Instruction Manual

BL 931700-0
BL 931700-1

Panel-Mounted pH Indicators & Controllers

Black Stone

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 areas could cause unacceptable interferences to radio and TV equipment. The glass bulb at the end of the electrode is sensitive to electrostatic discharges. Avoid touching this glass bulb at all times. During operation, ESD wrist straps should be worn to avoid possible damage to the electrode by electrostatic discharges. Any variation introduced by the user to the supplied equipment may degrade the instrument's EMC performance. To avoid electrical shock, do not use these instruments when voltages at the measurement surface exceed 24 Vac or 60 Vdc. To avoid damages or burns, do not perform any measurement in microwave ovens.

Dear Customer,

Thank you for choosing a Hanna product.

This manual will provide you with the necessary information for the correct operation of the meter. Please read it carefully before using the instrument.

If you need additional technical information, do not hesitate to e-mail us at **techserv@hannacan.com**.

These instruments are in compliance with the CE directives.

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully. If any damage has occurred during shipment, immediately notify your Dealer or the nearest Hanna Customer Service Center.

Each meter is supplied with:

• Mounting brackets
• Instruction manual

Note: Conserve all packing material until the instrument has been observed to function correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

BL931700-0 and **BL931700-1** are panel-mounted pH indicators and controllers designed for simplicity of use in a wide range of industrial applications.

Connections and wiring to electrode, power supply, contacts and external recorders are made via the terminal blocks on the rear panel. The meters are equipped with a BNC socket and accept input from conventional pH electrodes.

Other features include: 4-20 mA output, overtime control system, selection of dosing direction (Acid/Alk), contact for external control and disabling of dosing action, multi-colour LED for indicating if the meter is in measurement/dosing/alarm condition, possibility to set (Off-Auto-On switch) dosing action mode.

Two models are available:

• **BL 931700-0** powered at 12 Vdc
• **BL 931700-1** powered at 115 or 230 Vac

SPECIFICATIONS

Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@ 20°C/68°F)	± 0.02 pH
Typical EMC Deviation	± 0.10 pH / ± 0.10 mA
Calibration	Manual, through Offset & Slope trimmers
Dosing Contact	Maximum 2A (fuse protected), 250 Vac, 30 Vdc
Dosing Selection	Acid or Alk, selectable on the back panel
Contact Open＝Acid dosage＝Relay ON if Measure > Setpoint	
Contact Close＝Alk dosage＝Relay ON if Measure < Setpoint	
Setpoint	Adjustable, from 0 to 14 pH
Overtime	Adjustable, typically from 5 to approx. 30 minutes
Recorder Output	4 to 20 mA, accuracy ± 0.20 mA, 500 Ω maximum load
Power Consumption	10 VA
Installation Category	‖
Power supply:	External (fuse protected)
BL931700-0	12 Vdc
BL931700-1	115/230 Vac ; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3x2.1x3.9")

ASSEMBLING VIEW

Mounting bracket
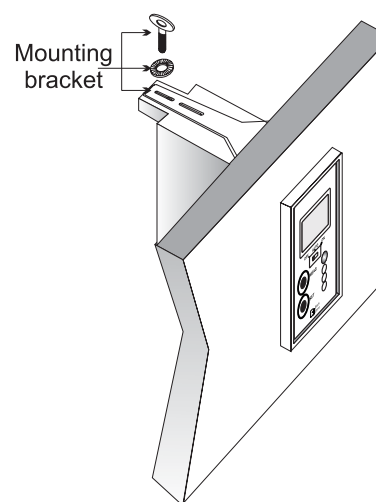
ACCESSORIES

pH CALIBRATION SOLUTIONS
HI 7004M/L pH 4.01 buffer solution, 230/500 mL bottle
HI 7006M/L pH 6.86 buffer solution, 230/500 mL bottle
HI 7007M/L pH 7.01 buffer solution, 230/500 mL bottle
HI 7009M/L pH 9.18 buffer solution, 230/500 mL bottle
HI 7010M/L pH 10.01 buffer solution, 230/500 mL bottle

OTHER SOLUTIONS
HI 70300M/L Electrode storage solution, 230/500 mL bottle
HI 7061M/L Electrode general cleaning solution, 230/500 mL
HI 7073M/L Protein cleaning solution, 230/500 mL bottle
HI 7074M/L Inorganic cleaning solution, 230/500 mL bottle
HI 7077M/L Oil & Fat cleaning solution, 230/500 mL

REFILLING ELECTROLYTE SOLUTIONS (50 mL, 4 pcs.)
HI 7071 3.5M KCl＋AgCl, for single junction electrodes
HI 7072 1M KNO$_3$ solution
HI 7082 3.5M KCl, for double junction electrodes

pH ELECTRODES
HI 1002/5 BNC connector, double junction, plastic-body w/external thread & 5 m (16.5') cable
HI 1090T Screw connector, double junction, glass-body with external thread
HI 1110S Screw connector, single junction, glass-body
HI 1210T Screw connector, double junction, plastic-body with external thread
HI 2114P/2 BNC connector, double junction, plastic-body with 2 m (6.6') cable
HI 1210B/5 BNC connector, double junction, plastic-body, with 5 m (16.5') cable
HI 2910B/5 BNC connector, double junction, plastic-body, with built-in amplifier and 5 m (16.5') cable

EXTENSION CABLES, SCREW TO BNC CONNECTOR
HI 7855/5 Extension cable 5 m (16.5') long
HI 7855/10 Extension cable 10 m (33') long

OTHER ACCESSORIES
BL PUMPS Dosing Pumps (flow rate from 1.5 to 20LPH)
HI 6050 Submersible electrode holder, 60 cm (24")
HI 6051 Submersible electrode holder, 110 cm (43")
HI 6054B Electrode holder for in-line applications
HI 6054T Electrode holder for in-line applications
HI 710005/6 12 Vdc power adapter, US/European plug
HI 731326 Calibration screwdriver (20 pcs)
HI 740146 Mounting brackets
HI 7871 Level Controller (min and max)
HI 7873 Level Controller (min, max and overflow)

Front panel
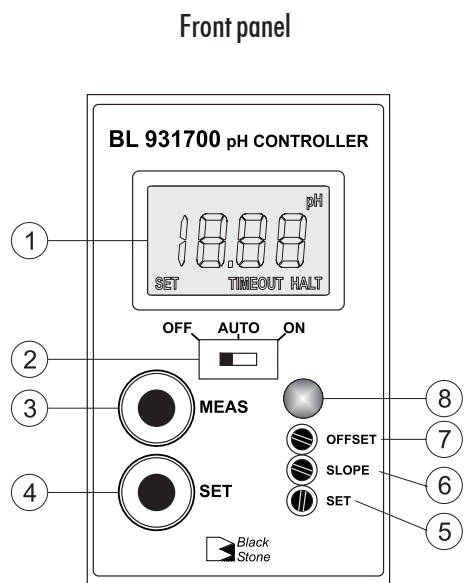
1. Liquid Crystal Display
2. Switch for selecting dosing mode:
   - OFF = dosing disabled
   - Auto = automatic dosage, depending on setpoint value and dosing selection
   - ON = dosing always active
3. "MEAS" key to set the instrument to measurement mode
4. "SET" key to display and set the setpoint value
5. "SET" trimmer to adjust the setpoint value (0 to 14 pH)
6. "SLOPE" trimmer to adjust the pH slope value during calibration
7. "OFFSET" trimmer to adjust the pH offset value during calibration
8. 3-colour LED indicator:
   - Green = meter in measurement mode
   - Orange/Yellow = dosing in progress
   - Red, blinking = indicates an alarm condition
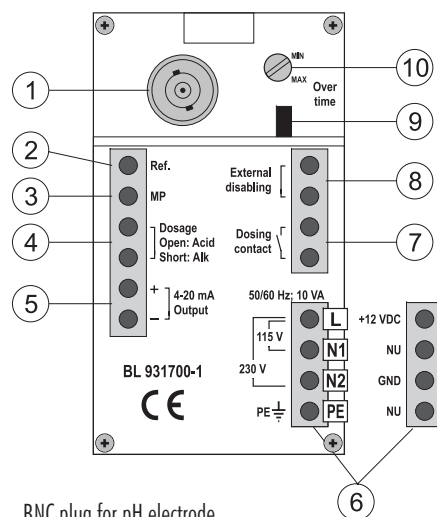
1. BNC plug for pH electrode
2. Connection for electrode reference
3. Connection for potential Matching Pin
4. Acid/Alkaline dosage selection terminal:
   - contact open = acid selection
   - contact closed = alkaline selection
5. 4-20 mA output terminal for recorder connection
6. Power supply terminal:
   - for BL931700-0 model: 12 Vdc adapter
   - for BL931700-1 model: 115 Vac or 230 Vac option
7. This contact acts as a switch for driving the dosing system (e.g. dosing pump)
8. External control and disabling of dosing system
9. Jumper for enabling (jumper in) or disabling (jumper removed) the overtime control
10. Trimmer for overtime setting (typically from 5 to 30 minutes)

⚠ All external cables connected to the rear panel should end with cable lugs.

⚠ **A circuit breaker (rated 6A max.) must be connected in close proximity to the equipment, and in a position easy to reach by the operator, for disconnection of the instrument and of all the devices connected to the relays.**

REAR PANEL CONNECTIONS
Terminals #1, #2 and #3: Electrode
- Connect a pH-electrode to the meter BNC plug (#1).
- To benefit from the differential input, connect the proper electrode wire (if available) or a cable with a potential matching pin (grounding bar) to the relevant terminal (#3) on the rear panel.

Note: When the Matching Pin can not be immersed together with the pH electrode in the solution, disable the differential input by shorting terminals #3 (Matching Pin) and #2 (Electrode Reference) with a jumper wire.

Terminals #4: Dosing selection
- For acid dosage, leave the circuit open.
- For alkaline dosage, short the terminals with a jumper wire.

Terminals #5: 4-20 mA Output
- These output terminals are used for connecting a recorder. The output is from 4 to 20 mA and is proportional to the measured pH value.

Terminals #6: Power Supply
- Model **BL931700-0**: connect the 2 wires of a 12 Vdc power adapter to the terminals +12 Vdc and GND.
- Model **BL931700-1**: connect a 3-wire power cable to the terminals while paying attention to the correct earth (PE), line (L) and neutral (N1 for 115 V or N2 for 230 V) contacts.

Terminals #7: Dosing Contact
- This contact drives the dosing system, accordingly to the selected setpoint and dosing direction:
  - if "Acid" dosage is set, the relay is ON and dosing activated if measured value is higher than setpoint;
  - if "Alk" dosage is set, the relay is ON and dosing activated if measured value is lower than setpoint.

Note: The setpoint has a typical hysteresis value comparable to the meter accuracy.

Terminals #8: External Disabling Contact
- This is a normally open contact and can be used for example for connecting a level controller.
- When the contact is closed, any dosing action stops, the LED indicator on the front panel will blink Red and the LCD will show the "HALT" warning message.

Note: If the OFF/Auto/ON switch is in ON position, the dosing action will not stop, even if the external disablig contact is closed. Dosage will proceed, the LED indicator will lit Orange/Yellow and the LCD will show the "HALT" warning message.

Overtime system: jumper (#9) and trimmer (#10)
- This system allows the user to set a maximum dosing period, by adjusting the rear trimmer from 5 (min) to approx. 30 (max) minutes.
- When the set time is exceeded, any dosing action stops, the LED indicator on the front panel will blink Red and the LCD will show the "TIMEOUT" warning message. To exit the overtime condition, set the OFF/Auto/ON switch to "OFF" position, and then to "Auto" again.
- For disabling the overtime feature, simply remove the jumper on the rear panel.

Note: The overtime system works only if the OFF/Auto/ON switch is in "Auto" position.

OPERATING THE METER
Before proceeding make sure that:
- the meter is calibrated;
- the setpoint value has been properly adjusted;
- all rear panel wiring and selections are correct;
- the OFF/Auto/ON switch is in the desired position.

Install or immerse the electrode in the solution to be monitored, then press the "MEAS" key (if necessary).
The LCD will show the pH value. The LED indicator will light up Green when the meter is in measurement mode and dosing is not active, while will light up Orange/Yellow for signaling that a dosing action is in progress.

CALIBRATION
With meter in measurement mode, immerse electrode and Matching Pin (if available) in pH 7.01 buffer solution, shake briefly and wait for reading to stabilize. Adjust the OFFSET trimmer until "7.01 pH" is displayed on the LCD.
Rinse electrode and Matching Pin (if available), immerse them in pH 4.01 (or pH 10.01) buffer solution, shake briefly and wait for reading to stabilize. Adjust the SLOPE trimmer until "4.01 pH" (or "10.01 pH") is displayed on the LCD.

SETPOINT
Press the "SET" key: the display will show the default or previously adjusted value, together with the "SET" indication. Using a small screwdriver adjust the "SET" trimmer until the desired setpoint value is displayed.
After 1 minute the meter automatically returns to the normal mode; or press the "MEAS" key.