

OSCILLOGRAPHIC RECORDERS

YOKOGAWA

ORP1200 / ORP1300 & ORM1200 / ORM1300

7810&7820

Oscillographic Recorders

ORP1200 / ORP1300

ORM1200 / ORM1300

**ORM1200 (7820)**

320 × 192 × 435mm 8.8kg
(4-ch model) to 9.5kg (8-ch model)
(12-5/8 × 7-11/16 × 17-3/16" 19.4 lbs
(4ch model) to 20.0 lbs (8-ch model)

* Except 7810□1, 7820□1, 7810□2-B, 7820□2-B models

**ORM1300 (7820)**

320 × 219 × 435mm 12kg
(12-5/8 × 8-11/16 × 17-1/8" 25.4 lbs)

★ ORP1200/ORM1200			
Model & Suffix code	Safety Standards	EMI Standard	Immunity Standard
7810□3, 7820□3	EN61010-1	EN55011 Group 1 Class A	EN50082-2: 1995
7810□2-D, -F, -R or -G, 7820□2-D, -F, -R or -G	CSA1010.1, EN61010-1	EN55011 Group 1 Class A	EN50082-2: 1995
7810□1, 7820□1	CSA1010.1	-	-
7810□2-B, 7820□2-B	CSA1010.1	-	-

★ ORP1300/ORM1300			
Model & Suffix code	Safety Standards	EMI Standard	Immunity Standard
7810□3, 7820□3	EN61010-1	EN55011 Group 1 Class A	EN50082-2: 1995
7810□2-D, -F, -R or -G, 7820□2-D, -F, -R or -G	CSA1010.1, EN61010-1	EN55011 Group 1 Class A	EN50082-2: 1995
7810□1, 7820□1	CSA1010.1	-	-
7810□2-B, 7820□2-B	CSA1010.1	-	-

Introducing the ORP/ORM Series Oscillographic Recorders for use in the measurement, recording and analysis of signals from DC to high-speed transient phenomena, with the functions of a pen recorder, electromagnetic oscillograph, memory and X-Y recorders all in one instrument.

The ORP/ORM Series is truly self-contained, the "all-round recorder with the standards of the future" capable of handling a wide variety of applications, from troubleshooting in the field to product evaluation and analysis in laboratories.

We are confident the ORP/ORM Series will always be the right choice for your varying application needs.

The ORP series measures and records multiple events on a max of 32 channels—4, 8, 16 analog-input and 16 logic-input channels—simultaneously. It processes input signals through a high-speed A/D converter with a sampling rate of 100 kS/s, offering guaranteed high accuracy and wideband features.

Three amplifier levels are available at the input stage depending on the application: high-voltage, universal, and logic (optional) levels. That is, the ORP series can make high-resolution measurements of a direct input signal from a thermocouple, monitor a transmission line, and handle on/off signals from a sequencer.

The ORM Series is our newest advance in fast universal recorder design. Available with 4, 8 or 16 isolated analog channels plus up to 16 additional logic channels. With individual 128k sample memory areas for every channel, linkable up to four per channel for 512k sample capacity on selected channels, augmented by standard-equipment IC card slot and 3.5-inch floppy drive.

Further enhanced by arithmetic and statistical computing functions, and integral graphic display. More than just recorders, these are multifaceted, all-in-one data acquisition and analysis instruments perfect for testing and analysis, as at home in the field as in the lab.

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FEATURES

■ Broad Range of Input Choices

Universal input models with 14-bit resolution and direct thermocouple input capability, Voltage-input models for direct connection to AC lines up to 240 V rms. All can be supplemented with 8- or 16-channel logic input options. All perform A/D conversions at 100 kS/s for wide bandwidth.

● For heavy electrical equipment and power line monitoring...

high-voltage input model (4, 8, 16 channels)

- Direct power line connection up to 240 V rms
- Wide input ranges (up to ± 350 V peak)
- Designed for safety — each channel fully isolated from all others

● For automotive and railway equipment testing, mechanical characteristics measurement, and transformer monitoring...

universal input model (4, 8, 16 channels)

- 14-bit A/D resolution
- Direct input from thermocouple types K, E, J, T, R, S, B, L, U, N, and W
- ± 50 mV to ± 50 V linear voltage ranges

● For sequencer ON/OFF signal ... logic input option (8, 16 channels)

- 16-channel logic inputs
- Logic input independent of analog input
- Trigger setup dependent on logic patterns

■ Individual 128 k sample memory area for every channel (ORM)

■ Large Memory Capacity

With 128 k sample/channel memory capacity and the ability to link up to four channel memory areas for 512 k sample capacity on selected inputs, these recorders really show their worth in long-duration capture of high-speed measurements. And to make this large capacity easy to use, we've included built-in graphic displays with zoom and scroll functions to help you find the areas of interest, and digital cursor functions for on-screen readout of voltages and time differences.

Additional features, for sampling to memory during real-time recording, and playback recording of sampled data, let you use chart paper and memory together to get maximum benefit from both.

■ 3.5-inch floppy drive and IC card slot standard (ORM)

Taking PC-friendliness one step farther, standard equipment includes both an IC memory card slot and a 3.5-inch floppy drive.

■ Fast, high-definition recording

Special recording techniques result in trace definition four times higher than conventional at the fast, 100 mm/s maximum chart speed.

FUNCTIONS

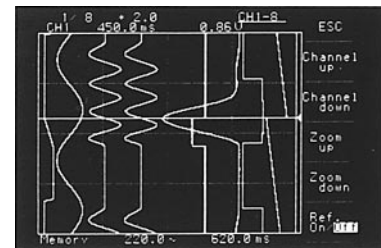
The ORP/ORM, provided with enhanced memory-recorder functions, enables you to read digital values just by pointing to them with the cursor, expand/contract or scroll the waveform, and measure the time (T) and data difference with the reference cursor.

The recorder is fully equipped with the functions needed to take the best advantage of its display features that make measurements more efficient. The ORP/ORM allows accurate and prompt measurements that consume less chart paper, reducing both work hours and running costs at the same time.

■ MEMORY FUNCTIONS

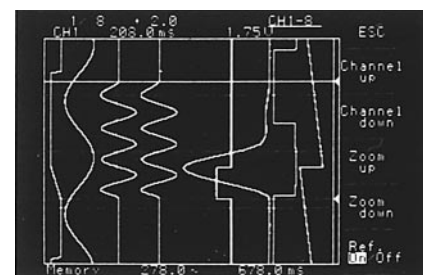
● Waveform expansion and scrolling

You can expand or scroll the waveform with the rotary knob to directly read the time and digital value of the position pointed to by the cursor.



● Reference cursor

You can read the time difference (ΔT) as well as the data difference between the positions pointed to by the reference cursor.



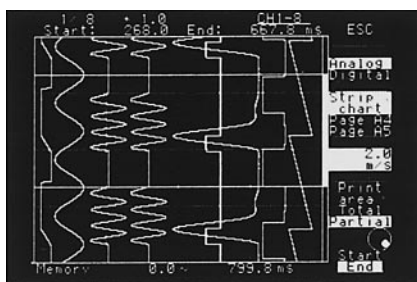
● Specification of portion for playback recording

You can play back a portion of the display on the recording chart by specifying the portion and then setting the playback recording mode.

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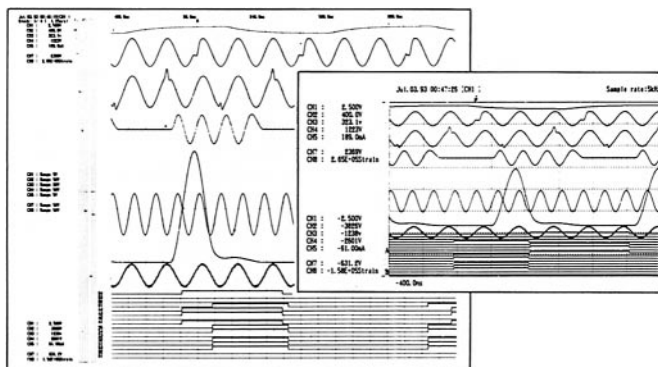
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- **Full- or half-size report printout**

You can designate a specific portion of the display to be automatically edited for a full- or half-page size report printout.

This unique user-friendly function helps create reports and manage your data.



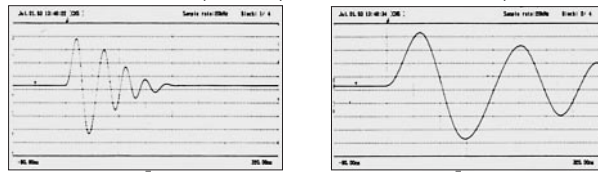
You can combine realtime recording with the memory function to run the ORP/ORM.

For example, for normal operation in the unattended continuous monitoring of a power supply, the ORP/ORM records only peak values with an envelope at a slow chart-feed rate. It stores the data immediately before and after a trigger only if the trigger is caused by a sudden event such as noise.

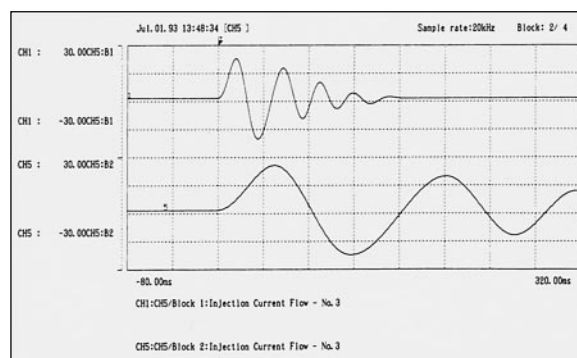
You can utilize the stored data according to your application needs; you can expand the time axis for playback recording of the stored data or analyze the data on the display after you have completed your continuous monitoring.

Data in block No. 1 (first run)

Data in block No. 2 (second run)



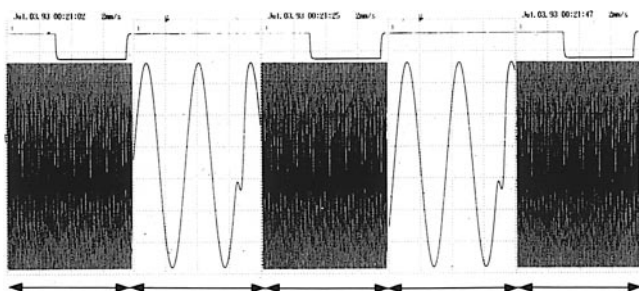
Recording different time series data on same time axis for comparison



- **Memory Playback Format Editing**

With the ORM series, you can perform a variety of reformatting operations on data when playing back from memory to chart, using the rotary knob to adjust recording scale and zero position as you view the playback waveform. This lets you obtain a clean, readable final recording even if multiple traces overlapped each other when the data was first captured, or if one or more traces went off the chart — without repeating the measurement.

In addition, you can even have format-edited waveforms auto-edited for printout in full- or half-page size, so that you can copy them directly into your reports.

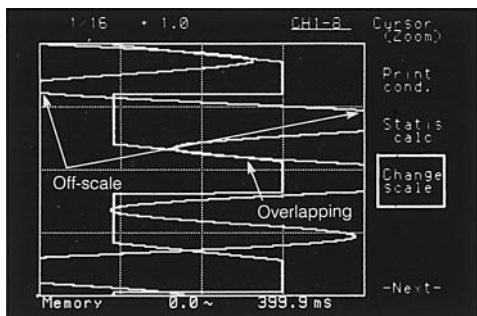


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Recording with off-scale and overlapping traces



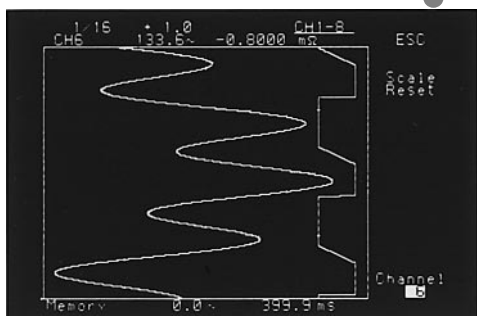
Scale too narrow for input signal during data capture and multiple traces are overlapped.

Format edit

Change scale and zero position with rotary knob to reformat measured data.



Change to report format for playback

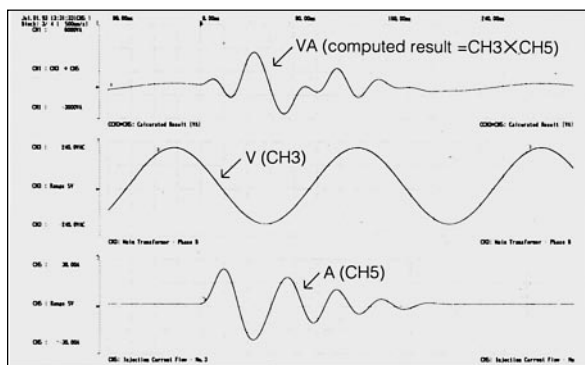


Play back format is edited for easily readable presentation.

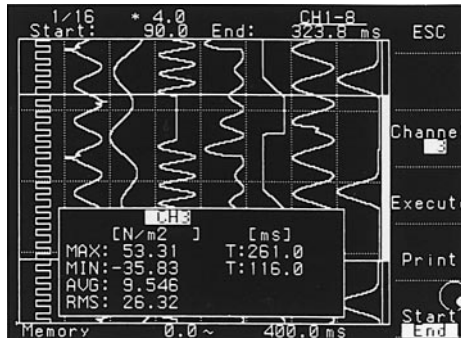
COMPUTING FUNCTIONS (ORM)

The ORM lets you process measured data with arithmetic operations and statistical functions. You can exploit this capability in a wide variety of ways, such as to measure temperature differences, or to multiply voltage and current to record and display VA values. The statistical functions let you compute, display and print out the maximum, minimum, mean, and rms values of time-series data for convenient report preparation.

Arithmetic computation examples



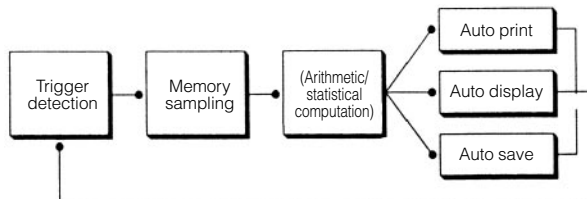
Statistical computation result display (any channel can be selected)



A hard copy of the displayed results can be printed.

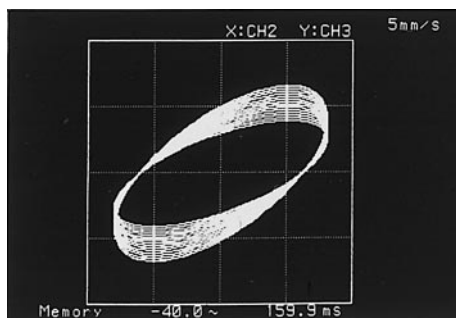
AUTO-SEQUENCE FUNCTION (ORM)

The auto-sequence function will automatically play back measured data to the chart, present it on the display, or save it to external media (floppy disk or IC card) upon completion of each memory sampling operation. Moreover, it can be combined with the computing functions to display, print out or save computation results at the end of each measurement cycle.



ACCUMULATE MODE DISPLAY FUNCTION

With the auto display function, you can accumulate (cumulatively overwrite) data captured at different times as if on a storage oscilloscope. This is particularly effective for comparing measurements taken at different times, such as in making fail/pass judgements based on data distributions.



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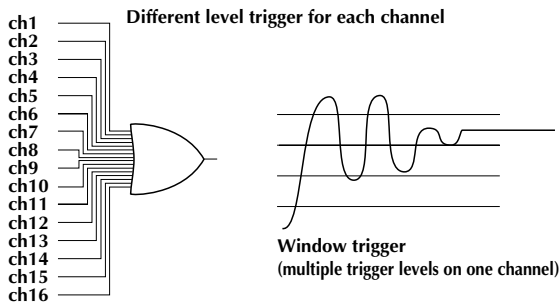
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ENHANCED TRIGGERING FUNCTIONS

The OR series recorders feature a versatile suite of triggering functions to help you reliably catch the abnormal transients you most want to see. You can select trigger sources from among several types: 4-source analog window trigger, 2-source logic pattern trigger, or level triggering set individually for each channel.

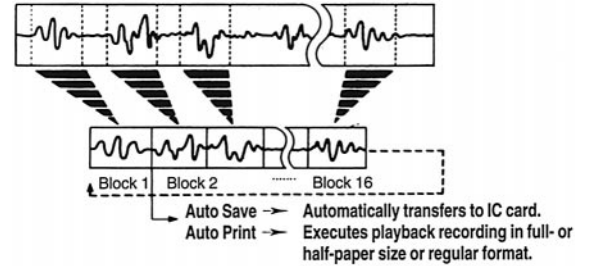
In addition, you can freely set up AND and OR combinations of individual sources and select pre- or post-triggering, and can set up for rising-edge, falling-edge, or high or low level triggering.

External trigger input and output terminals are provided as standard, enabling synchronized measurement with multiple recorders.



Repeated triggering and sequential memory (memory partition)

The OR stores data successively in the partitioned memory blocks whenever it detects a trigger. (You can have up to 16 partitioned memory blocks. You can select one of two modes; either the mode to terminate sampling to be stored in memory when the last block is full or the mode to continue sampling while overwriting blocks starting with the first one.)

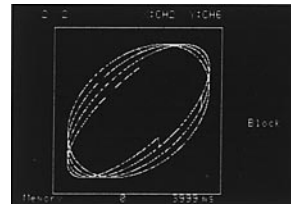


DISPLAY FUNCTIONS

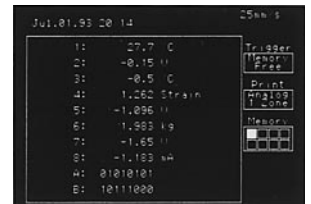
Fast Real-Time Graphic Display

The built-in graphic display lets you view the analog and logic signal waveforms in the same formats used for chart recording.

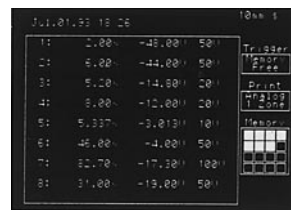
A rich variety of displays is available, including X-Y (for memory data) graphs, digital value listings, and scale range setup listings.



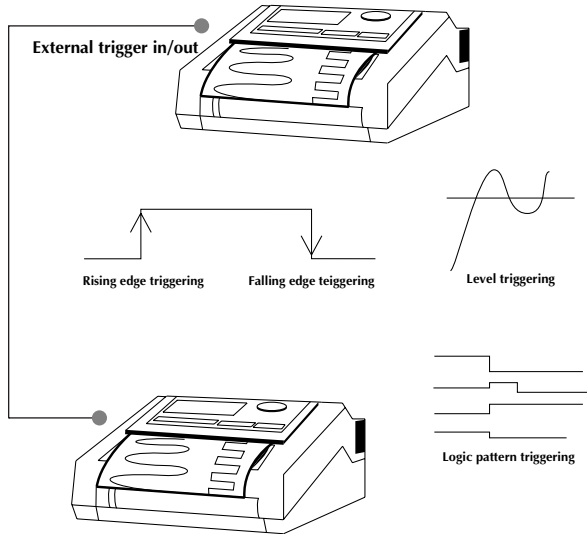
X-Y display



Digital value display



Scale range listing



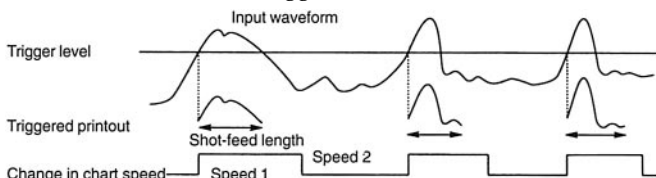
Enhanced trigger actions

Enhanced trigger functions allow you to combine each trigger mode with the operation mode of the recorder to make measurements that meet your application needs.

Example of actions:

Triggered printout or change in chart speed

The OR resumes recording or switches the chart speed each time it detects a trigger.



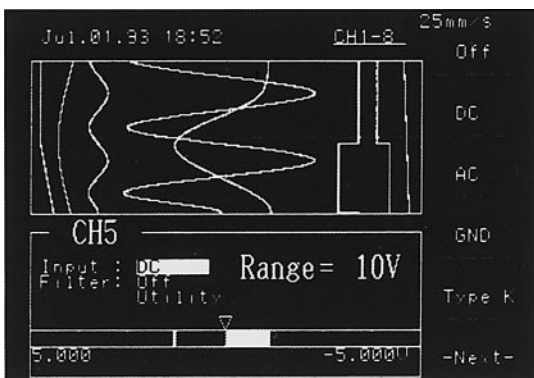
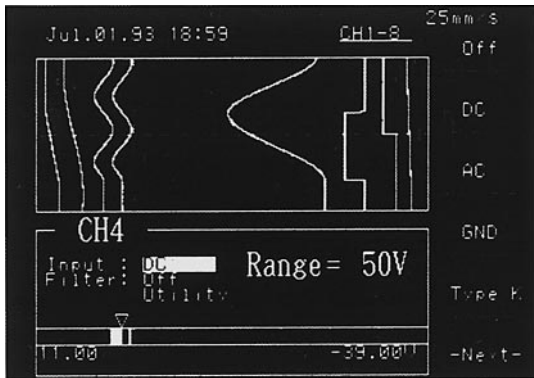
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● Analog-like Range and Zero Adjustment

Input range and zero setup are done by turning the rotary knob while viewing the signal on the graphic display, giving the same "feel" as an analog oscillograph. You can also use the rotary knob for quick readjustment while recording is in progress.

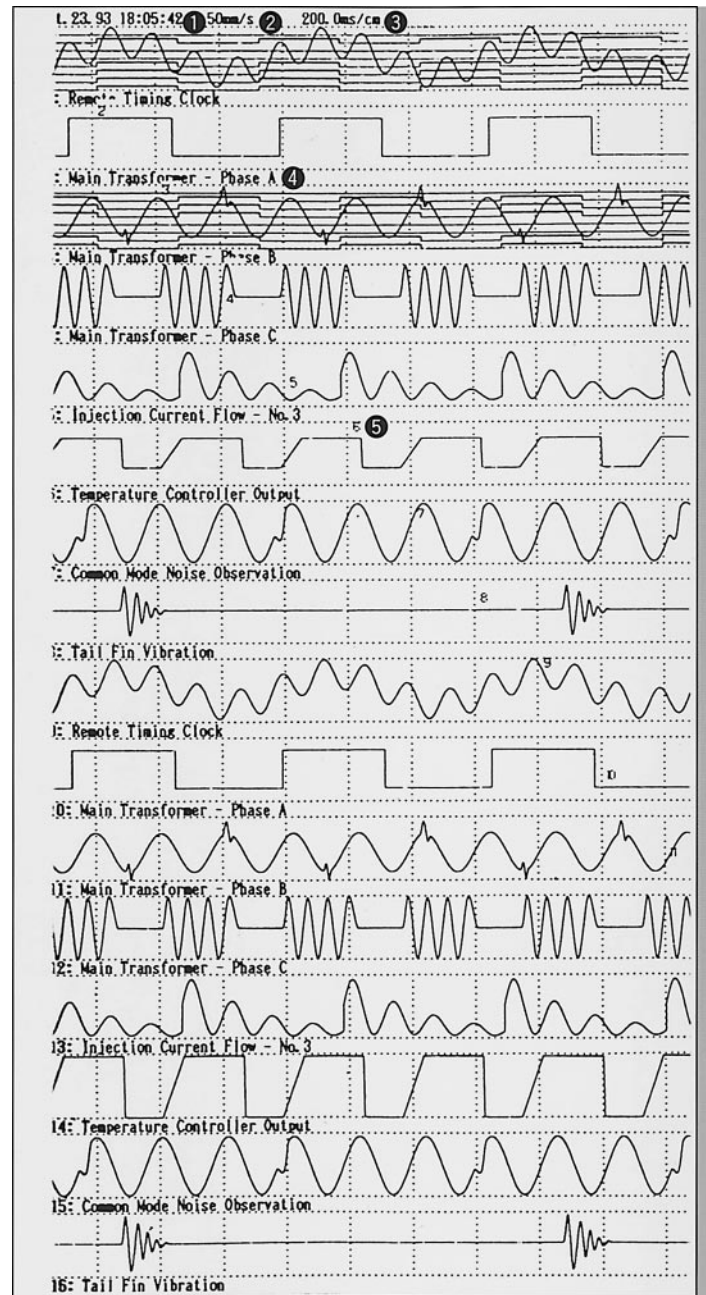


■ RECORDING AND PRINTING FUNCTIONS

Using a dot-overlapping technique, the OR records a total of 12 events with quality: data on both the 16 analog channels and the 16 logic channels. It demonstrates its full capabilities especially in simultaneous measurement or recording of multiple events.

You'll enjoy a variety of recording and printing functions, for example, message printing, scale printing and digital recording, as well as continuous analog recording. This enables a quicker, easier, and more accurate readout of data.

● Segregated mode (16 analog + 16 logic channels)



Logic waveform recording zones (8 channels/zone) can be placed anywhere on chart.

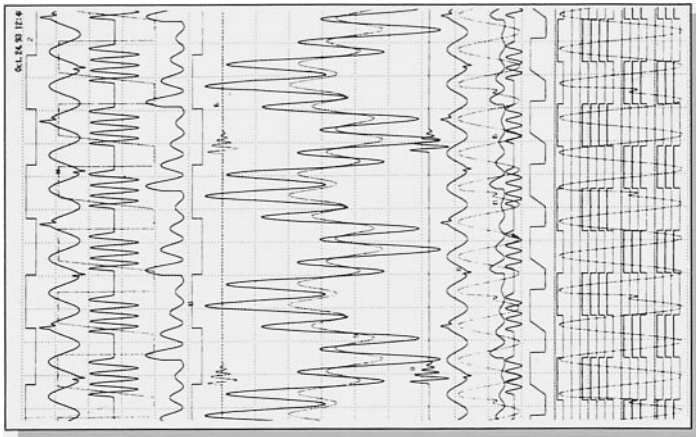
1. Time and date
2. Chart speed
3. Time/div or Time/cm
4. Message
5. Channel number

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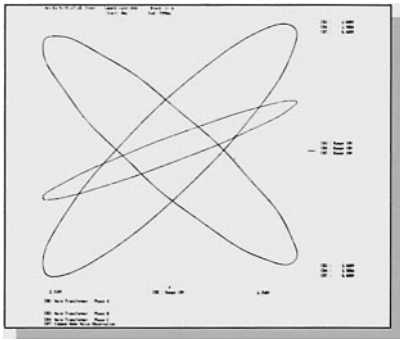
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- **Full-overlap mode (16 analog + 16 logic channels)**



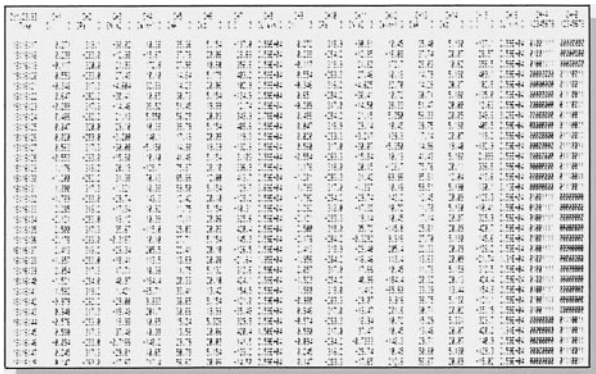
- **X-Y recording**

Use any channel for X-axis, with up to four channels on Y-axis



- **Digital data logging**

Print all channels on one line at rates as fast as a line per second.



- **High-quality, high-speed recording**

High-speed realtime recording at a rate of up to 100 mm/s. Recording quality is better than 2 to 4 times that of conventional Portable type recorders.

- **Change in chart speed**

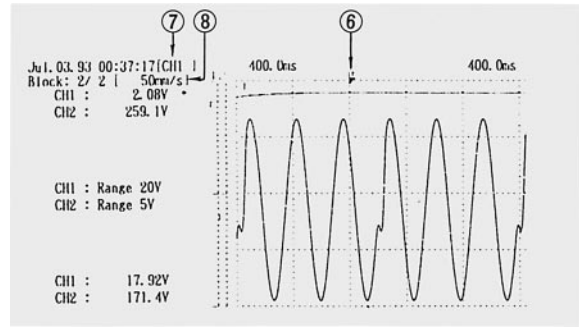
The ORP1200 automatically changes the chart speed when it detects a trigger.

- **Arbitrary recording-zone setup function**

You can set any portion of the display for recording on each channel at your discretion. In addition, this function can automatically separate the recording area into 2, 4 or 8 zones to store the data.

- **Playback/recording of data in memory**

You can also get a printout in either a full- or half-size report format.



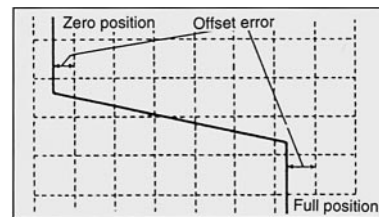
- 6. Trigger position
- 7. Triggered channel
- 8. Effective chart speed

- **Automatic amplifier error correction**

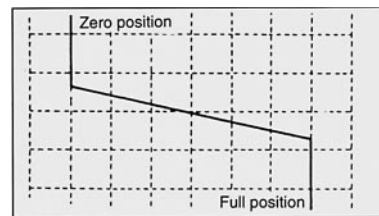
This function is useful when an input signal from an external amplifier carries offsets and thus causes the zero point to shift from the base line on the grid.

The ORP/ORM measures converter error and corrects it automatically.

This eliminates the need for adjusting the zero point of the amplifier or the need for calibrating the amplifier, allowing you to make accurate measurements that are directly aligned with the recording scale (base line on the grid).



"Offsets" of zero and full positions



Elimination of "offsets" using automatic correction

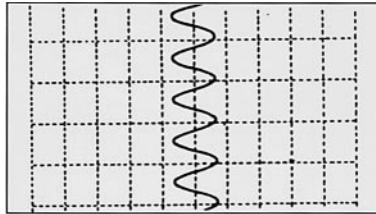
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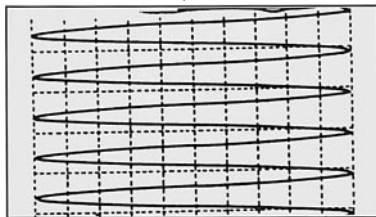


Auto-scaling function

The ORP/ORM automatically selects the optimum recording scale according to the amplitude of the input waveform.



Wide range but small amplitude



Optimum recording scale automatically selected

SPECIFICATIONS

Measurement Inputs

■ Voltage Inputs (7810□1, 7820□1)

Number of channels: 4, 8, 16ch
 Input type: Floating, unbalanced, isolated channels
 Measurement range & accuracy: As shown below (filter OFF, DC coupling, at 23 ±5°C)
 DC V input

Measurement Range	Actual Measurement Range	Accuracy
100mV	±100.0mV	±(0.5% of range)
200mV	±200.0mV	±(0.5% of range)
500mV	±500.0mV	±(0.5% of range)
1V	±1.000V	±(0.5% of range)
2V	±2.000V	±(0.5% of range)
5V	±5.000V	±(0.5% of range)
10V	±10.00V	±(0.5% of range)
20V	±20.00V	±(0.5% of range)
50V	±50.00V	±(0.5% of range)
100V	±100.0V	±(0.5% of range)
200V	±200.0V	±(0.5% of range)
500V	±500.0V	±(0.5% of range)

Input coupling: DC or AC
 DC coupling input: DC to 40 kHz (+1 dB, -3 dB, typical)
 AC coupling input: 1 Hz to 40 kHz (+1 dB, -3 dB, typical)
 Frequency bandwidth (filters OFF)
 A/D resolution: 12 bits effective
 Maximum sampling rate: 100 kS/s
 Maximum input voltage: 350 V (DC + AC Peak)
 Input impedance: 1MΩ ±1%
 Noise: 250 μVp-p (typical) for 100 mV range, short circuit input
 Maximum floating voltage: 350V (DC + AC Peak) (between input terminals and case, between all channels)
 Common mode rejection ratio: More than 80 dB (50/60 Hz, signal source resistance less than 500Ω)
 Filter: Lowpass filter, filter ON/OFF
 Cutoff frequency: 40 Hz, 400 Hz, 4 kHz
 Filter characteristics: -12 dB/octave
 Input terminal: Safety terminal type (for banana clip)

■ Universal Inputs (7810□2, 7820□2)

Number of channels: 4, 8, 16ch
 Input type: Floating, unbalanced, isolated channels
 Measurement range & accuracy: As shown below (filter OFF, DC coupling, at 23 ±5°C)
 DC V input:

Measurement Range	Actual Measurement Range	Accuracy
50mV	±50.00mV	±(0.5% of range + 50μV)
100mV	±100.0mV	±(0.3% of range + 50μV)
200mV	±200.0mV	±(0.25% of range + 50μV)
500mV	±500.0mV	±(0.25% of range + 50μV)
1V	±1.000V	±(0.25% of range + 50μV)
2V	±2.000V	±(0.25% of range + 50μV)
5V	±5.000V	±(0.25% of range + 50μV)
10V	±10.00V	±(0.25% of range + 50μV)
20V	±20.00V	±(0.25% of range + 50μV)
50V	±50.00V	±(0.25% of range + 50μV)

TC Input:

Measurement Range	Actual Measurement Range	Accuracy *1
K	-200.0 to 1300.0°C	±(0.2% of rdg + 1.5°C), however, -200 to 0°C ± (0.5% of rdg + 1.5°C)
E	-200.0 to 800.0°C	
J	-200.0 to 1100.0°C	
T	-200.0 to 400.0°C	
L	-200.0 to 900.0°C	
U	-200.0 to 400.0°C	
N	0.0 to 1300.0°C	± (0.2% of rdg + 2°C), however, 0 to 200°C: ±6°C, 200 to 800°C: ±4°C
R	0.0 to 1700.0°C	
S	0.0 to 1700.0°C	
B	0.0 to 1800.0°C	± (0.2% of rdg + 4°C), however, 400 to 700°C: ±8°C, Effective measurement range: 400 to 1800°C
W	0.0 to 2300.0°C	

*1: Excluding RJC accuracy

Reference junction compensation accuracy:

±1°C (input terminal temperatures are balanced)
 ±1.5°C (R, S, B, W)
 DC or AC

Input coupling:

Frequency bandwidth (filters OFF)

DC coupling input: DC to 40 kHz (+1 dB, -3 dB, typical)
 AC coupling input: 1 Hz to 40 kHz (+1 dB, -3 dB, typical)
 Temperature input: DC to 6 Hz (+1 dB, -3 dB, typical)

A/D resolution:

14 bits effective

Maximum sampling rate:

100 kS/s,

TC range data updating rate: approx. 135 Hz fixed

Maximum input voltage:

30 V rms AC or 60 V DC

Input impedance:

1MΩ ±1%

Noise:

200 μVp-p (typical) for 50 mV input, short circuit input

Maximum floating voltage:

30 V rms AC or 60 V DC (in accordance with safety standards); 250 V rms AC (common mode rejection ratio is satisfied), between input terminals and case and between channels)

Normal mode rejection ratio: 50 dB (50/60 Hz, with 1.5 Hz filter ON)

Common mode rejection ratio: More than 120 dB (50/60 Hz, with 1.5 Hz filter ON, signal source resistance less than 500Ω)
 80 dB (50/60 Hz, with 1.5 Hz filter OFF, signal source resistance less than 500Ω)

Filter:

Cutoff frequency: 1.5 Hz, 40 Hz, 400 Hz, 4 kHz

Filter characteristics:

1.5 Hz: Normal mode rejection ratio: -50 dB
 Common mode rejection ratio: -120dB (50/60 Hz)
 40/400 Hz/4 kHz: -12 dB/octave
 Binding post type

Recording

Printer type:

Thermal printer (dot overlap)

Recording function:

Real-time recording: T-Y, X-Y, numeric value recording
 Captured data recording: T-Y, X-Y, numeric value recording, A4/A5 format printing, output for number of data specified, calculation result printing

Recording/Printing:

Measurement data, captured data, setup list, unit, scale, annotation, grid, date and time, channel number, trigger mark, event message, channel information, etc.

Scale values:

Will be printed after recording is stopped
 60 characters/channel, will be printed every 160 mm

Channel Annotation:

Measurement range, recording span, and filter conditions for each channel will be printed every 160 mm

Grid:

Selectable from OFF, 10 mm Fine, 10 mm Simple, 10 Div Fine (time-base 10 mm Fine), and 10 Div Simple (time-base 10 mm Simple), and dark or light selection

Channel number:

Printed at an 160 mm × n interval (n = 1, 2, 5, 10)

Trigger mark:

Printed at the triggering location and time when printing out captured data

Event message:

5 types of messages consisted of 16 characters maximum. Can be printed by manual or remote operation as character string or date/time.

Date and time/chart speed:

Will be printed every 160 mm, linking to the chart speed.

Effective chart speed:

Calculated the speed equivalent real-time recording by the sampling speed and the playback rate of captured data when printing out captured data and printed

Setup list:

A list of setting parameters (setup) will be printed

Recording width:

Maximum 201 mm

Recording format

T-Y recording: 16 zones of 10 mm/zone (7810□, 7820□)
 8 zones of 20 mm/zone (7810□2, 7820□2), 7810□, 7820□)

X-Y recording:

4 zones of 40 mm/zone
 2 zones of 80 mm/zone
 1 zone of 160 mm/zone or 200 mm/zone (full overlap recording)

Digital recording:

Flexible zone: Zone width can be set for each channel (when 200 mm/zone selected, full overlap recording)

Recording accuracy:

Single channel on the X-axis and up to four channels on the Y-axis
 At a recording interval of 1, 2, 5, 10, 20, 30, or 60 s
 Measurement accuracy ±0.125 mm (1 dot)
 8 dots/mm

Recording resolution:

32 dots/mm for chart speeds up to 50 mm/s
 16 dots/mm for chart speed of 100 mm/s
 8 dots/mm for X-Y recording

OSCILLOGRAPHIC RECORDERS

ORP1200 / ORP1300 & ORM1200 / ORM1300

YOKOGAWA

Chart speed:	10, 25, 50, 100 mm/h
Real-time recording:	1, 2, 5, 10, 25, 50, 100 mm/min 1, 2, 5, 10, 25, 50, 100 mm/s
Printing captured data:	25 or 50 mm/s
Shot recording:	Can be activated by trigger or by key operation, and prints out a previous set length automatically (only for real-time recording)
Shot recording length:	0.2, 0.5, 1, or 2 m
Recording trace intensity:	Dark or light (except for X-Y recording)

Data Capture

Maximum memory size:	7810□□ : 32K data/ch 7820□□ : 128K data/ch
Memory type:	DRAM
Storage method:	Standard:
Re-allocated memory:	Assigns maximum memory to each channel equally The memory length of two or four channels can be combined.

	7810□□	7820□□
2CH	64K data/ch	286K data/ch
4CH	128K data/ch	512K data/ch

However, for combined channel memory is disabled. Divides the memory for each channels into blocks, writing one data item for each trigger

Partitioned memory:	Divides the memory for each channels into blocks, writing one data item for each trigger
Number of memory blocks:	1, 2, 4, 8, 16 (note that the memory length for each channel and the total memory capacity impose an upper limit on this number)
Memory length setting:	(7810□□) 1, 2, 4, 16, 32, 64k, (1) 128 k, (2) (1) Using 2-channel memory coupling function to be applied to odd-number channels only (2) Using 4-channel memory coupling function to be applied to channels 1, 5, 9, and 13 (7820□□) 1, 2, 4, 8, 16, 32, 64, 128, 256 k(1) 512 k(2) (1) Using 2-channel memory coupling function to be applied to odd-number channels only (2) Using 4-channel memory coupling function to be applied to channels 1, 5, 9, and 13
Sample rate:	1, 2, 5, 10, 20, 50, 100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k, 50 k, 100 k S/s or by external sampling clock. However, sample rate during recording: Up to 50 k S/s

Time-axis accuracy:	±0.02%
Captured data output:	Recording, display, communication
Cursor function:	Available (zoom-in on T-axis possible)
Block selection:	Any block is displayed and printed
Recording range:	Can be specified by cursor or numeric value input.
Recording format reset:	Recording scale and zero position can be reset. (ORM only)
Playback rate for analog recording:	25, 50, 100, 200, 400, 1000, 2000, 5000 data/cm
Playback rate for numeric value recording:	1, 2, 5, 10, 20, 50, 100 data/sampling
Auto-sequence function:	Sequential operation is automatically started after end of memory sampling
Auto-print:	Printout of captured data
Auto-save (IC card):	Saves captured data to the IC card.
Auto-save (FDD):	Saves captured data to FDD
Auto-display:	Displays captured data
Accumulation:	Accumulates captured data (cumulatively overwrites)
Auto statistical computation:	Captured data statistical computation and printout, or saving to FDD

Computation between channels:	
Arithmetic computations are enabled between any two channels (7820□□)	<ul style="list-style-type: none"> Available calculations: +, -, ×, ÷ Overlapped display printout: Any channel data block can be displayed/printed on the same time-base. When a computation is specified, a free space more than 1/2 the size of memory buffer is required for each channel.

Statistical computation function (7820□□):	Statistical computing can be performed for any channels for any interval.
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Statistical computation item:	Maximum, minimum, mean, RMS
Statistical computation span:	Specified by cursor
Statistical computation result output:	Displayed or printed out

3.5-inch FDD (**7820□□**)

Number of drives:	1
Usable media:	2HD, 2DD
Capacity:	1.2, 1.44 MB, 720 kB
Memory data:	Any part of the waveform memory data is specified and stored.
Dump function:	Stores and prints out all data regardless of memory capacity
Data readout function:	Transfers data from the 3.5-inch FDD to waveform memory for display on the screen.

Triggering

Effective trigger type:	Window trigger, all channels trigger, external trigger
Effective trigger action:	Real-time recording, data capture, chart speed change
Trigger mode:	Single, repeat, free
Trigger delay:	-100 to 1000%
Trigger combination:	AND, or OR
Trigger level:	Rise, fall, high, low (-100% to 100%)
Trigger output:	Output to external terminal

Display

Display method:	Scrolling from the top to the bottom of the screen
Screen:	LCD (5 inches), 320 × 240 dots
Contents of the screen:	Measurement data screen (waveform, numeric values), setting screen, span display (collective display of 16 ch maximum)

Display format for measurement data:	Displays analog input waveforms (maximum of 8 channels)
T-Y display:	<ul style="list-style-type: none"> • 78103□/78203□: One of two suitable screens, for channels 1 to 8 and 9 to 16, is displayed. (Display is stopped during printing action.) • When equipped with the logic input option, analog waveforms and logic data will be displayed on two screens. Display of a single waveform to a maximum of four waveforms (recording will be up to four waveforms). X-Y waveforms will only be displayed in the case of displaying captured data; in the case of real-time recording, the screen will show the T-Y display.

X-Y display:	Measured values are displayed as numerals (maximum 16 channels + logic pattern) Captured data playback screen changes display every 2 channels.
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Numeric value display:	Measured values are displayed as numerals (maximum 16 channels + logic pattern) Captured data playback screen changes display every 2 channels.
Screen time-base:	Linking to chart speed.
Numeric value monitoring display:	Updated every 0.5 sec

External I/O Signals

External trigger I/O:	TTL level (pulse width more than 2 μs)
External clock:	TTL level (up to max. 100 kHz, pulse width more than 2 μs; in case of real-time recording, max. 50 kHz)
Start/Stop:	TTL level (pulse width more than 2 μs) Real-time recording, data capture start/stop, event message print

General Specifications

Operating conditions:	0 to 40 °C, 30 to 80% RH (no condensation)
In FDD action (7820□□):	5 to 40 °C, 30 to 80% RH (no condensation)
Warm up time:	At least 30 minutes (TC range)
Dielectric strength rating:	Between power supply and case: 1500 V AC for 1 minute Between input terminals and case: 1500 V AC for 1 minute Between input terminals: 1500 V AC for 1 minute
Insulation source resistance:	Between power supply and case: 10 MΩ (minimum) at 500 V DC Between input terminals and case: 10 MΩ (minimum) at 500 V DC Between input terminals: 10 MΩ (minimum) at 500 V DC
Signal source resistance:	Max. 500 Ω
Magnetic field strength:	Max. 400 A/m
Momentary power loss rating:	±1% of range (at smallest voltage range)
Position:	Less than 1 cycle (at 100 V AC 50 Hz)
Clock accuracy:	Horizontal
Battery backup:	±100 ppm (typical) For up to five setups and clock: Lithium battery with a service life, at room temperature, of 10 years
Rated power supply voltage:	100 to 120 V AC 50/60 Hz or 200 to 240 V AC 50/60 Hz (suffix code specified when ordering)
Permissible power supply voltage:	100 V type: 90 to 132 V, 48 to 63 Hz 200 V type: 180 to 250 V, 48 to 63 Hz
Power consumption:	Values in parentheses are for ORM1300. 780□0□ : 100 V type: 300 VA max. 160 W max. 390 VA max. 205 W max. 200 V type: 360 VA max. 160 W max. 450 VA max. 205 W max. Without chart recording: 100 V type: 140 VA max. 65 W max. 240 VA max. Approx 115 W 200 V type: 170 VA max. 65 W max. 280 VA max. Approx 115 W
Dimensions:	7810□□ : Approx 320 (W) × 170.5 (H) × 435 (D) mm 7820□□ : Approx 320 (W) × 192 (H) × 435 (D) mm 78□03□ : Approx 320 (W) × 219 (H) × 435 (D) mm
Standard accessories:	Chart paper (1 roll of 210 mm × 50 m size), Power cord, Installation manual, Connector for remote operation, Fuse, Measurement input cable (when 7810□□/7820□□1 specified, required for number of input channels)

IC memory card

Number of slots:	1 (standard)
Memory capacity:	64, 256, or 512 k bytes, 1 M bytes (2 bytes/sample)
Memory contents:	Setup value (approx. 5 k bytes), measured value
Battery Backup:	Lithium battery (service life of approx. 1 year for 1 M bytes, approx. 2 years for 512 k bytes, 2 years for 256 k bytes and 4 years for 64 k bytes cards)

Options/Accessories

■ GP-IB interface	
Standard:	IEEE St'd 488-1978
Functions:	Setting parameters input/output, measurement values output (all settings and control other than power ON/OFF)
■ RS-232-C interface	
Standard:	EIA RS-232-C
Baud rate:	75, 150, 300, 600, 1200, 2400, 4800, 9600 bps
Functions:	Setting parameters input/output, measurement values output (all settings and control other than power ON/OFF)

OSCILLOGRAPHIC RECORDERS

YOKOGAWA

ORP1200 / ORP1300 & ORM1200 / ORM1300

Logic input
 Number of channels: 16
 Probe: Dedicated **702911** logic probe (8 ch/probe)
 Input type: Floating channels between probe and case with common ground
 Maximum input voltage range: ± 35 V DC
 Trigger: 2 sources (8-ch pattern trigger)
 Input impedance: More than 10 k Ω
 Threshold level: TTL level
 Input signal: TTL level or contact input (switchover)
 Dielectric strength rating: 500 V DC for 1 minute between probe and case
 Insulation resistance rating: 10 M Ω minimum at 500 V DC between probe and case

AVAILABLE MODELS

ORP1200

Model	Suffix Codes	Description
7810	11	4ch voltage input (w/O CE)
	12	4ch universal input (w/CE)
	13	4ch voltage input (w/CE)
	21	8ch voltage input (w/O CE)
	22	8ch universal input (w/CE)
	23	8ch voltage input (w/CE)
Power requirements	-1	100 V AC to 120 V AC
	-5	200 V AC to 240 V AC
Power cord	-D	UL, CSA standard power supply cord
	-F	VDE standard power supply cord
	-R	SAA standard power supply cord
	-J	BS standard power supply cord
	-B	JIS standard (including 3-pin/2-pin adapter)
Optional feature	/C1	GP-IB interface
	/C2	RS-232-C interface
	/N4	Logic input interface*1
	/D2	°F display*2

*1 Order **702911** separately. *2 Only for model **7810□2**.

ORP1300

Model	Suffix Codes	Description
7810	31	16-channel voltage input (w/O CE)
	32	16-channel universal input (w/CE)
	33	16-channel voltage input (w/CE)
Power requirements	-1	100 V AC to 120 V AC
	-5	200 V AC to 240 V AC
Power cord	-B	Connector for grounding (with 3-pin/2-pin adapter)
	-D	UL, CSA standard power supply cord
	-F	VDE standard power supply cord
	-R	SAA standard power supply cord
	-J	BS standard power supply cord
Optional feature	/C1	GP-IB interface*1
	/C2	RS-232-C interface*1
	N4	Logic input interface*2
	/D2	°F display*3

*1 Only either one can be specified. *2 Order **702911** (8-ch/probe) separately.
 *3 Only for **781032**.

ORM1200

Model	Suffix Codes	Description
7820	11	4-channel voltage input (w/O CE)
	12	4-channel universal input (w/CE)
	13	4-channel voltage input (w/CE)
	21	8-channel voltage input (w/O CE)
	22	8-channel universal input (w/CE)
	23	8-channel voltage input (w/CE)
Power requirements	-1	100 V AC to 120 V AC
	-5	200 V AC to 240 V AC
Power cord	-B	Connector for grounding (with 3-pin/2-pin adapter)
	-D	UL, CSA standard power supply cord
	-F	VDE standard power supply cord
	-R	SAA standard power supply cord
	-J	BS standard power supply cord
Optional feature	/C1	GP-IB interface*1
	/C2	RS-232-C interface*1
	/N4	Logic input interface*2
	/D2	°F display*3

*1 Only either one can be specified.
 *2 Logic probe is not included. Order **702911** separately (8-ch/probe).
 *3 Only for model **7820□2**.

ORM1300

Model	Suffix Codes	Description
7820	31	16-channel voltage input (w/O CE)
	32	16-channel universal input (w/CE)
	33	16-channel voltage input (w/CE)
Power requirements	-1	100 V AC to 120 V AC
	-5	200 V AC to 240 V AC
Power cord	-B	Connector for grounding (with 3-pin/2-pin adapter)
	-D	UL, CSA standard power supply cord
	-F	VDE standard power supply cord
	-R	SAA standard power supply cord
	-J	BS standard power supply cord
Optional feature	/C1	GP-IB interface*1
	/C2	RS-232-C interface*1
	/N4	Logic input interface*2
	/D2	°F display*3

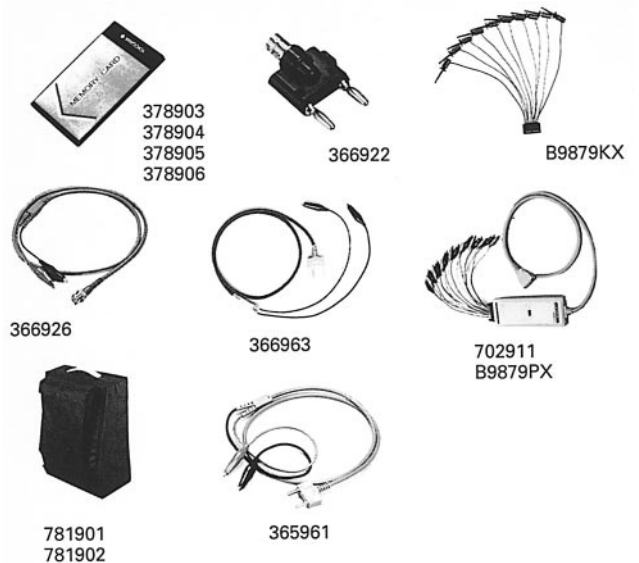
*1 Only either one can be specified.
 *2 Logic probe is not included. Order **702911** separately (8-ch/probe).
 *3 Only for model **782032**.

SPARES

Name	Parts Number	Description	Order Q'ty
Continuous roll chart paper	B9879AJ	50 m length (1 roll/unit)	6
Lithium battery	B9586JU	For 3789 03 (1 pc./unit)	2
Lithium battery	B9586JV	For 3789 04/05/06 (1 pc./unit)	2
Fuse	A1352EF	4A, Time lag (for ORP1200/ORM1200)	2
Fuse	A1353EF	5A, Time lag (for ORP1300/ORM1300)	2

OPTIONAL ACCESSORIES

Name	Code	Description	Order Q'ty
IC memory card	378903	64 k bytes	1
IC memory card	378904	256 k bytes	1
IC memory card	378905	512 k bytes	1
IC memory card	378906	1 M bytes	1
Power unit	365961	2 channels for each V and A	1
Measurement lead	366963	With alligator clip (for 7810□1/7820□1)	1
Conversion adapter	366921	Banana-BNC	1
BNC cable	366922	BNC-alligator clip (1 m)	1
Logic probe	702911	8-channel input (for /N4 option) (including B9879PX, B9879KX) Lead 1m	1
Logic probe	702912	8-channel input (for /N4 option) (including B9879PX, B9879KX) Lead 3m	1
Connection lead	B9879PX	Alligator clip (for /N4 option)	1
Connection lead	B9879KX	IC clip (for /N4 option)	1
Soft case	781901	For ORP1200/ORM1200	1
Soft case	781902	For ORP1300/ORM1300	1

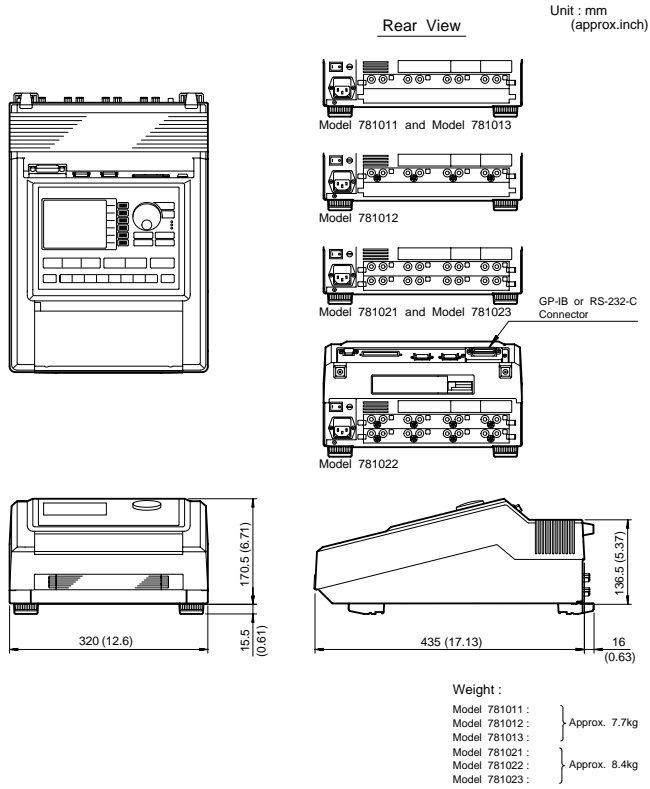


OSCILLOGRAPHIC RECORDERS

ORP1200 / ORP1300 & ORM1200 / ORM1300

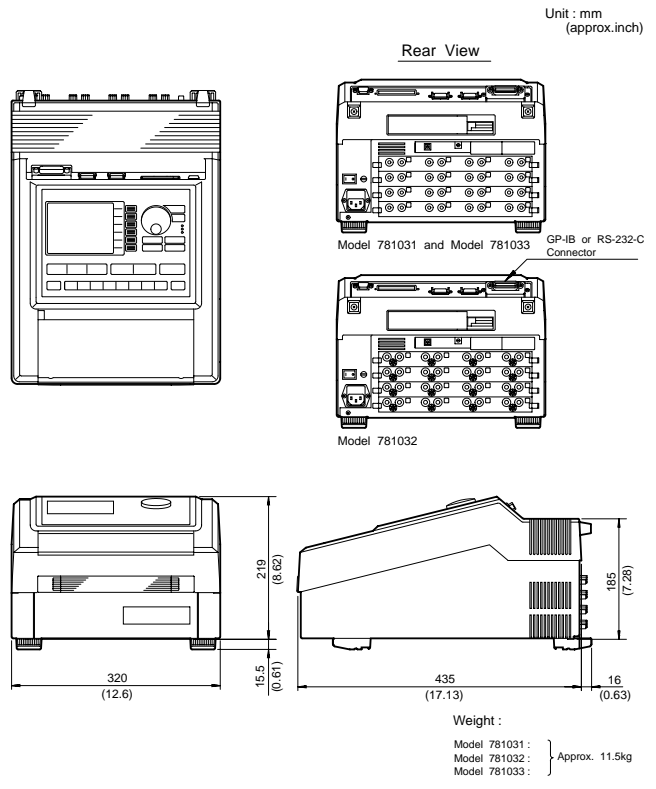
DIMENSIONS

< ORP1200 >



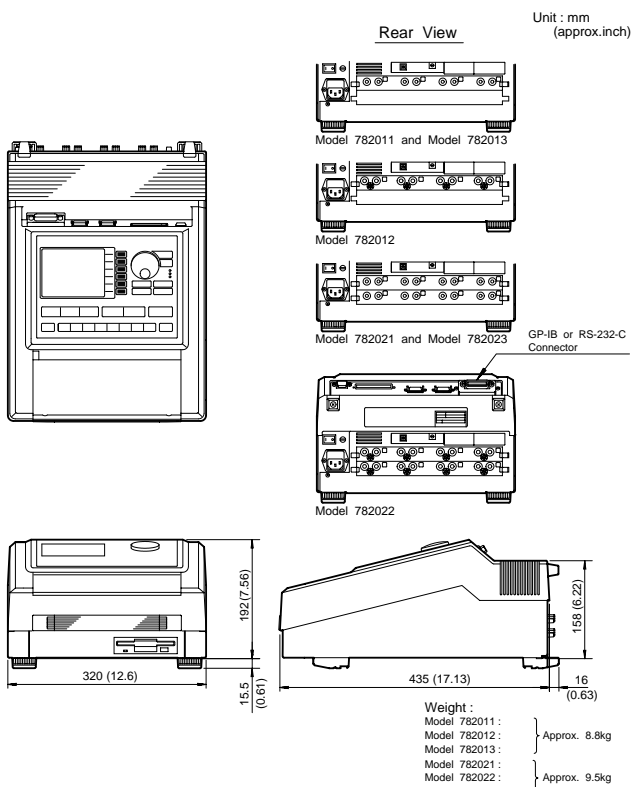
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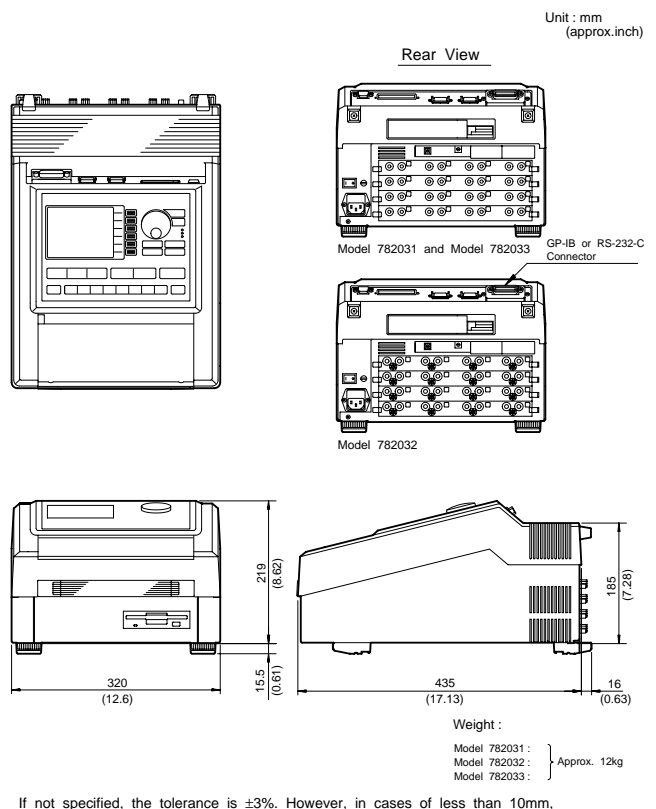
If not specified, the tolerance is $\pm 3\%$. However, in cases of less than 10mm, the tolerance is $\pm 0.3\text{mm}$.

< ORM1200 >



If not specified, the tolerance is $\pm 3\%$. However, in cases of less than 10mm, the tolerance is $\pm 0.3\text{mm}$.

< ORM1300 >



If not specified, the tolerance is $\pm 3\%$. However, in cases of less than 10mm, the tolerance is $\pm 0.3\text{mm}$.