

HIOKI

RECORDER

8801-8802 MEMORY Hi CORDER

8801

8802

Analog and Digital Waveforms Stored and Recorded

Dual-Capability Waveform Recorder

- 8801
 - ① Memory recorder ② Standard recorder
 - ③ High-speed X-Y recorder ④ Continuous X-Y recorder
 - 4-channel simultaneous recording
- 8802
 - 01 mod
 - 8 Logic Channels plus 3 Analog Channels
 - 02 mod
 - 16 Logic Channels plus 2 Analog Channels



8802-01

Captures and records high-speed and transient phenomena

4-Channel Waveform Recorder

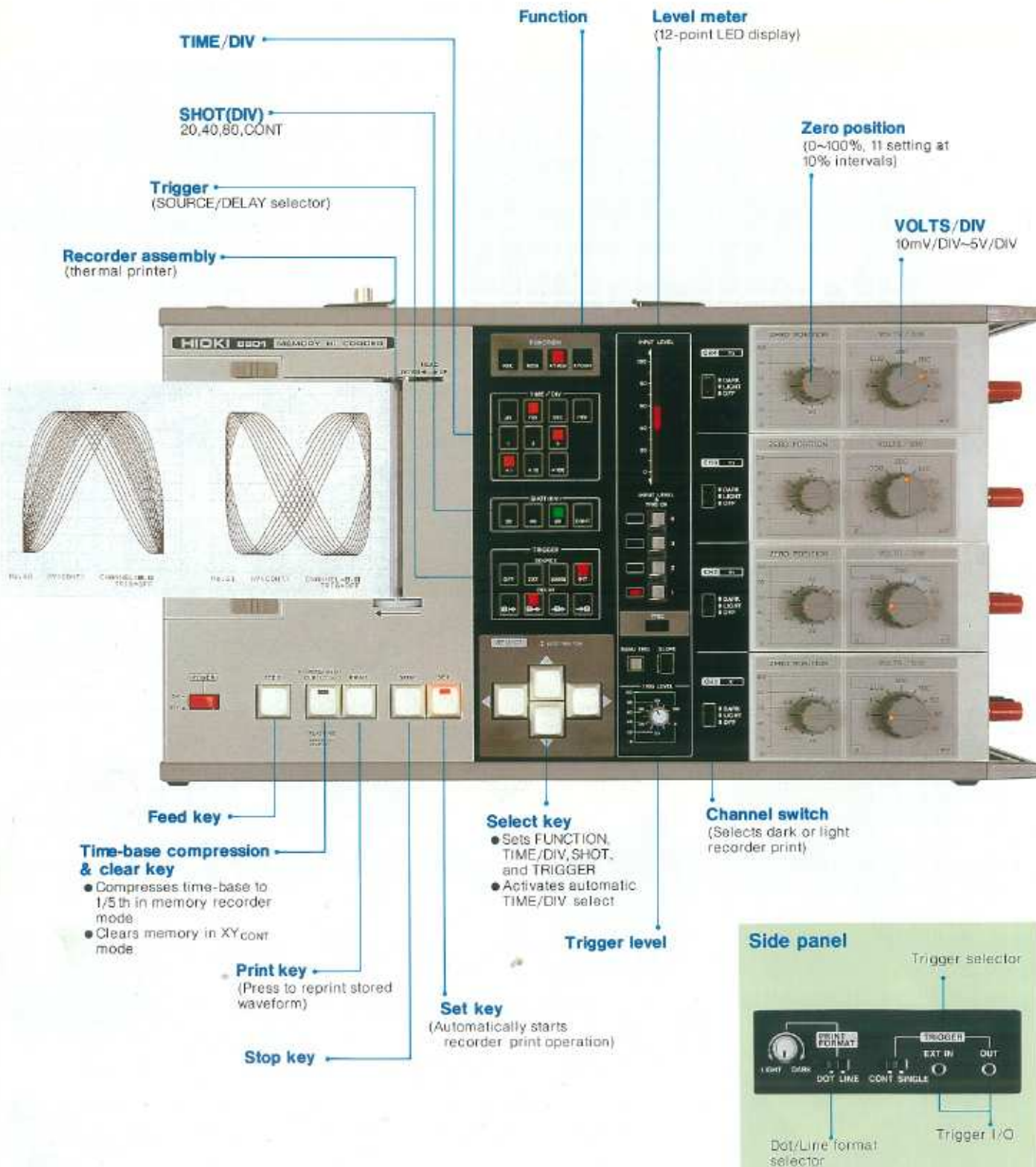
8801

The 8801 Memory Hi Corder employs the latest advances in modern electronics to digitize and store high-

speed and transient phenomena, then accurately reproduces the waveform on an easy-to-read recording chart. The distinguishing feature of this technically-advanced 4-channel recorder lies in its four operating functions. The 8801 can be used as a memory recorder, standard recorder,

high-speed X-Y recorder, or continuous-recording X-Y recorder. Suitable for use both in research and production procedures, the 8801 proves its worth in parts and materials testing. It also measures and records periodic quantities, plus mechanical shock, vibration, and stress phenomena.

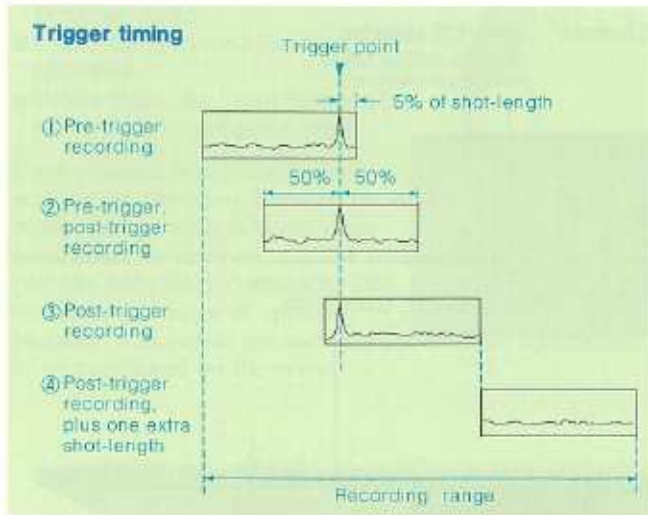
Sensible panel control layout



Four Operational Function

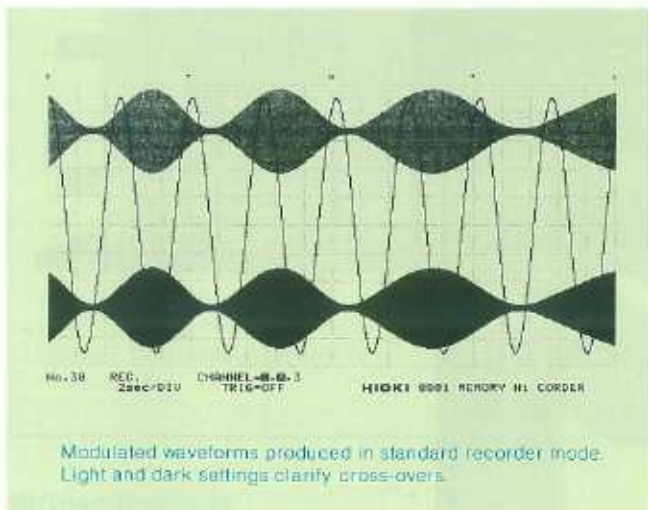
① Memory Recorder (MEM)

Recording speed ranges from $100\mu\text{s}/\text{DIV}$ to $5\text{ sec}/\text{DIV}$ (equivalent chart speed of $90\text{m}/\text{sec}$). Four trigger timing settings. Dots or lines can be used to record waveforms. 1/5th time-base compression setting.



② Standard Recorder (REC)

4-channel simultaneous recording is possible in this mode, with chart speeds ranging from $1\text{ sec}/\text{DIV}$ to $50\text{ min}/\text{DIV}$ ($1\text{ sec}/\text{DIV} = 54\text{cm}/\text{min}$). Sampling speed high enough to reproduce audible frequency waveform envelopes.

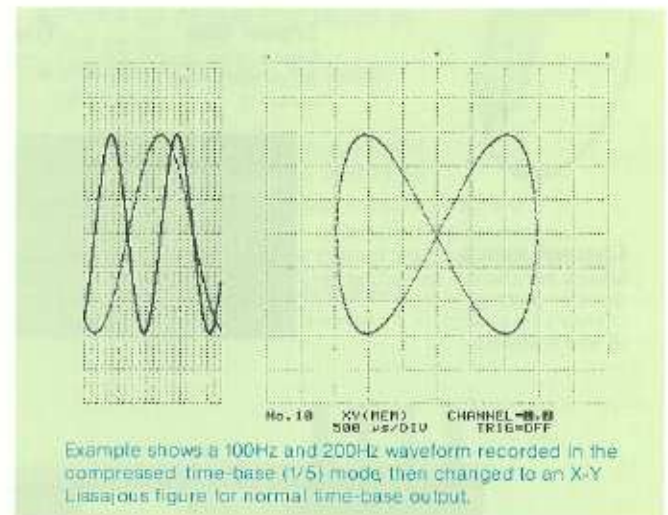


Easy to set up—Easy to operate

LEDs assist the operator in making control settings and monitoring recorder operation. Function, TIME/DIV, SHOT (DIV), and trigger selection are all simple key operations. And a 12-point LED level meter provides a constant means of monitoring input amplitudes.

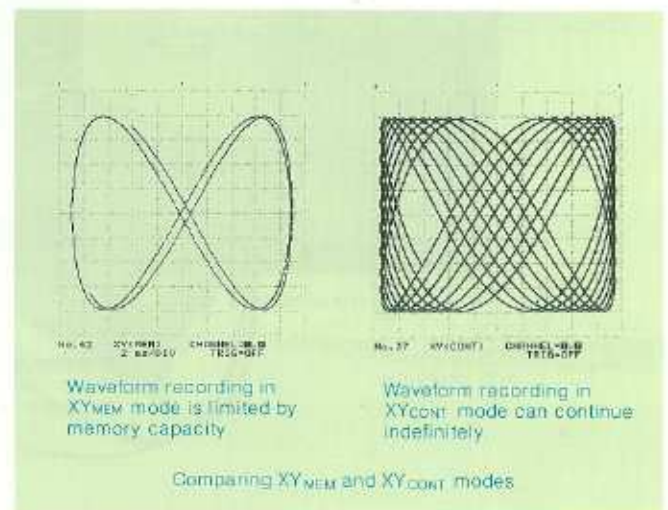
③ High-Speed X-Y Recorder (XY MEM)

Three channels ($X-Y_1$, $X-Y_2$, $X-Y_3$) can be recorded in this mode, making the recording of Lissajous figures and other X-Y plots possible at memory recorder speeds.



④ Continuous X-Y Recorder (XY CONT)

Recording time is unlimited in this mode, with the recording overlapped accordingly. X-Y phenomena can be recorded in up to three channels, accommodating signals ranging as high as several hundred hertz.



Comment print-out

Comments can be printed on the edge of the chart denoting such items as function and time-base setting, total output count, the channel(s) in use, trigger, and trigger delay information.

Compact, lightweight

Weighing only 8.3kg, the 8801 can be easily transported where required.

Analog and digital signal recording capability.

Records logic-circuit waveforms—8-channel or 16-channel

8802-01

The 8802 is a truly versatile multi-channel recorder capable of handling both analog signals, and digital signals

produced by logic circuits. 8802-01 is provided with 8 logic channels, and 8802-02 has 16. Used in the memory mode, the 8802 serves a wide range of functional applications. It can be used for both logic circuit analysis, or as a single event recorder. The trigger function in the logic

section can be set to any trigger conditions, plus a trigger filter can be used to suppress unwanted triggers. This assures that the trigger occurs at the proper point each time. Two types of logic probes are optionally available to suit all applications.



Channel switch
Selects the channel for recording. Selector settings include OFF, 4 channels (A setting), or 8 channels (A and B setting).

LED lights when switch is ON.

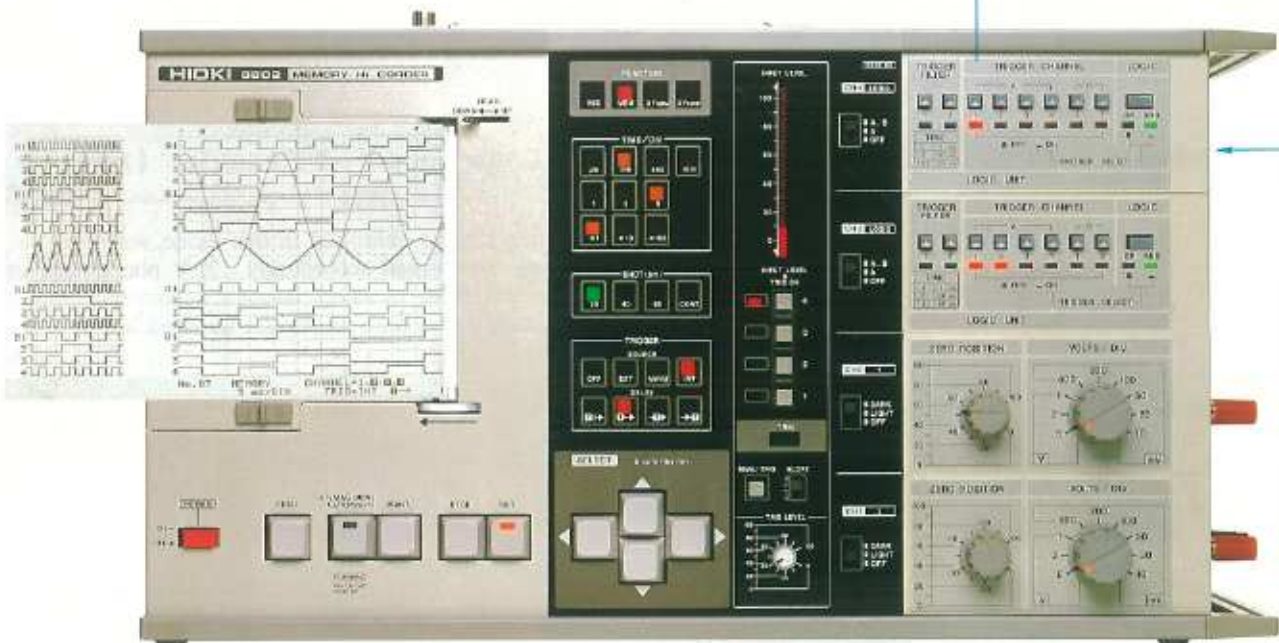


Photo shows model 8802-02

*See description of 8801 for analog section information.

Inverter switch
Inverts logic of channel for trigger circuit input.



Trigger Filter

The trigger filter circuit functions to suppress false triggers by filtering periods that contain unwanted artifacts such as relay contact bounce. Setting the appropriate time constant assures that the trigger will occur at the correct point each time.

Trigger Conditions

Trigger conditions can be set by ANDing or ORing any two channels from the four channels of the A side probe, and the two channels of the B side probe. Also, since the four A channels are connected to the trigger circuit via an inverter switch, any

pattern can be used to set the trigger.

Logic Unit

Two logic probes (9306 or 9307) can be connected to each logic unit.

Applications range from microcircuit testing to relay sequence analysis

Two logic probe options available

9306 Logic Probe

- Digital or contact input, switch selectable.
- Digital input functions at TTL level, or at signal levels up to 50V.
- Contact input recorded as positive logic.
- Indicator provided for each channel.
- Probe tips use interchangeable IC clips and alligator clips.



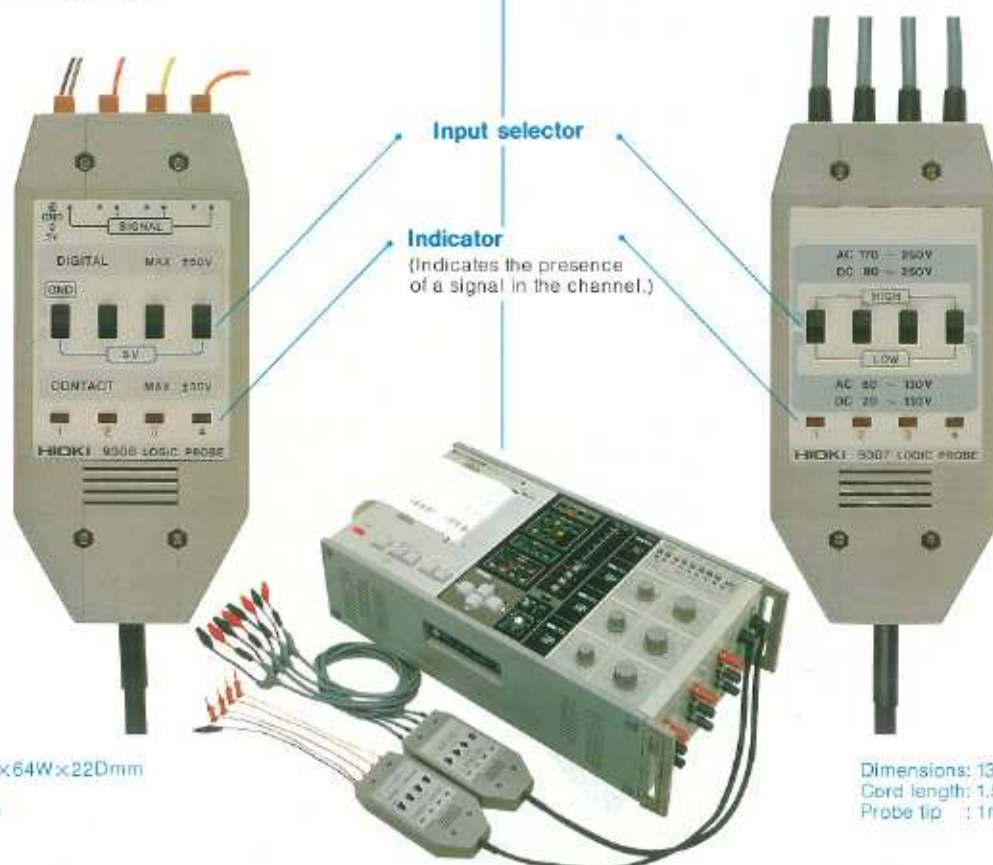
Each channel is provided with a selector for switching between the digital input (for use with ICs and other semiconductor devices), and the contact input (for use with relay contacts). This feature greatly increases the range of applications in which the 8802 can be used. Individual channel indicators allow operations to be monitored on the probe.

9307 Line Type Logic Probe

- Senses both AC and DC voltage levels.
- Four channels, floating.
- Senses relay contact make/break in systems ranging from DC 24V to AC 240V.
- Picks up momentary drops in the power line.
- Indicator provided for each channel.



Voltage range coverage is extended through the use of a Low and High switch. Fast response time assures accurate sensing of high-speed, or momentary phenomena. An analysis of operating timing can be made through the recording of relay coil voltage.



Dimensions: 137H×64W×22Dmm
Cord length: 1.5m
Probe tip : 20cm

Dimensions: 137H×64W×22Dmm
Cord length: 1.5m
Probe tip : 1m

Specifications

9306 Logic Probe

No. of channels	*1 4	
Input configuration	Digital input	*2 Contact input
Input impedance	Over 50kΩ	2kΩ
Threshold level	+1.4V	+1.4V
Max. allowable input voltage	±50V	±30V

*1 Channel GND common. Also, when two 9306 probes are connected to one unit, all eight channels share a common ground.

*2 Contact input goes HIGH when the input is shorted to the 5V line (output from the probe).

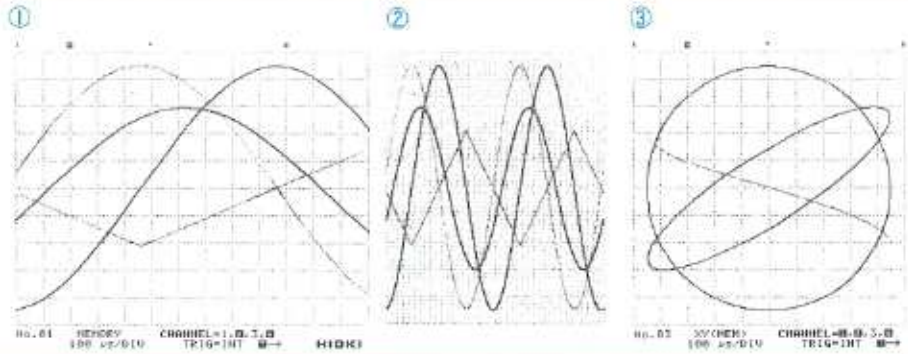
9307 Line Type Logic Probe

No. of channels	4 (floating)		
Max. floating voltage	250V (AC, DC)		
Input voltage	Low	High	
Input resistance	Approx. 30kΩ	Approx. 100kΩ	
Voltage sensing range	(AC)	80~130V	170~250V
	(DC)	20~130V	80~250V
Response time	↑	Within 1ms	Within 1ms
	↓	Within 3ms	Within 3ms

8801 Waveform Examples

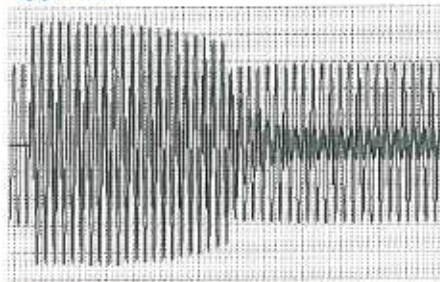
Waveform recorded using memory function. Output mode is changed, and reprint function used to provide a different view.

- ① Recording of high-speed phenomena.
- ② Reprint using compressed time-base.
- ③ Waveform combined into a 3-channel X-Y recording.

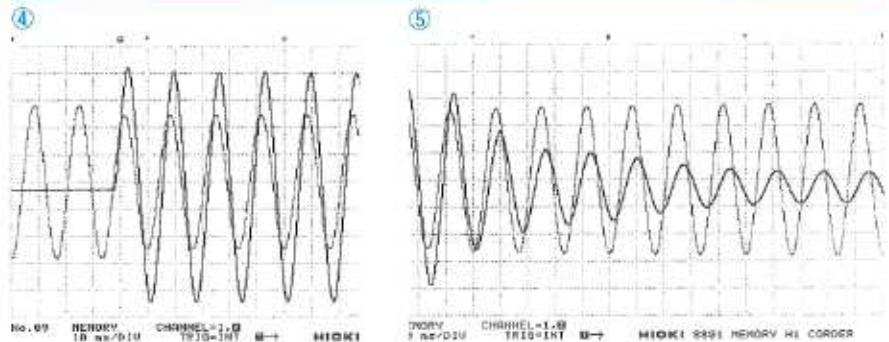


Starting current for a single-phase motor boring machine.

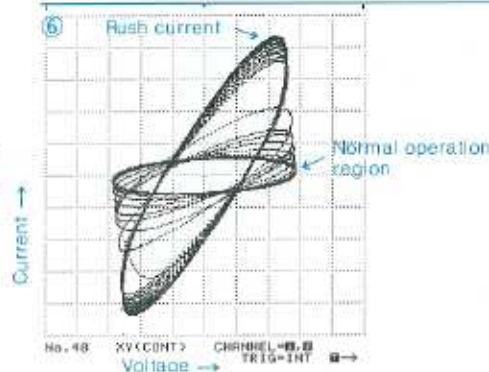
Total waveform is recorded using compressed time-base. Light recording represents volt age waveform during rush current period. Voltage drop is apparent.



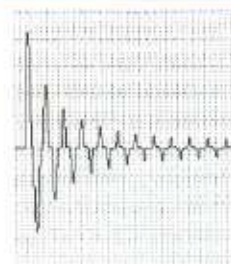
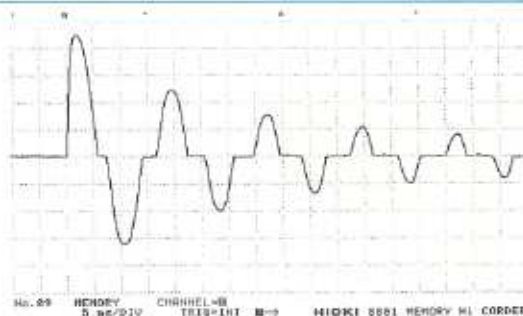
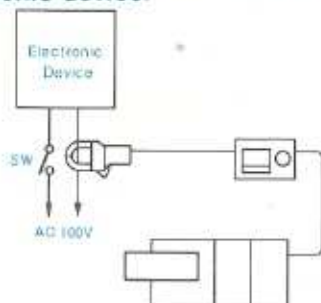
- ④ (start-up), and ⑤ (normal operating region) clarify the phase shift in these regions.



⑥ is an X-Y recording of ④ and ⑤. In the normal operating region, phase shift reduces power-factor, resulting in reduced power consumption ratio.



AC rush current waveform of an electronic device.

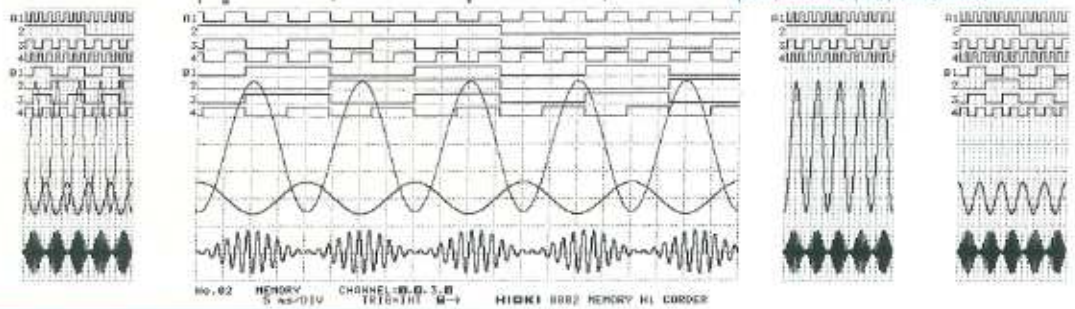


Reprinting the waveform on the left in the compressed time-base mode accentuates the transient phenomena.

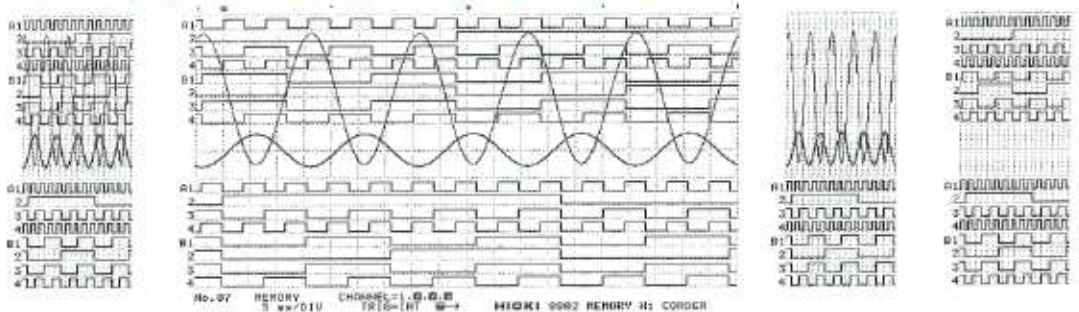
8802 Waveform Examples

8802-01 analog (3CH) plus digital (8CH) simultaneous recording

Reprint can be selected for the desired channel(s). The recordings on the right are made using the compressed (1/5) time-base mode.



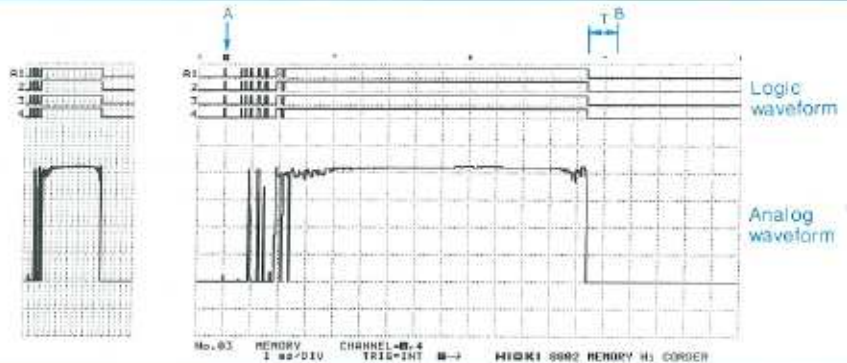
8802-02 analog (2CH) plus digital (16CH) simultaneous recording



Trigger Filter

The trigger circuit can be filtered to suppress unwanted triggers (due to contact bounce, etc.).

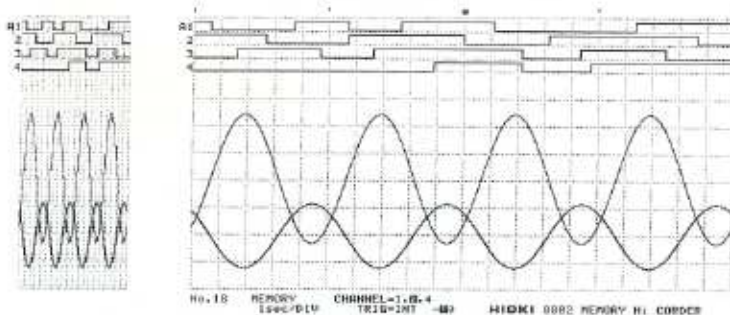
As shown in the example at right, the trigger is set on the negative-going edge (↓), and would normally be at point A. However, applying a trigger with a time-constant of T moves the trigger point to B.



Trigger Conditions

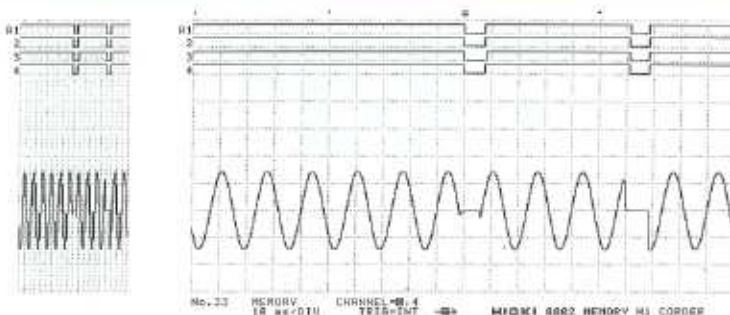
The trigger can be set using the AND or OR of two channels, or can be set using any type of pattern. Setting the trigger to activate when channels 1, 3, and 4 are HIGH, and channel 2 is LOW results in the following.

1, 2, 3, and 4 on the A side of the trigger channel is turned ON, and the AND/OR selector is set to AND. Turning inverter switch 2 on the side panel ON results in the trigger being changed to the positive (↑) edge.



Momentary Power Loss

The 9307 Line Type Logic Probe functions to sense the presence (or absence) of AC and DC voltage. Using this characteristic gives the recorder the capability to record momentary drops in the power supply.



Specifications

		8801	8802-01	8802-02
No. of channels		Analog, 4	Analog, 3/Logic, 8	Analog, 2/Logic, 16
Memory Recorder	Time-base	100 μ s/DIV~5 sec/DIV (15 step settings) (25 samples per DIV)		
	Recording length	20, 40, or 80 DIV/SHOT		
	Interpolation function	Yes		
	Compressed output	Time base can be compressed to 1/5 normal length		
Standard Recorder	Time-base	1 sec/DIV~50 sec/DIV, 1 min/DIV~50 min/DIV (12 step settings)		
	Recording length	20, 40, 80 DIV/SHOT, or continuous		
	Sampling period	100 μ s (using 1 channel)	200 μ s (using 1 channel)	
		160 μ s (using 2 channels)	400 μ s (using 2, 3, or 4 channels)	
200 μ s (using 3 or 4 channels)		* Logic unit counts as 1 channel		
High-Speed X-Y Recorder	No. of channels	3(X-Y ₁ · X-Y ₂ · X-Y ₃)	2 (X-Y ₁ · X-Y ₂)	1 (X-Y ₁)
	Effective recording width	Approx. 90mm×90mm (251×251 dots)		
	Sampling period	4 μ s~200ms		
Continuous X-Y Recorder	No. of channels	3	2	1
	Effective recording width	Approx. 90mm×90mm (251×251 dots)		
	Recording time	Unlimited		
	Sampling period	60 μ s (using 1 channel)	60 μ s (using 1 channel)	
100 μ s (using 2 channels)		100 μ s (using 2 channels)		
120 μ s (using 3 channels)				
Accessories		Power cord, 1	Power cord, 1	
		Input cable, 4	Input cable, 2	
		Shorting bar, 4	Shorting bar, 2	
		9221 Recording chart, 1 roll	9221 Recording chart, 1 roll	
		Spare fuse, 1	Spare fuse, 1	

Basic Specifications

Measurement Function	① Memory Recorder, ② Standard Recorder, ③ High-Speed X-Y Recorder, ④ Continuous X-Y Recorder
Memory Capacity	8-bits × 2 kilowords per channel
Recording Method	Thermal
Recording Chart	110mm×30m, 9mm/DIV (effective width, 90mm)
Max. Floating Input	DC 180V, AC 130V
CMRR	> 80dB (50/60Hz)
Operating Temperature	0~40°C (< 80% RH)
Power Source	AC 100, 120, 200, 220, 240V (available by order) ± 10%, 50/60Hz (100W max, 30W normal)
Dimensions/Weight	420L×240W×118D (mm)/8.3kg (approx.)
Input Section	
Sensitivity	10mV/DIV~5V/DIV, 9 step setting
Full-Scale Sensitivity	± 0.35% ± 1 dot
Offset Adjustment	0~100% of recording width, settable at 10% increments.
Frequency Response	DC~100kHz (± 3dB)
Input Configuration	Floating with guard, input resistance 1M Ω
AD Converter	8-bit parallel comparator type
Linearity	± 0.5%
Max. Input Voltage	DC 100V, AC 100V
Trigger Section	
Trigger Source	OFF/EXT/MANU/INT
Trigger Slope	↑ (positive edge)/ ↓ (negative edge)
Trigger Level	INT; across full effective recording width. EXT; TTL level, or terminal closure.
Trigger Delay	Post-trigger, Pre-trigger, Post-& Pre-trigger, or Post-trigger with one extra shot-length.
Trigger Output	TTL level (active LOW); pulse width, approx. 0.2s
Operation	Single or continuous trigger
Ext. Trigger Input	Minijack
(Logic Unit Trigger Function)	
Trigger Filter	1ms/20ms/50ms, 3 step settings
AND/OR Switch	Six channels (the four A CH, and two B CH) can be AND'd or OR'd
INVERT Switch	The four A channels can be inverted
Miscellaneous	
Input Level Indicator	12-point LED, indicates 23 levels of amplitude
Channel Switch	Sets waveform tone light or dark, or turns the channel OFF
(Logic Unit Section)	
A & B (8-CH recording)/A (4-CH recording)/OFF, switch selectable	

Addendum

Memory Recorder, High-speed X-Y Recorder

TIME/DIV	TIME/WORD	Recording Time
100 μ s/DIV	4 μ s	8ms
200	8	16
500	20	40
1ms/DIV	40	80
2	80	160
5	200	400
10	400	800
20	800	1.6sec
50	2ms	4.0
100	4	8.0
200	8	16.0
500	20	40.0
1sec/DIV	40	80.0
2	80	160
5	200	400

Standard Recorder

TIME/DIV	Chart Speed	Time-Base Resolution
1sec/DIV	540mm/min	1/25DIV
2	270	
5	108	
10	54	
20	27	
50	10.8	
1min/DIV	540mm/hour	1/50DIV
2	270	
5	108	
10	54	
20	27	
50	10.8	

Optional Accessories

9221 Recording Chart
(30 m, 10rolls)

9303 PT
(transformation ratio: 40:1 (400V input), 20:1 (200V input))

9304 Attenuator
(attenuation ratio: 10:1)

9305 Trigger Cord

9306 Logic Probe

9307 Line Type Logic Probe

9146 Carrying Case

HIOKI E.E. CORPORATION

DISTRIBUTED BY

HEAD OFFICE: P.O. Box 1, Sakaki, Nagano, 389-06 Japan.
Tlx: 3327508 HIOKI J / Cable: HEWLOV, Ueda
Telephone: (02688) 2-3030

TOKYO OFFICE: 2-23-24 Shiba Nakata, Kawaguchi, Saitama 333.
Telephone: (0482) 61-2401

HIOKI-RCC, INC.: 198 Route 206 South Somerville, N.J. 08876 U.S.A.
Telephone: (201) 874-6484