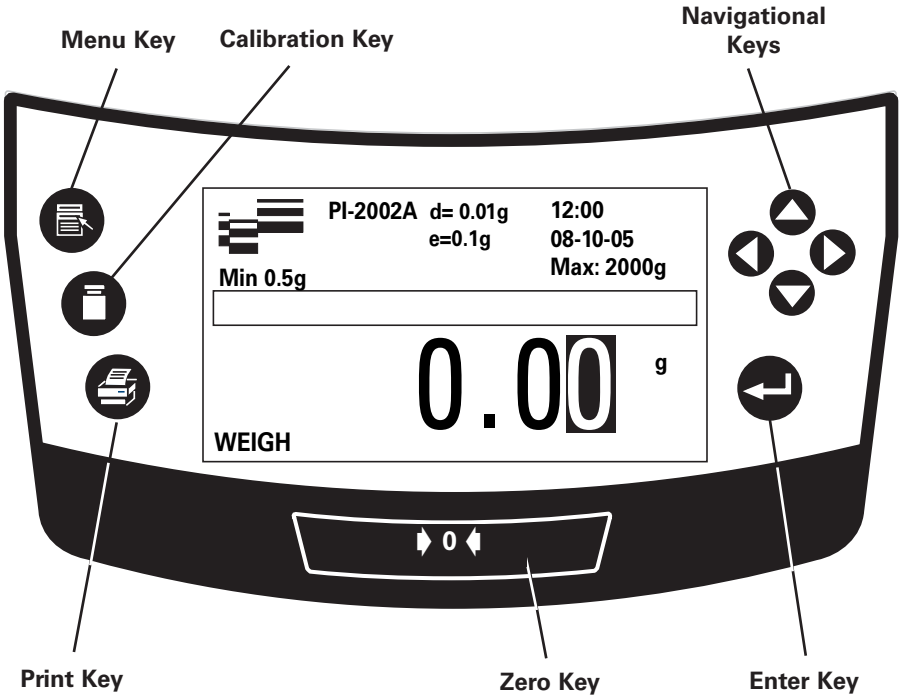
James C. Truex
Chairman, National Type Evaluation Program Committee

Issued Date: October 7, 2005

Note: The National Conference on Weights and Measures does not "approve", " recommend", or "endorse" any proprietary product or material, either as a single item or as a class or group. Results shall not be used in advertising or sales promotion to indicate explicit or implicit endorsement of the product or material by the NCWM.



# Operation

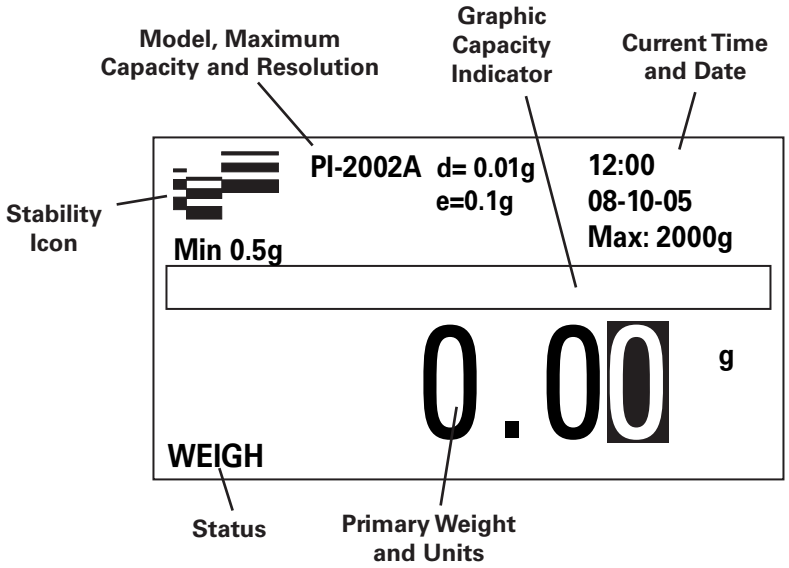



**Warm-up Time**

To deliver accurate results, the balance must warm-up (be attached to AC power) for at least 2 hours. Only after this time will the balance have reached the required operating temperature. It is advised to leave the unit plugged in so that all components are warm and the balance is ready to weigh

**Zeroing the Balance**

1. Place a container on the weighing pan. The balance will register the weight of the container.
2. Press the ⏵**0**⏴ key.
3. The balance will read 0.0000 grams (or selected units to the designated resolution) after successful taring.
4. When the reading is stable, the Denver Instrument icon appears in the top, left of the display. When unstable, a "**U**" appears.




**The following features/applications are available in your balance:**

- Calibration (w.int. cal. weight)
- Target/Percent Weighing
- Animal Weighing
- GLP/ISO
- Counting Mode
- Check Weighing Mode
- Statistics
- Formulation

**To access:**

1. Press the **Menu** key.
2. Press the ▼ until the correct category is highlighted.
3. Press ▶ or **ENTER** key.
4. Press ▼ until the desired feature is highlighted.
5. Using the navigational arrows, continue to make appropriate selections.
6. Press the **ENTER** key to accept.

Note: Pressing the ▶ **0** ◀ key will exit from any menu without saving changes.

**In alphanumeric fields:**

1. Use the navigational keys to enter the correct field.
2. When the cursor is in the text box, press ▼ to go to the first letter in alphabet and the ▲ key to scroll through the numbers.
3. Press the ▶ key to go to the next character(s).
4. Repeat this process until the desired digits are selected.
5. Press the **ENTER** keyto accept and return to the main menu.

Note: Pressing the ◀ key will return you to the previous character for editing. You can hold any navigational key down to quickly



# Accessories

| | |
|---|---|
| Draft ring (for round pan toploaders only) | 902228.1 |
| Security Device: Under the counter mounted | 36800110.1 |
| Security Device: Chain and lock | 400171.1 |
| In Use Cover (analyticals and round pan models) | 602619.1 |
| In Use Cover (square pan models) | 602620.1 |
| Weigh Below Hanger | 77000440.8 |

Complete Operation Manual available at *www.denverinstrument.com*

# Warranty Instructions

1. Please return the prepaid, pre-addressed Purchase Registration Card to Denver Instrument Company promptly upon your purchase of the Denver Instrument product. The return of the card is not a condition precedent to warranty coverage.
2. If you have any questions about a Denver Instrument product, please contact the nearest Denver Instrument office as listed below.
3. If it becomes necessary to return your Denver Instrument product for service, you must obtain a "Return Authorization Number". Please pack the product securely in its original approved packing carton or an other suitable container. Include your Return Authorization Number on the shipping label. Shipping charges must be fully prepaid.

Return to authorized distributor or :

*North and South America:*
**Denver Instrument Company**
**6542 Fig Street**
**Arvada, Colorado 80004**
**1-800-321-1135**
**Tel: 303-431-7255**
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**Fax: 49 551 20977 39**

| Menu | Print | | | |
|---|---|---|---|---|
| | | | Manually<br>Stable<br>Interval | |
| | **Language** | English<br>German<br>French<br>Spanish | | |
| | **System** | Security | Password | |
| | | RS232 | Baud Rate | 300<br>600<br>1200<br>2400<br>4800<br>9600<br>19200<br>38400<br>57600<br>115200 |
| | | | Bits/Parity | 8, N, 1<br>8, E, 1<br>8, O, 1<br>7, E, 1<br>7, O, 1 |
| | | | Handhsake | None<br>Hardware |
| | | | Echo | On<br>Off |
| | | Speaker | On<br>Off | |
| | | Defaults | Factory | |
| | | Software | | |
| | | Platform | | |
| | | Display | Contrast<br>Backlight | |
| | **Standby** | Off<br>1-180 minutes | | |



# Counting Mode

**(counting feature is not legal for trade)**

In counting mode, you can determine the number of parts, each having approximately the same weight. A reference weight is determined for the reference quantity and the balance weighs and counts similar pieces. The balance will display both the piece count and the combined weight in units set as the primary units.

# Check Weighing Mode

This application allows you to obtain plain-language limit responses to your weight based off of limits which are defined by the user.

# Animal Weighing Mode

Animal weigh mode makes it easy to weigh animals that are continuously moving as the weight is taken. This feature can also be used for measurements taken in environments with extreme vibrations and/or drafts.

# Target/Percent Weighing Mode

This application allows you to obtain weight readout in percent proportional to a reference weight. The balance will display both the percentage and the total weight in units set as the primary units.

# Statistics

Your balance has an internal memory of 250 data points. You can calculate and print statistics including: number of points, minimum weight, maximum weight, range, average, standard deviation and total weight.

# Formulation

This feature allows you to weigh out several different components in one container. Simply place your container on the pan and press the ▶ **0** ◀ key. Add each component followed by the ENTER key. The weight of the individual component will be shown as well as the total weight as the secondary weight.

# Environmental Settings

Your balance can be set up for optimized weighing to compensate for varying conditions including vibration and drafts .

## GLP/ISO

Your balance has a number of features that will allow customization for various reporting requirements pertaining to GLP and ISO requirements. When selected, GLP/ISO header will print with every data point.

## Print

This balance has a bi-directional RS232 port as well as a USB port which enables communication with other serial devices such as a printer or computer.

## System

Customize your balance with features in the system menu. Set a password, change the beep, reset factory defaults or adjust your RS232 settings to match your computer or printer.

## Restore Factory Defaults

To restore all settings to the factory defaults:
1. Press the Menu key.
2. Press ▼ until "System" is highlighted, press ▶ .
3. Press ▼ until "Defaults" is highlighted, press ▶ .

## Troubleshooting

| | | |
|---|---|---|
| **– – – HIGH** | The load exceeds the balance capacity. | Unload the balance or look for obstruction. |
| | Display capacity is exceeded. | Decrease weight on balance. |
| **– – – LOW** | The load is too low. | Check pan position. Unload pan and cycle power. |
| **Other errors** | Error has occured. | Cycle Power. Call technician for further assistance. |



## Menu Tree

| | | | |
|---|---|---|---|
| **Menu** | **Applications** | Count Mode | 5<br>10<br>20<br>50<br>100<br>Custom |
| | | Check Weigh | Low Limit<br>High Limit<br>Enable |
| | | Animal Mode | Automatic<br>Manual |
| | | Target Weigh | |
| | | Statistics | Enable<br>Print<br>Calculate<br>Clear |
| | | Formulation | |
| | | Normal Mode | |
| | **Units** | | Grams<br>Kilograms<br>Milligrams (not avail. on all models)<br>Carats |
| | Environment | Filter | Low<br>Normal<br>High |
| | | Stability | Fine<br>Normal<br>Coarse<br>Very Coarse |
| | | Auto Zero | On<br>Off |
| **GLP/ISO** | | User | |
| | | Date | MM-DD-YY<br>DD-MM-YY |
| | | Time | 24 hour<br>12 hour |
| | | Sample ID | |
| | | Number | |
| | | Header | On/Off |