omniace

RA3100

DATA ACQUISITION SYSTEM

A&D Company, Ltd.

Discover Precision

http://www.aandd.jp

All data recorded in Omniace

High-speed, long-term recording of phenomena on large-capacity storage media

Data Acquisition System

omniace RA3100

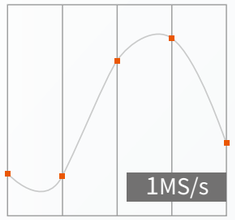
Omniace RA3100 is a data acquisition system for research, development, and field maintenance, which enables accurate and long-term measurement of high-speed switching waveforms, even in severely noisy environments, in electric automobiles, electronic appliances, railroad cars, and solar power generation systems utilizing inverter control technology that has become widespread in recent years.

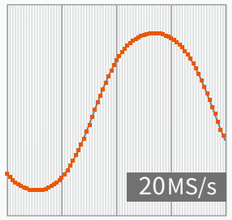
Multi-channel input	Max 36ch (analog input) Max 144ch (logic input)
High speed sampling	Max 20MS/s
Long-term recording	Memory capacity 4GB (when 18 channels are used, 20MS/s, 5 seconds) 256GB SSD (1MS/s, 59 minutes when using 36 channels.)
High-speed and High-definition printing	Maximum chart speed 100mm/s Back up to SSD even if there is no chart paper.
Various recording method	Recording to Memory, SSD, and Printer. All data can be measured simultaneously.
Input modules	Voltage,High-Voltage(1,000V), Temperature, Strain,Acceleration,Pulse and Logic Input Module
Excellent visibility and operability	12.1-inch LCD with touch panel provide you excellent visibility and operability.
Back scrolling	Data being measured can be played back without ending the measurement.
Various Monitor Displays	Y-T waveform, X-Y waveform, and FFT analysis can be displayed on the LCD monitor during measurement.

High-speed Sampling and High-definition Measurement

at 20MS/s with 18ch for 5 seconds

"The 2ch High-Speed Voltage Module" is an input module for high-speed sampling at the highest level of the series. Includes the ability for a sampling rate of 20MS/s, input voltage up to ±500V, and 14bit resolution . 9 modules can be installed in the main unit, allowing for 18-channel high-speed memory recording.





Recordable time into memory

	2ch	8ch	18ch
20 MS/s	50 sec	10 sec	5 sec
10 MS/s	1 min 40 sec	20 sec	10 sec
5 MS/s	3 min 20 sec	40 sec	20 sec
2 MS/s	8 min 20 sec	1 min 40 sec	50 sec
1 MS/s	16 min 40 sec	3 min 20 sec	1 min 40 sec
500 kS/s	33 min 20 sec	6 min 40 sec	3 min 20 sec
10 kS/s	27 hrs 46 min 40 sec	5 hrs 33 min 20 sec	2 hrs 46 min 40 sec
5 kS/s	55 hrs 33 min 20 sec	11 hrs 6 min 40 sec	5 hrs 33 min 20 sec
2 kS/s	138 hrs 53 min 20 sec	27 hrs 46 min 40 sec	13 hrs 53 min 20 sec
1 kS/s	277 hrs 46 min 40 sec	55 hrs 33 min 20 sec	27 hrs 46 min 40 sec

Long-term Recording

Various recording speeds, multiple channels, and a high-capacity storage medium to support a large amount of data are included as standard.
Recording desired signal accurately without missing detailed changes.

Memory capacity
4GB
(when 18 channels are used, 20MS/s, 5 seconds)

SSD capacity
256GB
(when 36 channels are used, 1MS/s, 59 minutes)

High-speed, High-definition Printing

High-resolution waveform printing at high speeds (100mm/s) is possible.
Even if the chart paper runs out, recorded data is backed up to the SSD and can be printed out later.

Multi-channel Input

"The 4ch Voltage Module" allows 4-channel input with a single unit. 9 modules can be installed in the main unit, allowing 36-channel recording.
"The 16-channel Logic Module" allows 16-channel logic signal input with a single unit. 9 modules can be installed in the main unit, allowing 144-channel logic signal recording.

Max 36ch
with analog input

Max 144ch
with logic input

Excellent Visibility and Operability

The LCD display with touch panel allows zoom in and out, and scrolling through the waveform simply, allowing a dynamic waveform drawing and operability like a smartphone.

Pinch-in(zoom out)

Pinch-out (zoom in)

Swipe (scroll)

Input Module

Up to 9 modules can be installed in the main unit. Various modules for high-speed voltage, high-accuracy voltate, logic inut, temperature measurement, and remote control are available.

2ch Voltage Module
RA30-101

4ch Voltage Module
RA30-102

2ch High-speed Voltage Module
RA30-103

2ch High-Voltage Module
RA30-107

16ch Logic Module
RA30-105

2ch Temperature Module
RA30-106

2ch AC Strain Module
RA30-104

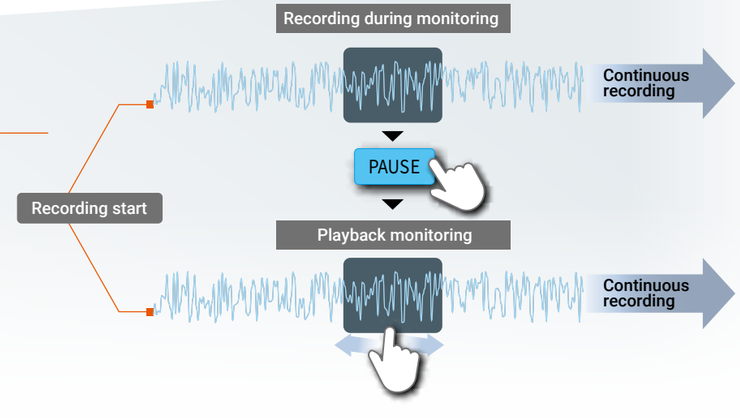
2ch Acceleration Module
RA30-109

2ch Frequency Module
RA30-108

Module Name and Model		Channels	Sampling Rate	Input	Specifications
2ch Voltage Module	RA30-101	2ch	1MS/s	Voltage ±500V	Measure high-speed voltage measurement with anti-aliasing filters
4ch Voltage Module	RA30-102	4ch	1MS/s	Voltage ±200V	Multi-channel voltage measurement
2ch High-speed Voltage Module	RA30-103	2ch	20MS/s	Voltage ±500V	High-speed voltage measurement
2ch High Voltage Module	RA30-107	2ch	1MS/s	Voltage ±1,000V	Module to measure high voltages of ±1,000V
16ch Logic Module	RA30-105	16ch	1MS/s	Contact, Voltage	Contact, Voltage signal measurement
2ch Temperature Module	RA30-106	2ch	1.5ms	Thermocouple : K, E, J, T, N, R, S, B, C RTD: Pt100, Pt1000	Measurement of temperature with a thermocouple and RTD
2ch AC Strain Module	RA30-104	2ch	100kS/s	Strain gauge, Strain gauge transducer	Module to measure stress, load, displacement, pressure, torque, and acceleration
2ch Acceleration Module	RA30-109	2ch	1MS/s	Piezoelectric acceleration transducer (charge output, built-in amplifier)	Module to measure acceleration, speed and displacement
2ch Frequency Module	RA30-108	2ch	1MS/s	Voltage ±500V	Input module capable of measuring period, rotation speed, number of pulses, etc., of input signals

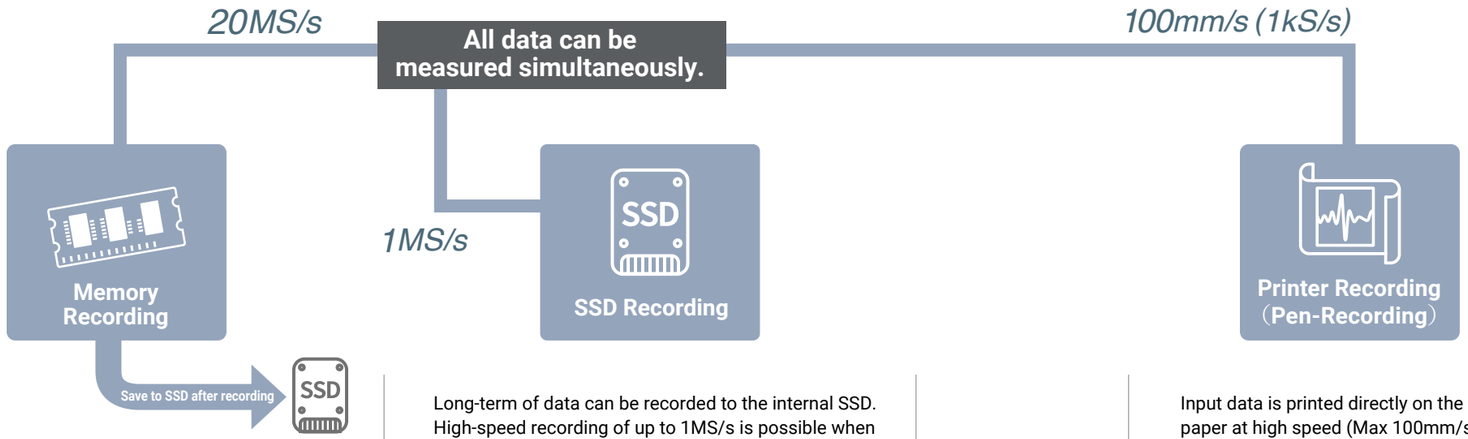
Back Scrolling

Press the [PAUSE] button during recording to playback recorded data while recording.



Various Recording Method

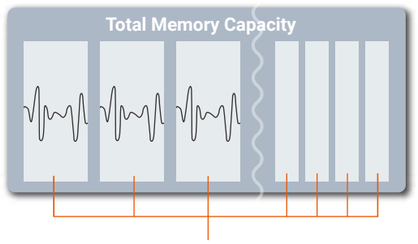
"Memory", "SSD", and "Printer" are provided as data recording destinations.
Data recording can be performed at three destinations at the same time.
This can be selected freely depending on the measurement purposes.



Memory mode records data in the internal memory (4GB) at high speed (Max: 20MS/s).
In addition, measurement can be performed under a variety of conditions using a variety of trigger functions.

After the input data is recorded in the memory, it is automatically saved to SSD.

Sampling speed : 20MS/s to 10S/min (depending on the input module)
Memory capacity : 4GB (2G point/ch)
Memory divisions : 1 to 200 divisions
Recording length : 2,000 to 2G points/ch (1-2-5 step)



Recordable Time on Memory

	2ch	8ch	18ch	36ch
20 MS/s	50 sec	10 sec	5 sec	—
10 MS/s	1 min 40 sec	20 sec	10 sec	5 sec
5 MS/s	3 min 20 sec	40 sec	20 sec	10 sec
2 MS/s	8 min 20 sec	1 min 40 sec	50 sec	25 sec
1 MS/s	16 min 40 sec	3 min 20 sec	1 min 40 sec	50 sec
500 kS/s	33 min 20 sec	6 min 40 sec	3 min 20 sec	1 min 40 sec
10 kS/s	27 hrs 46 min 40 sec	5 hrs 33 min 20 sec	2 hrs 46 min 40 sec	1 hrs 23 min 20 sec
5 kS/s	55 hrs 33 min 20 sec	11 hrs 6 min 40 sec	5 hrs 33 min 20 sec	2 hrs 46 min 40 sec
2 kS/s	138 hrs 53 min 20 sec	27 hrs 46 min 40 sec	13 hrs 53 min 20 sec	6 hrs 56 min 40 sec
1 kS/s	277 hrs 46 min 40 sec	55 hrs 33 min 20 sec	27 hrs 46 min 40 sec	13 hrs 53 min 20 sec

Long-term of data can be recorded to the internal SSD.
High-speed recording of up to 1MS/s is possible when using 36ch.
Since it is stored as digital data, data can be analyzed after recording and data can be managed for a long period of time.

Input data is saved directly to SSD.

Sampling speed : 1MS/s to 10S/min (depending on the input module)
SSD capacity : 256GB
Maximum recording time : 100 days
Data format : Normal data, Peak data

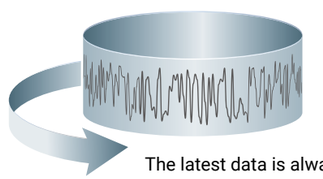
Recordable Time on SSD*1

Sample speed	2ch	8ch	18ch	36ch
*2 1 MS/s	11hrs 46min 40sec	3hrs 55min 33sec	1hrs 51min 34sec	57min 17sec
500 kS/s	23hrs 33min 21sec	7hrs 51min 07sec	3hrs 43min 09sec	1hrs 54min 35sec
200 kS/s	2day 11hrs 20min 02sec	19hrs 37min 48sec	9hrs 17min 54sec	4hrs 46min 29sec
100 kS/s	4day 21hrs 46min 49sec	1day 15hrs 15min 36sec	18hrs 35min 48sec	9hrs 32min 59sec
50 kS/s	9day 19hrs 33min 39sec	3day 06hrs 31min 13sec	1day 13hrs 11min 37sec	19hrs 05min 58sec
20 kS/s	24day 12hrs 54min 09sec	8day 04hrs 18min 03sec	3day 20hrs 59min 04sec	1day 23hrs 44min 55sec
10 kS/s	49day 01hrs 48min 19sec	16day 08hrs 36min 06sec	7day 17hrs 58min 09sec	3day 23hrs 29min 51sec
5 kS/s	98day 03hrs 36min 38sec	32day 17hrs 12min 12sec	15day 11hrs 56min 18sec	7day 22hrs 59min 43sec
2 kS/s	100day	81day 19hrs 00min 31sec	38day 17hrs 50min 46sec	19day 21hrs 29min 19sec
1 kS/s	100day	100day	77day 11hrs 41min 33sec	39day 18hrs 58min 38sec
500 S/s	100day	100day	100day	79day 13hrs 57min 16sec
200 S/s	100day	100day	100day	100day

*1 If you select peak data as the data type, the time will be 1/2 of the above time.
*2 A sample rate of 1 MS/s is not available when peak data is selected as the data type.

Window Recording

Endless recording is possible by specifying the ring buffer area (maximum 2G points/ch) as the window recording time. If you do not know when an abnormality will occur, you may miss the abnormal data if you set the recording time and measure. By ringing the recording area, you can always save the latest data.

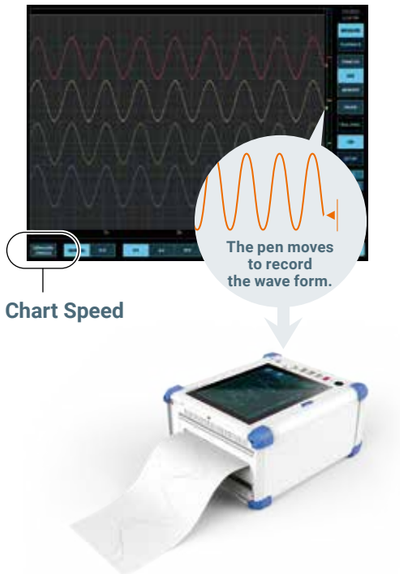


The latest data is always recorded.

Input data is printed directly on the chart paper at high speed (Max 100mm/s). Data printed on chart paper is also stored digitally on the SSD, so even if the chart paper runs out, the data can be printed out later.

Pen-Recording

Pen records are only recorded on recording paper; measurement data is not stored. Input module and paper feed rate settings can be configured during recording.



Recording Specifications

Number of recorded signals: 48 channels
Chart speed:
100mm/s(1kS/s)～1mm/min(10S/min)
Recording resolution:
20 to 80dots/mm (time axis)
8dots/mm (amplitude axis)

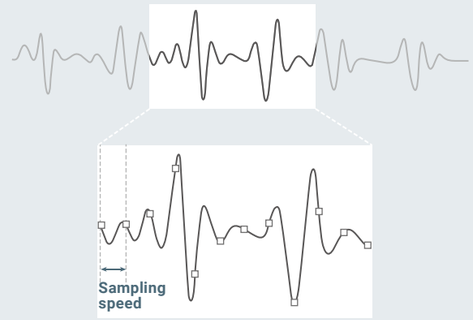
Selectable for SSD Recording

Normal Data and Peak Data

Omniace is a digital recorder that performs analog to digital conversion on all inputs and records those signals. Due to the relationship between the speed of analog to digital conversion and the frequency component of the input signal, the data may or may not be measured correctly.

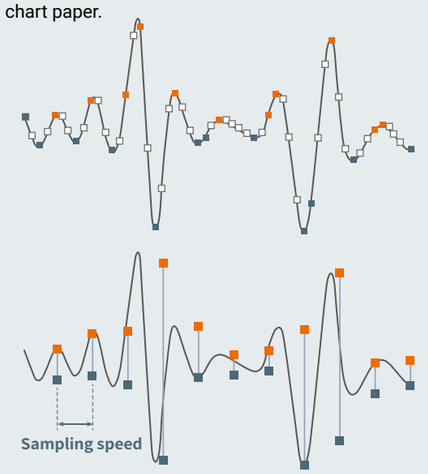
Normal Data

Normal data is recorded at each designated sampling speed. (□ points)
If the signal changes too fast relative to the sampling speed, the data singular point (peak value) may not be recorded. Memory recording can measure this type of data.



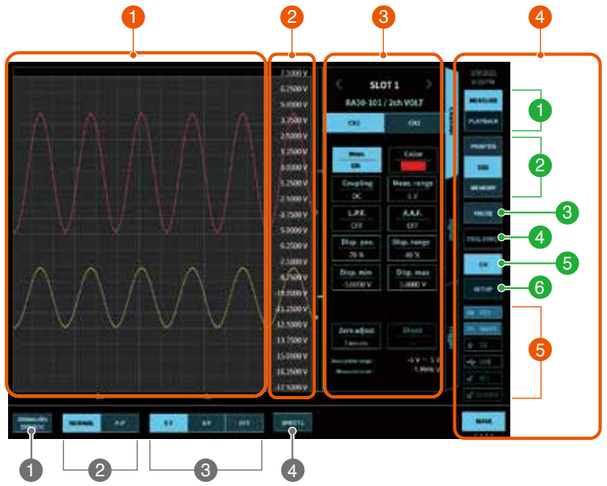
Peak Data

Peak data is sampling (■, ■, and □ points) between the designated recording speed at the fastest AD-conversion rate, and records two data points, the maximum value (■ points) and the minimum value (■ points). The amount of data can be compressed without losing the data singular point (peak value). Printer recording records data of this method on the chart paper.



Various Monitor Displays

Input signal and recorded data can be displayed as Y-T waveform display, X-Y display, and FFT.

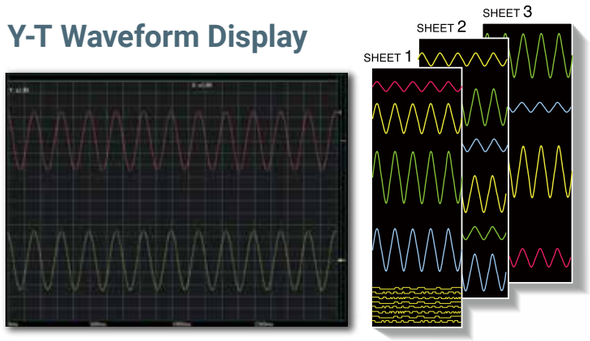


1. **Waveform display Area**
2. **Scale area**
3. **Submenu**
   Press the [CH] key in the "Operation key area" to make settings related to the input module.
4. **Side menu area**
5. **Status display icon**
   Storage medium, interface, key lock

1. **Chart speed switching**
2. **Data format of waveform display when recording to SSD**
3. **Monitor waveform selection**
   Select Y-T waveform, X-Y waveform, or FFT analysis.
4. **Sheet selection**

1. **Monitor selection**
   Measurement: Display the current input signal.
   Playback: Play back saved data
2. **Monitoring device selection**
   - Data to printer
   - Data to SSD
   - Data to memory
3. **Pause**
   Pause input monitoring
4. **TRIG.SYNC.**
   Monitor synchronized with a trigger
5. **CH**
   Input module settings
6. **Settings**
   Measurement conditions setting screen

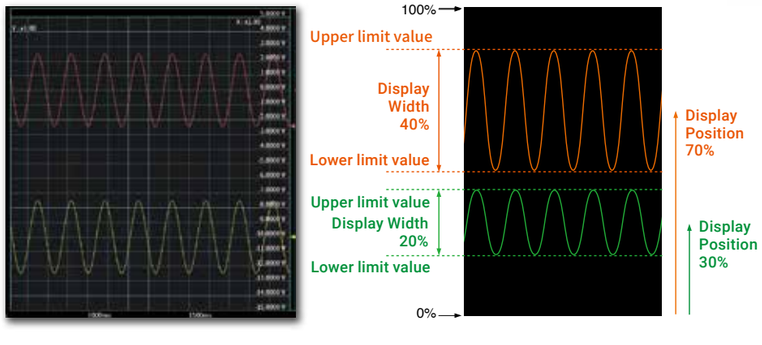
Y-T Waveform Display



Display the measurement channels split into three sheets.
Up to 48 channels of signals can be monitored on a sheet with 20 vertical/horizontal divisions.
Graphs can be divided into 1 to 18 sheets and displayed.

Set the signal display width and display position.

Signals can be drawn at any position on the graph at any width.You can easily draw a 100V signal in the width of 1div.



Display Width

Display the signals of each channel at any width.Set the width of the channel to be displayed as % out of the 100% width of the display graph.

Display Position

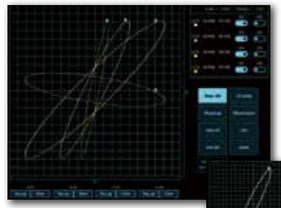
Set the position of the channel to be displayed as % out of the 100% width of the display graph.

Scale Setting

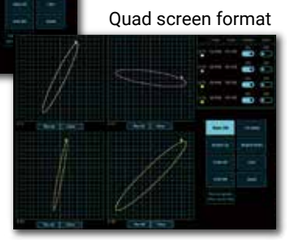
Set the upper limit/lower limit value of display for the display width of each channel as an input value or a physical conversion value.

X-Y waveform Display

An X-Y waveform can be drawn by specifying 4 channels for the X-axis and 4 channels for the Y-axis. The screen format can be displayed a large single screen format, or devided four screen formats for the each X and Y axis channels. The pen can also be moved up or down, and the grid can be turned on or off.



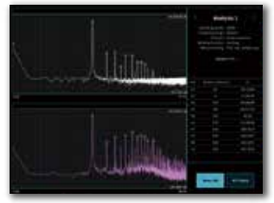
Single screen format



Quad screen format

FFT Analysis

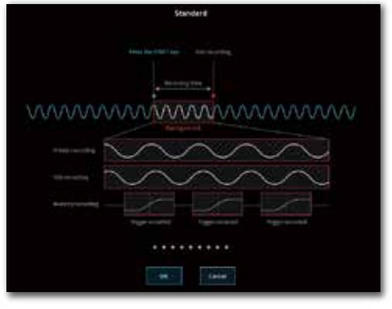
FFT analysis is performed for any two signals. The top 10 highest values can be read from the analysis results, and the value of any analysis result can be read using the cursor. (FFT analysis can be performed on normal data recorded in SSD.)



Data selection	Select from the input signal or recorded data
Sampling	1000, 2000, 5000, 10,000
Maximum analysis frequency	1/2 times of the sampling frequency
Display format	1 screen, 2 screens.
Functions	Time-Axis waveform, Linear Spectrum, RMS Spectrum, Power Spectrum, Power spectrum density,1/1 Octave, 1/3 Octave, Transfer Function, Cross-Power Spectrum, Coherence Function
Window Functions	Hanning window, Hamming window, Rectangular window
Average processing	Time axis simple addition average, Frequency axis simple addition average, Frequency axis exponent weighted average, Frequency axis peak hold
X-axis scale	Time, Linear frequency, Log frequency, 1/1 octave, 1/3 octave
Y-axis scale	Real value area, Imaginary number area, Amplitude, Logarithmic amplitude, Auto scale or manual scale in accordance with the phase analysis results

Recording Mode Selection

Nine measurement patterns are prepared as Recording modes.
"Recording Mode" can be selected from Measurement starts by manual operation, Measurement starts from a trigger signal or Repeating measurement, etc. When "Recording Mode" is selected, the necessary set-up menu is displayed and can be easily set.

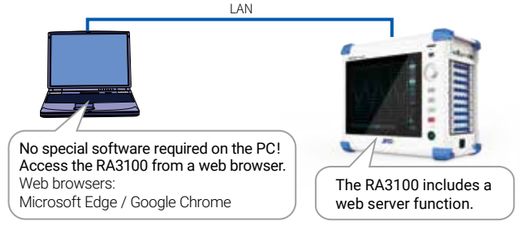


1 Normal record	2 Start time	3 Start trigger
4 Interval time (N times)	5 Start time + Start trigger	6 Start time + Interval time (N times)
7 Start trigger + Interval time (N times)	8 Start time + Start trigger + Interval time (N times)	9 Window recording

PC Compatibility

Web server function

The RA3100 can be remotely operated from a web browser (operating PC). The web browser displays the same screen as the RA3100 main unit with pseudo operation panel keys (START key, etc.) to make settings and start/stop recording.



Software for displaying measurement data*

"RA3100 Viewer" is software to display recorded data exported to external media from an RA3100 on a PC.

PC software for converting measurement data*

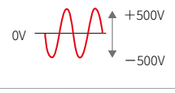
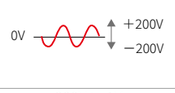
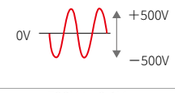
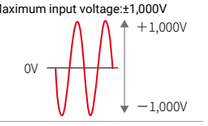
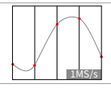
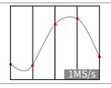
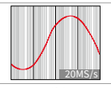
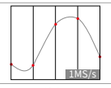
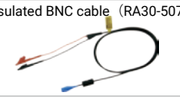
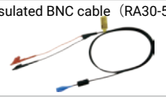
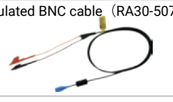
The "File Converter" software can convert recorded data exported to external media from an RA3100 to CSV or ASAM MDF (Ver. 4.1) files on a PC.

*The software can be downloaded from our website:
https://www.aandd.co.jp/support/soft_download/industrial.html

Various input modules

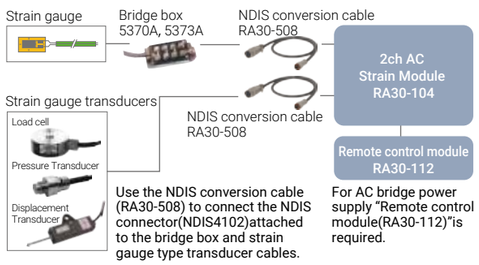
Voltage input modules 4 types

Lineup of input modules for measuring many voltage signals from small to high

Name	2ch Voltage Module	4ch Voltage Module	2ch High-speed Voltage Module	2ch High-Voltage Module
Model name	RA30-101	RA30-102	RA30-103	RA30-107
Appearance				
Function	Input module capable of measuing ±500V voltage. Anti-aliasing filter allow for frequency analysis with no wrap-around.	Input module with a maximum input of ±200V and 4 channels of voltage measure-ment. When 9 slots are used, a maximum of 36 channels can be measured.	This input module is capable of high-speed sampling at 20MS/s and measurement of ±500V input voltage.	This module can directly input high voltage of ±1,000V(700Vrms). Voltage waveform or RMS value can be measured.
No.of channels	2ch	4ch	2ch	2ch
Maximum input voltage	Maximum input voltage:±500V 	Maximum input voltage:±200V 	Maximum input voltage:±500V 	Maximum input voltage:±1,000V 
Range	500V to 0.1V	200V to 1V	500V to 0.1V	1,000V to 2V
Sampling speed				
A/D Resolution	16bit	16bit	14bit	16bit
Other function	With anti-aliasing filter	—	—	RMS conversion
Input cable	Insulated BNC cable（RA30-507） 	Insulated BNC cable（RA30-507） 	Insulated BNC cable（RA30-507） 	High voltage alligator clips(RA30-509-1) High-voltage connection cable (RA30-509-2)

2ch AC Strain Module RA30-104

This input module enables stress measurement using strain gauges as well as strain gauge transducers such as load cells, pressure transducers, and torque transducers. The AC bridge method can be used for measurement that is strong against external noise.

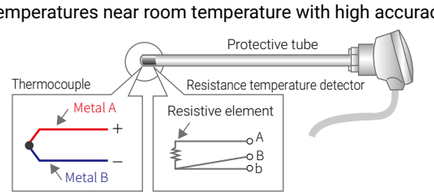


Use the NDIS conversion cable (RA30-508) to connect the NDIS connector(NDIS4102)attached to the bridge box and strain gauge type transducer cables.

For AC bridge power supply "Remote control module(RA30-112)"is required.

2ch Temperature Module RA30-106

An input module for a thermocouple or resistance temperature detector. Thermocouples can be used for high temperatures and wide temperature ranges, while resistance thermometers can be used to measure temperatures near room temperature with high accuracy.

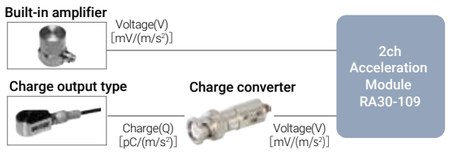


Features of Thermocouples and Resistance Temperature Detectors

Thermocouple	Advantages	Disadvantages
A sensor utilizing the phenomenon that a voltage is generated when a temperature difference is applied to the contact points at both ends of a circuit created by connecting two different types of metal wires.	Low cost, high temperature and wide temperature range (-200 to 2,300°C), small temperature measurement objects, measurement in confined spaces, fast thermal response	Poor accuracy (compared to Resistance temperature detector), reference junction required
Resistance temperature detector	**Advantages**	**Disadvantages**
A sensor utilizing the phenomenon that the electrical resistance of metals changes with changes in temperature.	High accuracy (compared to Thermocouple), no reference junction required	Large form factor, slow response, narrower temperature range (-200 to 850°C) than thermocouple, expensive, weak against vibration and shock

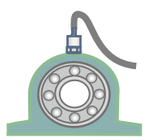
2ch Acceleration Module RA30-109

This module can measure acceleration, speed, and displace-ment of mechanical vibration using a piezoelectric acceleration transducer (built-in amplifier, charge output type). For mathe-matical functions, RMS conversion, and then envelope processing can be performed.

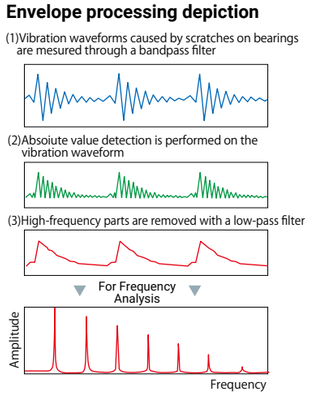


Envelope processing

Envelope processing helps to identify abnormal areas of bearings (inner rings, outer rings, and rollers/balls) by looking at the periodicity of vibrations caused by bearing flaws. Envelope-processed signals are subjected to frequency analysis and the resulting primary frequency and information such as the size of each bearing part, the number of rollers and balls, and the shaft rotation speed can be used to infer the damaged part.

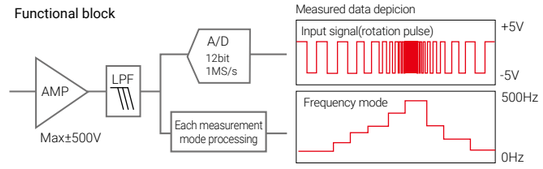


Envelope processing depiction



2ch Frequency Module RA30-108

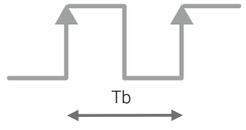
Period, rotation speed, pulse count, etc. can be measured for the input pulse signal.
Measurement result data such as period, rotation speed, pulse count, etc., and the input pulse signal can be saved.



Measurement Mode

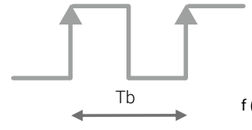
Period

Measures the period of the measured pulse. (s: seconds)
Measures the width (Tb) from leading edge to leading edge of the pulse.



Frequency Mode

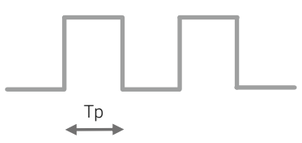
Measure the frequency of the measured pulse. (Hz: hertz)
Calculates the period from the width (Tb) from leading edge to leading edge of the pulse.



f (Hz) = 1 / Period (Tb)

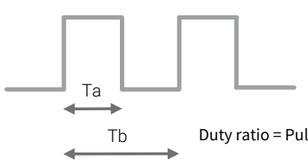
Pulse Width Mode

Measures the pulse width (Tp) from leading edge (trailing edge) to trailing edge (leading edge) of the pulse. (s: seconds)



Duty Ratio Mode

Measures the pulse ratio (Ta/Tb) from leading edge (trailing edge) to trailing edge (leading edge) of the pulse.（%）



Duty ratio = Pulse width (Ta) / Period (Tb)

Rotation Speed Mode

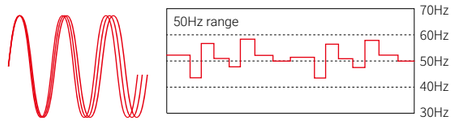
Measure the rotation speed of the measured pulse. (rpm: rotations) Rotation speed (rpm) = 60 / (Measured period x No. of pulses per revolution)

* The number of pulses per revolution can be set from 1 to 100.

The gear to the left has 11 teeth,
so the number of pulses per revolution is 11.

Power Frequency Mode

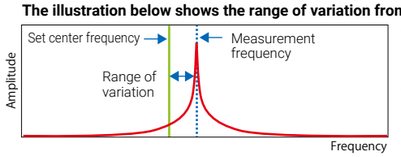
Measures fluctuations in power supply frequency (50/60/400Hz).



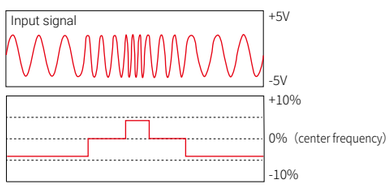
Range of Variation Mode

Measures the variation from the measured frequency and the set center frequency. (%)
Range of variation (%) = Measurement frequency / Center frequency

The illustration below shows the range of variation from frequency analysis data.

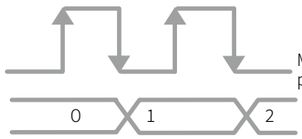


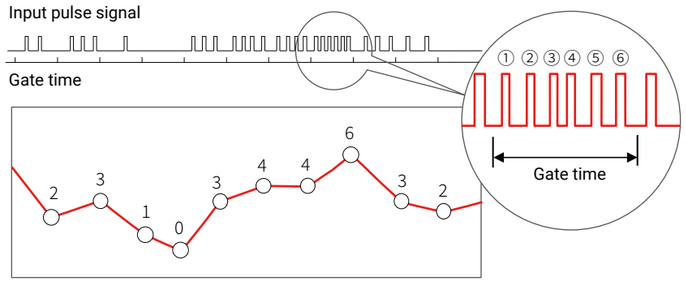
This module detects the frequency from the input pulse and calculates the variation from the set center frequency value. Changes in range of variation can be measured as sequential data.



●Pulse Count Mode

Integrates the number of pulses confirmed from pulse leading edge (trailing edge) to trailing edge (leading edge) within the gate time.
The count value is cleared at every gate time.



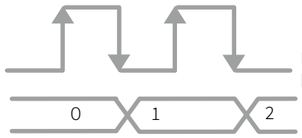


The number of pulse signals input within the gate time is counted and recorded.

- Maximum integration: Up to 40,000 counts can be counted.
  (Minimum pulse width: 2.5μs)

●Pulse Integration Mode

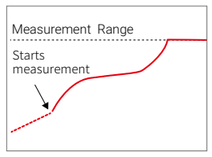
Integrates the number of pulses when the pulse is confirmed from leading edge (trailing edge) to trailing edge (leading edge) of the pulse.



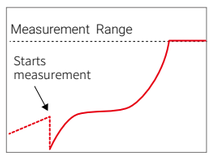
Count value reset operations

OFF ：Count value is stopped at the range upper limit.
Start：When recording starts, the count value is reset and then stopped at the range upper limit.
Over ：When the count value reaches the upper limit of the range, the count value is reset and measurement starts again from 0.
Start & Over：The count value is reset when recording starts. When the count value reaches the upper limit of the range, the count value is reset and measurement starts again from 0.

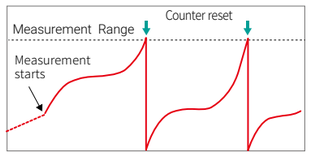
Reset operation：OFF



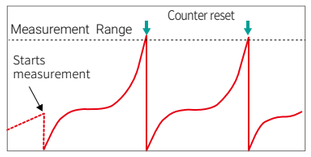
Reset operation：Start



Reset operation：Over

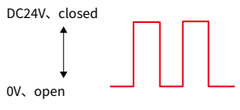
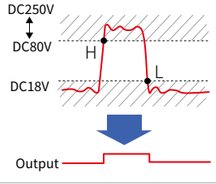
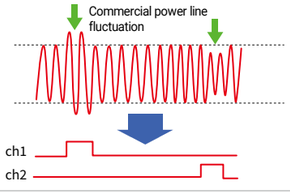


Reset operation：Start & Over



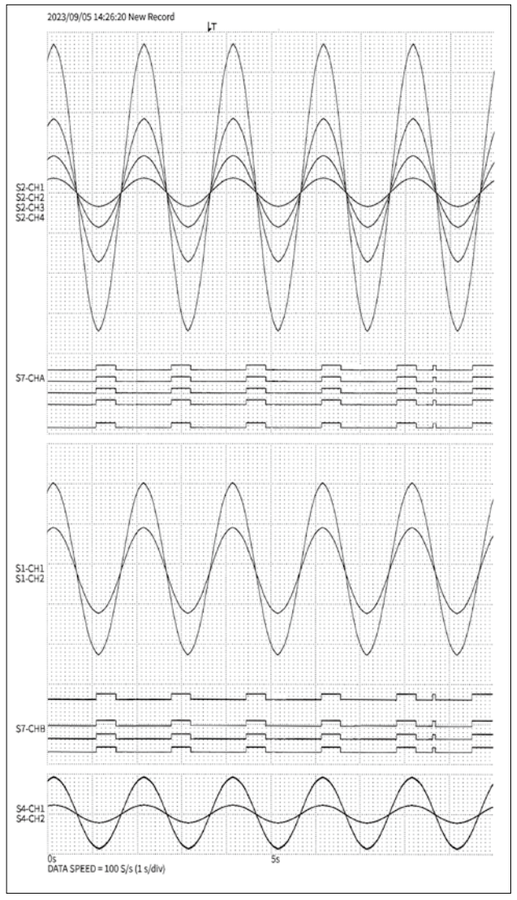
16ch Logic Module RA30-105

One unit of this input module can input 16 channels of logic signals and when 9 modules are installed in the main unit, 144 channels of logic signals can be measured.Detects and records high and low voltage (0 to 24V) or open and closed contacts. Furthermore, by connecting probes, it is possible to measure high and low AC and DC voltages up to 250V and power line variations (100V and 200V).

Single cable/ adapter	8ch logic cable (alligator, IC clip) RA30-501, RA30-502	Floating voltage probe 1539S＋ 8ch logic cable (round type convertor connector) RA30-503	Voltage conversion probes for recording voltage increases and decreases 1540S／1543S＋ 8ch logic cable (round type convertor connector) RA30-503
Function	Records high and low voltage (0 to 24V) or open and closed contacts. 	High and low AC/DC voltages of up to 250V can be measured. 	Power line fluctuations (100V, 200V) can be measured. 

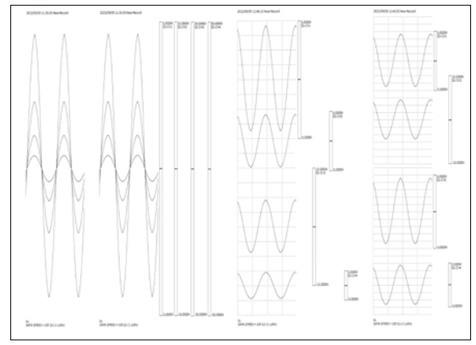
High-speed, high-definition recording

High-speed (100mm/s) and high-definition (80dots/mm at 25mm/s) recording is possible. The maximum number of signals that can be recorded simultaneously is 48.
In addition to signals, the recording name, measurement start time, trigger mark, recording speed, etc., can be printed.
You can freely change the number of graphs to record, the width of each graph (2.5mm to 215mm), and the space between graphs. In addition, the position and amplitude of the event signal can be changed every 8 channels.



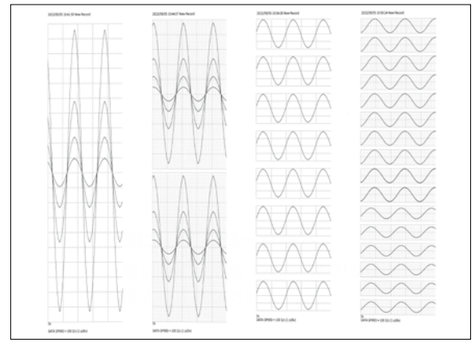
Auto scale

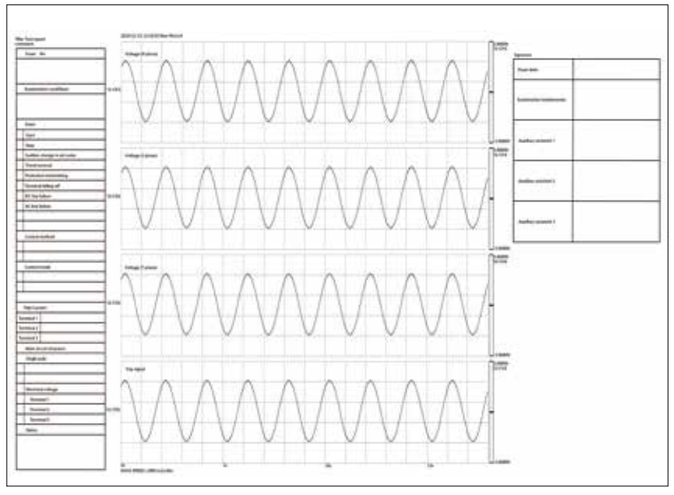
The scale can be printed after recording.



Recording division

Records can be divided from 1 to 18.
Recording width can be adjusted from 215mm to 2.5mm.





Headers / Annotations / Footers

When recording waveforms to the printer, an arbitrary character string can be printed before (header), during (annotation), and after (footer) the waveform recording.

Input Module and Peripheral Option Selection Guide

Input Signal		Probes and Cables
Voltage	±1,000V (DC or ACpeak)	Alligator clip for High Voltage RA30-509-01 Connection cable for High Voltage RA30-509-02 Extension cable for High Voltage RA30-509-03
Voltage	±500V (DC or ACpeak)	Isolated BNC cable (Alligator clip) RA30-507
Current	High current	AC/DC clamp meter 2009R (Kyoritsu) ・2,000A, 400A ・DC, 20 to 1kHz ・ϕ55
Current	Medium current Low current	Clamp Sensor 8115 (Kyoritsu) ・130A AC, 180A DC ・DC, 40 to 1kHz ・ϕ12 BNC-Safety jack adapter 0243-3021 Clamp Adaptor 8112 (Kyoritsu) ・20A, 2A, 0.2A ・40 to 10kHz ・ϕ8
Voltage fluctuation	±10% and ±20% of 100V type or 200V type	AC Voltage Level Detector 1540S/1543S This unit detects voltage fluctuations of power line. ±10% and ±20% of 100VAC or 200VAC lines can be detected
Voltage detection	50VAC to 250VAC 20V to 250VDC	AC/DC Voltage Detector 1539S This unit detects AC or DC voltage and outputs as High/Low. It supports 4 channels 50 to 150V AC: Low 100 to 250V AC: High 20 to 150V DC: Low 80 to 250V DC: High
		8ch Logic input cable (round type connector converter) RA30-503
Logic	At voltage input, contact input	8ch Logic cable (IC clip) RA30-501 8ch Logic cable(Alligator clip) RA30-502 MDR20 Pole terminal block AX-PCX-10S20 Terminal block connection cable RA30-504

Input Signal		Transducer	
Pulse	±500V (DC or ACpeak)	Pulse encoder	
Temperature	Thermocouple K,E,J,T,N,R,S,B,C RTD Pt100, Pt1000	Covered and sheathed thermocouples	Temperature sensor connection connector RA30-555
Vibration (impact acceleration)		Amp-embedded charge accelerometer SV2000 series	
		Piezoelectric accelerometer SV1000, 9Fseries	Charge converter This unit is necessary when piezoelectric accelerometers are used. AP11-901 AP11-902 AP11-903
Strain, load, displacement, acceleration, and torque		Strain gauge	Bridge box 5370A, 5373A
		Strain gauge sensors : Load cell, Pressure transducer, Displacement transducer, Torque transducer, Slip ring and Accelerometer	
		NDIS Conversion cable RA30-508	

Input Module

2ch Voltage module RA30-101
Input module to measure voltage with anti-aliasing filters
・±100mV to ±500V
・1MS/s（1μs）
・A/D：16bit

4ch Voltage module RA30-102
Input module to measure multi-channel voltage
・±1V to ±200V
・1MS/s（1μs）
・A/D：16bit

2ch High-speed voltage module RA30-103
Input module to measure high-speed voltage
・±100mV to ±500V
・20MS/s（50ns）
・A/D：14bit

2ch High Voltage Module RA30-107
Input module to measure 1,000V voltage
・±2V to ±1,000V
・1MS/s（1μs）
・A/D：16bit

16ch Logic module RA30-105
Input module that records voltage (H, L) or contact (open , close)
・Number of input:16ch
・1MS/s(1μs)
・Input：Voltage or contact

2ch Frequency Module RA30-108
Period, rotation speed, pulse count, etc. can be measured.
・±1V to ±500V
・1MS/s（1μs）
・A/D：12bit

2ch Temperature module RA30-106
Input module to measure temperature with a thermocouple and RTD
・Thermocouple (K,E,J,T,N,R,S,B,C)
・RTD (Pt100, Pt1000)
・Update rate: 1.5ms, 100ms, 1s
・A/D：16bit

2ch Acceleration Module RA30-109
This module can measure acceleration, speed and displacement.
・Piezoelectric acceleration transducer input
・1MS/s (1μs)
・A/D：16bit

2ch AC Strain Module RA30-104
Input module for high-sensitivity strain measurement.
・500 x 10^{-6} Strain (BV=2V)
・100kS/s (10μs)
・A/D：16bit

omniace RA3100

Main Unit

Control Module

Remote control module RA30-112
Start/stop, mark printing, paper feed, external sampling by external signal, external trigger signal input and trigger signal output, Bridge power supply to 2ch AC strain module

Control Cable

Remote control cable (among main units) RA30-505

Remote control input cable (loose wire) RA30-506

MDR20 Pole terminal block AX-PCX-10S20

Terminal block connection cable RA30-504

External Storage Medium

SD Memory card (4GB) RM11-453

SD Memory card (8GB) RM11-454

Z-fold Paper Storage Box

Z-fold Paper Storage Box RA30-551
Including Z-fold paper adaptor RA12-301
Dimensions: H97 x W283 x D371 (mm)
Weight: 4kg or lower

Z-fold paper adaptor RA12-301

Recording Paper

Recording Paper YPS106
219.5mm × 30m roll paper (5 rolls/box)

Recording Paper (with perforated line) YPS108
219.5mm × 30m roll paper (5 rolls/box)

Recording Paper (Z-fold paper) YPS112
219.5mm × 201m Z-fold paper (1 set/box)

Other

Soft Carrying Case RA23-183

Hard Carrying Case with Casters RA30-552
Dimensions:H635 × W450 × D320(mm)
H550 × W450 × D320(mm): Castor wheels not included
Weight: 8.5kg or lower

Basic Specifications

Specifications			
Recording Function	Memory Recording	High speed event recording to memory	*Any combination of memory recording, SSD recording, and printer recording is possible.
	SSD Recording	Recording of the input signal to the internal SSD	
	Printer Recording	Thermal printing using a thermal head	
Channel	Module Slot	9 slots	
	Analog Measurement	Max 36 channels (when 9 pcs 4-channel voltage modules are installed)	
	Logic Measurement	Max 144 channels (when 9 pcs 16-channel logic modules are installed)	
Sampling Speed	Memory Recording	20MS/s(50ns) to 10S/min	
	SSD Recording	1MS/s(1µs) to 10S/min	
	Printer Recording	1kS/s(100mm/s) to 10S/min(1mm/min)	
Memory Capacity		4GB(2G points/ch)	
Storage Device		Solid State Drive (SSD) 256GB	
		SD card (supporting SD / SDHC / SDXC) for data storage after recording.	
		USB memory using a USB port, for data storage after recording.	
Printer	Printing Method	Thermal printing using a thermal head	
	Paper Width	219.5mm	
	Effective Recording Width	Maximum 215mm	
	Chart Speed	100mm/s to 1mm/min	
Trigger	Uses	Trigger for starting record operations (Start Trigger), trigger for memory recording (Memory Trigger).	
	Start Trigger	Trigger to start recording operation (selected by manual trigger, external trigger, or measuring channel (arbitrary 1ch))	
	Memory Trigger	Trigger to start memory recording (selected by manual trigger, external trigger, or measuring channel (arbitrary 1ch))	
	Trigger Source	Input signal (analog/logic), manual trigger, external trigger	
	Trigger type	Level trigger, window trigger (memory recording trigger), bit pattern trigger	
	Trigger Mode	Set AND/OR for the measuring channel.	
	Pre-trigger	0 to 99% (1% step)	
	Trigger Mark	The trigger point is indicated with a "T" mark, and the trigger date and hour/minute/second are printed.	
	Trigger Filter	Filter duration: 0 to 100 seconds	
	External Trigger Input	External signal input (Active Low, High level: 2.1V to 5.0V, Low level : 0V to 0.5V, Pulse width : at High-speed response: 1µs or higher at high level, 1µs or higher at low level / at Normal response: 1ms or higher at high level, 1ms or higher at low level / at Low response: 10ms or higher at high level, 10ms or higher at low level)	
	Trigger Output	Output signal when trigger conditions are met (Active Low, H: 3.8V or higher, L: 0.5V or less, Pulse width : 1µs at high speed response, 1ms at normal response, 10ms at low-speed response)	
Monitor	Y-T Waveform Monitor	Display amplitude waveform of measuirng signal during time changes.	
	X-Y Waveform Monitor	Input signal 1 is protted in the X axis and input signal 2 is protted in the Y axis to display correlation of those signals.	
	FFT Analysis Monitor	FFT analysis of the measuring signals of any two channels is performed, and the analysis results are displayed in the frequency axis.	
Display		12.1-inch XGA TFT color LCD (1024 x 768 pixels) with capacitive touch panel	
Operation Section	Operation Panel Key	POWER ··· Power ON/OFF START ··· Start of measurement STOP ··· End of measurement TRIG ··· Manual trigger PRINT ··· Start of Printer Recording/Screen Copy	
	Rotary Knob	Change of the measuring range, waveform position, etc.	
Interface	LAN	1000BASE-T (1Gbps) ··· For control by communication command	
	COM	RS-232C ··· For control by communication command	
	USB	Ver. 3.0 2 port ··· For storage devices (USB memory)	
	SD Card	SD standard (SD/SDHC/SDXC supported)	
	Video Output	DVI-D ··· Digital output for external display	
Compliance Standards	Safety	EN 61010-1, EN 61010-2-30 Overvoltage category (installation category) II Measurement category : Depends on the specifications of each input module.	
	EMC	EN61326-1 ClassA	
Operating Environment	Temperature	0 to 40˚C	
	Humidity	35 to 85 %RH (without condensation)	
Storage Environment	Temperature	-20 to 60˚C	
	Humidity	20 to 85%RH (without condensation)	
Vibration Resistance	Random Vibration Durability Test	Frequency : 5 to 500Hz, Accelleration : 6.5m/s^2 on X-axis and Y-axis, 10.2m/s^2 on Z-axis	
	Sine Wave Vibration Durability Test	Frequency : 10 to 55Hz, Acceleratin : 20.0m/s^2, 20 cycles for each of the three axes	
Backup Battery Life (for Clock Backup)		Approx. 10 years (at the surrounding temperature is 23 ℃)	
Power Consumption		Power-supply voltage : 100 to 240V AC, frequency 50/60Hz Power Consumption : 300VA or less (under the maximum load conditions), 80VA when recording is stopped, 5VA during stand-by	
Dimensions		394(W)× 334(H)× 199(D)mm ※excluding projections	
Weight		9.5kg or less (main body only),	

Recording Function Specifications		
Memory Recording	Function	After data is recorded to the internal memory at the set sampling rate, the data is automatically saved to the SSD.
	Memory Capacity	4GB (2G points/ch)
	Data Type	Normal data
	Memory Division	1 to 200 Div. (The maximum value changes depending on the channel used and recording length)
	Number of data	2,000 to 2G point/ch (1-2-5 step : The maximum value changes depending on the channels and division number used)
	Sampling Speed	20MS/s (50ns) to 10S/min, Max. 18ch for 20MS/s when simultaneous measurement
	Maximum Recording time	100days
	Recording Operation	by START/STOP button for Time recording, Interval recording, and START trigger recording
SSD Recording	Function	The measurement data of the input signal is directly recorded to the internal SSD.
	Data Logging Capacity	Internal SSD (256GB)
	Data type	Normal data and peak data selectable
	Sampling Speed	1MS/s (1µs) to 10S/min, Max. 500kS/s in case of peak data
	External Synchronization Sampling	Synchronous clock: 250kHz or less ※Recording by external synchronization can be either SSD recording or printer recording (Pen Record recording).
	Maximum Recording Time	100days
	Recording Operation	by START/STOP button for Time recording, Interval recording, START trigger recording, window recording
	Window Recording	The data is recorded in the ring buffer area (max. 2G point/ch) specified as the window recording time. When the data is exceeded the data areea, overwrite from the top the data area and record all data up to the end of measurement. SSD recording can not be used with memory recording and printer recording at the same time. The data format is normal data.
Printer Recording(Pen-Recording)	Function	Outputs the input signal directly to the printer.
	Paper Width	219.5mm
	Effective Recording Width	Maximum 215mm
	Recording Operation	by START/STOP button for Time recording, Interval recording, START trigger recording : Waveform recording on the chart paper while saving the data to the SSD. Playback and copy is possible after recording. by PRINT button(Pen-Recording): Direct waveform recording to chart paper without saving any data. Chart speed and measuring range can be changed during recording.
	Number of Recording Channels	Max. 48 channels per sheet, Measuring channels can be divided in 3 sheets.
	Data Type	Peak data
	Chart Speed	100mm/s (1kS/s) to 1mm/min (10S/min), User Default Setting enabled. Max. 50mm/s (500Hz) at external synchronization ※Recording by external synchronization can be either SSD recording or printer recording (Pen Record recording).
	Printing Density	Amplitude axis : 8dots/mm Time axis : 80dots/mm (at 20mm/s), 40dots/mm (at 50mm/s), 20dots/mm (at 100mm/s) 40dots/mm (at external synchronization)

Monitor Specifications (on recording and replay)		
Y-T Waveform	Recording Function	Displays during memory recording, SSD recording, and printer recording
	Supported Data Type	Normal data, Peak data
	Number of Sheets (Screen)	Max. 48 channels per sheet (screen), Measuring channels can be divided in 3 sheets (screen).
	Number of Graphs	1 to 18 (The height of each graph on the recording paper can be changed in increments of 2.5mm.)
	Grid Count	Vertical : 20div., Horzontal: 20div. (when 1 graph is displayed on screen)
	Time Axis Data Count	100data/div
	Display Function	Numeric display, Signal Name, Amplitude Axis Scale, Recording Time, Trigger Mark, Cursor, Thumbnail
	Display Width	The signal of each channel is displayed at an arbitrary width (Set by % as the full display graph width is 100%)
	Display Position	Display the signal of each channel at any position (Set by % as the full display graph width is 100%)
	Scale Setting	Set the upper limit/lower limit values as input values or physical conversion values for each display width.
	Logic Waveform Display	16ch logic waveform display position movable
X-Y Waveform	Recording Function	Displays during SSD recording
	Supported Data Type	Normal data
	Sampling Rate	1KS/s or less
	Display format	1 screen (up to 4 concurrent waveforms), 4 screens (1 waveform per graph)
	Grid Count	Vertical : 20div., Horizontal : 20div.
	Display Function	Draw X-Y waveform with dots or lines in X-axis/Y-axis scale, pen up/down setting available.
	Scale Setting	Set the max/min scale values as input values or physical conversion values for each graph.
	Locas	ON/OFF of locas enabled (pen up & down)
	Printing	Print the plotted X-Y waveform with the printer
FFT Analysis	Recording Function	Display during SSD recording
	Supported Data Type	Normal data
	Sampling Points	1,000, 2,000, 5,000, or 10,000points
	Sampling Speed	1MS/s or less
	Max Analysis Frequency	1/2 times of the sampling frequency
	Display format	1 screen, 2 screens.
	Function	Time axis waveform, Linear spectrum, RMS spectrum, Power spectrum, Power spectrum dencity, 1/1 octave analysis,1/3 octave analysis, Cross power spectrum, Transfer function, Coherence
	Window Function	Hanning, Hamming, Rectangular
	Average Processing	Time axis simple addition average, Frequency axis simple addition average, Frequency axis exponentially weighted average, Frequency axis peak hold or off
	Number of Averaging	1 to 10
	X-axis Scale	Time, Linear Frequency, Log Frequency, 1/1 Octave, 1/3 Octave
	Y-axis Scale	Real value area, Imaginary number area, Amplitude, Logarithmic amplitude, Phase Auto scale or manual scale in accordance with the analysis results
	Peak Value Display	Extract the local maximum value or a maximum value of 10 points from the analysis result.

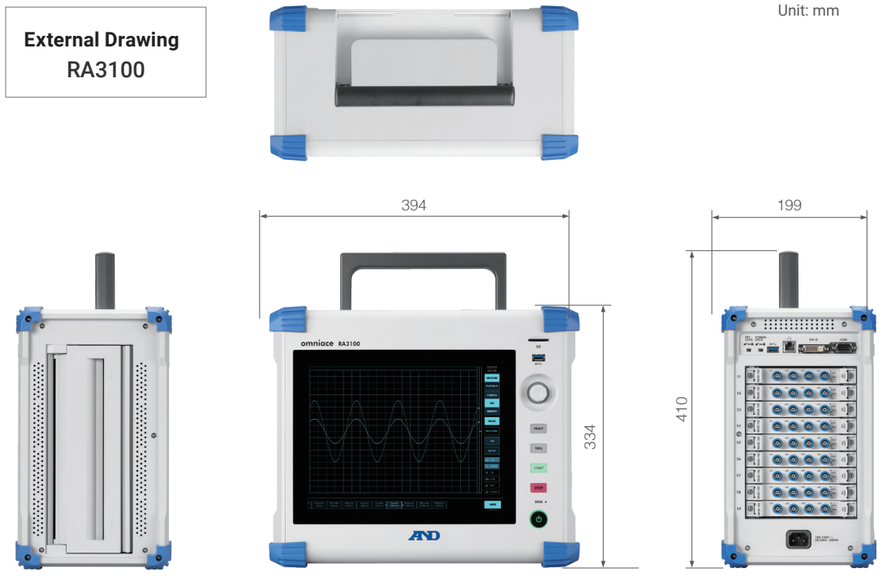
Other Specifications		
Recording Mode		There are nine selectable measurement modes. Normal recording/Start time/START trigger/Interval time (N times)/Start time + START trigger/Start time + Interval time (N times)/START trigger + Interval time (N times)/Start time + Interval time (N times)/Window recording
Playback Processing	Scaling	The display position can be changed with pinch-in, pinch-out scaling, zooming, and swiping.
	Cursor	Y-T : Measured value at the cursor position Time display between cursors, Max/Min value/Average value FFT : Cursor position frequency and pulse amplitude
	Back Scrolling	Measured data can be monitored while recording by pressing the [PAUSE] button.
Printer Section	System Annotations	Measurement start time, Recording name, Trigger condition (Trigger point, Trigger date, Trigger time) Sampling speed, Chart speed, Time axis, etc. are printed at the same time as waveform recording
	Mark Print	Printing marks (date/time) on the chart paper or the data on SSD
	Header, Footer, and Page Annotations	Any character can be printed before, during, or after the waveform area during printing (Up to 60 characters horizontally and 86 lines vertically)
	Screen Copy	Print screen image on chart paper
Screen Image Saving		Save screenshots in PNG format (color) on the main unit or on a storage medium
Save/Readout of Settings		Save settings (input and main unit setting conditions) on SSD Measuring conditions saved in the SSD can be read out.
Keylock Function		· Lock operation panel keys · Lock the touch panel
Monitor Brightness		Adjustable
Physical Value Conversion		Physical conversion of input signals, Change of full scale on display, Rregistration of units.
Language		Japanese, English, Chinese (simplified, combined), Korean

Remote Control Module Specifications

Remote Control Module RA30-112 Specifications		
Input Connector		half-pitch 20-pin connector
Output Connector		half-pitch 14-pin connector
External Input		Function : Control by external signal.
	Control Signal	START/STOP, MARK, FEED, PRINT, TRIG
	Input Level	High level : 2.1V to 5.0V, Low level : 0V to 0.5V (active low)
	Response Speed	Select from High-speed/Normal/Low-speed
	Effective Pulse Width	High-speed response : 1µs or higher during high interval, 1µs or higher during low interval Normal response : High interval 1ms or higher, Low interval 1ms or higher Low-speed response : 10ms or higher during high, 10ms or higher during low-speed response
	Max. allowable Input Voltage	30V
External Output		Function : Control signals can be externally output
	Control Signal	START/STOP, MARK, FEED, PRINT, TRIG, EXT1/EXT2
	Output Level	High level: 3.8V to 5.0V, Low level: 0V to 0.5V (active low)
	Output Pulse Width	START/STOP, FEED, PRINT : Active output during operation TRIG, MARK : High-speed response: 1µs/Normal response : 1ms/Low-speed response: 10ms
External Sampling Input (EXT.SMPL IN)		Synchronization via external clock signal is possible (simultaneous SSD recording and printer recording are not possible.)
	Input Level	High level : 2.1V to 5.0V, Low level : 0V to 0.5V
	Effective Pulse Width	High-speed (SSD Recording) : 2µs or higher/Low-speed (Printer Recording) : 1ms or higher
	Maximum Input Frequency	High-speed (SSD Recording) : 250kHz/Low-speed (printer recording) : 500Hz, 0.1mm/pulse
External Sampling Output (EXT.SMPL OUT)		Function: Synchronization clock signal can be output externally
	Output Level	High level : 3.8V to 5.0V, Low level : 0V to 0.5V (active low)
Synchronization Signal for AC Strain Input/Output		Function : Synchronization signal generator for using AC strain
	Carrier Wave	0V to 5V, square wave, 5kHz
	Synchronization	Synchronization possible with other RA3000 product including RA30-112
Reference Clock for Calibration		Function : Square wave signal output for operation check of voltage input module
	Output Level	0V to 5V (±1%)
	Output Frequency	1kHz (±1%)
	Duty Ratio	50% (±5%)
Withstand voltage		AC300V, 1 minute (between input/output and main chassis)
Maximum Rated Voltage to Ground		AC, DC42V
Dimensions		Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight		Approx. 250g
Compliance Standards		Safety : EN61010-1 EMC : EN61326-1, class A

External Drawing
RA3100

Unit: mm



Input Module Specifications

2ch Voltage Module RA30-101

Input Channels	2ch
Input Connector	Isolated BNC connector
Input Type	Isolated unbalanced input (Isolation between each channel, between each channel and main chassis)
Input Coupling	AC, DC, and GND coupling
Input Impedance	1MΩ
Measurement Range(RANGE)	±100, 200, 500mV, 1, 2, 5, 10, 20, 50, 100, 200, 500V
Measurement Accuracy	±0.3% of range (23℃±5℃, DC coupling, LPF 3Hz, after zero offset)
Temperature Coefficient	± (400ppm of range)/℃
Frequency Response	DC coupling：DC to 100kHz(-3dB to +1dB)(with LPF, AAF OFF) AC coupling：0.3Hz to 100kHz(-3dB to +1dB)(with LPF, AAF OFF)
Low-pass Filter(LPF)	Cutoff frequency：3Hz, 30Hz, 300Hz, 3kHz, OFF (-1.6dB±1dB) Characteristics：2 pole Bessel type
Anti-aliasing Filter(AAF)	Cutoff frequency：20, 40, 80, 200, 400, 800, 2k, 4k, 8k, 20k, 40kHz, OFF Attenuation：-66dB or less at 1.5 times of cutoff frequency
A/D Converter	A/D resolution：16bit　Sampling rate：1MS/s (max)
Allowable Input Voltage	±500V peak
Maximum Rated Voltage To Groud	300V AC/DC CATII(between channels, between input terminals and chassis)
Withstand Voltage	3kV AC, 1 miute (between input terminal and main chassis, between each channel)
Dimensions	Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight	Approx. 300g
Compliance Standards	Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A

4ch Voltage Module　RA30-102

Input Channels	4ch
Input Connector	isolated BNC connector
Input Type	Isolated unbalanced input (Isolation between each channel, between each channel and the main chassis)
Input Coupling	DC and GND coupling
Input Impedance	1MΩ or higher
Measurement Range (RANGE)	±1, 2, 5, 10, 20, 50, 100, 200V
Measurement Accuracy	±0.2% of RANGE (23℃ ±5℃, DC coupling, LPF 3Hz, after zero offset)
Temperature Coefficient	±(400ppm of range)/℃
Frequency Response	DC coupling：DC to 100kHz(-3dB to +1dB)(with LPF OFF)
Low-pass Filter(LPF)	Cutoff frequency：3Hz, 30Hz, 300Hz, 3kHz, OFF (-1.6dB±1dB) Characteristics：2 pole Bessel type
A/D Converter	A/D resolution：16bit　Sampling rate：1MS/s (max)
Allowable Input Voltage	±200V peak
Maximum Rated Voltage to Gourd	300V AC/DC CATII(between channels, between input terminals and chassis)
Withstand Voltage	3kV AC, 1 miute(between channels or between input terminals and chassis)
Dimensions	Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight	Approx. 320g
Compliance Standards	Safety: EN61010-1, EN61010-2-30 EMC: EN61326-1, class A

2ch High Speed Voltage Module　RA30-103

Input Channels	2ch
Input Connector	Isolated BNC connector
Input Type	Isolated unbalanced input (Isolation:between channels, between each channel and chassis)
Input Coupling	AC, DC, and GND coupling
Input Impedance	1MΩ or higher
Measurement Range (RANGE)	±100, 200, 500mV, 1, 2, 5, 10, 20, 50, 100, 200, 500V
Measurement Accuracy	± 0.5% of RANGE (23℃ ±5℃, DC coupling, LPF 5Hz, after zero offset)
Temperature Coefficient	± (500ppm of range)/℃
Frequency Characteristics	DC coupling：DC to 5MHz(-3dB to +1dB) (with LPF OFF) AC coupling：6Hz to 5MHz(-3dB to +1dB)(with LPF OFF)
Low-pass Filter(LPF)	Cutoff frequency：5Hz, 50kHz, 500kHz, OFF (-3dB±1dB)
A/D Converter	A/D resolution：14bit　Sampling rate：20MS/s (max)
Common Mode Rejection Ratio	80dB or higher (50/60Hz)
Allowable Input Voltage	500V peak
Maximum Rated Voltage to Ground	300V AC/DC CATII(between channels, between input terminals and chassis)
Withstand Voltage	3kV AC, 1 minute(between channels, between input terminals and chassis)
Dimensions	Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight	Approx. 300g
Compliance Standards	Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A

2ch High Voltage Module RA30-107

Input Channels		2ch
Input Connector		Safety banana socket
Input Type		Isolated unbalanced input (Isolation between each channel, between each channel and main chassis)
Input Coupling		AC, DC, and GND coupling
Input Impedance		4MΩ
Measurement mode		Voltage measurement mode / RMS measurement mode
Response time (when RMS measurement mode)		High speed：0.1s (within ±10%), Medium speed：0.25s (within ±10%), Low speed：1s (within ±10%) *1 All of the above are leading edge 0% → 90% of RANGE, trailing edge 100% → 10% of RANGE
Measurement Range(RANGE)		± 2, 5, 10, 20, 50, 100, 200, 500, 1,000V
Measurement Accuracy	**Voltage measurement mode:**	±0.3% of range (DC coupling, LPF 3Hz)(23℃ ±5℃, DC coupling, LPF 3Hz, after zero offset)
	RMS measurement mode — When DC coupled	±0.3% of range (DC coupling, LPF 3Hz)(23℃ ±5℃, DC coupling, LPF 3Hz, after zero offset)
	RMS measurement mode — When AC coupled (Sine wave input)	For low speed response：±0.5% of RANGE (10Hz to 1kHz input), ±1.5% of RANGE (1kHz to 10kHz input) For medium speed response：±0.5% of RANGE (40Hz to 1kHz input), ±1.5% of RANGE (1kHz to 10kHz input) For high speed response：±0.5% of RANGE (100Hz to 1kHz input), ±1.5% of RANGE (1kHz to 10kHz input) * All of the above are at 23°C ±5°C, after zero cancellation.
Temperature Coefficient		± (300ppm of range)/℃
Frequency Response		DC coupling：DC to 100kHz (-3dB to +1dB) (with voltage measurement mode, LPF OFF) AC coupling：0.3Hz to 100kHz (-3dB to +1dB) (with voltage measurement mode：LPF OFF)
Low-pass Filter(LPF)		Cutoff frequency：3Hz, 30Hz, 300Hz, 3kHz, OFF (-1.6dB±1dB) Characteristics：2 pole Bessel type

Thermocouple

A/D Converter	A/D resolution：16bit　Sampling rate：1MS/s (max)
Allowable Input Voltage	±1,000V peak
Maximum Rated Voltage To Groud	1,000V AC/DC CATII (between channels, between input terminals and chassis) 600V AC/DC CATIII (between channels, between input terminals and chassis)
Withstand Voltage	3kV AC, 1 miute(between channels or between input terminals and chassis)
Dimensions	Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight	Approx. 300g
Compliance Standards	Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A

16ch Logic Module　RA30-105

Input Channels	16ch
I/O Connector	8ch x 2 ports
Input Type	Single input, common input (non-isolated), isolated between input signal and main chassis
Voltage Detection	Input range：0 to 24V Threshold value：1.4V (±0.4V)/2.5V (±0.5V)/4V (±0.6V) (selectable from 3 levels) Input Impedance：1MΩ ±1%
Contact Detection	Threshold (selectable from below 3 levels) Close (High level)：250 Ω or less/Open (Low level)：2kΩ or more Close (High level)：1.5kΩ or less/Open (Low level)：5kΩ or more Close (High level)：3kΩ or less/Open (Low level)：9kΩ or more Load current：0.5mA (typ.) at load resistance 0 to 18kΩ
Responsive Pulse	2μs or higher
Allowable Input Voltage	30V DC
Maximum Rated Voltage to Ground	42V AC/DC
Withstand Voltage	300V AC, 1miute(between channels, between input terminals and chassis)
Power Output for Options	For connecting our probe
Dimensions	Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight	Approx. 250g
Compliance Standards	Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A

2ch Temperature Module RA30-106

Input Channels				2ch
Input Connector				Removable socket (front panel) Temperature sensor connector coupling wire: 0.2 SQ to 1.5 SQ (AWG24 to AWG16)
Input Type				Isolated unbalanced input (isolation: between channels、between each channel and chassis)
Input Impedance				5MΩ or higher
Adaptive Sensor				Thermocouple：K, E, J, T, N, R, S, B, C (JIS C1602:2015) Resistance temperature detector (RTD)：Pt100, Pt1000 (JIS C1604:2013)
Cold Junction Compensation				Internal/external switching type
Internal Cold Junction Compensation Temp.				±1°C (23°C ±5°C), ±1.5°C (overall temperature range)
Disconnection Detection				ON/OFF switchable
Measurement Range/ Accuracy	T/C Type	Measurement Range (RANGE)	Measuring range (℃)	Measurement Accuracy
	K	200℃	-200 to 200	-200 to 0℃±(0.1% of RANGE + 2℃) 0 to 1370℃±(0.1% of RANGE + 1℃)
		600℃	-200 to 600	
		1370℃	-200 to 1370	
	E	200℃	-200 to 200	-200 to 0℃±(0.1% of RANGE + 2℃) 0 to 1000℃±(0.1% of RANGE + 1℃)
		600℃	-200 to 600	
		1000℃	-200 to 1000	
	J	200℃	-200 to 200	-200 to 0℃±(0.1% of RANGE + 2℃) 0 to 1100℃±(0.1% of RANGE + 1℃)
		400℃	-200 to 400	
		1100℃	-200 to 1100	
	T	100℃	-100 to 100	-200 to 0℃±(0.1% of RANGE + 2℃) 0 to 400℃±(0.1% of RANGE + 1℃)
		200℃	-200 to 200	
		400℃	-200 to 400	
	N	200℃	-200 to 200	-200 to 0℃±(0.1% of RANGE + 2℃) 0 to 1300℃±(0.1% of RANGE + 1℃)
		600℃	-200 to 600	
		1300℃	-200 to 1300	
	R	200℃	0 to 200	0 to 400℃±(0.1% of RANGE + 3.5℃) 400 to 1760℃±(0.1% of RANGE + 3℃)
		1000℃	0 to 1000	
		1760℃	0 to 1760	
	S	200℃	0 to 200	0 to 400℃±(0.1% of RANGE + 3.5℃) 400 to 1760℃±(0.1% of RANGE + 3℃)
		1000℃	0 to 1000	
		1700℃	0 to 1700	
	B	600℃	400 to 600	400 to 1800℃±(0.1% of RANGE + 3℃)
		1000℃	400 to 1000	
		1800℃	400 to 1800	
	C	600℃	0 to 600	0 to 400℃±(0.1% of RANGE + 3.5℃) 400 to 2300℃±(0.1% of RANGE + 3℃)
		1200℃	0 to 1200	
		2300℃	0 to 2300	
Temperature Coefficient				(Measurement Accuracy × 0.1)/℃

Resistance Temperature Detector (RTD)

Measurement Type				3-wire type
Measurement Current				0.5mA, 1mA switchable (at Pt100), fixed at 0.1mA (at Pt1000)
Measurement Range	Type	Measurement Range (RANGE)	Measuring range (℃)	Measurement Accuracy
	Pt100	200℃	-200 to 200	-200 to 850℃ ± (0.1% of RANGE ±0.5℃)
		400℃	-200 to 400	
		850℃	-200 to 850	
	Pt1000	200℃	-200 to 200	
		400℃	-200 to 400	
		850℃	-200 to 850	
Temperature Coefficient				(Measurement Accuracy × 0.1)/℃

A/D Converter	A/D resolution：16bit Data update rates：high speed (1.5ms), normal speed (100ms), low speed (1s)
Common Mode Rejection Ratio	100dB (Data update: normal speed, low speed), 80dB (Data update: High speed) at 50/60Hz, Signal source resistance 1kΩ
Allowable Input Voltage	30V peak
Maximum Rated Voltage To Earth	300V AC/DC(between channels, between input terminals and chassis)
Withstand Voltage	3kV AC, 1 miute(between channels, between input terminals and chassis)
Dimensions	Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight	Approx. 300g
Compliance Standards	Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A
Accessories	Temperature sensor connection connector(RA30-555)　2pcs/sets

2ch Frequency Module　RA30-108

Input Channels		2ch
Input Connector		Isolated BNC connector
Input Type		Isolated unbalanced input (Isolation between each channel, between each channel and main chassis
Input Coupling		AC, DC, and GND coupling
Input Impedance		1MΩ
Measurement Range (RANGE)		Range for the input signal: 1, 2, 5, 10, 20, 50, 100, 200, 500V
Measurement Probability		±3% of RANGE (23°C±5°C, DC coupling, LPF 300Hz)
Measurement Signal		4 signals Signal 1：1ch measurement mode, Signal 3：1ch input signal Signal 2：2ch measurement mode, Signal 4：2ch input signal
Response Speed		OFF, 1 to 1,000ms (1ms steps)
Thres-hold	**Voltage Range**	Variable from -200V to +200V
	Hysteresis	1 to 10% of RANGE (1% steps)
Measurement Mode		Period, frequency, rotation speed, pulse width, duty ratio, power supply frequency, frequency deviation, pulse count, pulse integration
	Period Mode	Available measurement range：5us to 100s Measurement range (RANGE)：1, 2, 5, 10, 20, 50, 100, 200, 500ms, 1, 2, 5, 10, 20, 50, 100s Measurement probability：±0.5%rdg (1ms RANGE), ±0.3%rdg (2ms RANGE), ±0.1%rdg (5ms RANGE), ±0.05%rdg (10ms to 100s RANGE) Pulse averaging process：2 to 4,096 Smoothing process：OFF, 2 to 100
	Frequency mode	Available measurement range：0 to 200kHz Measurement range (RANGE)：2, 5, 10, 20, 50, 100, 200, 500Hz, 1, 2, 5, 10, 20, 50, 100, 200kHz Measurement probability：±0.5%rdg (200kHz RANGE), ±0.3%rdg (100kHz RANGE), ±0.1%rdg (50kHz RANGE), ±0.05%rdg (2Hz to 20kHz RANGE) Pulse averaging process：2 to 4,096 Smoothing process：OFF, 2 to 100
	Rotation speed mode	Available measurement range：0 to 1,000krpm Measurement range (RANGE)：10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20k, 50k, 100k, 200k, 500k, 1,000krpm Measurement probability：±0.05%rdg Pulse averaging process：2 to 4,096 Pulse/Rev：1 to 100 Smoothing process：OFF, 2 to 100
	Pulse width mode	Available measurement range：2.5μs to 100s (min. pulse width: 2.5μs) Measurement range (RANGE)：1, 2, 5, 10, 20, 50, 100, 200, 500ms, 1, 2, 5, 10, 20, 50, 100s Measurement probability：±0.25%rdg (1ms RANGE), ±0.15%rdg (2ms RANGE), ±0.05%rdg (5ms to 100s RANGE) Pulse polarity：Positive, Negative Pulse averaging process：2 to 4,096 Smoothing process：OFF, 2 to 100
	Duty ratio mode	Measurable frequency range: 1Hz to 20Hz：100% (20Hz) RANGE (min. pulse width 500μs) 10Hz to 200Hz：100% (200Hz) RANGE (min. pulse width 50μs) 100Hz to 2kHz：100% (2kHz) RANGE (min. pulse width 5μs) 1kHz to 20kHz：100% (20kHz) RANGE (min. pulse width 2.5μs) Measurement range (RANGE)：100% (20Hz), 100% (200Hz), 100% (2kHz), 100% (20kHz) Measurement probability： ±0.05% (1Hz) to ±1% (20Hz) of 100% (20Hz) RANGE * ±1% x input frequency / 20Hz ±0.05% (10Hz) to ±1% (200Hz) of 100% (200Hz) RANGE * ±1% x input frequency / 200Hz ±0.05% (100Hz) to ±1% (2kHz) of 100% (2kHz) RANGE * ±1% x input frequency / 2 kHz ±0.25% (1kHz) to ±5% (20kHz) of 100% (20kHz) RANGE * ±5% x input frequency / 20kHz Measurable duty ratio range：0 to 100% Pulse polarity: Positive, Negative Pulse averaging process：2 to 4,096 Smoothing process：OFF, 2 to 100
	Power frequency mode	Measurement range (RANGE)：50Hz (30 to 70Hz), 60Hz (40 to 80Hz), 400Hz (360 to 440Hz) Measurement probability：±0.002%rdg (50Hz RANGE), ±0.003%rdg (60Hz RANGE), ±0.005%rdg (400Hz RANGE) Pulse averaging process：2 to 4,096 Smoothing process：OFF, 2 to 100
	Range of variation mode	Available measurement range：3.3Hz to 19,800Hz Measurement range (RANGE)：±50% (center frequency range 6.6Hz to 13.2kHz) Measurement probability：±0.05%rdg Center frequency：3.3Hz to 19,800Hz Pulse averaging process：2 to 4,096 Smoothing process：OFF, 2 to 100
	Pulse count mode	Measurement range (RANGE)：Fixed at 40,000 Measurement probability：±0.003%rdg Available measurement range：16.6666mHz to 200kHz (min. pulse width 2.5μs) Gate time：200, 500ms, 1, 2, 5, 10, 20, 30, 60s Pulse polarity：Positive, Negative
	Pulse integration mode	Measurement range (RANGE)：50, 100, 200, 500k, 1, 2, 5, 10, 20, 50, 100, 200, 500M, 1, 2G Measurement probability：±0.002%rdg Available measurement range：5mHz to 200kHz (min. pulse width 2.5μs) Pulse polarity：Positive, Negative Integration auto-reset：OFF, Start, Over, Start & Over
	Decelera-tion Stop Processing Function (Excluding pulse count mode and pulse integration mode)	If the pulse input is interrupted, the deceleration state is calculated in real time and the measured value is set to 0 or OVER RANGE in steps.
	Pulse/Rev	Specify the number of pulses per revolution. (Rotation speed mode function)
	Pulse polarity	Specify the pulse determination method. (Pulse width mode, Pulse count mode and pulse integration mode only) Positive: Detects and determines a measured pulse from its leading edge to trailing edge. Negative: Detects and determines a measured pulse from its trailing edge to leading edge.
	Integration auto-reset	Auto-resets measurement data in pulse integration mode. Sets the count to zero at the start of recording (Start) and at the upper range limit (Over).
	Pulse averag-ing process function (Excluding pulse count mode and pulse integration mode)	Takes the average of the set number of measurement data as the data to be output. Effective for taking out irregularities in the input signal. However, data is not output until the set number of pulses is measured.
	Smoothing process function	The data detected in each measurement mode will change to a cascading waveform according to the response speed value. The waveform can be made smooth by performing moving average processing on the cascading waveform. However, there will be a delay if smoothing processing is enabled.
Low-pass Filter(LPF)		Cutoff frequency：300Hz, 3kHz, 30kHz, OFF (-1.6dB±1dB) Characteristics：2 pole Bessel type
A/D Converter		A/D resolution：12bit　Sampling rate：1MS/s (max)

Allowable Input Voltage	±500V peak
Maximum Rated Voltage To Groud	300V AC/DC CATII (between channels, between input terminals and chassis)
Withstand Voltage	3kV AC, 1 miute(between channels, between input terminals and chassis)
Dimensions	Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight	Approx. 300g
Compliance Standards	Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A

2ch AC Strain Module RA30-104

Input Channels		2ch
Input Connector		NDIS4109 Connector (conversion cable sold separately)
Bridge Voltage (BV)		0.5V AC, 2V AC, 5kHz Sine Wave
Applicable Strain Gauge Resistance		120Ω to 350Ω
Gauge Rate		2
Equilibrium adjustment range and adjustment method		Within 10,000 x 10^{-6} strain, within 2,000pF capacitance
Equilibrium adjustment accuracy		±0.3% of RANGE
Temperature coefficient		±(400ppm of RANGE)/℃
Measurement range (RANGE)		500, 1,000, 2,000, 5,000, 10,000, 20,000 x 10^{-6} strain (at 2Vrms bridge power) 2,000, 4,000, 8,000, 20,000, 40,000, 80,000 x 10^{-6} strain (at 0.5Vrms bridge power)
Non-linearity		±0.1% of RANGE
Frequency Characteristics		DC to 2kHz ±10%
Simple Bridge Check		It can detect short-circuits on bridge sides and disconnections of some cables and bridge sides.
Low-Pass Filter (LPF)		Cutoff frequency：10Hz, 30Hz, 100Hz, 300Hz, OFF (-3dB±1dB) Characteristics：Secondary Butterworths
Internal Calibrator		±1 to 9,999 x 10^{-6} strain Accuracy within ±0.5% of RANGE (at 23°C±5°C)
A/D Converter		A/D resolution：16bit　Sampling rate：100kS/s (max)
Maximum Rated Voltage to Ground		100V (DC+ACpeak)
Withstand voltage		300V AC, 1 minute (between channels, between input terminals and chassis)
Dimensions		Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight		Approx. 300g
Compliance Standards		Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A

2ch Acceleration Module RA30-109

Input Channels		2ch
Input Connector		Metal BNC connector
Input Type		Isolated unbalanced input (Isolation between each channel, between each channel and main chassis)
Sensor Power Supply		4.2mA±5%, 22.5V±5%
Sensor sensitivity setting range		0.100 to 100.000mV/(m/s^2)
Measurement Mode		Acceleration, speed, displacement
Measurement range (RANGE)		Measurement range varies depending on sensor sensitivity. Acceleration：1, 2, 3.16, 5, 10, 20, 31.6, 50, 100, 200, 316, 500m/s^2, 1, 2, 3.16, 5, 10, 20, 31.6, 50km/s^2 Speed：10, 20, 31.6, 50, 100, 200, 316, 500mm/s, 1, 2, 3.16, 5, 10, 20, 31.6, 50, 100, 200, 316, 500m/s Displacement：100, 200, 316, 500μm, 1, 2, 3.16, 5, 10, 20, 31.6, 50, 100, 200, 316, 500mm, 1, 2, 3.16, 5m
Measurement Probability		±1% of rdg (In acceleration mode) ±2% of rdg (In speed mode) ±3% of rdg (In displacement mode) *23°C±5°C, sine wave 80Hz, when LPF and AAF are OFF)
Temperature coefficient		±(300ppm of RANGE) / °C (at acceleration)
Frequency Characteristics		Acceleration：5Hz to 20kHz (±0.5dB), 1.5Hz to 50kHz (±1dB), 1Hz to 70kHz (-3dB, +1dB) Speed：15.9Hz (0dB±1dB) to 1.59kHz (-40dB±1dB), logarithmic decrement: -6dB/oct Displacement：15.9Hz (0dB±1dB) to 159Hz (-40dB±1dB), logarithmic decrement：-12dB/oct
Low-Pass Filter (LPF)		Cutoff frequency：20Hz, 200Hz, 2kHz, 20kHz, OFF (-3dB±1dB) Characteristics：Tertiary Butterworths
Anti-aliasing Filter (AAF)		Cutoff frequency：20, 40, 80, 200, 400, 800, 2k, 4k, 8k, 20k, 40kHz, OFF Attenuation：At 1.5 times the cutoff frequency, -66dB max.
A/D conversion		Resolution：16bit　Sampling rate：1MS/s (max)
Arithmetic Functions — RMS conversion — Response Speed		High speed：0.3s ±10% / medium speed: 0.6s ±10% / low speed：2.4s ±10%
Arithmetic Functions — RMS conversion — Measurement Probability		At low speed：±1% of RANGE (10Hz to 1kHz), ±1.5% of RANGE (1kHz to 5kHz) At medium speed：±1% of RANGE (30Hz to 1kHz), ±1.5% of RANGE (1kHz to 5kHz) At high speed：±1% of RANGE (50Hz to 1kHz), ±1.5% of RANGE (1kHz to 5kHz)
Arithmetic Functions — Envelope processing		Processing details：Bandpass filter (1kHz to 20kHz) → Absolute value detection → Low-pass filter (1kHz)
TEDS		IEEE 1451.4 Class1 compliant (Template ID：25, automatic setting of sensor sensitivity)
Maximum Rated Voltage To Groud		42V (DC+AC peak)(between channels, between input terminals and chassis)
Dimensions		Approx. 140 (input-side W) x 223(D) x 20(H) mm
Weight		Approx. 300g
Compliance Standards		Safety：EN61010-1, EN61010-2-30 EMC：EN61326-1, class A

Charge Converter　AP11-901, AP11-902, AP11-903

Gain	1.0mV/pC ±5% (AP11-901, AP11-902), 0.1mV/pC ±5% (AP11-903)
Max Input Charge	5,000pC (AP11-901, AP11-902), 50,000pC (AP11-903)
Max Input Charge	Approx 1.6Hz to 50Hz
Max Output Voltage	5Vp-p or less
Drive Voltage	12V to 25V DC
Drive Current	0.5 to 5mA
Rated Noise	20μVrms or less (AP11-902), 100μVrms or less (AP11-901, AP11-903)
Phase	180°
Operating Temperature	-20 to 80℃(AP11-901), -20 to 110℃(AP11-902, AP11-903)
Connector	Input：Miniature connector (10-32UNF) Output：Male BNC terminal (AP11-901) Female BNC connector (AP11-902, AP11-903)
Dimensions	Φ12 x 38mm (AP11-901), 21Hex x 34mm (AP11-902, AP11-903)
Weight	Approx. 20g (AP11-901), approx. 65g (AP11-902, AP11-903)

Main Unit & Accessories

Main Unit

Item	Model	Specifications
Omniace	RA3100	Standard accessories: AC power cable × 1, recording paper × 1, paper holder × 1pair, input module slot cover plate × 1 set, quick operation guide × 1, Instruction manual CD-ROM × 1

Input Module

Item	Model	Specifications
2ch Voltage Module*1	RA30-101	Sampiling 1MS/s, Input ±100mV to ±500V, A/D resolution 16bit, Anti-aliasing filter
4ch Voltage Module*1	RA30-102	Sampiling 1MS/s, Input ±1V to ±200V, A/D resolution 16bit
2ch High Speed Voltage Module*1	RA30-103	Sampiling 20MS/s, Input ±100mV to ±500V, A/D resolution 14bit
2ch AC Strain Module*3	RA30-104	2ch, Max. strain input 500 x 10^{-6} strain, AC bridge method, Frequency response DC to 2kHz
16ch Logic Module*5	RA30-105	Input 16ch (voltage or contact)
2ch Temperature Module*4	RA30-106	Data update rate 1.5ms, Thermocouple/RTD, 2 temperature sensor connectors (RA30-555) included
2ch High Voltage Module*2	RA30-107	2ch, max. input ±1,000V, sample rate 1MS/s, RMS conversion
2ch Frequency Module*1	RA30-108	2ch, Pulse input, Input ±500V
2ch Acceleration Module*6	RA30-109	2ch, acceleration transducer (charge output type, voltage output type) input, acceleration, speed, displacement, TEDS compatible

∗1 Use Isolated BNC cable (Alligator clip) RA30-507
∗2 Use Alligator clip for High Voltage (RA30-509-01), Connection cable for High Voltage (RA30-509-02).
∗3 Remote Control Module (RA30-112) is required for 2ch AC Strain Module (RA30-104) to supply AC bridge power. Use NDIS Conversion cable (RA30-508) to connect NDIS connector (NDIS4102).
∗4 A temperature sensor connector RA30-555 is provided to attach the temperature sensor to the 2ch temperature module.
∗5 Use 8ch Logic cable (RA30-501, RA30-502, RA30-503), cable for connecting the terminal block (RA30-504).
∗6 When using Charge converter (AP11-902, AP11-903), use Signal cable (AS30-504).

Control Module

Item	Model	Specifications
Remote Control Module*7	RA30-112	Remote control, TRIG IN and OUT, and synchronization signal output when AC strain module is used

∗7 Use a remote control module cable (RA30-505, RA30-506) to connect the remote control module to other devices.

Signal Input Related Options

Item	Model	Specifications
Isolated BNC Cable (Alligator clip)	RA30-507	1.5m length with an insulated BNC - safety alligator clip (+red,-black), connected to RA30-101, -102, -103, -108
Alligator clip for High Voltage	RA30-509-01	High voltage alligator clips, CAT III 1,000V, 1 red and 1 black per channel
Connection cable for High Voltage	RA30-509-02	High voltage connection cable 2m, CAT III 1,000V, S-banana plug to S-banana plug, 1 red and 1 black per channel
Extension cable for High Voltage	RA30-509-03	High voltage extension cable 2m, CAT III 1,000V, S-banana jack to S-banana plug, 1 red and 1 black per channel
Signal cable	RA30-508	2m length, Metal BNC to Metal BNC, connect to RA30-109 and AP11-902/903 charge converter
NDIS Conversion cable	AS30-504	Conversion cable to connect NDIS connector (NDIS4102) of bridge box and strain gage type transducers. For 1ch, length 60cm
8ch Logic Cable (IC clip)	RA30-501	1.5m length for logic input, IC terminal clip (8ch), connected to RA30-105
8ch Logic Cable (Alligator clip)	RA30-502	1.5m length for logic input, electrical terminal clip (8ch), connected to RA30-105
8ch Logic Cable (round type connector converter)	RA30-503	30cm length conversion cable for connection to the RA30-105 from the 1539S
Cable for Terminal Block	RA30-504	2m length, connecedt to the RA30-105 or RA30-112, attach the MDR20 terminal block AX-PCX-10S20
Remote Control Cable (to connect between main units)	RA30-505	2m length, connect the RA30-112 to connect with another RA3100 unit each other
Remote Control Cable (withouot another connector)	RA30-506	2m length, connect to the RA30-112 to control the RA3100 main unit
Temperature Sensor Connection Connector	RA30-555	Connector attached to the terminal of temperature sensor connected to the RA30-106, 2 pcs/sets
MDR20 Terminal Block for AD4430C	AX-PCX-10S20	Used as terminal block for IN/OUT of RA30-105, RA30-112 signals
BNC Adaptor*8	0243-3021	Isolated BNC connector and Safety terminal plug, When using Clamp Adaptor (8112), AC/DC Clamp Sensor (8115)

∗8 When 2ch AC Strain Module (RA30-102) is installed in an adjacent slot, BNC Adaptor (0243-3021) cannot be installed for all channels.

Options Related to Current and Voltage Measurement

Item	Model	Specifications
AC/DC Voltage Detector	1539S	4 inputs, AC/DC voltage detector that detects presence of selected low or high voltages and outputs Hi/Lo logic signal
Voltage Fluctuation Detector	1540S	Detects 100/120V AC voltage sags & surges exceeding selected 10% or 20% of AC peak value and outputs as pulse
	1543S	Detects 220/240V AC voltage sags & surges exceeding selected 10% or 20% of AC peak value and outputs as pulse
AC/DC Digital Clamp Meter	2009R*9	For high current (2000A/400A, DC/40 to 1kHz), Φ55, 0311-5184 signal input cable required
Clamp Adaptor	8112*10	For low current (20A/2A/0.2A, 40 to 10kHz), Φ8, 0243-3021 BNC adaptor required
AC/DC Clamp Sensor	8115*10	For low current (AC130A/DC180A, DC/40 to 1kHz), Φ12, 0243-3021 BNC adaptor required
Signal Input Cable for Clamp Meter	0311-5184*11	Length: 2m, miniature plug for microphone and insulated BNC connector

∗9 Use signal input cable (0311-5184) if connecting output from 2009R to RA3100.
∗10 Use BNC adaptor (0243-3021) if connecting output from 8112 or 8115 to RA3100.
∗11 Signal input cable to connect 2009R clamp meter to RA3100 insulated BNC connector.

Recording Paper

Item		Model	Specifications
Recording Paper*12	Roll Paper	YPS106	219.5mm × 30m roll paper (5 rolls/box), Drawing No. 0511-3167
	Roll Paper (with perforation)	YPS108	219.5mm × 30m roll paper (5 rolls/box), perforation 300mm pitch, numbering 99 to 01, Drawing No. 0511-3166
	Z-fold Paper	YPS112	219.5mm × 201m Z-fold paper (1 set/box), folding width 300mm pitch, total of 670 sheets, Drawing No. 0511-3182

∗12 Quality not assured if paper other than above is used.

Peripheral Options

Item	Model	Specifications
SD memory card 4G	RM11-453	4GB, industrial use (for saving setting conditions & mesured data)
SD memory card 8G	RM11-454	8GB, industrial use (for saving setting conditions & mesured data)
Z-fold Paper Storage Box	RA30-551	Including Z-fold paper adaptor RA12-301
Z-fold Paper Adaptor	RA12-301	
Recording paper holder	5633-1794	2 pcs/sets
Soft Carrying Case	RA23-183	
Hard Carrying Case with Casters	RA30-552	

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