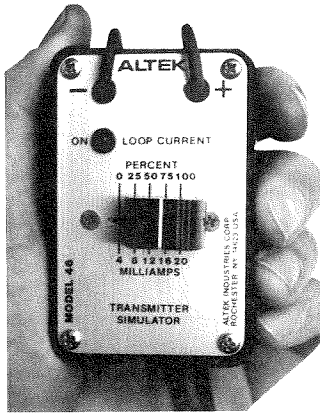


ALTEK

MILLIAMP CALIBRATORS

Models 46, 131, 134, 156



MODEL 46

- **2-WIRE SIMULATOR**
Calibrate Receivers
- **5 POINT CALIBRATION**
4, 8, 12, 16, 20mA
- **LOOP POWERED**
No Batteries Required
- **EASY TO USE**
One Hand Operation

Simulate 2-Wire Transmitters to calibrate receivers, recorders, controllers, indicators and computers. Loop Power eliminates the need for batteries. Loop current is CLAMPED at the key value you select. Accuracy is $\pm 0.08\%$ of 4 to 20mA, even with changes in load and supply voltage.

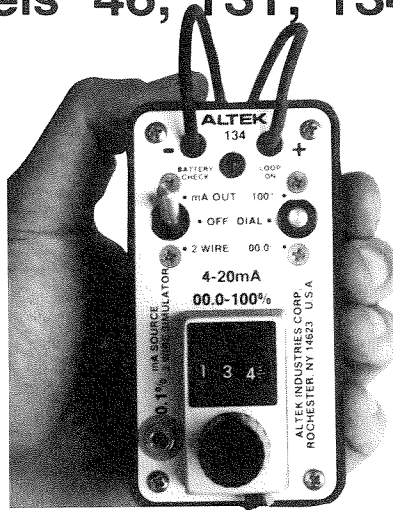
Switch settings of 0, 25, 50, 75 and 100% give you fast, full range checkout of instrument or system. The single switch and palm sized case have been designed for simple, one handed operation. Just clip the Built-in leads to the 2-Wire terminals in the Field, Junction Box or Control Room.

ALTEK'S broad line of pocket sized milliamp calibrators offers 2-Wire transmitter simulators as well as milliamp sources. Each model gives you ease of use, as well as accuracy and ruggedness.

When you check out receivers, recorders or controllers in a 2-Wire 4 to 20mA loop, simply disconnect the 2-Wire transmitter and hook up a Model 46 or 134 in 2-Wire mode. Flip a switch to get instant Full Scale and Zero outputs. The calibrators operate just like a 2-Wire transmitter by modulating the external power supply voltage into a 4 to 20mA signal.

When a zero based milliamp source is needed to simulate power transducers, calibrate meters, excite strain gauges or RTDs; choose one of our Model 131 mA Sources. Each model has a "QUIK-CHEK" switch for Full Scale and Zero, in addition to a continuous digital dial. Lock the dial for precise setting of a third output value. Set it at the midpoint for checking linearity or at any other desired value in the range.

In the control room, shop, or field, use the Model 134 as a precise 4 to 20mA Source. Stroke valves, set trip points or calibrate receivers or recorders. Easily replaceable 9 Volt alkaline batteries will source 20 milliamps *continuously* for over 25 hours. Many users can go for months between battery changes!



MODEL 134 (156)

- **MILLIAMP OUTPUT**
Sources 4-20mA
- **2-WIRE SIMULATOR**
Field or Panel
- **"QUIK-CHEK™" SWITCH**
Instant 4.00 & 20.00mA
- **CONTINUOUS DIAL**
0.02% Resolution

Calibrate computers, receivers and controllers with unparalleled ease. The Model 134 is also ideal for setting current trips and stroking valves. Built-in batteries supply 20mA loads from 0 to 1000 Ohms (typically 3 months of field use).

Simulate any 2-Wire Transmitter without using internal batteries. Current stays at desired value even with changes in load and supply voltage.

"QUIK-CHEK" switch gives you instant settings of 0 and 100% for both the mA Source and 2-Wire Simulator. Set any value in dial position using the 10 turn continuous adjustment.

Used as a 2-Wire Transmitter Simulator the Model 134 receives all of its operating power from the loop. This lets you operate continuously for days when long term loop testing is required. Use it as a manual loading station when a controller needs repair or replacement. Minimize process shutdowns installing a new controller.

Model 156 is similar to the Model 134, but operates in 10 to 50mA loops. The digital dial covers 10 to 50 mA with "QUIK-CHEKs" at 0.0 and 100.0%.

High efficiency design typically gives you months of operation before replacing the batteries. Optional AC adaptors are available for full time bench use.

ALTEK is your source for other milliamp analyzers with additional features, plus calibrators for Thermocouple, Voltage, RTD and process Frequency Signals.

Altek also produces calibrators for custom ranges and unique applications. Additional models and ranges are frequently added to the Altek instrument family to meet all of your critical calibration requirements.



MODEL 131

- **THREE MODELS**
131-1 0-1 mA
131-10 0-10 mA
131-20 0-20 mA
- **BUILT-IN BATTERIES**
Replaceable 9 Volts
- **"QUIK-CHEK™" SWITCH**
Instant 0 and 100%

True current source design for accurate ($\pm 0.1\%$) calibration. Models for 0 to 1, 0 to 10 or 0 to 20 milliamps give you precisely the range you need, for zero based receivers. Select instant settings of 0 and 100% for Zero and Full Scale Output. Set any exact value using the digital dial.

Continuous adjustability with memory lock assures fast, precise settings of power metering circuits, current trips, recorders, data loggers, controllers, computers and final control elements. Built-in long life batteries allow complete portability for checkout and calibration of all milliamp input devices.

OPERATING INSTRUCTIONS

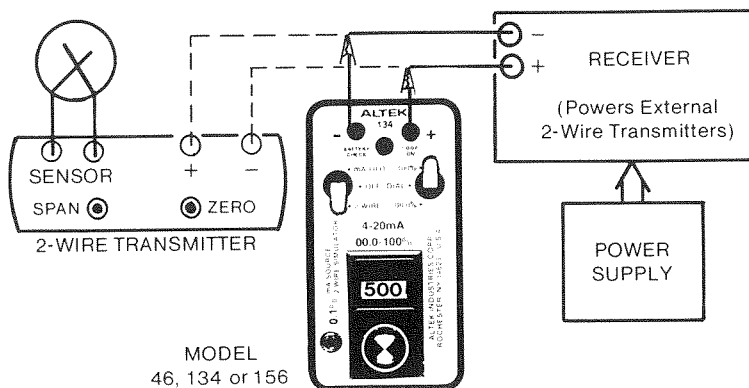
2-WIRE SIMULATOR MODE

Models 46, 134 & 156

- 1) Disconnect existing 2-Wire transmitter from the loop
- 2) Put the Mode selector switch (Models 134 & 156) into the 2-Wire position
- 3) Connect the red lead of the calibrator to the plus (+) terminal of the field connections and the black lead to the minus (-)

The LED will glow steadily to indicate that the loop current is present. If the LED doesn't glow, check the connections and the power supply.

Select the 0.0% and 100.0% switch positions to quickly calibrate the endpoints of your receivers. Intermediate positions of 25, 50 and 75% may be selected with the Model 46. Use the digital dial on the Models 134 & 156 to select any value from 0.0 to 100.0% (a setting of 645 on the dial is equal to 64.5%).



MODEL
46, 134 or 156

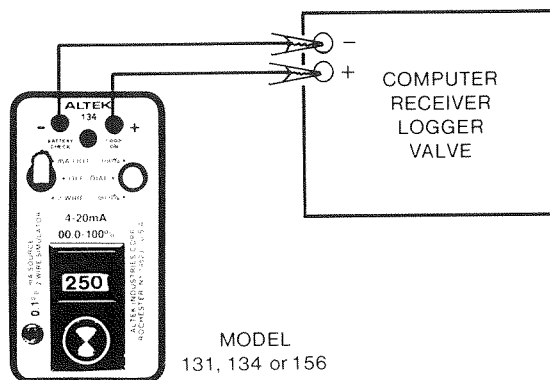
SOURCE MODE

Models 131, 134 & 156

- 1) Disconnect one or both wires from the device to be calibrated
- 2) Connect the red lead of the calibrator to the plus (+) input of the device and the black lead to the minus (-)
- 3) Move the Mode switch to ON (Model 131) or mA OUT (Models 134 & 156)

The LED on the Models 134 & 156 will glow steadily only when current is flowing thru the loop. The LED on the Model 131 glows when switched on and brightens as the current increases. If the LED doesn't light or change in brightness, check the batteries and connections.

Output current is continuously adjustable with the "QUIK-CHEK" switch in the DIAL position. Exact 0.0 and 100.0% outputs are available by using the 0.0 and 100.0% "QUIK-CHEKS."



MODEL
131, 134 or 156

SPECIFICATIONS

(Unless otherwise specified, specifications are in $\pm\%$ of Span @ 25 Degrees C)

ACCURACY:

- MODEL 46 . . . $\pm 0.08\%$
- MODEL 131 . . . $\pm 0.1\%$
- MODELS 134 & 156
- Dial: $\pm 0.1\%$ from 1% to 99%
- "QUIK-CHEK" Switch: $\pm 0.08\%$ at 0.00% and 100.0%

TEMPERATURE EFFECT: $\pm 0.01\%$ /Degree C

OPERATING TEMPERATURE RANGE: -10 to $+140^\circ\text{F}$ (-25 to $+60^\circ\text{C}$)

STORAGE TEMPERATURE LIMITS: -40 to $+160^\circ\text{F}$ (-40 to $+70^\circ\text{C}$)

POWER SUPPLY EFFECT: $\pm 0.005\%$ /Volt

WARM UP TIME: 2 Seconds to rated accuracy

WEIGHT:

- Model 46 . . . 3 ounces (85 grams)
- Models 131, 134 & 156 . . . 12 ounces (340 grams)

SIZE:

- Model 46 . . . $1\frac{1}{2} \times 2\frac{1}{8} \times 3\frac{1}{4}$ inches (38x54x63 mm)
- Models 131, 134 & 156 . . . $2\frac{1}{8} \times 4 \times 2\frac{1}{2}$ inches (54x102x55 mm)

LOOP VOLTAGE LIMITS:

- Models 46 & 134 . . . 6 to 45 VDC
- Model 156 . . . 45 to 90 VDC

OUTPUT DRIVE CAPABILITY:

Model	Fresh Batteries or AC Adaptor	Battery Low Limit
131-1	14k Ohms	10k Ohms
131-10	1400 Ohms	1k Ohms
131-20 & 134	1000 Ohms	800 Ohms
156	350 Ohms	275 Ohms

BATTERY LIFE: (Nominal):

Model	Nominal Life- Alkaline Battery (Recommend Duracell mN 1604)
134	25 hours at 20mA continuous output (3-9 Volt)
156	8 hours at 50mA continuous output (3-9 Volt)
131-1	500 hours at 1mA continuous output (2-9 Volt)
131-10	50 hours at 10mA continuous output (2-9 Volt)
131-20	25 hours at 20mA continuous output (3-9 Volt)

Battery Check:

- Model 131 . . . LED will glow when the power switch is held in the BATTERY CHECK position
- Models 134 & 156 . . . LED will pulse once when the power switch is moved to the mA OUT position

DIGITAL DIAL SETTING vs MILLIAMPS

MODEL	Reading on Dial												MILLIAMPS			
	000	062(5)	100	200	250	300	400	500	562(5)	600	700	750		800	900	000
134 (LINEAR)	4.00	5.00	5.60	7.20	8.00	8.80	10.4	12.0	13.0	13.6	15.2	16.0	16.8	18.4	20.0	
(0, 25, 50, 75, 100% D/P FLOW)	0%	25%			50%				75%						100%	
156 (LINEAR)	10.0	12.5	14.0	18.0	20.0	22.0	26.0	30.0	32.5	34.0	38.0	40.0	42.0	46.0	50.0	
131-1	00.0		.100	.200	.250	.300	.400	.500		.600	.700	.750	.800	.900	1.00	
131-10	00.0		1.00	2.00	2.50	3.00	4.00	5.00		6.00	7.00	7.50	8.00	9.00	10.0	
131-20	00.0		2.00	4.00	5.00	6.00	8.00	10.0		12.0	14.0	15.0	16.0	18.0	20.0	

ORDERING INFORMATION:

	Part No.
Model 46 2-Wire Transmitter Simulator	46-0420
Model 131 0 to 1mA Source	131-1
0 to 10mA Source	131-10
0 to 20mA Source	131-20
Model 134 4 to 20mA Source/2-Wire Simulator	134-0420
Model 156 10 to 50mA Source/2-Wire Simulator	156-1050
AC Adaptors for Models 131, 134 & 156	
120 VAC Adaptor	28-0120
240 VAC Adaptor	28-0240
Carrying Case	09-3781

WARRANTY

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

AVAILABLE FROM: