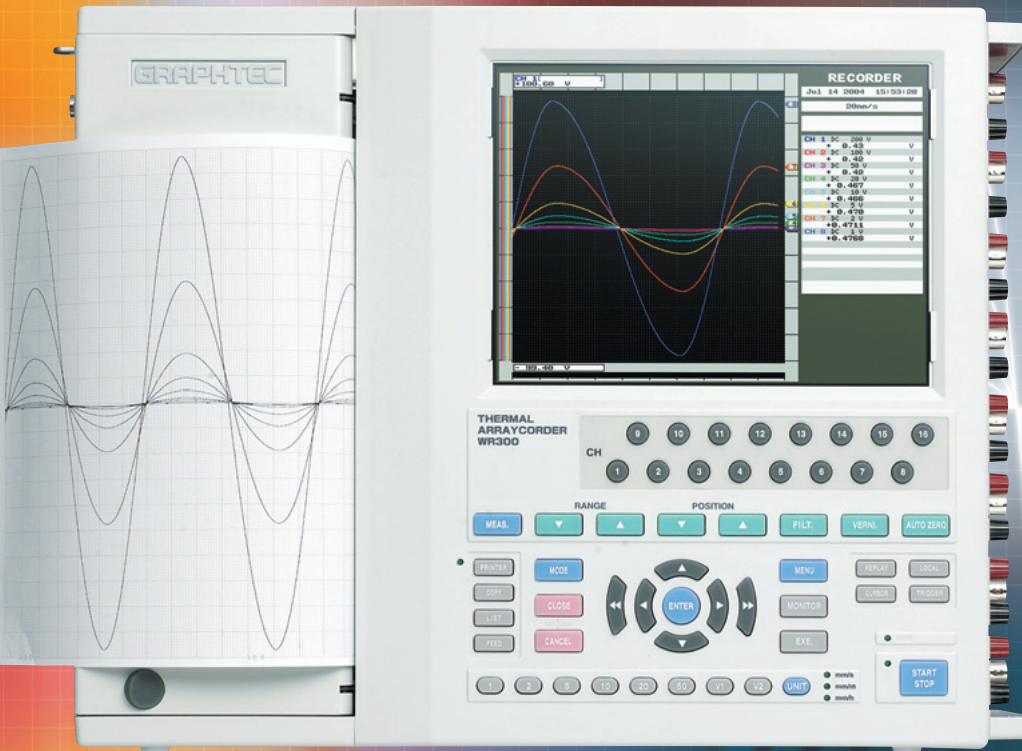


GRAPHTEC

Thermal Arraycorders

WR300^{NEW} SERIES



**State of the art recorder!
Accurate Data capture and recording.
This machine has it all.**

Direct Recording

Chart, Internal Memory, 40GB HDD



Multi-Function

Voltage / Temperature / Strain / Frequency



Direct Operation

Range, Position, Chart speed



Easy PC Connection

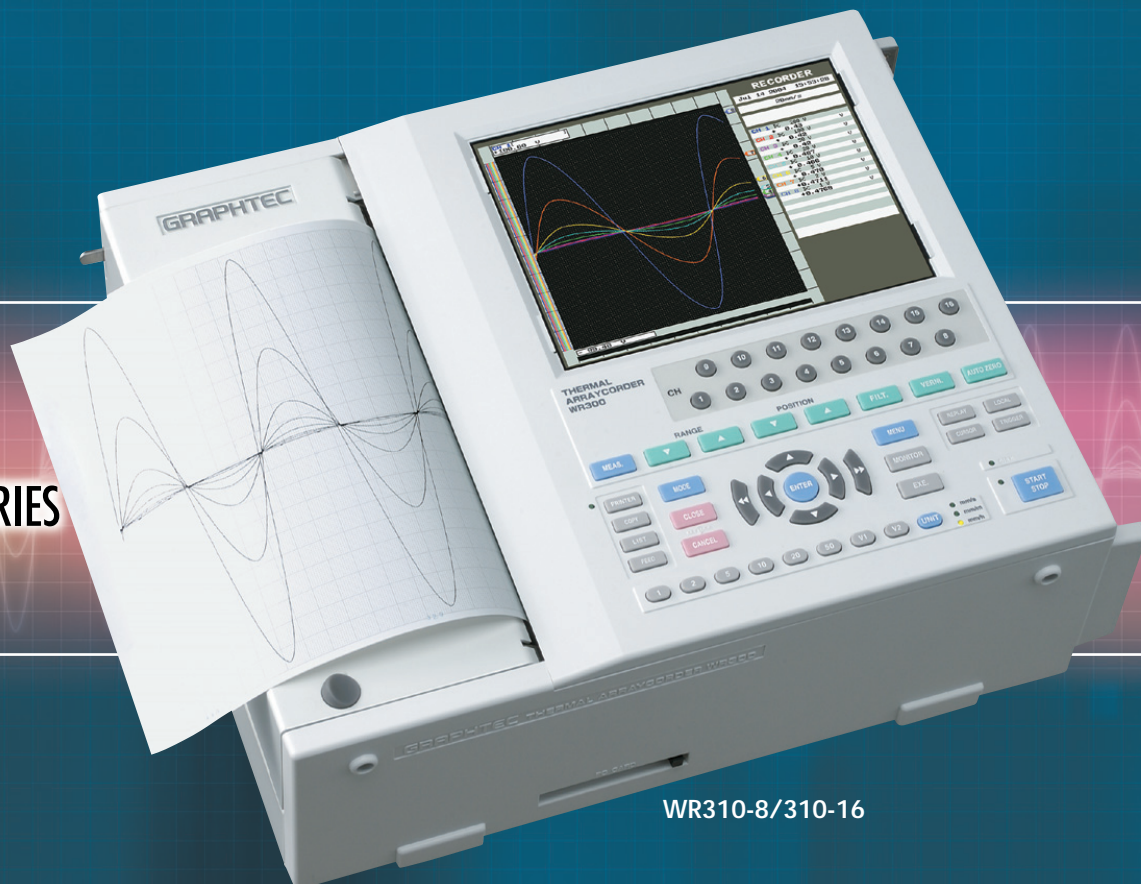
USB, LAN, PCMCIA



WR310: High-end model with long-term analog data recording and large capacity data capture capabilities

Ideal for use in all kinds of research and development, as well as for control applications at production and manufacturing sites, quality control, and more

- Up to 1 MS/s sample rate on all channels
- Bandwidth (frequency response): DC to 200 kHz (using the WR3-V amplifier)

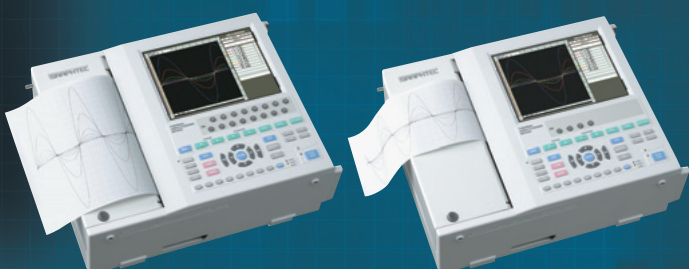


WR310-8/310-16

Thermal Arraycorders **WR300** NEW SERIES

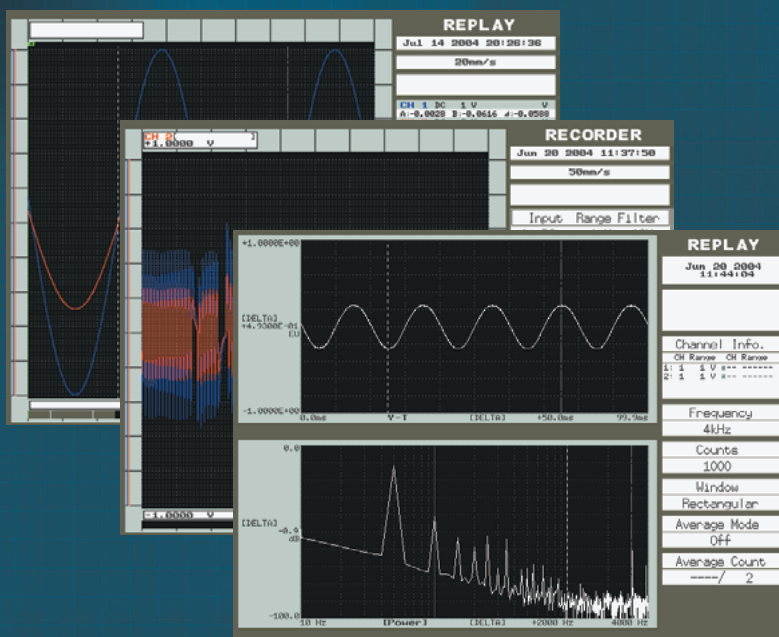
WR300: Recorder designed specifically for long-term waveform recording

- Selection of models with 4, 8, or 16 input channels
- 50 mm/s chart speed
- 100 mm recording width for 4-ch models;
200 mm recording width for 8-ch and 16-ch models



WR300-8/-16

WR300-4



Data Capture (Large capacity) — 40 GB HDD / PCMCIA card

Long-term data capture is possible with WR300 series at high speed. WR310 enables continuous measurement for 200 minutes at 10kS/s for 8-ch. 1 Mword/ch internal memory is standard.

| Measurement data capture times <small>(when measuring on 8 channels)</small> | | | | | | | | |
|--|-----------|------------|-------------|----------|----------|----------|-----------|-----------|
| | 1 μ S | 10 μ S | 100 μ S | 1 ms | 5 ms | 10 ms | 100 ms | 1 s |
| 1 Mword/ch memory | 1 s | 10 s | 1.6 min | 16.6 min | 1.4 h | 2.8 h | 28 h | 11 days |
| HDD (1 file = 2 GB)* | 2.08 min | 20.8 min | 3.4 h | 1.4 days | 7.2 days | 14 days | 144 days | 1446 days |
| PCMCIA card (256 MB) | | | | | 22 h | 1.8 days | 18.5 days | 185 days |

*One data capture operation is up to 2 GB

Recording (Thermal recording) — Various chart types/sizes are supported

Built-in 200 mm (8") wide thermal array printer in the 8- and 16-ch models; 100 mm wide printer in the 4-ch model.



Multi-function input — Plug-in amplifiers

Models available with 4, 8 or 16 input channels. Plug-in 2-channel WR300 series amplifiers adapt the system to a wide variety of input types and sensors.

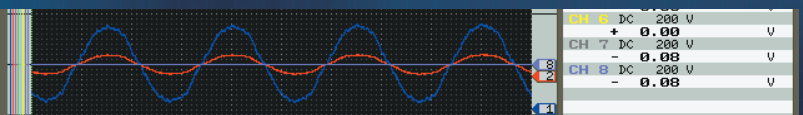


Synchronize your WR310 recordings to IRIG-B time!

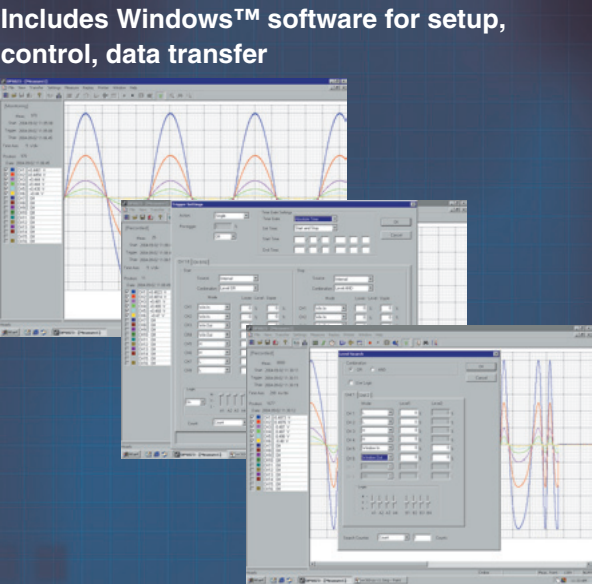
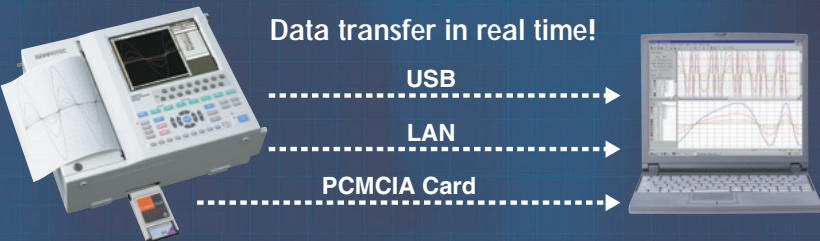
Performance, reliability and ease of use.

Display (8.4" color LCD monitor) — Easy operation and highly visible display

8.4" color LCD monitor for data display and graphical user interface.



PC connection & remote interface



Remote Functions

| Name | Function | Remarks |
|------------------------------|--|---------------------------|
| START/STOP (Level operation) | Measurement START/STOP Pulse width: At least 1 s , Repeat cycle: At least 1 s | Input: CMOS type (0/+5V) |
| START/STOP (Edge operation) | Measurement START/STOP Measurement starts and stops repeatedly whenever the L level is reached. Pulse width: At least 1 s , Repeat cycle: At least 1 s | |
| EXT. FEED | Chart feed Amount fed per pulse: 0.03125 mm , Max. high frequency: 660 pps (20 mm/s) | |
| EXT. TRIGGER | Trigger activation L level pulse width: At least 10 ms | Output: CMOS type (0/+5V) |
| EXT. SAMPLE | Data capture cycle Pulse width: At least 500 ns , Repeat cycle: At least 10 μ s | |
| TRIGGER Output | Trigger output A CMOS type "L" pulse signal is output whenever a trigger is activated. Output pulse: At least 10 ms | |

WR300 Series Model Configuration Chart

| | WR300 | | | WR310 | |
|--|-------|------|-------|-------|-------|
| | 4 | 8 | 16 | 8 | 16 |
| No. of channels | Yes | No | No | No | No |
| 100 mm roll paper | Yes | No | No | No | No |
| 100 mm Z-fold paper (for internal use) | Opt. | No | No | No | No |
| 100 mm internal Z-fold unit | Opt. | No | No | No | No. |
| 200 mm roll paper | No | Yes | Yes | Yes | Yes |
| 200 mm Z-fold paper (for internal use) | No | Opt. | Opt. | Opt. | Opt. |
| 200 mm internal Z-fold unit | No | Opt. | Opt. | Opt. | Opt. |
| 200 mm Z-fold paper (long-length) | No | Opt. | Opt. | Opt. | Opt. |
| Long length 200 mm Z-fold unit | No | Opt. | Opt. | Opt. | Opt. |
| Logic amp | 4-ch | 8-ch | 16-ch | 8-ch | 16-ch |
| IRIG | No | No | No | Yes | Yes |
| 40 GB hard disk | No | No | No | Yes | Yes |

Basic Specifications

Main Unit Specifications

| Item | Details |
|--------------------------------------|--|
| Analog input | 4-ch model: 2 slots, 8-ch model: 4 slots, 16-ch model: 8 slots (amplifiers can be mixed in any combination) |
| Logic input | 4-ch model: 4 channels, 8-ch model: 8 channels, 16-ch model: 16 channels |
| PC interface | Ethernet, USB 1.1 |
| Memory capacity | 1 Mword per channel |
| Internal memory | 40 GB 2.5 inch hard disk*1, PCMCIA slot (Type II) |
| Isolation voltage | Between the AC power supply and casing: 1 minute at 1,500 V AC |
| Insulation resistance | Between the AC power supply and casing: 20 MΩ at 500 V DC |
| Backup functions | Setting conditions: EEPROM, Clock: Lithium batteries |
| Operating environment | 0°C to 40°C, 30% to 80% RH (5°C to 35°C when using hard disk or printer) |
| Operating noise levels | Standby: 60 dBA max. |
| Rated power supply | 100 to 120 V AC/200 to 240 V AC, 50/60 Hz (automatically selected for the voltage being used) |
| Power consumption | 4-channel model: approx. 100 VA, 8-ch model: approx. 120 VA, 16-channel model: approx. 140 VA (when the print density is 50% and the printer is being used) |
| External dimensions (approximate) | 380 mm (W) x 296 mm (D) x 125 mm (H), (excluding rubber feet and protrusions) [15W x 11.6D x 4.9H inches] |
| Weight (approximate) | 4-ch model: 5.6 kg (including 2 amplifiers, less options) [12.32 lb.] 8-ch model: 6.1 kg (including 4 amplifiers, less options) [13.4 lb.] 16-ch model: 6.8 kg (including 8 amplifiers, less options) [15 lb.] |

*1: WR310 only

Monitor and Printer Specifications

| Item | Details | |
|------------------|---|--|
| Display screen | 8.4inch (diag.) color TFT LCD | |
| Display details | Setting windows, mode measurement values | |
| Thermal printer | 4-ch model: 100 mm wide, 8 dots per mm 8-ch/16-ch models: 200 mm wide, 8 dots per mm | |
| Measurement mode | Recorder mode, FFT mode | |
| Recorder mode | Display format | Display format: Y-T Display direction: Horizontal scroll No. of display zones: Zone specification, fixed format |
| | Digital display | Digital display of measured values for up to 8 channels on right-hand side of screen |
| | Display method | Scroll, Fixed |
| | Print details | Waveforms and screen copy |
| | Chart speed | 1, 2, 2.5, 5, 10, 20, 25, 50 mm/s 1, 2, 2.5, 5, 10, 20, 25, 50, 100 mm/min, mm/h |
| | Printing accuracy | Y: ±0.3% ±1 dot, T: ±2% ±0.5 mm |
| | Annotation printing | System annotation: (System, User, System & User, OFF) Channel annotation: (Amp, User, Amp & User, Value, OFF) |
| | No. of annotation characters | 10 to 32 characters |
| | Annotation printing interval | 10 cm to 100 cm in 10 cm steps |
| | Captured data replay | Waveform display/scroll, Waveform zoom-in/zoom-out, Cursor function, Calculation function, Data search function |
| | Waveform expansion/ | Time axis fixed zoom-in/zoom-out: x 10 to x 1/1000 (data between specified cursors) |
| | Compression functions | Time axis variable zoom-in/zoom-out: data between specified cursors Voltage axis variable zoom-in/zoom-out: data between specified cursors |
| | Cursor functions | Cursor readout function/Scroll function/Zoom function |
| | Calculation functions | Arithmetic operations/Moving average/Log/Index mean/Absolute value/Differential and integral (two types of integral)/Second differential (two types of second integral)/Sine/Cosine/Tangent/Arcsine/Arccosine /Arc tangent/Pi (π) |
| | Data search | Date/Time: Data search from specified time/date Level: Data search above (below) specified level |
| FFT mode | Analysis functions | Auto-correlation: Linear spectrum, power spectrum, power spectrum density, RMS spectrum Cross-correlation: Cross spectrum, transfer function, coherence function |
| | Analysis frequencies | 400 kHz, 200 kHz, 100 kHz, 80 kHz, 40 kHz, 20 kHz, 10 kHz, 8 kHz,5 kHz, 4 kHz, 2 kHz, 1 kHz, 800 Hz, 500 Hz, 400 Hz, 200 Hz, 100 Hz, 80 Hz, 40 Hz, 20 Hz, 10 Hz, 8 Hz, 5 Hz, 4 Hz, 2 Hz, 1 Hz, 0.8 Hz, 0.5 Hz, 0.4 Hz, 0.2 Hz, 0.1 Hz, 0.08 Hz |
| | Number of analysis channels | 4 ch |
| | Window functions | Hanning & rectangular windows |
| | Number of sampling points | 1,000 points, 2,000 points |
| | Averaging | Summation, exponential, peak hold |
| | Display format | 1 Division, 2 Divisions, 4 Divisions, Nyquist |
| | Print details | Screen copy |

Data Capture Function Specifications

| Function | Item | Details |
|------------------|-----------------------------|---|
| Internal capture | Captured data | Measurement conditions, measurement data |
| | Capture capacity | Memory 1 Mword per channel PCMCIA card Depends on usage conditions Hard disk*1 40 GB (1 file: 2 GB max.) |
| | Sampling interval | Memory Depends on amplifier PCMCIA card Max. 5 ms Hard disk*1 8 ch data capture : Max. 1 μs, 16 ch data capture: Max. 2 μs Note: 10 μs for temperature ranges |
| | Memory banks (Block) *2 | 1, 2, 4, 8, 16, 32, 64, 128 |
| | Capture start specification | After a trigger, capture starts simultaneously with waveform recording (selectable On/Off) |
| Network capture | Captured data | Measurement conditions, measurement data |
| | Capture capacity | Depends on PC connected |
| | Sampling interval | Depends on amplifier |
| | Transfer data details | During measurement Min/Max values transferred in real-time After measurement Data captured to memory/hard disk |
| | Data backup*2 | Memory, PCM-CIA card, hard disk (data capture capacity and sampling interval are the same as for Internal capture). |
| | Capture start specification | After a trigger, capture starts simultaneously with waveform recording (can be set On/Off) |

*1: WR310 only *2: When using memory

Trigger Specifications

| Item | Details |
|---|--|
| Time gate | OFF, Relative time, Absolute time |
| Action | Single, Repeat |
| [Start condition] source | OFF: Start trigger via pressing the START key Internal: Start trigger via AND/OR combination of measured signals Manual: Start trigger via pressing the TRIGGER key External: Start trigger via TRIGGER IN signal on remote connector |
| [Stop condition] source | OFF: Stop trigger via pressing the STOP key Internal: Stop trigger via a combination of measured signals Manual: Stop trigger via pressing the TRIGGER key External: Stop trigger via TRIGGER IN signal on remote connector Time: Stops measurement at preset time |
| Combination | Level OR, Level AND, Edge OR, Edge AND |
| Judgment mode | Edge: Rise time (↑), Fall time (↓) Level: H (High), L (Low) Window: IN, OUT, OFF |
| Level | −100% to +100% of setting range in 1% steps |
| Trigger Counter (when the Combination setting is Level) | Number of times: 1 to 255 Filter: Product of the Sampling Interval and the Number of Times settings (can only be set when the Function setting is Memory). |
| Pretrigger | Internal memory: 0% to 100% in 1% steps PCMCIA card, HDD: On/Off |
| Logic trigger | Pattern: H (High), L (Low), X (Don't care) Judgment mode: When the pattern is matched |

Software Specifications

| Item | Details |
|--------------------------------|---|
| Compatible operating system | Windows 2000/XP |
| Functions | Measurement conditions setting, data measurement, file conversion, report creation (option) |
| Measurement condition settings | WR300/310 control, communication conditions setting |
| Measurement function | Recorder mode |
| Display format | Y-T |
| Display direction | Horizontal scroll |
| No. of display zones | Zone specification |
| Digital display | Digital display of measured values for up to 8 channels on left side of screen |
| Display method | Scroll, fixed |
| Captured data replay | Waveform display/scroll/waveform expansion/compression |
| Cursor functions | Cursor readout, data search |
| File conversion | TEXT, CSV, DADISP, GBD |
| Report creation (option) | Report creation mode or waveform screen copy and paste |

Standard Accessories

| | |
|---|--------|
| Thermal paper (4ch PR230 100mm , 8ch-16ch PR231A 200mm) | 1 roll |
| Roll paper bobbins | 2 |
| REMOTE connector | 1 |
| LCD Protector | 1 |
| User Guide CD-ROM with OPS023 Application Software , USB Driver | 1 |
| Quick Guide | 2 |
| AC cable (RSC-110) | 1 |

Plug-in Amplifier Specifications

WR3-V Amplifier (for voltage measurement)

| Item | Details |
|--------------------------------------|---|
| No. of channels | 2 channels per module |
| Input configuration | Independent, unbalanced input for each channel (floating ground) |
| Input resistance | 1 MΩ ±1% |
| Input coupling | AC, DC, GND, CAL, (1/2 F.S.), OFF |
| Measurement range | 50, 100, 200, 500 mV/F.S. 1, 2, 5, 10, 20, 50, 100, 200 V/F.S. |
| Input filters | Line: 1.5 Hz (−3 dB) at −6 dB/oct Low-pass : 5 Hz, 10 Hz, 50 Hz, 500 Hz, 5 kHz, 50 kHz (−3 dB) at −6 dB/oct |
| Accuracy (23±3°C) | ±0.25% of F.S. |
| Temperature coefficients | Zero point: 0.02% of F.S./°C Gain: 0.02% of F.S./°C |
| Insulation resistance | 100 MΩ (at 500 V DC) |
| Isolation voltage | Between input terminal and casing: 1 minute at 1000 VAC |
| Permissible signal source resistance | Max. 1 kΩ |
| A/D converter | Sampling interval: 1 μs A/D resolution: 12-bit |
| Common mode rejection ratio | 80 dB (typ.) (50/60 Hz, Signal source resistance: max. 500Ω) |
| Signal/noise ratio | −46 dB (typ.) 200(Vp-p at 50 mV range (with +/− shorted) |
| Frequency response | DC coupling: DC to 200 kHz (+/−3 dB Typ.) AC coupling: 10 Hz to 200 kHz (+/−4.5 dB Typ.) |
| Max permissible input voltage | Between +/− terminals: 5 V to 200 V range : 200 V DC (DC + AC _{p-p}) 50 mV to 2 V range: 30 V DC (DC + AC _{p-p}) Between input terminals and GND: 33 V AC rms |
| Input terminal type | BNC |

WR3-M Amplifier (for voltage/temperature measurement)

| Item | Details |
|--|---|
| No. of channels | 2 channels per module |
| Input configuration | Independent, unbalanced input for each channel (floating ground) |
| Input resistance | 1 MΩ ±1% constant |
| Input coupling | AC, DC, TEMP., GND, CAL (1/2 F.S.), OFF |
| Measurement range | [Voltage] 20, 50, 100, 200, 500 mV 1, 2, 5, 10, 20, 50, 100, 200, 500 V Auto [Temperature] TC-K: −200 to 1300 °C TC-J: −200 to 1100 °C TC-T: −200 to 400 °C TC-R: 0 to 1600 °C TC-E: −200 to 800 °C TC-B: 600 to 1700 °C |
| Input filters | [Line] 1.5 Hz (−3 dB) at −6 dB/oct. [Low-pass] 5, 10, 30, 50, 500Hz, 5 kHz (−3 dB) at −6 dB/oct. |
| Accuracy (23°C ±3 °C) (Temperature accuracy includes reference contact compensation accuracy) | [Voltage] ±0.25% of F.S. [Temperature] < TC-K, J, E > −200 °C to 0 °C: ± (1% of rdg + 3.5 °C) Other: ± (0.2% of rdg + 3.5 °C) < TC-T > −200 °C to 0 °C: ± (0.8% of rdg + 3 °C) Other: ± (0.2% of rdg + 3 °C) < TC-R > 0 °C to 200 °C: ± 9.5 °C 200 °C to 800 °C: ± 6.5 °C Other: ±(0.2% of rdg + 4.5 °C) < TC-B > 600 °C to 700 °C: ± 9.5 °C Other: ± (0.2% of rdg + 5.5 °C) |
| Temperature coefficient | Zero point: 0.01% of F.S./°C Gain: 0.02% of F.S./°C |
| Insulation resistance | 100 MΩ (at 500 V DC) |
| Isolation voltage | Between input terminal and casing: 1 minute at 1,000 V AC |
| Permissible signal source resistance | Max. 1 kΩ |
| Input bias current | 2nA (typ.) |
| A/D converter | Sampling interval: 10 μs A/D resolution: 16 bits (out of which 14 are internally acknowledged) |
| Common mode rejection ratio | 100 dB typ (120 dB with Line Filter on) |
| Signal/noise ratio | −46 dB (typ) 100 μV-P at 20 mV range (with +/− shorted) |
| Frequency response | DC coupling: DC to 20 kHz (+/− 3 dB Typ.) AC coupling: 10 Hz to 20 kHz (+/− 4.5 dB Typ.) |
| Max permissible input voltage | Between +/− terminals: 2 V to 500 V range : 500 V DC (DC + AC _{p-p}) 20 mV to 1 V range: 100 V DC (DC + AC _{p-p}) Between input terminals and GND: 33 V AC rms |
| Input terminal type | Banana connector (two connectors) |

WR3-DCB Amplifier (for strain measurement)

| Item | Details |
|-----------------------------|---|
| No. of channels | 2 channels per module |
| Input terminals/format | Independent balanced input for each channel (NDIS strain input connectors) |
| Input coupling | DC, CAL+, CAL−, ZERO, OFF |
| Measurement range | Voltage: 1000 to 20,000 x 10 ^{−6} strain FS (1/2/5 steps) |
| Max permissible input | Differential input 10 VDC (DC+ACp-p) |
| Sync voltage | 100 VACrms |
| Insulation resistance | Min. 100 MΩ (at 500 V DC) |
| Isolation voltage | Between input terminal and casing: 1 minute at 1,000 V AC |
| A/D converter | Sampling interval: 10 μs Resolution: 16-bit (14-bit effectively) |
| Common mode rejection ratio | 80 dB typ (50/60 Hz) |
| Signal/noise ratio | Max. 50 x 10 ^{−6} strain (2 V DC, 350 Ω) |
| Input resistance | Approx. 10 MΩ (5 M + 5 M) |
| Accuracy (23 °C ±3 °C) | ±(0.3% of F.S. +1.2 x 10 ^{−6} strain) |
| Frequency bandwidth | DC to 20 kHz (+/−3 dB) |
| Stability | Zero point ±1.2 x 10 ^{−6} strain/°C ±10 x 10 ^{−6} strain/8 h ±10 x 10 ^{−6} strain/0.5 h (initial drift / from 10 s after power on) |
| Gain | ±0.02% of F.S./°C 0.10% of F.S./8h |
| Filters | Line 1.5 Hz (+/−3 dB) at −6 dB/Q (octave) L.P.F 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz (−3dB) at −12 dB/oct |
| Gage ratio | 2.0 fixed |
| Gage resistance | 120 to 1000 Ω |
| Bridge voltage | Voltage DC 2 V Accuracy ±0.2% Stability ±0.01%/°C |
| Balance adjustment | Method Auto balance adjustment method Accuracy ±10 x 10 ^{−6} strain (° = microstrain) Range Resistance ±2% (10,000 x 10 ^{−6} strain) |

WR3-FV Amplifier (for frequency measurement)

| Item | Details |
|------------------------|---|
| Input terminals/format | Independent unbalanced input for each channel (floating ground) |
| Input coupling | DC (0 V reference), OC (+2.5 V reference), OFF |
| Measurement range | 200 Hz to 40 kHz F.S. (1/2/4/5 steps) |
| Max permissible input | Between +/− terminals DC 60 V (DC+ACp-p) Between floating terminals 30 VACrms |
| A/D converter | Sampling interval: 4 μs (250 kHz) Resolution : 12 bits (out of which 14 are internally acknowledged) |
| Input resistance | DC: Approx. 100 k Ω OC: Approx. 10 k Ω |
| Accuracy | ±0.5% of F.S. |
| Max. input frequency | 40 kHz |
| Min pulse width | Min. 2.5 μs |
| Min. voltage | Min. ±1 V relative to the reference value |
| Low-pass filters | 100 Hz, 1 kHz, 10 kHz (−3 dB) at −6 dB/oct |

Logic Amplifier (for measurement of logic signals)

| Item | Details |
|---------------------------------------|---|
| No. of channels | 4-ch model: (4 channels/logic input terminal x 1) 8-ch model: (8 channels/logic input terminal x 2) 16-ch model: (16 channels/logic input terminal x 4) |
| Input voltage range | 0 to 25 V max. (single ground input) |
| Threshold level | TTL (+1.4 V), CMOS (+2.5 V), Contact (+5.0 V) |
| Sampling interval | 1 μs max. (regardless of which analog amplifiers are installed) |
| Trigger setting | 8-channel pattern trigger |
| Display/Recording | On/Off switchable for each group (1 group: 4 channels) |
| Display/Record position specification | Display/Recording position can be specified for each group in each zone |

IRIG (Time Code) (WR310 only)

| Item | Details |
|---------------------|---|
| Input signal type | Modulated, demodulated |
| Output signal type | Demodulated |
| Input signal format | IRIG-B, IRIG-E |
| Print record | System annotation printing |
| Display | Asterisk mark [*] displayed when time code received When a time code has not been received, the recorder's internal time is displayed The year displayed is the internal function clock |
| Input connector | BNC |

Options/Accessories/Supplies Charts

Units

| Unit | Model No. | Details |
|---|-------------|--------------------|
| Voltage measurement amplifier | WR3-V AMP | Can be added later |
| Voltage/temperature measurement amplifier | WR3-M AMP | Can be added later |
| DC strain measurement amplifier | WR3-DCB AMP | Can be added later |
| Frequency measurement amplifier | WR3-FV AMP | Can be added later |
| 200 mm long-length Z-fold unit | B-522 | Can be added later |
| 100 mm internal Z-fold unit | B-523 | Can be added later |
| 200 mm internal Z-fold unit | B-524 | Can be added later |

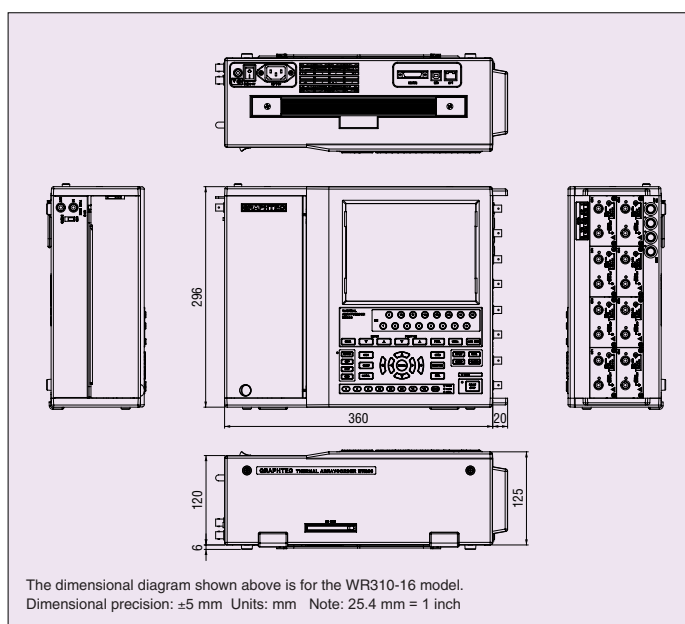
Accessories

| Accessories | Model No. | Details |
|-------------------------------|-----------|---|
| Input cable (8-cable set) | B-331 | 2-pin cable (banana terminal) bare tips |
| Input cable (16-cable set) | B-335 | 2-pin cable (banana terminal) bare tips |
| Clamp adapter (1200 A) | CM-102 | |
| Digital clamp meter | CM-111 | |
| Logic amplifier probe | RIC-07 | |
| Alligator clip cable | RIC-08 | |
| IC clip cable | RIC-09 | |
| Probe set (Set RIC-07 to 09) | RIC-10 | |
| Floating voltage input probe | CM-105 | |
| Voltage conversion probe | CM-106 | |
| Clamp meter temperature probe | RIC-110 | |
| Line separator | CM-108 | |
| Safety adapter | SMA-102 | High-voltage BNC-to-banana conversion adapter |

Supplies

| Supplies | Model No. | Min. Qty. | Details |
|--|-----------|-----------|---|
| Roll paper (thermal recording paper) | PR230 | 5 rolls | 100 mm wide, 40 m length |
| Z-fold paper (thermal recording paper) | PZ230 | 5 packs | 100 mm wide, 40 m length |
| Roll paper (thermal recording paper) | PR231A | 10 rolls | 200 mm wide, 40 m length |
| Z-fold paper (thermal recording paper) | PZ233 | 5 packs | 200 mm wide, 40 m length |
| Z-fold paper (thermal recording paper) | PZ231A | 5 packs | 200 mm wide, 100 m length |
| Head cleaner | B-368 | 1 set | For cleaning the thermal recording head |

External Dimensions



- Brand names and product names are the trademarks or registered trademarks of their respective owners.
- Specifications are subject to change without notice.



To ensure correct and safe use of your recorder:

- Read your User's Manual before using the recorder, and operate it correctly in accordance with the procedures described.
- To prevent malfunctions or electrical shock due to current leakage, ensure that the recorder has a good protective ground, and ensure that the supply voltage conforms to the recorder's power rating.

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