HIOKI

8946

4ch ANALOG UNIT

INSTRUCTION MANUAL

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Introduction

Thank you for purchasing the HIOKI "Model 8946 4ch ANALOG UNIT". To obtain maximum performance from the device, please read this manual first, and keep it handy for future reference.

Overview

The 8946 is the 4ch analog unit for the Memory HiCorders. For the detailed installation procedure, refer to the instruction manual for the main unit.

HIOKI device supported: 8720, 8835-01, 8841, 8860, 8861

Inspection and Maintenance

Initial Inspection

When you receive the device, inspect it carefully to ensure that no damage occurred during shipping. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

Preliminary Checks

- Before using the device the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.
- Before using the device, make sure that the insulation on the connection cords is undamaged and that no bare conductors are improperly exposed. Using the device in such conditions could cause an electric shock, so contact your dealer or Hioki representative for replacements.

Maintenance and Service

- To clean the device, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.
- If the device seems to be malfunctioning, contact your dealer or Hioki representative.
- Pack the device so that it will not sustain damage during shipping, and include a description of existing damage. We cannot accept responsibility for damage incurred during shipping.

Safety

This manual contains information and warnings essential for safe operation of the device and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.

⚠DANGER

This device is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the device. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from device defects.

Safety Symbol

⚠	In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the device. The ⚠ symbol printed on the device indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function.
⏚	Indicates a grounding terminal.
~	Indicates AC (Alternating Current).
⎓	Indicates DC (Direct Current).

The following symbols in this manual indicate the relative importance of cautions and warnings.

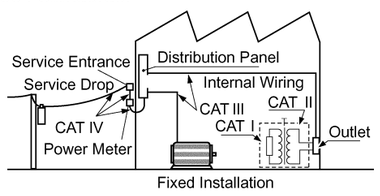
⚠DANGER	Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
⚠WARNING	Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
⚠CAUTION	Indicates that incorrect operation presents a possibility of injury to the user or damage to the device.

Measurement categories (Overvoltage categories)

This device complies with CAT I safety requirements.
To ensure safe operation of measurement devices, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement categories. These are defined as follows.

CAT I: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.
CAT II: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)
CAT III: Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.
CAT IV: The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).

Higher-numbered categories correspond to electrical environments with greater momentary energy. So a measurement device designed for CAT III environments can endure greater momentary energy than a device designed for CAT II.
Using a measurement device in an environment designated with a higher-numbered category than that for which the device is rated could result in a severe accident, and must be carefully avoided.
Never use a CAT I measuring device in CAT II, III, or IV environments.
The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.



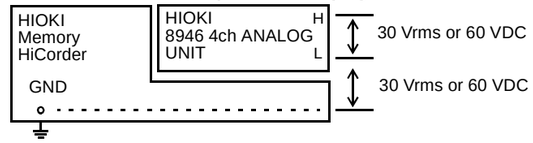
Fixed Installation

Usage Notes

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

⚠DANGER

- The maximum input voltage is 30 V rms or 60 V DC. Attempting to measure voltage in excess of the maximum input could destroy the device and result in personal injury or death.
- The maximum rated voltage between input terminals and ground (voltage between 8946 input terminal and main unit frame, and between input terminals of other input modules) is 30 V rms or 60 V DC. Attempting to measure voltages exceeding this level could damage the device and result in personal injury.



⚠WARNING

- Do not allow the device to get wet, and do not take measurements with wet hands. This may cause an electric shock.
- Do not use the device where it may be exposed to corrosive or combustible gases. The device may be damaged or cause an explosion.
- For safety reasons, when taking measurements, only use the specified HIOKI 9198 CONNECTION CORD.

⚠CAUTION

- Do not store or use the device where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the device may be damaged and insulation may deteriorate so that it no longer meets specifications.
- This device is not designed to be entirely water- or dust-proof. Do not use it in an especially dusty environment, nor where it might be splashed with liquid. This may cause damage.
- To avoid damage to the device, protect it from physical shock when transporting and handling. Be especially careful to avoid physical shock from dropping.

Specifications

Accuracy guaranteed for one year at 23±5°C (73±9°F), 35 to 80%RH, after auto-balancing, after 30-minutes warming-up time.

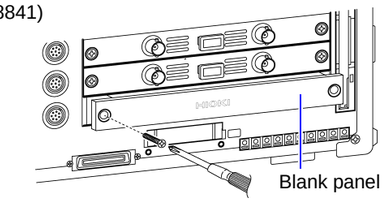
Number of input channels	4
Measurement ranges	f.s. = 10 DIV: 20 m, 50 m, 100 m, 200 m, 500 m,1, 2, 5 V/DIV f.s. = 20 DIV: 10 m, 20 m, 50 m, 100 m, 200 m, 500 m, 1, 2 V/DIV
DC amplitude accuracy	±0.5%f.s.
Zero position accuracy	±0.15%f.s. (after zero adjustment)
Temperature characteristic	Gain: ±0.05%f.s./°C Zero position: ±0.025%f.s./°C
Frequency characteristic	DC to 100 kHz ±3dB
Noise	1 mVp-p typ., 2 mVp-p max. sensitivity range, with input shorted
Common mode rejection ratio	80 dB minimum(at 50/60 Hz and with signal source resistance 100 Ω maximum)
Low-pass filter	OFF, 5, 500, 5 k, 50 kHz ±50% (-3 dB)
Input type	Unbalanced (input isolated from output)
Input coupling	DC/ GND
Input resistance	1 MΩ±1%
Input capacitance	15 pF±10 pF (at 100 kHz)
A/D resolution	12 bits
Maximum sampling rate	1 MS/s (maximum sampling period: 1 µs)
Input terminals	BNC terminal
Maximum input voltage	30 V rms or 60 VDC
Maximum rated voltage to earth	30 V rms or 60 VDC (between each input channel and main unit, and between input channels)
Operating temperature and humidity ranges	Same as the Memory HiCorder in which the 8946 is installed
Storage temperature and humidity ranges	-10 to 50°C (14 to 122°F), 80% RH or less (no condensation)
Operating environment	Same as the Memory HiCorder in which the 8946 is installed
Effect of radiated radio-frequency electromagnetic field	±2%f.s. (max) at 3 V/m
Dimensions and mass	Approx. 170W x 20H x 148.5D mm (6.69"W x 0.79"H x 5.85"D) (excluding projections) Approx. 310 g (10.9 oz.)
Accessory	Instruction Manual
Applicable Standards	
Safety	EN 61010 Pollution degree 2, Measurement category I (anticipated transient overvoltage 330 V)
EMC	EN 61326

Replacement Procedure

⚠WARNING

- To avoid electric shock accident, before removing or replacing an input module, confirm that the instrument is turned off and that the power cord and connection cables are disconnected.
  The mounting screws must be firmly tightened or the input module may not perform to specifications, or may even fail.
- To avoid the danger of electric shock, never operate the instrument with an input module removed. To use the instrument after removing an input module, install a blank panel over the opening of the removed module.

(Example:8841)

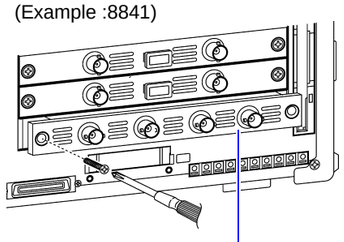


⚠CAUTION

Do not measure with a blank panel removed. Otherwise, the main unit internal temperature becomes unstable and consequently the specifications are not met.

This section describes how to replace the 8946 4ch ANALOG UNIT.
The following procedure describes how to remove the 8946.
Install the modules by reversing the procedure for removal.

(Example :8841)



1. Remove the connection cords and thermocouple from all input modules.
2. Power off the main unit, and disconnect the power cord.
3. Remove the two fixing screws with a Phillips screwdriver.
4. Grasp the BNC connectors and pull the module out.