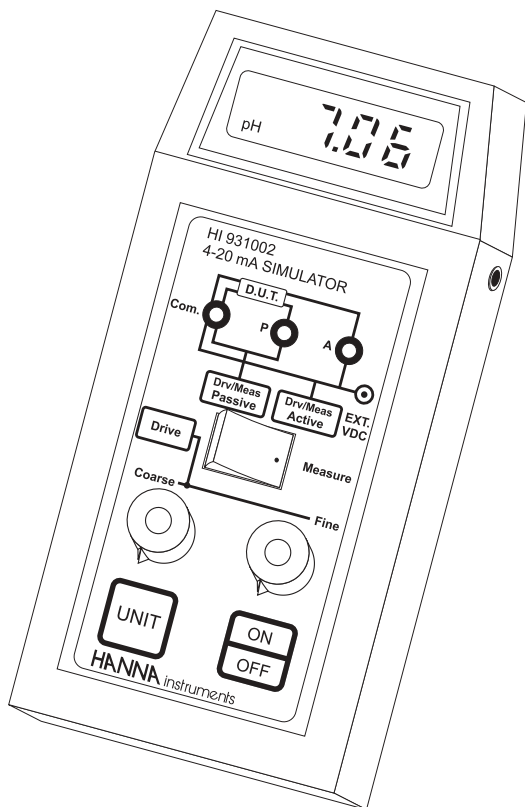


Instruction Manual

HI 931002 4-20 mA Simulator



Dear Customer,

Thank you for choosing a Hanna Instruments Product.

Please read this instruction manual carefully before using the instrument.

This manual will provide you with all the necessary information for the correct use of the instrument, as well as a precise idea of its versatility in a wide range of applications.

These instruments are in compliance with **CE** directives EN 50081-1 and EN 50082-1.

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PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If noticeable damage is found, immediately notify your Dealer.

In addition to this manual you should find the following items:

- HI 931002 meter;
- 12 VDC power adapter (HI710005 or HI710006);
- 1 m (3.3') connection cables;
- 9 V battery.

Note: Save all packing material until the instrument has been observed to function correctly. All defective items must be returned to the Dealer in their original packing.

GENERAL DESCRIPTION

HI 931002 is a portable 4-20 mA simulator, ammeter and calibrator designed specifically for monitoring and regulating a 4-20 mA current loop from practically any process meter with or without voltage source. Four operational modes are provided:

1) Passive Drive/Calibrator Mode. HI 931002 can be set to simulate 4-20 mA current values and the user can then adjust the process meter accordingly.

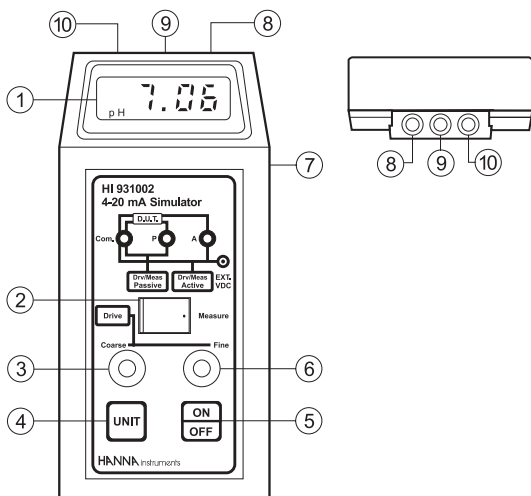
2) Active Drive/Simulator Mode. HI 931002 simulates the correct values as above in addition to providing power to the current loop. Power is provided through an external adapter (included) which is connected to the simulator. This mode is ideal for calibrating chart recorders, pressure transducers or current indicators.

3) Passive Measurement/Tester Mode. HI 931002 practically becomes an Ammeter. It measures and displays the mA (or pH) values transmitted by the process meter.

4) Active Measurement/Tester Mode. Same as point 3 in addition to providing voltage to the 4-20 mA bus.

HI 931002 can practically measure incoming current, provide power and simulate 4-20 mA output to calibrate almost any process meter. A large LCD shows current values. You can select between drive and measurement modes through a switch on the front panel and two dials that allow for quick adjustment of the current.

FUNCTIONAL DESCRIPTION AND SPECIFICATIONS HI 931002



- | | |
|--------------------------|------------------------------|
| 1) LCD display | 6) fine setting knob |
| 2) Mode selection switch | 7) Ext. power adapter socket |
| 3) coarse setting knob | 8) "A" connector |
| 4) Unit selection key | 9) "P" connector |
| 5) ON/OFF key | 10) "Com." connector. |

Range	Active Drive	2.00 to 19.99 mA	-1.50 to 14.00 pH
	Passive Drive	2.00 to 19.99 mA	-1.50 to 14.00 pH
	Active Measure	0.00 to 19.99 mA	-3.50 to 14.00 pH
	Passive Measure	0.00 to 19.99 mA	-3.50 to 14.00 pH
Resolution		0.01mA	0.01 pH
Accuracy (@20°C/68°F)		±0.01mA	±0.01 pH
EMC Typical Deviation		±1% f.s.	
Input resistance		20 Ω	
Fuse		5x20 mm, 200mA, 250V	
Battery Type/Life		9V alkaline/1600 hours of continuous use	
Ext. Power Supply		12 to 32 VDC	
Environment		0 to 50°C (32 to 122°F); 95% RH	
Dimensions		180 x 83 x 40 mm (7.1 x 3.3 x 1.6")	
Weight		320 g (11.3 oz.)	

OPERATIONAL GUIDE

INITIAL PREPARATION

Each meter is supplied complete with a 9V battery. Slide off the battery compartment cover on the back of the meter (see page 9), install the battery while paying attention to its polarity.

PASSIVE DRIVE (CALBRATOR) MODE

This mode is intended to calibrate an active receiver unit.

The HI 931002 simulates 4 to 20 mA current, powered by the active receiver from the 4-20 mA bus. The current value displayed on the LCD, can be adjusted through two single turn potentiometers in increments of 0.01 mA.

- Disconnect the external power adapter from HI 931002 if present.

- Turn the meter on by pressing the ON/OFF key.



- Select the measurement unit by pressing the UNIT key.



- Switch the selection switch to the "Drive" mode.



Drive

- Wire the calibrator "Com." and "P" connectors to the Device Under Test (D.U.T.) input contacts (see page 4, #10 and #9 respectively) using the cables provided, paying attention to the polarity ("Com." to - and "P" to + terminals).
- Turn the Fine and Coarse knobs to any desired value and make sure that the D.U.T. reflects the current value displayed on the HI 931002 LCD.

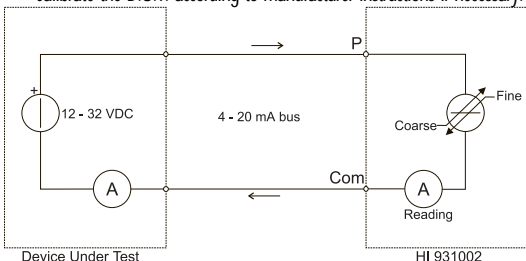
Coarse



Fine



- Calibrate the D.U.T. according to manufacturer instructions if necessary.



ACTIVE DRIVE (SIMULATOR) MODE

This mode is intended to drive a chart recorder, calibrate a pressure/current transducer or a current indicator. The HI 931002 supplies a voltage to the 4-20 mA bus via an external connected 12-32 VDC power supply. The calibrator regulates the current, displayed on the LCD, as in the previous mode (Passive Drive).

- Turn the meter on by pressing the ON/OFF key.



- Select the measurement unit by pressing the UNIT key.



- Switch the selection switch to the "Drive" mode.



- Connect the external power adapter to the power socket on the right side of the HI 931002.
- Wire the calibrator "Com." and "A" connectors to the Device Under Test (D.U.T.) input contacts (see page 4, #10 and #8 respectively) using the cables provided, paying attention to the polarity ("Com." to - and "A" to + terminals).
- Turn the Fine and Coarse knobs to any desired value and make sure that the D.U.T. reflects the current value displayed on the HI 931002 LCD.

Coarse

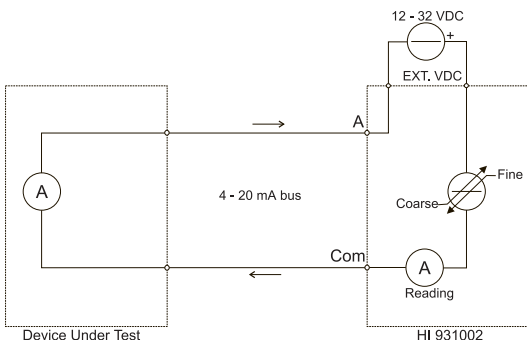


Fine



- Calibrate the D.U.T. according to manufacturer instructions if necessary.

Note: the battery powers on the display only. Calibrator operational mode is functional even without a battery or if battery is discharged.



PASSIVE MEASURING (TESTER) MODE

This mode is intended to test an active transmitter. The HI 931002 reads the current produced by the transmitter via the 4-20 mA bus and displays the reading in mA or pH units.

- Disconnect the external power adapter from HI 931002 if present.

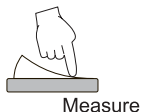
- Turn the meter on by pressing the ON/OFF key.



- Select the measurement unit by pressing the UNIT key.



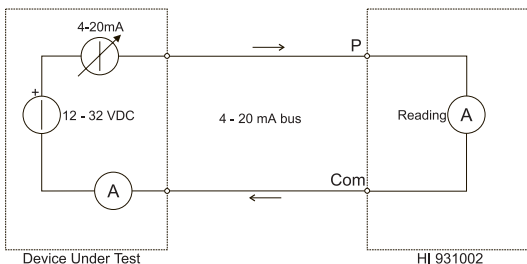
- Switch the selection switch to the "Measure" mode.



- Wire the calibrator "Com." and "P" connectors to the Device Under Test (D.U.T.) input contacts (see page 4, #10 and #9 respectively) using the cables provided, paying attention to the polarity ("Com." to - and "P" to + terminals).
- Verify that the D.U.T. displays the same reading of the HI 931002 and calibrate the D.U.T. according to manufacturer instructions if necessary.

IMPORTANT NOTE:

Set the selection switch to MEASURE mode only if the D.U.T. is a transmitter and can limit current below 100mA.
WRONG OPERATION WILL BREAK THE INTERNAL FUSE.



ACTIVE MEASURING (TESTER) MODE

This mode is intended to test a passive transmitter. The HI 931002 supplies only the power to the 4-20 mA bus via an external connected 12-32 VDC power supply and displays the value of the current produced by the transmitter.

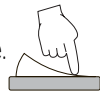
- Turn the meter on by pressing the ON/OFF key.



- Select the measurement unit by pressing the UNIT key.



- Switch the selection switch to the "Measure" mode.

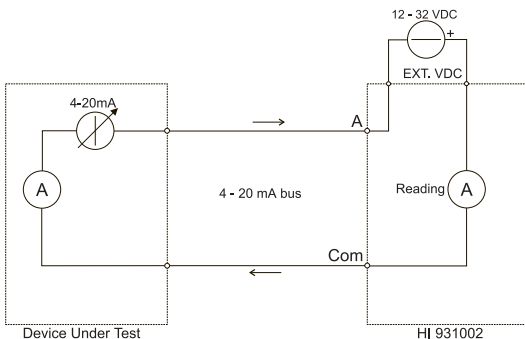


Measure

- Connect the external power adapter to the power socket on the right side of the HI931002.
- Wire the calibrator "Com." and "A" connectors to the Device Under Test (D.U.T.) input contacts (see page 4, #10 and #8 respectively) using the cables provided, paying attention to the polarity ("Com." to - and "A" to + terminals).
- Verify that the D.U.T. displays the same reading of the HI 931002 and calibrate the D.U.T. according to manufacturer instructions if necessary.

IMPORTANT NOTE:

Set the selection switch to MEASURE mode only if the D.U.T. is a transmitter and can limit current below 100mA.
WRONG OPERATION WILL BREAK THE INTERNAL FUSE.



mA - pH RELATION

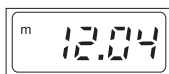
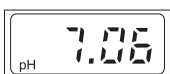
The HI 931002 LCD will show the current from the transmitter in mA or in pH units according to the relation:

$$4 \text{ mA} = 0 \text{ pH}$$

$$12 \text{ mA} = 7 \text{ pH} \quad \text{mA} = 1.14 \times (\text{pH reading}) + 4$$

$$20 \text{ mA} = 14 \text{ pH.}$$

Press UNIT key to select the desired range. The reading will toggle between the mA and pH reading.



BATTERY REPLACEMENT

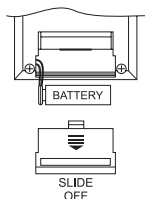
The instrument uses a 9 volt battery that lasts for approximately 1600 hours of continuous use.

When the battery is rundown, "V" and two decimal points blink on the LCD to warn the user.



Battery replacement must only take place in a non-hazardous area using the battery types specified in this instruction manual (see page 4).

To change battery, slide the bottom back cover, replace the old battery and replace the cover.



FUSE REPLACEMENT

The HI 931002 is equipped with a protection fuse inside the instrument. In the event the fuse would break contact your nearest Hanna Service.

ACCESSORIES

- HI 710001 Soft carrying case, dimensions 230 x 100 x 50 mm
- HI 7826/1 Simulator 1 m (3.3') connection cables
- HI 710031 Hard carrying case, dimensions 340 x 230 x 90 mm
- HI 710005 115VAC-12VDC voltage adapter
- HI 710006 230VAC-12VDC voltage adapter
- HI 721310 9V battery (10 pcs)
- MN931002R1 Instruction manual

WARRANTY

All Hanna Instruments meters are warranted for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. **The electrodes and the probes are warranted for a period of six months.** This warranty is limited to repair or replacement free of charge.

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization number from the Customer Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

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Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

CE DECLARATION OF CONFORMITY



DECLARATION OF CONFORMITY

We

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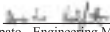
herewith certify that the mA simulator:

HI 931002

has been tested and found to be in compliance with the following regulations:

IEC 801-2	Electrostatic Discharge
IEC 801-3	RF Radiated
IEC 801-4	Fast Transient
EN 55022	Radiated, Class B
EN 61010-1	User Safety Requirement

Date of Issue: 16-9-1997


D. Volpato - Engineering Manager
On behalf of
Hanna Instruments Italia S.r.l.

Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance.

To avoid damages or burns, do not perform any measurement in microwave ovens.

PRINTED IN
PORTUGAL

MN931002R1
04/98



MN931002R1



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