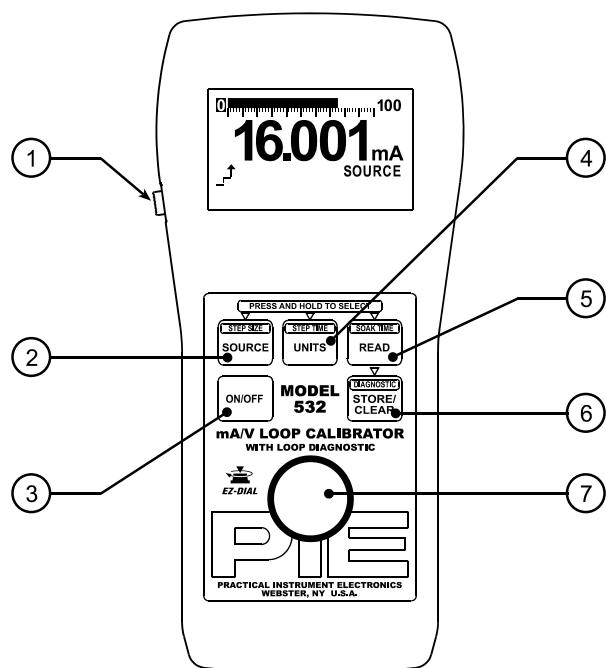


Basic Keypad Operations

J EZ-Check™ Switch/EZ-Step™ Pushbutton

Slide the switch to select the user stored values for calibration points. Press the button to adjust the output by the user defined step size. Press and hold the button to activate the auto step/ramp mode.



M UNITS/STEP TIME Button

Press and release **UNITS/STEP TIME** to change how current is displayed: either in milliamperes or % of 4-20/10-50 mA. Voltage is only displayed in volts.

Press and hold **UNITS/STEP TIME** to change step size.

N READ/SOAK TIME Button

Press and release **READ/SOAK TIME** to change read modes. These are:

- Read Millamps
- Power and Measure 2-Wire Transmitter
- Read Volts

Press and hold **READ/SOAK TIME** to change soak time.

† STORE/CLEAR Button

In any source mode:

Press **STORE/CLEAR** to save the current reading in the EZ-Checkä HI or LO position. The EZ-Checkä switch must be set to HI or LO. The display will flash "STORED" to confirm.

In any read mode:

Press **STORE/CLEAR** to clear the values saved in the EZ-Checkä HI and LO positions. The display will flash "Cleared" to confirm.

‡ EZ-Dial™ Knob

Turn the EZ-Dialä knob to adjust the output level. Press and turn to adjust 100X faster.

K SOURCE/STEP SIZE Button

Press and release **SOURCE/STEP SIZE** to change source modes. These are:

- Source Millamps
- 2-Wire Transmitter Simulate
- Source Volts

Press and hold **SOURCE/STEP SIZE** to change step size.

I ON/OFF Button

Press **ON/OFF** to turn the Model 535 on or off.



Model 535 Operating Instructions

Model 535 Configuration

Press the EZ-Dialä Knob while turning the Model 535 on to access the configuration mode. Turn the EZ-Dialä Knob to select configuration items. Press the EZ-Dialä Knob to change configuration items. Turn the unit off or just wait approximately 8 seconds to exit the configuration mode.

| | |
|----------------|-----|
| • AUTO OFF | ON |
| EZ-STEP | OFF |
| EZ-CHECK | OFF |
| 10-50 mA RANGE | ON |
| FACTORY RESET | OFF |

Auto Off -

ON (default)/OFF

Auto Off is ON, by default, to save battery life by turning the unit off after 30 minutes of inactivity. Turn Auto Off to OFF to prevent automatic shutdown. This is typically useful for manual loading or continuous use.

EZ-Stepä -

ON/OFF (default)

If EZ-Stepä is ON manual and automatic stepping/ramping is available. If EZ-Stepä is OFF the EZ-Stepä pushbutton will be disabled and the step direction indicator will not be displayed.

EZ-Checkä HI/LO Readings

ON/OFF (default)

If the EZ-Checkä HI/LO Readings option is ON, the highest and lowest readings will automatically be saved in the HI and LO EZ-Checkä™ positions.

If this option is OFF the HI and LO positions will show the current reading.

4-20/10-50 Range (default)

ON

Select either 4-20 or 10-50 milliamp range. The Model 535 scales % mode display and the bar graph accordingly.

Factory Reset

ON/OFF (default)

If Factory Reset is ON, the unit will restore all factory defaults when the Model 535 is turned OFF and back ON. This will reset any changes made in the Model 535 Configuration options, returning the unit to its simplest factory configuration.

EZ-Dialä Knob

Adjust the output up and down with the EZ-Dialä knob. The increment is 0.001 mA (or 0.01 % if display units are % of 4-20/10-50 mA.) Press while turning to adjust 100X faster – 0.100 mA (or 1.00 %.)

EZ-Checkä Switch

The EZ-Checkä™ switch has three positions -- high, set, and low. Its position is shown at the left edge of the display with "HI" and "LO" indicators. Use of the EZ-Checkä switch depends on mode:

Source Modes:

Slide the EZ-Checkä switch to the HI and LO positions to recall the settings stored in those positions. While in the HI and LO positions, dial the EZ-Dialä knob to change the display. Press **STORE/CLEAR** to save new settings in the HI and LO positions. The display will flash "STORED" to confirm.

Hint: For faster calibrations, the position of the switch can be felt. This feature allows continuous monitoring of the device being calibrated without looking back at the Model 535 display. This is also useful in poor lighting or under difficult operating conditions.

Read Modes:

In read modes, the Model 535 calibrator records the maximum and minimum readings observed in each mode. Slide the EZ-Checkä switch to the HI and LO positions to display the readings. Press **STORE/CLEAR** to clear the readings. The display will flash "Cleared" to confirm. By default, the Model 535 has EZ-Checkä HI/LO Readings OFF.

EZ-Stepä Pushbutton/ Manual Step

The EZ-Stepä pushbutton is a feature only in source modes.

Press and hold the EZ-Stepä pushbutton for less than one second to cause the output to step up or down by the EZ-Stepä size.

The EZ-Stepä direction is indicated on the display (\downarrow or \uparrow). Press the EZ-Dialä knob to change the step direction.

Stepping and auto step/ramp limits are defined by the EZ-Checkä HI and LO settings. The step direction changes when a limit is reached.

The step size is computed as the difference between the EZ-Checkä HI and the EZ-Checkä LO divided by the number of steps. See figure 1. By default, the Model 535 has EZ-Stepä OFF.

Auto Step/Ramp

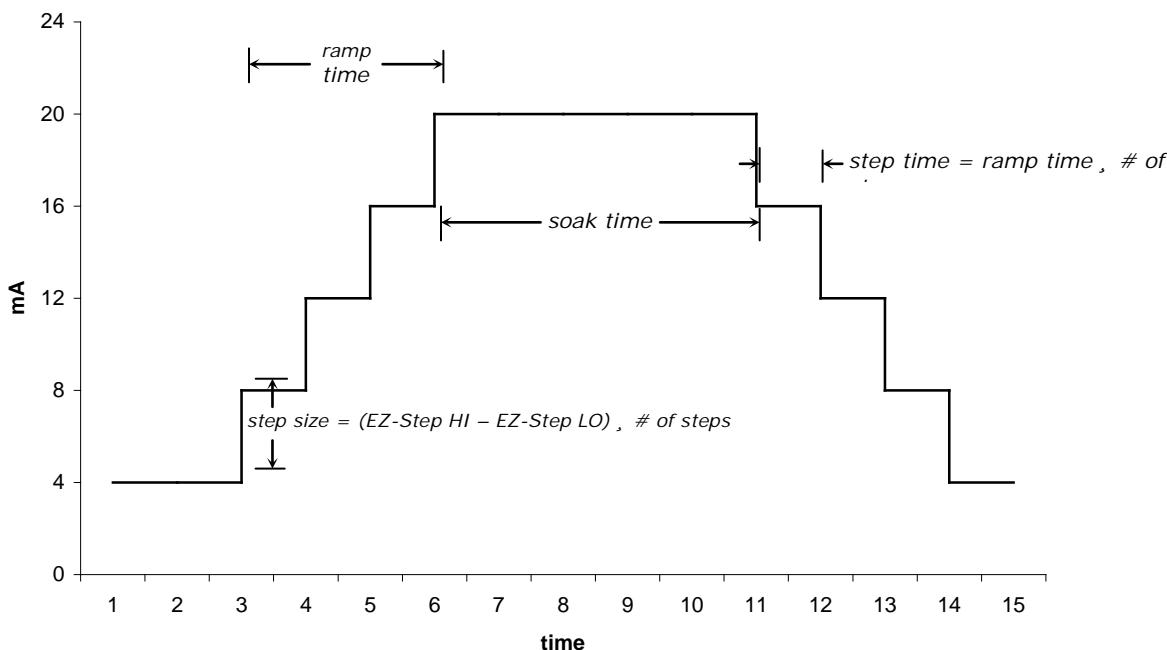
Press the EZ-Stepä pushbutton for more than one second to activate auto step/ramp mode. The Model 535 will automatically step by the selected EZ-Stepä size and time. Press the EZ-Stepä pushbutton again to deactivate auto step/ramp mode.

The EZ-Stepä direction is indicated on the display ( or ). Press the EZ-Dialä knob to change the step direction. The step direction can be changed while automatically stepping/ramping.

Stepping and auto step/ramp limits are defined by the EZ-Checkä HI and LO settings. The step direction changes when a limit is reached.

Figure 1 will show how the Step/Ramp Parameters are used to configure automatic stepping/ramping.

Figure 1



Note: The Model 535's ability to detect overload/undervoltage conditions may be limited by the rate of change in the output when using automatic stepping/ramping. Turn auto step/ramp off while connecting or disconnecting the Model 535.

Quick Reference Bar Graph

The Quick Reference Bar Graph indicates the input and output level on the Model 535 in % of 4-20/10-50 mA with 1% resolution.



Model 535 Operating Instructions

Manual Step and Auto Step/Ramp Parameter

To Change the EZ-Stepä Size:

1. Press and hold the SOURCE/STEP SIZE button for more than 3/4 of a second.
2. The display will flash "EZ-STEP SIZE".
3. Turn the EZ-Dialä knob to select from 2 to 16 steps between the EZ-Checkä limits.
4. Turn the EZ-Dialä clockwise past 16 steps to select continuous ramp mode.
5. Press the SOURCE/STEP SIZE button again to return to the normal display.

Note: If the EZ-Stepä option is turned off, the display will flash "EZ-STEP OFF".

EZ-STEP SIZE
04.000mA to 20.000mA
04 steps
04.000mA per step

To Change the EZ-Stepä Time:

1. Press and hold the UNITS/STEP TIME button for more than 3/4 of a second.
2. The display will flash "EZ-STEP TIME".
3. Turn the EZ-Dialä knob to select from 5 to 900 second ramp time. The time per step is calculated based on the selected EZ-Stepä size.
4. Press the SOURCE/STEP SIZE button to return to the normal display.

EZ-STEP TIME
04.000mA to 20.000mA
005s ramp
001.250s per step

To Change the Soak Time:

1. Press and hold the READ/SOAK TIME button for more than 3/4 of a second.
2. The display will flash "SOAK TIME".
3. Turn the EZ-Dialä knob to select from 0 to 900 second soak time.

Note: A soak time of 0 defeats the soak period. The step time will be used instead.

EZ-STEP SOAK TIME
04.000mA to 20.000mA
005s soak
001.250s per step

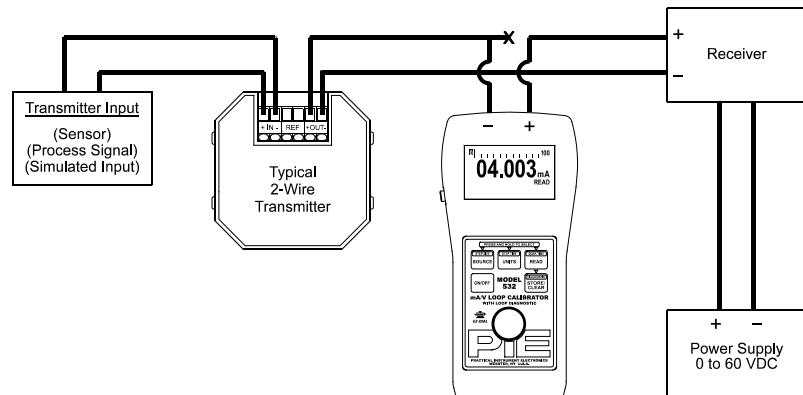
To Change the EZ-Step™ Direction:

1. Press and release the EZ-Dialä knob without turning.

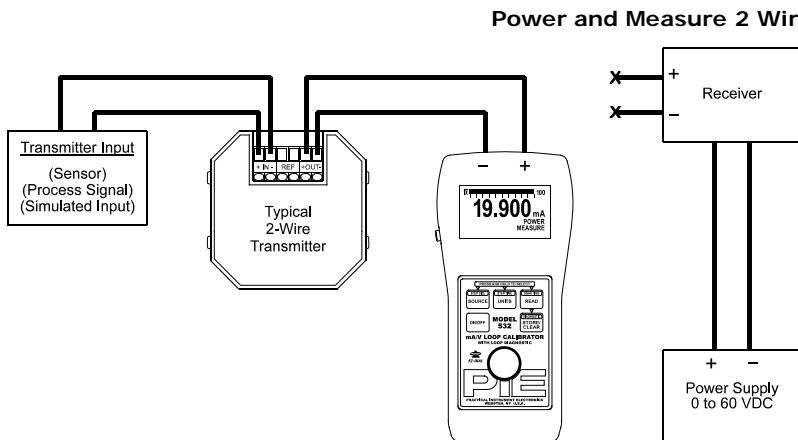
2. The display will change to show the EZ-Stepä direction selected ( or ).

Modes of Operation

Read Milliamp

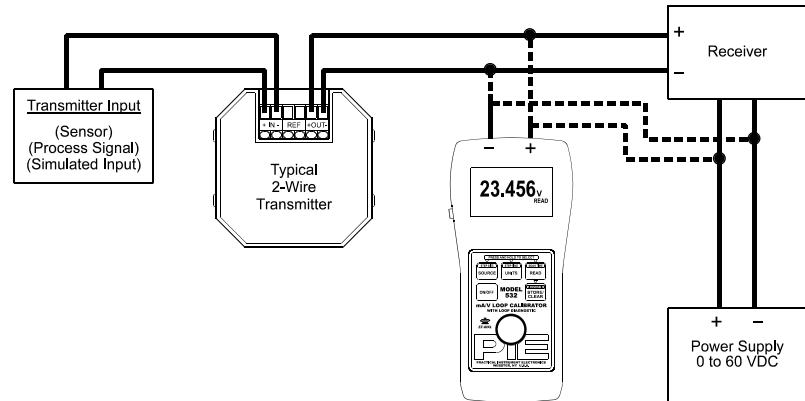


Connect the Model 535 in series with the process loop to monitor current. Observe correct polarity. Current limiting above 24 mA (52 mA if 10-50 range is selected) is indicated by a flashing "CURRENT LIMITED" display.



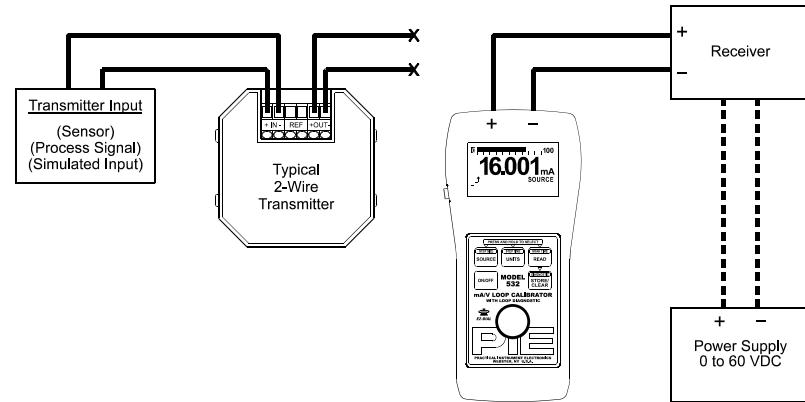
The Model 535 provides power to the process loop while displaying output current. Use this mode to test a transmitter's ability to control loop current. Current limiting above 24 mA (52 mA if 10-50 range is selected) is indicated by a flashing "CURRENT LIMITED" display.

Read Volts



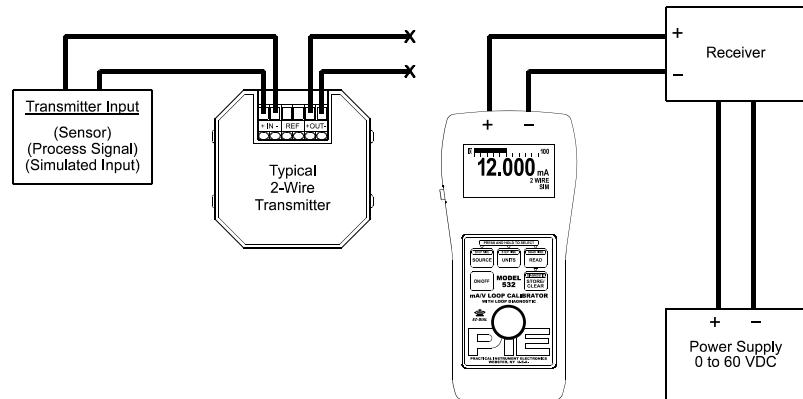
The Model 535 measures +/- 30 VDC with 4X overrange ability. The display flashes "OVERRANGE" when the 30 volt limit is exceeded.

Source Milliamp



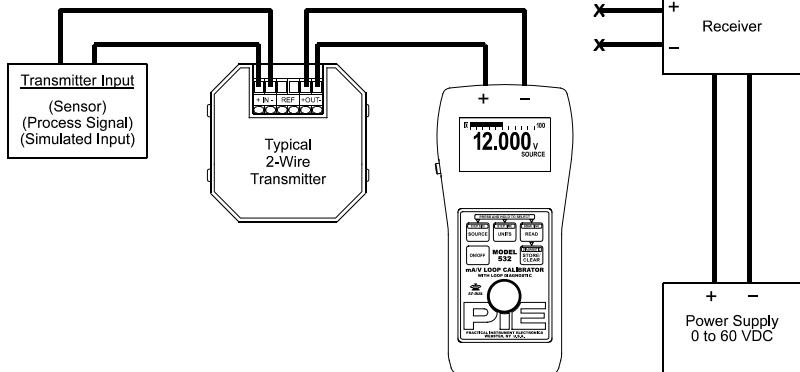
Connect the Model 535 directly to 4-20/10-50 mA receiver equipment, alarms, panel meters, etc. Use the EZ-Dial® Knob and EZ-Check® Switch to adjust loop current. The display flashes "HIGH Ω" when the loop resistance is too high or the leads are open.

2 Wire Transmitter Simulate



Substitute the Model 535 for a 2 wire transmitter. Use the EZ-Dialä Knob and EZ-Checkä Switch to adjust loop current. At least 2 volts of loop power is required, else the display flashes "CHECK LOOP SUPPLY."

Source Volts



The Model 532 sources 0.000-24.000 volts. This is useful for powering transmitters and receiver equipment. Use the EZ-Dialä Knob and EZ-Checkä Switch to adjust output voltage. The display flashes "LOW W" when the output is overloaded.

Specifications

General Specifications:

Unless otherwise indicated all specifications are rated from a nominal 23 °C, 70 % RH for 1 year from calibration with >1 MW load on external banana jack access to 10 W current sense (Model 535A).

| | |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature Range | -20 to 60 °C (-5 to 140 °F) |
| Storage Temperature Range | -30 to 60 °C (-22 to 140 °F) |
| Relative Humidity Range | 10 % ≤RH≤ 90 % (0 to 35 °C), Non-condensing 10 % ≤RH≤ 70 % (35 to 60 °C), Non-condensing |
| Size | 7.00 X 3.30 X 2.21 inches (177.8 x 83.8 x 56.1mm) |
| Weight | 14.0 oz (397 grams) |
| Battery | 4 - AA Alkaline Optional 120 VAC 50/60 Hz AC adaptor included |
| Miscellaneous | Low battery indication with nominal 1 hour of operation left Over-voltage protection to 120 Vrms (rated for 30 seconds) or 240 Vrms (rated for 15 seconds) Bar graph display with 1% resolution of 4-20/10-50 mA signal scale High contrast graphic liquid crystal display with 0.45" (11.4 mm) high digits |



Model 535 Operating Instructions

Common Specifications for all Current Modes:

| | |
|-----------------------------|-------------------------------------------------------------------------------------------------------|
| Ranges | 0.000 to 24.000 mA, -25.00 to 125.00% of 4-20 mA 0.000 to 52.000 mA, -25.00 to 105.00% of 10-50 mA |
| Accuracy | $\leq \pm (0.025\% \text{ of reading} + 0.004 \text{ mA})$ |
| Temperature Effect | $\leq \pm 50 \text{ ppm}/^{\circ}\text{C}$ of range |
| Resolution | 0.001 mA and 0.01 % |
| Step/Ramp Timebase Accuracy | 0.01% of 4.9152 MHz |

Source/Power and Measure 2-Wire Transmitter Specifications:

| | |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Loop Compliance Voltage | $\geq 43 \text{ Volts}$ |
| Loop Drive Capability | 1200 Ω at 20 mA/800 Ω at 50 mA for entire battery life |
| Miscellaneous | Open loop or out of compliance conditions are indicated by appropriate error display Battery life in: Source mode ≥ 18 hrs at 12 mA/ ≥ 9 hrs at 30 mA typical Power measure ≥ 10 hrs at 12 mA/ ≥ 5 hrs at 30 mA typical Selectable EZ-Step(s) for Source Mode/2-Wire Transmitter Simulation: 2 to 16 selectable step settings Step size is determined by the selected high & low ranges Selectable time settings for stepping and soak: STEP: 5 to 900 seconds SOAK: 0 to 900 seconds |

Read mA Specifications:

| | |
|-----------------------------------|---------------------------------------------------------------------------------|
| Voltage Burden | $\leq 2\text{V}$ |
| Overload/Current Limit Protection | $\leq 24 \text{ mA}$ (4-20 range)/ $\leq 52.5 \text{ mA}$ (10-50 range) nominal |
| Battery Life | ≥ 40 hours typical |

2-Wire Transmitter Simulation Specifications:

| | |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overload/Current Limit Protection | $\leq 24 \text{ mA}$ (4-20 range)/ $\leq 52.5 \text{ mA}$ (10-50 range) nominal |
| Loop Voltage Limits | 2-90 VDC |
| Miscellaneous | Open loop or out of compliance conditions are indicated by appropriate error display Battery life ≥ 40 hour typical Selectable EZ-Step(s) for Source Mode/2-Wire Transmitter Simulation: 2 to 16 selectable step settings Step size is determined by the selected high & low ranges Selectable time settings for stepping and soak: STEP: 5 to 900 seconds SOAK: 0 to 900 seconds |



Model 535 Operating Instructions

Read Voltage Specifications:

| | |
|--------------------|---------------------------------------------------------------------------|
| Range: | 0.00 to 30.00 VDC (with 4X over range) |
| Resolutions | 0.01 VDC |
| Temperature Effect | $\leq \pm 200 \text{ ppm}/^\circ\text{C}$ of range |
| Input Resistance | $\geq 1 \text{ M}\Omega$ |
| Accuracy | 0.00 to 30.00 VDC $\leq \pm (0.1\% \text{ of reading} \pm 0.1 \text{ V})$ |

Source Voltage Specifications:

| | |
|-------------------|-----------------------------------------------------------------------------------------------|
| Source Range: | 0.000 to 24.000 VDC |
| Output Resistance | $\leq 0.3 \Omega$ |
| Source Current | $\geq 20.000 \text{ mA}$ |
| Accuracy | $\leq \pm (0.025\% \text{ RDG} + 0.004 \text{ V}) \pm 50 \text{ ppm}/^\circ\text{C}$ of range |

Ordering Information:

| | |
|-------------------------------------------------------------|---------------------|
| 4-20/10-50 Milliamp mA/V Loop Calibrator | Model 535 |
| Includes: | |
| Calibration Test Data | |
| NIST Traceable Certificate | |
| Carrying Case | 020-0200 (included) |
| 60 Hz AC adapter | 020-0102 (included) |
| Option: | |
| 50 Hz AC adapter | 020-0101 |
| Option: | |
| External banana jack access to internal 10 W current sense. | Model 535A |

Warranty

Our equipment is guaranteed against defective material and workmanship (excluding batteries) for a period of three years from the date of shipment. Claims under guarantee can be made by returning the equipment prepaid to our factory. The equipment will be repaired, replaced or adjusted at our option. The liability of Practical Instrument Electronics (PIE) is restricted to that given under our guarantee. No responsibility is accepted for damage, loss or other expense incurred through sale or use of our equipment. Under no condition shall Practical Instrument Electronics, Inc. be liable for any special, incidental or consequential damage.