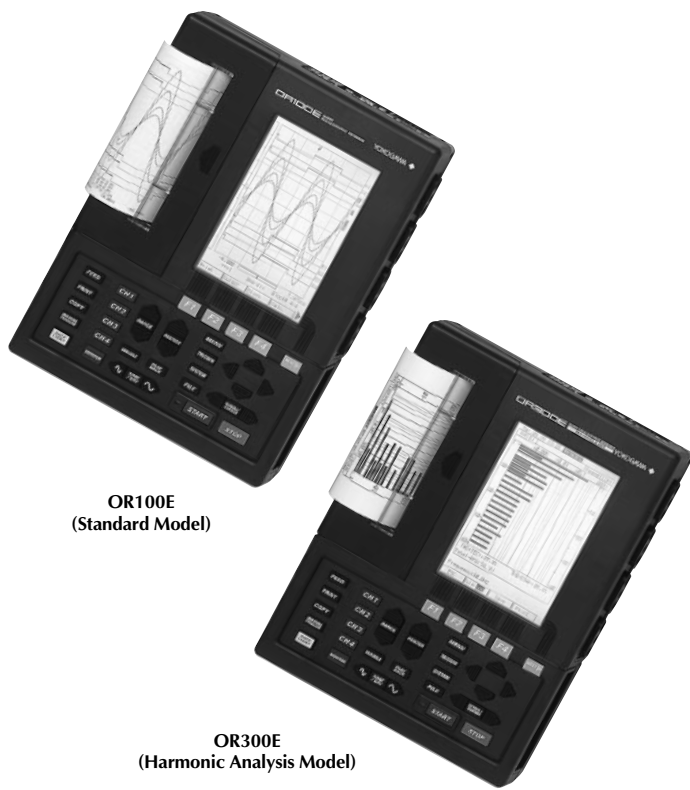# HANDY OSCILLOGRAPHIC RECORDERS

YOKOGAWA

Handy Oscillographic Recorders
OR100E & OR300E

OR100E
(Standard Model)

OR300E
(Harmonic Analysis Model)

190 × 256 × 46mm 1.3 to 1.5kg
(7-1/2 × 10-1/8 × 1-7/8" 2.9 to 3.3 lbs)

★

RS-232

CE

FAX/modem

Safety Standards; CSA22.2 No.1010.1, EN61010-1
EMI Standard; Emission:EN61326 classA
                              EN61000-3-2 classD
                              EN61000-3-3
Immunity standard; EN61326

The OR100E/OR300E series of Handy Oscillographic Recorders are complete multi-purpose recorders featuring up to four isolated analog input channels, fax/modem capability using a PC card, four-mode power supply and powerful trigger functions. The OR300E also has a harmonic analysis function. These recorders are small in size, with a footprint equivalent to a sheet of B5 paper, and weigh only 1.4 kg.* They can be used standalone for a wide range of applications, from low-speed/long-term continuous recording to high-speed recording of transient conditions.

* OR100E 4-channel model; not including battery weight

OR100E/OR300E Comparison

	OR100E	OR300E
Basic system	2-channel and 4-channel standard models	2-channel and 4-channel models with harmonic analysis
Input types	DC, TC or Off	DC, TC, RMS or Off
Measurement modes	Real-Time Recording, Memory, Real-Time + Memory	Real-Time Recording, Memory, Real-Time + Memory, Harmonic Analysis
Input performance	400 kS/s, effective 11 bits A/D, maximum 500V rms input	
Memory length	128K of data per channel	
External dimensions (mm)	Approximately 190 (W) x 46 (H) x 256 (D)	
Weight (4-channel model without battery)	Approximately 1.4 kg	Approximately 1.5 kg

FEATURES

● **Four-channel 500 Vrms direct input in a slim, light body**
The notebook-size OR100E/OR300E Series weighs only 1.4 kg* but can take simultaneous measurements on up to four isolated analog channels. The analog input unit can directly measure voltages as high as 500 Vrms operating at high speed and high resolution (400 kS/s, 11 bits). The OR100E/OR300E Series supports logic measurements on as many as eight channels using optional logic probes, enabling twelve simultaneous analog and logic measurements at high speed.

● **Four-mode power supply for field use**
The OR100E/OR300E Series supports four power supply modes. In DC power mode, it can run on alkaline dry cells (six AA alkaline batteries), a rechargeable battery (nickel metal-hydride) or an external DC power supply (12V, 24V or 48V DC) using a DC-DC converter (sold separately). In AC power mode, it can run on an AC power supply (90 to 264V AC) using an AC-DC adapter (sold separately). The AC-DC adapter also serves to recharge the nickel metal-hydride battery. Moreover, if the AC power is cut off, operations are backed up by battery power.

● **Powerful trigger functions**
The OR100E/OR300E Series has a wave-window trigger which is very useful for monitoring for abnormalities in the waveform of a commercial frequency power supply, as well as a level window trigger, edge trigger, trigger filter and time-out trigger.

● **Fax/modem capability using a PC card**
The OR100E/OR300E Series makes it easy to collect data remotely using a phone line and a commercially available fax/modem card.

● **Support for multiple interfaces (logic input, RS-232, trigger I/O, etc.)**

1. Logic input connectors: Enable connection of two four-channel logic probes (sold separately) independent of the analog inputs.
2. RS-232: Recorder settings, on-line data transfer and memory data transfer.
3. Trigger I/O: Terminals for parallel operation of multiple recorders, external sampling clock, and measurement start/stop control

FUNCTIONS

■ **POWERFUL TRIGGER FUNCTIONS**
The OR100E/OR300E Series provides powerful trigger functions for reliable measurement of monitored parameters. In Normal Trigger Mode, triggers are set for the rise and fall levels. Wave-window Trigger Mode allows you to monitor for power supply waveform abnormalities in real time. In addition, pre-trigger settings may be set as desired.

● **Normal Trigger Mode**
Normal Trigger Mode can be used to set triggers such as time triggers, logic triggers and independent triggers for each of up to four analog channels. A wide variety of trigger types can be used, including rise and fall triggers, bi-slope triggers, level (high/low) triggers, and window IN/OUT triggers. You can also set trigger sensing to sense fluctuations in the root mean square value of AC signals, and trigger filters to prevent trigger malfunctions due to noise.

● **Wave-Window Trigger**

The wave-window trigger is used for monitoring 50-Hz and 60-Hz power supply waveforms. A wave-window (area consisting of the base waveform plus a certain width) is created based on an ideal power supply waveform (sine wave) or the actual power supply waveform. The trigger is sensed when the measured signal is outside the wave-window. The wave-window trigger is used for real-time monitoring for phenomena which cannot be detected by conventional level parameters, such as instantaneous power failures, sags and impulses in the commercial power supply. Separate wave-windows can be set for each analog channel.

Wave-window trigger   Level window trigger
Trigger sensed   Sag   Impulse
Instantaneous power failure
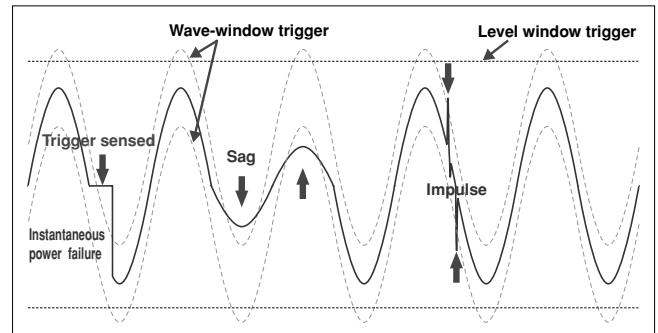
■ **SHARP DISPLAY, CALCULATION FUNCTIONS AND HIGH-QUALITY RECORDING FUNCTIONS**

● **Display**

A half-VGA display is used for 50% better resolution than in Yokogawa's older models.

Digital value monitor
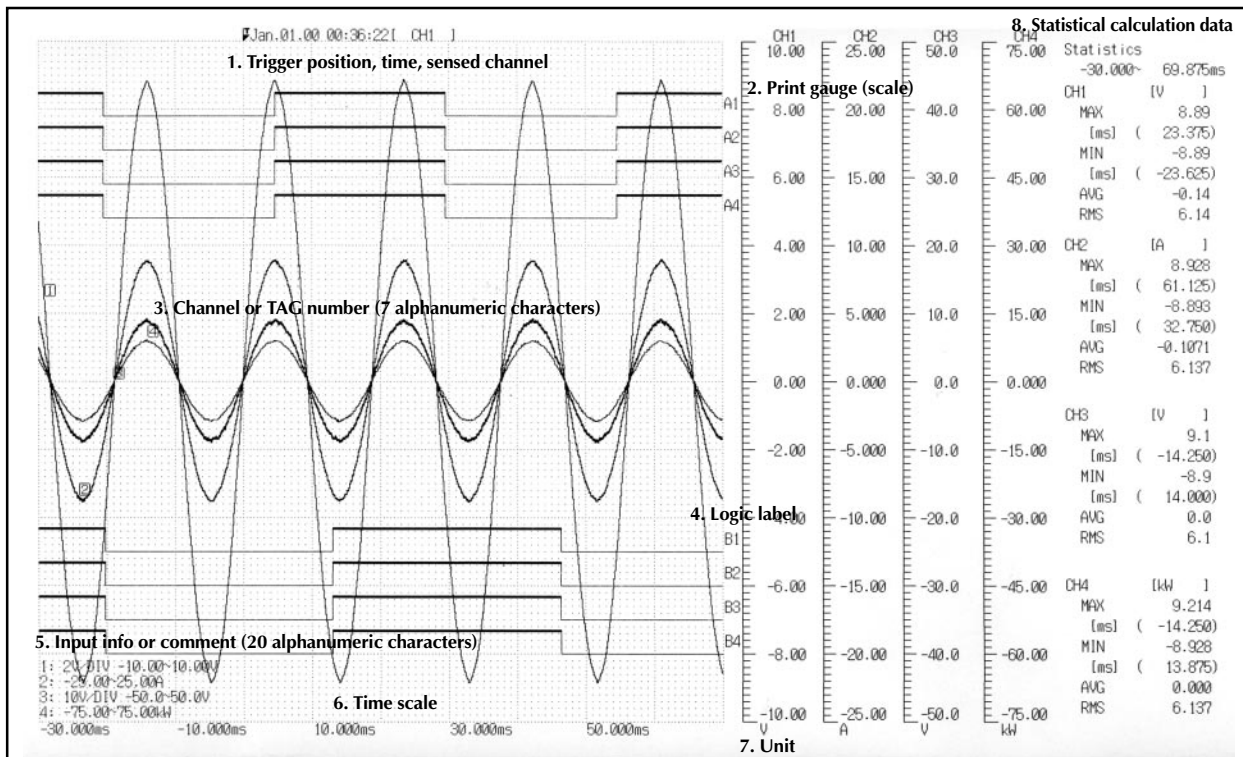
Trend display   X-Y display
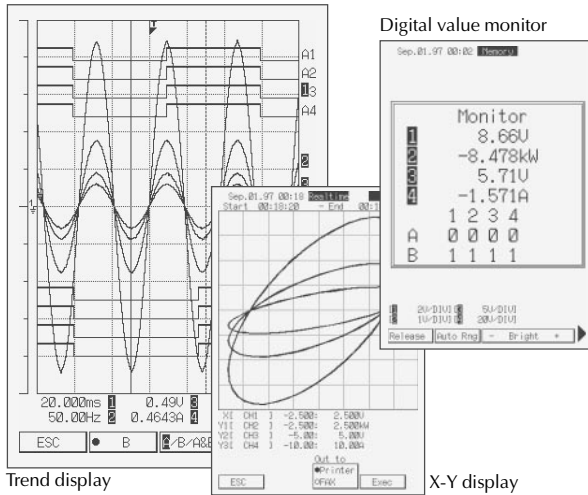
● **Standard Calculation Functions**

In addition to scaling, the OR100E/OR300E Series supports statistical calculation functions for determining maximum, minimum, average, root mean square and surface area values for ranges specified with the cursor.
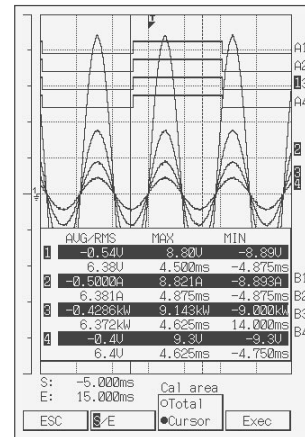
● **High-quality recording onto chart with effective width of 100 mm and length of 10 meters**

1. Trigger position, time, sensed channel
2. Print gauge (scale)
3. Channel or TAG number (7 alphanumeric characters)
4. Logic label
5. Input info or comment (20 alphanumeric characters)
6. Time scale
7. Unit
8. Statistical calculation data

■ **FAX/MODEM CAPABILITY USING A PC CARD**

The OR100E/OR300E Series makes it easy to collect data remotely using a phone line and a commercially available fax/modem card. Simply connect the PC card to a phone line to connect to your recorder remotely, eliminating the distance factor.

• The auto-dialing function can be used to automatically transfer captured data to your fax for high-quality output (as a graphical image). This reduces the need for periodic visits to the measurement site and allows you to respond quicker if a problem is detected.

• If you call your recorder over a phone line from a PC, you can transfer files to the PC or remotely control the recorder (e.g., change recorder measurement ranges or trigger levels) through the PC.
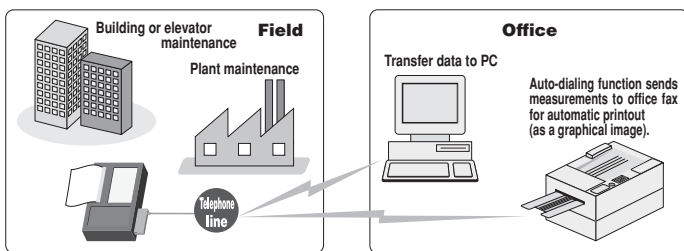
■ **SAVING DATA TO A FLASH ATA MEMORY CARD**

Measurements can be saved in binary or ASCII format to flash ATA memory cards with a maximum capacity of 160 MB. You can process or analyze measurement data using the ACRAWin32 data viewer, or commercially available spreadsheet software. Screen data from your OR100E/OR300E recorder can be saved in bitmap (BMP) format as graphical objects. Saved bitmap files can be pasted into documents in Windows programs such as word processors to easily create reports. Moreover, both measuring data which is saved in binary format and setting data stored in ASCII format can be redisplayed or re-recorded by OR100E/OR300E recorders.

● **Creating a Report (Example)**
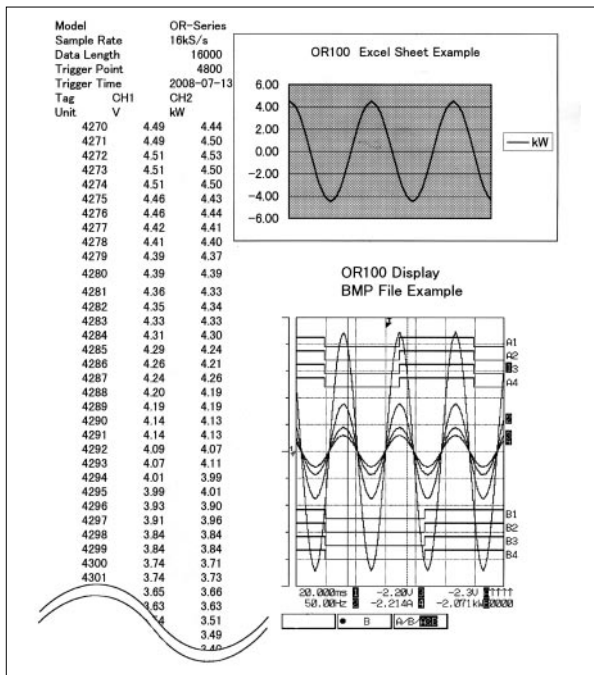
Creating a Report with a Flash ATA Memory Card (Using MS-Excel)

■ **DATA RECORDER FUNCTIONS USING A PC CARD**

The OR100E/OR300E lets you write measurements continuously and in real time to an ATA flash memory card (PCMCIA card). This means internal memory capacity is no longer a limitation on total recording time[1], allowing you to take long-duration measurements previously handled by data recorders. You can also display measured data stored in flash memory on the OR100E/OR300E display for easy field checks.[2] In addition, ACRAWin32 is available to assist you in making reports when handling massive amounts of data.

[1]: Maximum sampling rate: 1.6 kS/sec;

[2]: Displays 128 kdata/ch steps

■ **TEMPERATURE MEASUREMENT**

In addition to the direct measurement capability (up to 500 Vrms), the new OR100E/OR300E includes a temperature input adapter (788041-1) that works with type K thermocouples. The adapter is powered by the OR100E/OR300E, so there's no need for a special power supply when you use the recorder in the field or take long-duration measurements. The OR100E/OR300E has a special temperature input adapter range (see the diagram on the right) for easy setup.
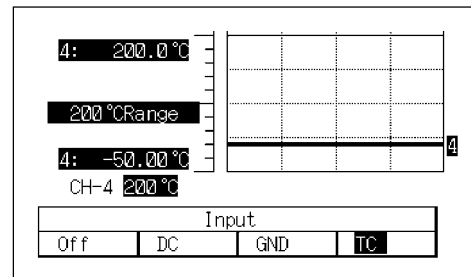
(Screenshot)

● **Temperature input adapter 788041-1**

Compatible sensor type: Type K thermocouple
Maximum number of connected sensors: 1 per adapter
Terminal type: Clump terminal
Temperature range: -50 to 600°C

Temperature range and accuracy:

Measurement range	Measurement span	Measurement accuracy
200°C range	-50 to 200°C	±2°C
400°C range	-50 to 400°C	±3°C
600°C range	-50 to 600°C	±5°C

(23 ± 5°C, following 30-minute warmup period)

Note:
A thermocouple is not included and must be purchased by the customer. The temperature input adapter (788041) is for models OR100E and OR300E only. It does not work with models OR100 and OR300.

■ **HARMONIC ANALYSIS FUNCTION (OR300E)**

This function measures phenomena such as power supply waveforms containing harmonic components, and the harmonic current flowing into or out of a commercial power system. Measurements are put through harmonic analysis up to the 40th order. Analysis parameters which can be selected are the root mean square value, content and phase angle of each harmonic order, and active power, power content, and power phase angle. This function also displays the overall root mean square value, overall distortion factor, active/reactive/apparent power, and power factor.

Waveform Observations (Examples)

The captured waveform can be checked.

Harmonic power analysis works only in Automatic Analysis mode.

Bar graph displays of root mean square values and contents of orders up to 40

Display of phase angles of orders up to 40

List display of RMS values, contents, and phase angles, as well as total RMS value and overall distortion factor

Bar graph displays of active power and power contents of orders up to 40

Display of phase angles of orders up to 40. Current flow into or out of the power system can be determined.

List display of active power, power contents, and phase angles, as well as, active/reactive/apparent power and power factor

HANDY OSCILLOGRAPHIC RECORDERS

OR100E & OR300E

◆ YOKOGAWA

SPECIFICATIONS

■ Measurement input

Input type: Floating unbalanced input, I/O isolation (channel independence)
Input mode: DC, GND, RMS (RMS is for OR300E only)
Measurement range and accuracy: See table below.

(After zero-calibration following 30-minute warm-up at 23 ± 5°C)

Measurement range (V/div)	Measurable range	Accuracy
100mV FS(10mV/div)	± 100.0mV	± (1% of FS + 1mV)
200mV FS(20mV/div)	± 200.0mV	± (1% of FS + 1mV)
500mV FS(50mV/div)	± 500.0mV	± (1% of FS + 1mV)
1V FS(100mV/div)	± 1.000V	± (1% of FS + 1mV)
2V FS(200mV/div)	± 2.000V	± (1% of FS + 1mV)
5V FS(500mV/div)	± 5.000V	± (1% of FS + 1mV)
10V FS(1V /div)	± 10.00V	± (1% of FS + 1mV)
20V FS(2V /div)	± 20.00V	± (1% of FS + 1mV)
50V FS(5V /div)	± 50.00V	± (1% of FS + 1mV)
100V FS(10V /div)	± 100.0V	± (1% of FS + 1mV)
200V FS(20V /div)	± 200.0V	± (1% of FS + 1mV)
500V FS(50V /div)	± 500.0V	± (1% of FS + 1mV)
1000V FS(100V /div)	± 500.0V	± (1% of FS + 1mV)

Zero position: Can be moved within measurement range; null function included.
Frequency characteristics (with filter off): DC to 40 kHz (+1/-3 dB, typical)
Common mode rejection ratio (CMRR):
　　85 dB or greater (50/60 Hz; signal source resistance of 500 (or less)
Low-pass filter: 5 Hz, 500 Hz, off
　　Attenuation characteristic;-6 dB/octave
Noise (with filter off, 10 mV/div range input shorted): 2.0 mVp-p (typical)
AD resolution: 12 bits (equivalent to 11bit internal processing resolution)
Maximum sampling speed: 400 kS/s (all channels simultaneously; 80 kS/s in wave-window)
Input impedance: 1 MΩ ± 1%, 5 pF (at 40 kHz, typical)
Input terminal: Safety terminal (for banana plug)
Maximum input voltage and maximum floating voltage:
　　Between H and L input terminals, between H-L input terminal and ground

Overvoltage category	Maximum input voltage
CATII environment	500 Vrms
CATIII environment	300 Vrms

■ With temperature input adapter 788041
Compatible sensor type: Type K thermocouple
Maximum number of connected sensors: 1 per adapter
Terminal type: Clump terminal
Temperature range: -50 to 600°C
Temperature range and accuracy:

Measurement range	Measurement span	Measurement accuracy
200°C range	-50 to 200°C	±2°C
400°C range	-50 to 400°C	±3°C
600°C range	-50 to 600°C	±5°C

(23 ± 5°C, following 30-minute warmup period)

Note:
A thermocouple is not included and must be purchased by the customer. The temperature input adapter (788041) is for models OR100E and OR300E only. It does not work with models OR100 and OR300.
Scale: Settable in increments of 10°C on both upper and lower ends
Position: Movable in increments of 10°C
Low-pass filter: 5 Hz (fixed)

■ Memory function
Time axis: 200, 500 µs/div
　　1, 2, 5, 10, 20, 50, 100, 200, 500 ms/div
　　1, 2, 5, 10, 30 s/div
　　1, 2 min/div
Time axis resolution: 80 points/div (measurement period is 1/80 of time axis)
Memory recording length:
　　10, 20, 50, 100, 200, 400, 800, 1600, 3200*1, 6400*2 div
　　*1: Only works on odd-numbered channel when two channels are connected together.
　　*2: Only works on channel 1 when four channels are connected together.
Number of memory division blocks:
　　32 maximum--varies depending on installed memory length, set memory length and whether or not wave window trigger is used.
Auto functions: Automatic printing, automatic statistical calculations, automatic saving (to external memory), automatic dialing (for faxing)
Cursor functions: One cursor: Measurements on all channels displayed simultaneously.
　　Two cursor: Time on all channels, as well as measurement differences or frequencies
Zoom-in/zoom-out function: Time axis: ×2, ×1, ×1/2 to ×1/1000
　　(The reduction ratio varies depending on memory length.)
　　Y axis: ×5, ×2, ×1, ×1/2

■ Data recorder function
Maximum sampling rate: 1.6 kS/sec
Data length for playback on recorder: 128 kdata/ch steps

■ Recording
Recording paper: Thermal paper roll (111 mm (width) ×10 meters), effective recording width: 104 mm
Paper feed accuracy: ±3%
Chart speeds: 2, 5, 10, 30 s/div; 1, 2, 5, 10, 30 min/div; 1 hour/div

■ Recording formats
T-Y recording: 4 analog channels + 8 logic bits; 1, 2, and 4 division recording capability (logic recording can be turned on/off separately for each bit)
Digital recording: measurements are recorded as digital values.
X-Y recording: X1-Y1, Y2, Y3. X axis is always 1 channel only.
　　Recording size: 8 div × 8 div (80 mm × 80 mm)
　　Recording format options: Dots, lines
Recording length: 20 div, 200 div, 800 div, continuous, 800 div is available on OR300, or on OR100 with /L1 and /L2 options
Recording line types: Three line thicknesses (analog waveforms)

■ Printing function
Printed information: List (settings), scale (units), time print marker, chart speed, chart speed modification point marker, trigger sensing position, trigger time, trigger sensing channel, grid (thin line, baseline, off), channel number, TAG, etc.
Comments: Character string (20 characters per channel) or channel information printed in 100 mm intervals.
Channel number: Channel number or TAG name (7 characters per channel) printed on waveform.

■ Real-time & memory
Description of operations: Normally memory sampling starts when trigger is detected during real-time recording.

■ Normal Trigger
Trigger sources: Analog channels 1-4, logic A and B, external trigger input, manual, timer
Trigger modes: Free, Single, Repeat
Trigger combinations (conditions): AND/OR
Analog trigger types: Rise, fall, high, low, bi-slope, level window (in, out)
Trigger level setting: 1% FS increments
Trigger filter: Filter or time-out (except when bi-slope is set)
Trigger delay: -100% to 100% (in increments of 1%)

■ Wave-window trigger
Trigger modes: Single, repeat, free
Frequencies: 50 Hz, 60 Hz
Trigger combinations (conditions): OR on each analog channel
Method for creating reference waveform:
　　Automatically generated from current input or specified parameters
Reference waveform parameters:
　　Amplitude, tolerance, offset (1% increments for each), phase (in increments of 1°)
Trigger delay: -100% to 100% (in increments of 10%)
Sampling rates: 80 kS/s (1 ms/div), 40 kS/s (2 ms/div), 16 kS/s (5 ms/div), 8 kS/s(10 ms/div)
Memory length: Memory cannot be linked; maximum memory length for each channel is one-half that of normal triggers.
　　Maximum memory length: 200 div (800 div in OR300 or in OR100 with long memory option)

■ Display
Screen: 5.7-inch LCD, 480×320 dots, contrast adjustable
Backlight: Fluorescent tube, can be turned on/off manually
Display languages: Japanese, English

■ Harmonic Analysis Mode Specifications (OR300E)
Fundamental wave: 50 Hz, 60 Hz or automatic (45.0 Hz to 65.0 Hz; Automatic Analysis mode only)
Sampling rates: 25600 Hz (50 Hz), 30720 Hz (60 Hz)
Analysis data points: 512
Analysis orders: Fundamental wave to 40th order
Analysis modes: Waveform Analysis, Automatic Analysis
Sample length (in Waveform Analysis mode): 5-250 cycles, maximum 1000 cycles (4 channels linked)
Anti-aliasing filter: Cutoff frequency: 7.5 kHz, -30 dB/oct
　　Effect on analyzed range caused by aliasing: -40 dB or less
Amplitude accuracy (voltage, current) *1:
　　Fundamental wave to 20th order ± (1.5% of rdg + 1.5% of FS)
　　21st to 40th orders ± (1.5% of rdg + 2% of FS)
Phase accuracy (voltage and current to fundamental wave phase tolerance) *1 *2:
　　2nd order to 10th order: ±5 deg, 11th order to 40th order ±15 deg
　　*1) In 50/60 Hz fixed mode (not including current clamp accuracy)
　　*2) Harmonic amplitude: At FS/100 to FS
Analyzed frequency range: 45 to 2.6 kHz (65 Hz × 40)
Triggers: Same as OR100 trigger functions in Waveform Analysis mode (but trigger sensing rate depends on sampling rate).
　　Triggers available in Automatic Analysis mode: Synchronized channel and level trigger settings, distortion factor and content of specified order.
Analysis types: Root mean square value, content and phase angle for harmonic component of each order; and active power*, power content*, and phase angle* (overall root mean square value, overall distortion factor; active/reactive/apparent power, and power factor can be displayed)
　　*: The following power measurement method is used (only works in Automatic Analysis mode; voltage output from a clamp probe is scaled to current values):
　　Single-phase two-wire method (in the 4-channel model, two single-phase two-wire systems can be measured), single-phase three-wire method, three-phase three-wire method
Saving analysis results to PC card: Analysis results can be saved to aflash ATA memory card.
Data format: CSV
Saving methods: Manual and automatic (for saving continuous trends at specified intervals)
Trend saving parameters:
　　Root mean square value, content, phase angle, overall root mean square value, overall distortion factor, activepower, power content, phase angle, total active power, apparent power, reactive power,andpower factor. Analysis trends and number of orders for saving trends to PC card can be selected separately for each channel.
Trend saving intervals: 1 minute, 10 minutes, 30 minutes, 1 hour, 24 hours

■ Real-time RMS measurement (OR300E)

Frequency ranges:	DC, 40 Hz to 1 kHz
Measurement range:	100 mVrms to 500 Vrms
Measurement accuracy:	As shown below for 50/60 Hz, sine wave
	100 mV FS to 2 V FS: ± (2% of FS + 1 mV)
	5 V FS to 50 V FS: ± (2% of FS + 50 mV)
	100 V FS to 1000 V FS: ± (2% of FS + 0.1 V)
Response rate:	(for 0-100% of FS step input)
	Rise (0→90% of FS): 200 ms (typical)
	Fall (100→10% of FS): 310 ms (typical)
Crest factor:	2 (measurable range for crest factor 2 is rms value of no more than 90% of f.s.)

■ External I/O interface

Terminal:	Screwless terminal
External trigger input:	TTL level or contact (pulse width of 2 μs or greater)
	Depending on settings, can be used as input for external sampling clock (up to 100 kHz) or for starting/stopping measurement.
External trigger output:	TTL level (pulse width of 10 ms or greater; for parallel operation)

■ RS-232 interface

Connector:	9-pin DSUB connector (male)
Transfer rates:	1200, 2400, 4800, 9600, 19200 bps

■ PC card interface

● External memory:
Supported card: Flash ATA memory card (made by SanDisk Corporation or equivalent)
Supported card sizes: Up to 160 MB
Function specifications: Saving settings data, measurement data, and graphical images (BMP)
Saving formats: ASCII, binary, BMP
● Modem communications:
Supported card: Fax/modem card
Transmission rate: 19200 bps maximum
Fax control: EA-592 Class 2 card must be used.
Function specifications: Sending measurement data, receiving setting commands, automatic transmission of measurement data (fax only)

■ Logic Probes

	788031	788035
Input type	4-channel, TTL or contact input; common input in the same probe.	4-channel, voltage input; insulation between channels.
Maximum allowable input voltage	±35 VDC	±250 Vrms
Input impedance	Approximately 10 kΩ	Approximately 100 kΩ
Threshold level	Approximately +1.4 V	Sensed: 60-250 VAC, ±30-±250 VDC Not sensed: 0-10 VAC, 0-±10 VDC
Withstand voltage	500 VDC, 1 minute (between probe and case)	1.5 kVAC, 1 minute (between channels) 1.5 kVDC, 1 minute (between probe and case)

■ Other separately sold accessories

● Dedicated AC adapter (sold separately):
Rated supply voltage:	100 to 240 VAC
Permissible supply voltage fluctuation range:	90 to 264 VAC
Rated supply frequency:	50/60 Hz
Permissible supply frequency fluctuation range:	48 to 62 Hz
Maximum consumed power:	70 to 90 VA
Rated output voltage:	12 VDC
Rated maximum output current:	2.6 A

● Dedicated NiMH battery pack (sold separately)
Battery volume:	2100 mAh, 7.2V
Number of charges (cycle life):	
	Approximately 300 (varies depending on usage environment)
Running time:	Approximately 3.5 hours (on trigger standby without options)
	Approximately 3 hours (when recording 1 Hz cycle waveform in 2 S/div)
Charging function:	Charged in the recorder, connect the dedicated AC adapter and turn off the power switch to enter charge mode. Charging time is approximately 1.5 hours.

● DC converter (sold separately):
Allowed input voltages:	788025-1: 9-18 VDC
	788025-2: 18-36 VDC
	788025-3: 36-60 VDC
Output voltage:	12V ± 5%
Power consumption:	Approximately 25VA maximum
Terminal type:	Screw terminal (lead wire approximately 5 meters long included)

■ General specifications

Measurement modes:	Memory, Real-Time Recorder, Real-time Recording & Memory, Harmonic Analysis (OR300 only)
Channels:	Analog: 2 channels or 4 channels
	Logic: 8 bits (maximum of 2 four-bit probes can be connected)
Internal memory capacity:	
	Standard: 32K data per channel (or 64K data per two linked channels, 128K data per four linked channels)
	OR300 or OR100 with long memory option: 128K per channel (or 256K data per two linked channels, 512K data per four linked channels)
Internal memory type:	SRAM (battery backup)
Power supply:	Commercially available AA alkaline dry cells or special AC adapter, special NiMH battery pack, special DC converter for external DC power source.
	When both the AC adapter and batteries are connected, the AC adapter is used first.
Power consumption:	Using AC adapter: 25 VA maximum
	Using batteries: 20 VA maximum
AA/R6 dry cells:	Six AA/R6 alkaline dry cells (JIS, IEC model name: LR6)

Alkaline dry cell running time:
Approximately 2 hours (on trigger standby without options)
Approximately 1/2 hour (when recording 1 Hz cycle waveform in 2 S/div) (about 10 minutes shorter with OR300)

Warm-up time:	30 minutes
Withstand voltages:	Between recorder and special AC adapter power line: 2 kVAC for 1 minute
	Between recorder and analog input terminal: 2 kVAC for 1 minute
	Between input terminals: 2 kVAC for 1 minute
Insulation resistance:	Between recorder and special AC adapter power line: Minimum 10 MΩ at 500 VDC
	Between recorder and analog input terminal: Minimum 100 MΩ at 500 VDC
	Between input terminals: Minimum 100 MΩ at 500 VDC
Allowed signal source resistance:	Maximum 500Ω
Environment:	Usage temperature and humidity: 5 to 40°C, 35 to 80% RH
	(Note: Wet-bulb temperature of 29°C or less, no condensation.)
Storage temperature and humidity:	-20 to 60°C, 90% RH
	(Note: Wet-bulb temperature of 29°C or less, no condensation; NiMH battery and alkaline dry cells not included.)
Clock accuracy:	±100 ppm (typical)
Battery backup:	Lithium battery for backing up settings, waveform data and clock
Life of lithium battery for backup:	Approximately 5 years (at room temperature)
Safety/EMC performance:	
	Safety performance: CSA-C22.2 No. 1010-92 approved
	Declaration of compliance with EN61010-1
External dimensions:	Approximately 256 (H) × 190 (W) × 46 (D) mm
Weight:	OR122 (2-channel model): Approximately 1.3 kg (not including batteries or chart)
	OR142 (4-channel model): Approximately 1.4 kg (not including batteries or chart)
	OR322 (2-channel model): Approximately 1.4 kg (not including batteries or chart)
	OR342 (4-channel model): Approximately 1.5 kg (not including batteries or chart)
Accessories:	Printer paper (111 mm × 10 meter roll; part number: B9988AE): 1 roll
	Measurement input leads for voltage input (model 366963): Leads for each channel
	AA/R6 alkaline dry cells (part number: A1070EB): 6
	Belt (part number: B9988CK): 1 set
	Instruction Manual: 1

■ ACRAWin32 PC software

Data display:	Displays waveform data measured and saved using OR100E, OR300E, OR1400. (supported recorders differ depending on software model) OR300E harmonic analysis results cannot be redrawn.
Data conversion:	Conversion to ASCII, Lotus 1-2-3 and Excel formats.
Number of displayed waveforms:	
	Maximum simultaneous display of 16 analog waveforms and 16 logic waveforms (displayed separately for each file; maximum number of simultaneous waveforms varies depending on model)
Calculation function:	Use cursor to select range on waveform display screen or digital value display screen. Minimum, maximum, P-P, average and root mean square values are calculated.
Communication with recorders (destinations):	
	Enter the desired recorder name, and set details such as the access method, communicated information schedule, data type selection, and password during communication. Next start or stop communication (OR100E/OR300E only).
PC:	The PC must be running Windows 95, 98, NT 4.0 or higher, have a Pentium 90 MHz CPU or higher, have at least 16 MB of RAM and at least 5 MB free hard drive space.
Serial port and modem:	
	For communication between a PC and the OR100E/OR300E using theOR100E/OR300E Connector communication software, the PC must be connected through a serial port (RS-232) or modem. In addition, the operating system must recognize the communication devices.
RS-232 cable and adapter:	
	For serial communication, an RS-232 cable with reverse-connected

HANDY OSCILLOGRAPHIC RECORDERS

OR100E & OR300E

AVAILABLE MODELS

OR100E (standard model)

Model	Suffix code		Description
OR122			2-channel isolated input model*
OR142			4-channel isolated input model*
Display language	-2		English (including key panel)
Options		/P □***	Accessory pack**

OR300E (harmonic analysis model)

Model	Suffix code		Description
OR322			2-channel isolated input model*
OR342			4-channel isolated input model*
Display language	-2		English (including key panel)
Options		/P □***	Accessory pack**

* : Standard-equipped with measurement cables for each analog input channel.
** : Includes AC adapter, rechargeable battery pack and carrying case (788081).
*** : M (for UL/CSA), F (for VDE), R (for SAA), S (for BS)

● **Separately sold accessories**

788011		AC adapter
	- □*1	Power cord
788021		Rechargeable battery pack *2
788025		DC converter
	-1	For connecting external 12 VDC power supply
	-2	For connecting external 24 VDC power supply
	-3	For connecting external 48 VDC power supply
788031		4-channel logic probe *3
788035		4-channel high voltage logic probe (each channel isolated) *4
788041		Temperature input adapter
	-1	For type K thermocouple
788081		Carrying case
788082		Small carrying case

*1: M (for UL/CSA), F (for VDE), R (for SAA), S (for BS)
*2: Be sure to get an AC adapter (788011) if you are getting a rechargeable battery pack.
*3: Includes IC clip and crocodile leads.
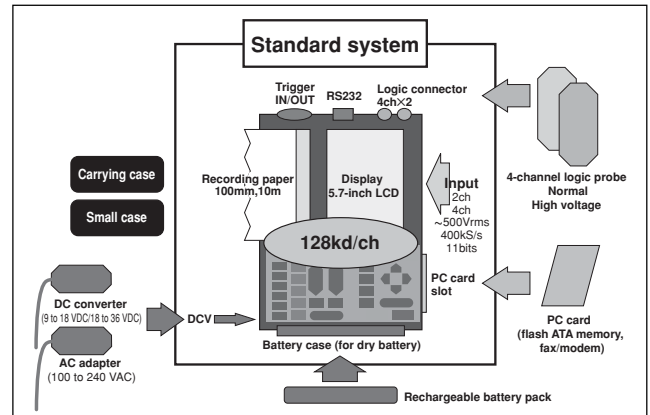*4: Includes crocodile leads.

● **PC Software ACRA Win32**

789501		Viewer for OR100E/OR300E only and OR100E/OR300E viewer software for OR100E/OR300E connector software
789502		Viewer software for OR100E/OR300E, ORM (Windows 95, 98, NT4.0)
789503		Viewer software for OR100E/OR300E, OR1400 and ORM, and OR100/OR300 connector software (Windows 95, 98, NT4.0)
789301		File conversion software for OR100E/OR300E (Windows 3.1 version)
	-02	English

● **Accessories**

B9988AE		111 mm × 10 meter roll paper

SYSTEM COMPONENTS

Standard system

Trigger IN/OUT RS232 Logic connector 4ch×2

Carrying case

Small case

Recording paper 100mm,10m

Display 5.7-inch LCD

Input 2ch 4ch ~500Vrms 400kS/s 11bits

128kd/ch

PC card slot

DC converter (9 to 18 VDC/18 to 36 VDC)

DCV

AC adapter (100 to 240 VAC)

Battery case (for dry battery)

4-channel logic probe Normal High voltage

PC card (flash ATA memory, fax/modem)

Rechargeable battery pack

■ **PERIPHERAL EQUIPMENT**

788011
AC adapter

788021
Rechargeable battery pack

788025
DC-DC converter

788031
Logic probe (w35VDC)

788035
Logic probe (w250Vrms)

788081
Carrying case

788082
Small case

366922
Conversion adapter

366963
Measurement lead

96001
Clamp probe*

*:Product of Yokogawa M&C Corporation