SPECIFICATIONS

Item \ Model		LR12000E	LR8100E	LR4100E		LR4200E	
				LR4110E	LR4120E	LR4210E	LR4220E
Measurement	Drive System	Automatic null-balancing digital servo					
	Input Circuitry	Floaing, guarded inputs (no guard in low-sensitivity model)					
	Measuring Ranges	DC voltage (DC V): Low-sensitivity: 10 mV to 200 V F.S. Medium-sensitivity: 1 mV to 200 V F.S. High-sensitivity: 0.1 mV to 200 V F.S. Thermocouple (TC): R, S, B, K, E, J, T, N, W, L (DIN), U (DIN), KPvsAu7Fe RTD: Pt100 (1 mA), JPt100 (1 mA), Pt50 (1 mA), JPt50 (1 mA), J263*B,. Ni100 (1 mA)/DIN, Ni100 (1 mA)/SAMA					
	Measurement Accuracy (at 23±2°C, 55±10% R.H.)	DC voltage: ±(0.05% of rdg +0.03% of range +1.0 µV)* Thermocouples: R, S ±(0.05% of rdg +1°C) Below 100°C ±3.7°C 100 to 300°C: ±1.5°C B ±(0.05% of rdg +1°C) 400 to 600°C: ±2.0°C (not guaranteed below 400°C) K, E, T, L, U ±(0.05% of rdg +0.5°C) J ±(0.05% of rdg +0.5°C) -200 to 100°C: ±0.7°C N ±(0.05% of rdg +0.5°C) KPvsAu7Fe ±(0.05% of rdg +0.5°C) (not guaranteed below 4 K or above 280 K) RTD: Pt100, JPt100, Ni100 ±(0.05% of rdg +0.2°C) Pt50, J263*B ±(0.05% of rdg +0.3°C) * In case the measurement range is 1mV, a 0.1 Hz filter must be used. For ranges more than 1 mV, no filter is necessary.					
	Reference Junction Compensation Accuracy	±1°C for R, S, B; ±0.5°C for other (for measured temperature of –100°C or below, add 0.5°C)					
	Allowable Source Resistance	1 kΩ max. (DC voltage, thermocouple)					
	Input Bias Current	4 nA					
	Input Resistance	Approx. 1 MΩ (DC voltage, thermocouple)					
	Filter	0.1, 1 Hz, or Off (selectable)					
	Maximum Allowable Input Voltage	250 V DC + AC rms (between input terminals and case, and between input channels)					
	Common Mode Rejection Ratio	150 dB (AC)					
	Normal Mode Rejection Ratio	50 dB min. at 50/60Hz					
	Immunity to Noise in Pulses (input/power supply terminals)	±1 kV: Pulsewise: 800 ns; Rise time: 1 ns (These data values are based on the in-house test standards.)					
	Zero Point Adjustment	Freely adjustable					
	Measuring Cycle	135 Hz					
	Pen Offset Compensation	Standard: (1) Average value recording or max./min. value recording selectable (2) Time axis resolution, 0.05 mm (3) ON/OFF switch provided (4) Auto sweepout function for pen offset data (5) Selectable pen offset compensation reference pen					
	Temperature Coefficients	Zero: 0.05 µV/°C + 0.01% of range/°C; F.S.: 0.01% of range/°C					
	External Input Span	Compensate for converter errors by setting the converter zero point and full-span voltages as the span left and span right values in the LR, and scale these values.					
Recording	Writing System	Disposable felt-tip pens					
	Effective Recording Width	250 mm					
	Pen Offset Between Channels	Approx. 3.5 mm	Approx. 4.0 mm				
	Recording Accuracy	Measurement accuracy + ±0.2% of effective recording span (including linearity, dead band, error between ranges)					
	Maximum Pen Speed	Approx. 1,600 mm/s					
	Maximum Pen Acceleration	Approx. 78.4 m/s²					
	Number of Recording Pens Pen Colors	10 or 12 Pen: 1 Color, 2 Red, 3 Green, 4 Blue, 5 Brown, 6 Black, 7 Orange, 8 Violet, 9 Light blue, 10 Yellow green, 11 Pink, 12 Yellow	4, 6, or 8 Pen: 1 Color, 2 Red, 3 Green, 4 Blue, 5 Black, 6 Purple, 7 Orange, 8 Violet	1, 2, 3 or 4 Pen: 1 Color, 2 Red, 3 Green, 4 Blue, 5 Brown			
	Chart	30 m Z-fold chart (DIN)		20 m Z-fold chart (DIN)		20 m Z-fold chart (DIN) 20 m roll (DIN) (Option/ROL or /REROL required)	
	Chart Speed	10 to 600 mm/min and mm/hour	10 to 1,200 mm/min and mm/hour (1-mm steps)				
	Chart Speed Change	Selection between Speed 1 and Speed 2 using remote control signal (optional)					
	Chart Drive	Pulse motor					
	Chart Speed Accuracy	±0.1% (When running 1 m or more continuously and related to the grid of the chart paper)					
	Recording ON/OFF	1 key per channel ON: Measurement + recording OFF: Measurement only (lifts pens and parks them far right)					
	Pen Lift	Lifts or lowers all pens simultaneously (pens can be lifted/lowered individually with Recording ON/OFF keys)					
	Partial Expansion/Compression	Both scale compression boundary values (measured values) and recording position (1% steps) can be set.					
	Auto Span Shift	In auto span shift mode, span automatically shifts ±50% if input goes outside present span, and recording continues. Effective within ±10% of selected					
Printing	Printing System	Wire dot, ink ribbon (one color)					
	Printing Speed	Approx. 1.5 s/line					
	Printing Character Set	Alphanumeric characters (upper-case)					

<table>
<tr><th colspan="2">Item \ Model</th><th>LR12000E</th><th>LR8100E</th><th colspan="2">LR4100E</th><th colspan="2">LR4200E</th></tr>
<tr><th colspan="2"></th><th></th><th></th><th>LR4110E</th><th>LR4120E</th><th>LR4210E</th><th>LR4220E</th></tr>
<tr><td rowspan="12">Printing</td><td>Printout Types</td><td colspan="6">TAG No. print: User-set tag can be printed in place of channel number (7 characters max.)
Alarm print: Channel number, alarm type, ON/OFF time
Scale print: Prints 0% and 100% scale values at same interval as for periodic print.
Change of chart speed print: Prints time and post-change chart speed when chart speed changes.
List print: Prints all setup information (ranges, alarms, etc.) on chart.
Manual print: Prints time and measured values of all channels on one line when MANUAL PRINT key is pressed.
Message print: Prints user-defined messages up to 70 characters long, with time.
MESSAGE (0): Printed when MANUAL MESSAGE key is pressed.
MESSAGE (1 to 4): Provided with REMOTE option; printed on reception of external contact input (4 points max.)
Change of range print: Prints time and change when range changes in auto span shift mode.
Pen offset compensation ON/OFF print: Prints time and pen offset compensation ON/OFF mark when pen offset compensation is turned ON or OFF.
Periodic print: Prints time, chart speed, channel No. (TAG), measured data, and units at fixed intervals.

Chart speed and printing interval for LR8100E/4100E/4200E<table><tr><th>mm/min</th><th>mm/h</th><th>Printing interval</th></tr><tr><td>1200 to 300</td><td>—</td><td>1 minute</td></tr><tr><td>299 to 30</td><td>—</td><td>10 minutes</td></tr><tr><td>29 to 10</td><td>1200 to 120</td><td>1 hour</td></tr><tr><td>—</td><td>119 to 60</td><td>2 hours</td></tr><tr><td>—</td><td>59 to 40</td><td>3 hours</td></tr><tr><td>—</td><td>39 to 20</td><td>6 hours</td></tr><tr><td>—</td><td>19 to 10</td><td>12 hours</td></tr></table>Chart speed and printing interval for LR12000E<table><tr><th>mm/min</th><th>mm/h</th><th>Printing interval</th></tr><tr><td>600 to 300</td><td>—</td><td>1 minute</td></tr><tr><td>299 to 30</td><td>—</td><td>10 minutes</td></tr><tr><td>29 to 10</td><td>600 to 120</td><td>1 hour</td></tr><tr><td>—</td><td>119 to 60</td><td>2 hours</td></tr><tr><td>—</td><td>59 to 40</td><td>3 hours</td></tr><tr><td>—</td><td>39 to 20</td><td>6 hours</td></tr><tr><td>—</td><td>19 to 10</td><td>12 hours</td></tr></table></td></tr>
<tr><td rowspan="2">Display</td><td>Display</td><td colspan="6">Fluorescent display (5 × 7 dot, matrix). 20 characters per channel</td></tr>
<tr><td>Display Modes</td><td colspan="6">(1) Digital data display: 7-digits measured value (sign, measurement data, unit, decimal point, alarm status), time, chart speed *(2) Bar graph display (2.5% resolution)*
(3) Range data display (zero, span)* (4) Digital data display for all channels (LR12000E only): 7-digits measured, unit, alarm status
Any of (1), (2), or (3) can be selected with the DISPLAY SELECT key.*: The LR12000E displays these items for the first six channels and the second six channels as selected.</td></tr>
<tr><td rowspan="2">Other Functions</td><td>Alarm</td><td colspan="6">Number of levels: 2 levels/channel: Types: High, low, delta high, delta low.
Outputs (optional): 12 internal points (LR12000E), 8 internal points (LR8100E) or 4 internal points (LR4100E/LR4200E), all with 24 V AC, 1 A contact rating</td></tr>
<tr><td>Computation</td><td colspan="6">(1) Scaling Input voltage range: Must be within measurement range. Scaling range: –22000 to +22000 (user-set decimal point)
(2) Difference computation Between any two channels set to the same range code</td></tr>
<tr><td rowspan="8">General Specifications</td><td>IC Memory Card</td><td colspan="6">Setup data memory (standard) Memory capacity: 8 KB (with lithium battery, life approx. 5 years) *Cannot be specified with suffix code/FDD at the same time . Setting life storage capacity LR12000E: Approx. 2 files; LR8100E: Approx. 3 files: LR4100E/LR4200E: Approx. 5 files</td></tr>
<tr><td>System Error Alarm (FAIL)</td><td colspan="2">If CPU fails, “FAIL” LED (red) lights and FAIL contact signal (optional) is output.</td><td colspan="4"></td></tr>
<tr><td>Chart End Output</td><td colspan="2">When chart end is reached, “CHART” LED (red) lights, pens lift, and recorder is placed in monitor status (relay outpt is optional).</td><td colspan="4">When chart end is reached, “CHART” LED (red) lights, pens lift, and recorder is placed in monitor status (relay output is optional; pens are not lifted in LR4120E and LR4220E).</td></tr>
<tr><td>Power Consumption</td><td>Max: 10 pens: 380 VA
12 pens: 450 VA

Balanced: 10 pens: 170 VA
12 pens: 190 VA</td><td>Max: 4 pens: 240 VA
6 pens: 290 VA
8 pens: 340 VA

Balanced: 4 pens: 120 VA
6 pens: 135 VA
8 pens: 150 VA</td><td colspan="2">Max: 1 pen: 155 VA
2 pens: 180 VA
3 pens: 205 VA
4 pens: 230 VA

Balanced: 1 pen: 90 VA
2 pens: 100 VA
3 pens: 105 VA
4 pens: 110 VA</td><td colspan="2">Max: 1 pen: 155 VA
2 pens: 180 VA
3 pens: 205 VA
4 pens: 230 VA

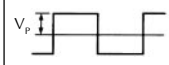
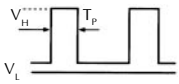
Balanced: 1 pen: 90 VA
2 pens: 100 VA
3 pens: 105 VA
4 pens: 110 VA</td></tr>
<tr><td>Dimensions (W)× (H) × (D)</td><td>Approx. 438 × 273 × 434 mm</td><td>Approx. 438 × 273 × 310 mm</td><td colspan="2">Approx. 438 × 206 × 323 mm</td><td colspan="2">Approx. 448 × 455 × 185 mm</td></tr>
<tr><td>Weight</td><td>10 pens: Approx. 19.5 kg
12 pens: Approx. 20.5 kg</td><td>4 pens: Approx. 16.5 kg
6 pens: Approx. 18 kg
8 pens: Approx. 18.5 kg</td><td>1 pen: Approx. 13 kg
2 pens: Approx. 13.5 kg
3 pens: Approx. 14 kg
4 pens: Approx. 14.5 kg</td><td>1 pen: Approx 12 kg
2 pens: Approx. 12.5 kg
3 pens: Approx. 13 kg
4 pens: Approx. 13.5 kg</td><td>1 pen: Approx. 13 kg
2 pens: Approx. 13.5 kg
3 pens: Approx, 14 kg
4 pens: Approx. 14.5 kg</td><td>1 pen: Approx. 12 kg
2 pens: Approx. 12.5 kg
3 pens: Approx. 13 kg
4 pens: Approx. 13.5 kg</td></tr>
<tr><td>Clock</td><td colspan="6">With calendar function</td></tr>
<tr><td>Position</td><td colspan="6">Veritical</td></tr>
<tr><td>Memory Backup</td><td colspan="6">Internal lithium battery for memory backup (life approx. 10 years at room temperature)</td></tr>
<tr><td>Operating Environment</td><td colspan="6">0 to 40°C, 30 to 80% R.H. (5 to 40°C, 30 to 80% R.H. if suffix code/FDD is specified)</td></tr>
<tr><td>Recommended Calibration Conditions</td><td colspan="6">For measurement ranges less than 1 mV: 6 months For measurement ranges not less than 1 mV: 12 months (environment with proper ventilation and at 23±5°C)</td></tr>
<tr><td>Withstanding Voltage</td><td colspan="6">1,500 V AC between power supply and case for 1 minute</td></tr>
<tr><td>Insulation Resistance</td><td colspan="6">100 MΩ min. at 500 V DC between power supply and case, and between input terminals and case</td></tr>
<tr><td>Power Supply</td><td colspan="6">Allowable power supply voltage: 90 to 132 V AC/180 to 250 AC 48 to 63 Hz. Rated power supply voltage: 100 to 120 V AC/200 to 240 V AC, 50/60 Hz (universal power supply for LR8100E, LR4100E, and LR4200E), (automatic power supply selection for LR12000E)</td></tr>
</table>

■ OPTIONAL SPECIFICATIONS

<table>
<tr><th>Item</th><th>Specifications</th><th>Remarks</th></tr>
<tr><td>GP-IB Interface (/GP-IB)</td><td>Conforms to IEEE St'd 488-1978
Talker functions: • Measured value input/output (ASCII and binary output; ASCII input)
• Setup information input/output (ASCII)
• Memory data output (ASCII and binary)
Listener functions: • All functions can be remotely controlled and set except the following: POWER ON/OFF, KEY LOCK ON/OFF, CHART FEED</td><td rowspan="2">Example of time required to transfer measured values from an LR8100E and store them to disk on a personal computer:
Personal computer used: 80286 CPU, 8 MHz GP-IB board N88 BASIC (86) (MS-DOS version)
Disk is hard disk

(GP-IB communications) (Readout time)
ASCII 4 CH model Approx. 80 ms
8 CH model Approx. 140 ms
12 CH model Approx. 170 ms
Binary 4 CH model Approx. 30 ms
8 CH model Approx. 50 ms
12 CH model Approx. 60 ms

(RS-232-C communications) (Readout time)
ASCII 4 CH model Approx. 110 ms
8 CH model Approx. 200 ms
12 CH model Approx. 250 ms
Binary 4 CH model Approx. 60 ms
8 CH model Approx. 100 ms
12 CH model Approx. 120 ms

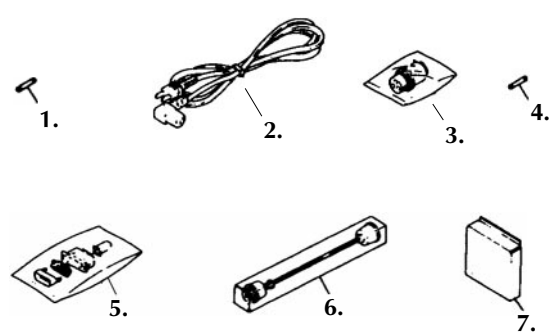
* Since data is output for 8 channels of an 8-channel model even if only 4 channels are to be measured, output rates cannot be improved.</td></tr>
<tr><td>RS-232-C interface (/RS232C)</td><td>Conforms to EIA RS-232-C
Modes: • Measured value input/output (ASCII and binary output, ASCII input)
• Setup information input/output (ASCII)
• Memory data output (ASCII and binary)
Communication rate: 75, 150, 300, 600, 1,200, 2,400, 4,800, or 9,600 bps</td></tr>
<tr><td>IC Memory Card</td><td>Functions: Storage of setup information and measured values
Data format: MS-DOS
Sampling modes and sampling rates:
• Free mode (manual start) or Trigger mode (started by trigger condition)
• Sampling rate: 135, 9, 5, 3, 1, 0.5, 0.2, 0.1, 0.05, 0.02, or 0.01 Hz
Memory capacity: 256, 512KB, 1MB
Data length: 1,000, 2,000, 4,000, 8,000, 16,000, or 32,000 samples/channel (setting shared by all channels; data is 2 bytes/sample)
Number of files: 47 files max.
Trigger conditions: Alarm detection, CHART END, or external contact input (optional)
Pre-trigger: 0 to 100% (set in 10% increments)
Memory data: Measured data, communications input data, computed data
Output: Communications output, or playback recording
Battery backup: Lithium battery</td><td></td></tr>
<tr><td>Remote Control (/REM)</td><td>Functions:
• Chart start/stop (paper feed start/stop)
• Chart speed change (toggle between speed 1 and 2)
* • Manual print (print time and measured data values)
• Chart speed control (control chart speed using external signal source)
<table><tr><th>Waveform</th><th>Sine, triangle or square wave</th><th>Pulse train</th></tr><tr><td>Level</td><td> 
4 V < V_P < 24 V</td><td> 
+4 V < V_H < +24 V
–24 V < V_L < +0.5 V
TP > 300 µS</td></tr><tr><td>Source output impedance</td><td>600Ω max.</td><td>50Ω max.</td></tr><tr><td>Chart speed</td><td colspan="2">0.15 f cm/min (f in Hz or pps)</td></tr><tr><td>Max. frequency</td><td>800 Hz</td><td>800 pps</td></tr></table>* • Message print (time, and message of up to 70 characters; 4 numbered messages available)
* • Pen lift (all pens lifted/lowered simultaneously)
• Record ON/OFF selection (ON: Measurement + recording; OFF: Measurement only)
• External trigger (start writing of data to accessory IC memory card)
• Other (fail, chart end output)
** • Reroll (reroll start/stop)</td><td>• Input signals may be TTL, open collector, or contact point.
• Alarms and variations in the remote contact input are detected at 125-ms intervals.
• Functions maked with *** not available in LR4120E or LR4220E.
• Function marked with **** available on LR4200E with /REROL only.</td></tr>
<tr><td>Alarm Output (/AK-04, /AK-08 or /AK-12)</td><td>Number of output points: 12 internal points (LR12000E), 8 internal points (LR8100E) or 4 internal points (LR4100E, LR4200E)
Contact capacity: 24 V DC/AC, 1 A
Other: Fail and chart end outputs</td><td>• AK-04 (for LR4100E, LR4200E)
• AK-08 (for LR8100E)
• AK-12 (for LR12000E)</td></tr>
<tr><td>Computing Functions (/MATH)</td><td>Functions: Arithmetic operations, SQR (square root), ABS (absolute value), LOG (logarithm), EXP (exponent)
Number of channels: Max. 8 channels (LR8100E), or max. 4 channels (LR4100E and LR4200E)
Computational expressions: Up to 18 characters
Output: Computed data can be recorded, saved to memory, or output via communications.</td><td>• Channel number to obtain computation results must always be greater than the measuring channel number. (The computation results cannot be obtained on the measuring channel.)
• The LR12000E does not include computing functions (/MATH).</td></tr>
</table>

Item	Specifications	Remarks
DC Drive (/DC)	Normal operating voltage: +10 to +32 V DC (ratings: 12 to 24 V) Power consumption: For **LR8100E**: 70 VA (when balanced), 200 VA (max.) For **LR4100E**: 50 VA (when balanced), 140 VA (max.) Accessories: Connector (1), fuse (1)	Available on **LR8100E** and **LR4100E** only.
Roll Chart Function (/ROL)	Function: Enables both Z-fold and roll chart to be used.	Available on **LR4200E** only.
Reroll Function (/REROL)	Function: Roll chart can be rewound in reverse direction using panel switch of external signal (contact closure, open collector, or TTL, when equipped with /REM option) Accessories: Reel	Available on **LR4200E** only. This function includes /ROL.
3.5-inch Floppy Disk Drive (/FDD)	Number of drives: 1* Medium: 2HD Data capacity: 1.44 MB fixed ** Models in which FDD can be installed: **LR4100E**, **LR8100E**, **LR12000E** *** Buffer memory capacity: **LR4100E**/Built-in 256 Kbyte SRAM **LR8100E**/Built-in 512 Kbyte SRAM **LR12000E**/Built-in 768 Kbyte SRAM Data backup: Approx. 1 day (at room temperature when power is off) * If a drop in the backup voltage is detected when the power is turned on, the data in the buffer memory is initialized. Types of memory: Set values (these values do not pass through the internal buffer memory), measurement values, computation values Data saving method: Buffer memory measurement values and computation values are stored, then data are copied to a floppy disk. Set values are stored directly to a floppy disk. Data saving at power failure: Data existing until the power failure occurred is saved. Sampling does not continue after the power is restored. **** Data saving format: YOKOGAWA standard binary format (However, data can be converted to ASCII when copied to floppy disk.) Data length: 1000, 2000, 4000, 8000, 16000, or 32000 data/ch (However, the total memory length must be within the memory capacity.) Data capacity: Measurement value = 2 bytes/data, Computation value = 4 bytes/data Sampling rate: Synchronized with the measurement interval of the recorder (135 Hz), or 9, 5, 3, 1, 0.5, 0.2, 0.1, 0.05, 0.02, or 0.01 Hz Time axis accuracy: Depends on time accuracy of the recorder. Memory mode (free): Sampling in the buffer memory starts when a key is pressed. Memory mode (trigger): Memory sampling starts when the trigger conditions are met. When the specified length is captured, memory operation stops. Number of settable files: Up to 47 files (If the number exceeds 47, an error is displayed.) Filename: Enter six standard-width characters. If the number of standard-width characters exceeds six, only the first six characters are displayed on the LR. Trigger conditions: Alarm detection, chart end, external contact input (option REM) Pre-trigger: 0 to 100% (in 10% increments) Playback of buffer memory data: Data stored in the buffer memory can be played back, recorded, and output to a communication circuit. Playback of data from an FD: Data can be recorded and output, or output to a communication circuit, after reading it into the internal buffer memory by a loading process. (Only possible for data saved to FD in binary format.) ASCII conversion: Data stored in the buffer memory in the YOKOGAWA standard binary format (measurement values, computation values) can be converted to ASCII format, then copied to a floppy disk. Auto-save: Measurement data is first recorded in the internal buffer memory, then automatically copied to an FD. Auto-load: Measurement data stored in an FD is first copied into the internal buffer memory, then automatically printed out on the recording paper.	* When the recorder comes with the 3.5-inch FDD, an IC memory card slot is not provided, no IC memory card (8 KB) is installed, ** The medium is fixed at 1.44 MB. However, floppy disks formatted on a personal computer (1.44 MB, 1.2 MB, 720 KB) can be used. *** The 3.5-inch option (/FDD) cannot be specified for the **LR4200E**. **** If a power failure occurs while data is being recorded to the buffer memory, the data that has been stored in the buffer memory up until the power failure occurred will remain in the memory. However, data recording will not resume after the power is restored; if a power failure occurs during an auto-save operation, the data must be separately copied to an FD.

■ STANDARD ACCESSORIES

No.	Name	Part No.	Q'ty	Remarks
1.	Fuse	**A1111EF**	1	2 A time-lag (in fuse holder) (for **LR8100E**, **LR4100E** and **LR4200E**)
	Fuse	**A1113EF**	1	3.15 A time-lag (in fuse holder) (for **LR12000E**)
2.	Power cord	**A1007WD**	1	Rated voltage, 125 V
3.	DC power supply connector	**A1053JC**	1	For **LR8100E** or **LR4100E** with /DC option
4.	Fuse (/DC)	**B9586UV**	1	For **LR8100E** or **LR4100E.** 20 A time-lag for DC option
5.	Connector	**A1005JD**	1	For **LR8100E** with /AK-08 or **LR4100E** or **LR4200E** with /AK-04 or REM; AMPHENOL 57-30360
	Connector	**A1006JD**	2	For **LR12000E** with /AK-12
	Connector	**A1006JD**	1	For **LR8100E** with /AK-08 or **LR12000E** or **LR8100E** with /REM; AMPHENOL 57-30500
6.	Chart stock roller	**B9623AA**	1	For **LR4200E** with /ROL; For use with roll chart
7.	Terminal cover	**B9937GK**	1	For **LR12000E**
		B9585BH	1	For **LR8100E** *
		B9619BC	1	For **LR4100E** *
		B9622DK	1	For **LR4200E**

Note : Not with **LR4120E** and **LR4220E.**
*__LR8100E__ and __LR4100E__ terminal covers come with two mounting screws.



■ SPECIFICATIONS OF SOFTWARE PACKAGES

Windows 95 software package

Operating conditions
■ Connection
Product name: LR PC software
1 to 12-pen model (**370013**)
Connectable recorders: **LR4100**, **LR4200**, **LR8100**, **LR12000**, **LR4100E**, **LR4200E**, **LR8100E**, **LR12000E**
Connectable number of recorders: 1
Maximum number of connectable channels: 1 to 12 ch
Communication interface: GP-IB or RS-232-C
■ Disks
Floppy disk: 3.5-inch FD (1.44 MB format)
Hard disk: Free space of at least 100 MB
■ Communication interface
GP-IB board: Made by National Instruments (Can be used with Windows 95.)
AT-GPIB/TNT is used with IBM PC-AT and compatible machines.
RS-232-C: Can be used with Windows 95.
■ Environment
PC: Personal computer that supports Windows 95.
The PC must have a CPU of at least Pentium 90MHz and at least 16 MB of RAM.
OS: Windows 95
CRT: Display that is compatible with Windows 95
Video: 640 × 480 minimum,at least 256 colors
(at least 1024 × 768 is recommended)
Mouse: Compatible with Windows 95
Printer: Compatible with Windows 95 (driver is necessary)
FDD: 2HD/1.44 MB

Setting package

■ Outline
This package sets, controls, and changes the LR recorder measurement conditions, and also sets the operating environment online via a general communication interface (GP-IB or RS-232-C).
■ Setting
Setting of the measurement range (each channel), recording conditions, recording paper speed, measurement interval, alarm, memory, etc.
■ Control
Control of display switching, recording paper start/stop, pen lift, printing functions, etc.

Data logging package

■ Outline
The data measured by the LR recorder are stored in the specified hard disk of the personal computer while being displayed in real-time.
■ Measurement interval
Sampling rate: 1, 2, 3, ..., 60 seconds
Display update rate: Same as the sampling rate
Data storage interval: An integral multiple between 1 and 128 of the sampling rate
* The measurement interval depends on the PC used and the operating system.
■ Display function
Display function: Analog range display, digital value display, level meter display, alarms
Number of display channels: 12 ch
Screen display: Size can be changed.

Viewer package

■ Outline
This package redisplays data stored in the hard disk of the personal computer using the data logging package. The redisplayed data can then be analyzed, computed or converted. The data stored in the FD using the LR can also be displayed.
■ Redisplay
Number of displayed channels: 1 to 12ch
Redisplay: The specified files are displayed as an analog trend.
Redisplay format: User specification, Full range, Slide, Multi-axis
Time-axis span display: Zoom-in/-out of time axis, high-speed scroll
Display file: Multiple files can be displayed simultaneously.
Comment: Marks can be made and comments entered within the analog trend on the time axis.
Unit: Up to 6 standard-width characters. Displayed near the channel(s).
Grid: The span grid corresponding to each analog trend is displayed as numerical values and lines.
Magnification change: Selectable between 1/1000 and 20.
Data sheet: The analog trend screen switches to the numerical data sheet screen.
Date/time/number of data and MIN/MAX data for each channel can be displayed.
■ File conversion
File conversion: Conversion to Lotus 1-2-3, ASCII, or Excel format
Conversion range: The number of data points or cursors can be specified on the redisplay screen.
Conversion channel: Display screen group unit
■ Print
Print output: Each file can be output in analog trend format or data sheet format.

Environment setting package

■ Environment setting
Communication: Sets the type of LR communication (GP-IB/RS-232-C).
Data directory: Sets the directory in which measurement data is to be stored on the hard disk in the PC.

Windows 3.1 data conversion package

■ Outline
When a data file is selected, the start and end times of measurement of the selected data file, number of channels, sampling rate, and other parameters are displayed. Next, select the conversion format on the file conversion screen, then set the data number for the start and end points of the conversion, thinning-out and channel range, then start the conversion itself. Finally, enter a new filename after the conversion process ends.
■ Operating conditions
Floppy disk: 3.5-inch FD (1.44 MB format)
Hard disk: Free space of at least 10 MB
Operating environment
■ PC: Personal computer that supports Windows 3.1.
The PC must have a CPU of at least 80486DX2 (50 MHz), and at least 8 MB of RAM.
A Pentium CPU and at least 16 MB of RAM is recommended.
■ OS: Windows 3.1 and a version of MS-DOS /Windows 95 (16-bit) that supports Windows 3.1
■ CRT: A display compatible with Windows 3.1
■ Mouse: Compatible with Windows 3.1

AVAILABLE MODELS

■ LR12000E

Model		Suffix Cpde	Description
3702 (with printer & electrical pen lift)	**14**	.....	10-pen low sensitiviity (DCV, TC, RTD)
	15	.....	10-pen medium sensitivity (DCV, TC, RTD)
	16	.....	10-pen high sensitivity (DCV, TC, RTD)
	24	.....	12-pen low sensitivity (DCV, TC, RTD)
	25	.....	12-pen medium sensitivity (DCV, TC, RTD)
	26	.....	12-pen high sensitivity (DCV, TC, RTD)
Power cord		**-B**	

■ LR8100E

Model		Suffix Cpde	Description	
3701 Number of channels	**4**	.....	4-pen model	**LR8100E** Recorder (with printer & electrical pen lift)
	6	.....	6-pen model	
	8	.....	8-pen model	
Input types & max. sensitivity		**1**	10 mV F.S. (DC V, TC)	
		2	1 mV F.S. (DC V, TC)	
		3	0.1 mV F.S. (DC V, TC)	
		4	10 mV F.S. (DC V, TC, RTD)	
		5	1 mV F.S. (DC V, TC, RTD)	
		6	0.1 mV F.S. (DC V, TC, RTD)	
Version		**-B**		
Power supply		**-0**	90 to 250 V AC	

■ LR4100E

Model		Suffix Cpde	Description	
3711 Number of channels	**1**	.....	1-pen model	**LR4110E** Recorder (with printer & electrical pen lift)
	2	.....	2-pen model	
	3	.....	3-pen model	
	4	.....	4-pen model	
3712 Number of channels	**1**	.....	1-pen model	**LR4120E** Recorder (without printer, with manual pen lift)
	2	.....	2-pen model	
	3	.....	3-pen model	
	4	.....	4-pen model	
Input types & max. sensitivity		**1**	10 mV F.S. (DC V, TC)	
		2	1 mV F.S. (DC V, TC)	
		3	0.1 mV F.S. (DC V, TC)	
		4	10 mV F.S. (DCV, TC, RTD)	
		5	1 mV F.S. (DC V, TC, RTD)	
		6	0.1 mV F.S. (DC V, TC, RTD)	
Version		**-B**		
Power supply		**-0**	90 to 250 V AC	

■ LR4200E

Model		Suffix Cpde	Description	
3721 Number of channels	**1**	·····	1-pen model	**LR4210E** Recorder (with printer & electrical pen lift)
	2	·····	2-pen model	
	3	·····	3-pen model	
	4	·····	4-pen model	
3722 Number of channels	**1**	·····	1-pen model	**LR4220E** Recorder (without printer, with manual pen lift)
	2	·····	2-pen model	
	3	·····	3-pen model	
	4	·····	4-pen model	
Input types & max. sensitivity	**1**	·····	10 mV F.S. (DC V, TC)	
	2	·····	1 mV F.S. (DC V, TC)	
	3	·····	0.1 mV F.S. (DC V, TC)	
	4	·····	10 mV F.S. (DCV, TC, RTD)	
	5	·····	1 mV F.S. (DC V, TC, RTD)	
	6	·····	0.1 mV F.S. (DC V, TC, RTD)	
Version		**-B** ·····		
Power supply		**-0** ·····	90 to 250 V AC	

■ OPTIONS

Suffix Code	Description
*/GP-IB	GP-IB interface
*/RS232C	RS-232-C interface
**/FDD	3.5-inch floppy disk drive
/MATH	Math functions (Cannot be specified for **LR12000E**)
/AK-12	Internal alarms (for **LR12000E**)
/AK-08	Internal alarms (for **LR8100E**)
/AK-04	Internal alarms (for **LR4100E/LR4200E**)
/REM	Remote function (for **LR12000E**)
/REM	Remote function (for **LR8100E**)
/REM	Remote function (for **LR4100E/4200E**)
/DC	DC power (for **LR8100E/4100E**)
/ROL	Roll chart drive (for **LR4200E**)
/REROL	Reroll function (for **LR4200E**), including /ROL

* Specify one code (/GP-IB or /RS232C).
** The IC memory card cannot be used if /FDD is specified as optional specifications. This suffix code cannot be specified for the **LR4200E** recorder.

■ SPARES

Name	Part No.	Description	Order Q'ty
Ribbon Cassette	**B9585SH**	1 chart/unit	1 unit
Z-fold chart	**B9585AH**	30 m (1 box/unit) (for **LR12000E**)	10 units
Z-fold chart	**B9619AH**	20 m (1 box/unit) (for **LR4100E** and **LR4200E**)	10 units
Roll chart	**B9622AH**	20 m (1 box/unit) (for **LR4200E**)	10 units
IC memory card	**378901**	For setup info. memory, 8 KB	1 unit
Soft cover	**B9585AY**	1 pc/unit (for **LR8100E**)	1 unit
Soft cover	**B9619AV**	1 pc/unit (for **LR4100E**)	1 unit
Soft cover	**B9622AV**	1 pc/unit (for **LR4200E**)	1 unit
Lithium battery	**B9588ZB**	For main unit (1 pc/unit)	1 unit
Lithium battery	**B9586JU**	For **378901** (1 pc/unit)	2 units
Lithium bttery	**B9586JV**	For **378904**, **05**, **06** (1 pc/unit)	2 units

■ ORDER IF NECESSARY

Name	Code No.	Number of Copies
Test certificate	**398400**	For **LR12000E**
		For **LR4100E/4200E/8100E**
Instruction manual	**398402**	If another copy is requested

■ APPLICATION SOFTWARE

Name	Part No.	Description
LR PC Scoftware	**370013**	Model equipped with 12 pens: Windows 95 (32-bit OS)
Data conversion software	**370092**	For Windows 3.1, converted to ASCII/Excel/Loutus

■ PEN CARTRIDGE

● LR12000E

Name	Color	Part No.	Pen speed	Description
Standard pen cartridge for pen 1	Red	**B9937NA**	Standard	(3 pens/unit)
Standard pen cartridge for pen 2	Green	**B9937NB**	Standard	(3 pens/unit)
Standard pen cartridge for pen 3	Blue	**B9937NC**	Standard	(3 pens/unit)
Standard pen cartridge for pen 4	Brown	**B9937ND**	Standard	(3 pens/unit)
Standard pen cartridge for pen 5	Black	**B9937NE**	Standard	(3 pens/unit)
Standard pen cartridge for pen 6	Purple	**B9937NF**	Standard	(3 pens/unit)
Standard pen cartridge for pen 7	Orange	**B9937NG**	Standard	(3 pens/unit)
Standard pen cartridge for pen 8	Violet	**B9937NH**	Standard	(3 pens/unit)
Standard pen cartridge for pen 9	Light blue	**B9937NJ**	Standard	(3 pens/unit)
Standard pen cartridge for pen 10	Yellow green	**B9937NK**	Standard	(3 pens/unit)
Standard pen cartridge for pen 11	Pink	**B9937NL**	Standard	(3 pens/unit)
Standard pen cartridge for pen 12	Yellow	**B9937NM**	Standard	(3 pens/unit)
Low speed pen cartridge for pen 1	Red	**B9937NN**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 2	Green	**B9937NP**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 3	Blue	**B9937NQ**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 4	Brown	**B9937NR**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 5	Black	**B9937NS**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 6	Purple	**B9937NT**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 7	Orange	**B9937NU**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 8	Violet	**B9937NV**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 9	Light blue	**B9937NW**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 10	Yellow green	**B9937NX**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 11	Pink	**B9937NY**	Low speed	(3 pens/unit)
Low speed pen cartridge for pen 12	Yellow	**B9937NZ**	Low speed	(3 pens/unit)
High speed pen cartridge for pen 1	Red	**B9937PN**	High speed	(3 pens/unit)
High speed pen cartridge for pen 2	Green	**B9937PP**	High speed	(3 pens/unit)
High speed pen cartridge for pen 3	Blue	**B9937PQ**	High speed	(3 pens/unit)
High speed pen cartridge for pen 4	Brown	**B9937PR**	High speed	(3 pens/unit)
High speed pen cartridge for pen 5	Black	**B9937PS**	High speed	(3 pens/unit)
High speed pen cartridge for pen 6	Purple	**B9937PT**	High speed	(3 pens/unit)
High speed pen cartridge for pen 7	Orange	**B9937PU**	High speed	(3 pens/unit)
High speed pen cartridge for pen 8	Violet	**B9937PV**	High speed	(3 pens/unit)
High speed pen cartridge for pen 9	Light blue	**B9937PW**	High speed	(3 pens/unit)
High speed pen cartridge for pen 10	Yellow green	**B9937PX**	High speed	(3 pens/unit)
High speed pen cartridge for pen 11	Pink	**B9937PY**	High speed	(3 pens/unit)
High speed pen cartridge for pen 12	Yellow	**B9937PZ**	High speed	(3 pens/unit)
Pen cartridge set for pens 1 to 10	10 colors	**B9937PA**	Standard	(10 pens/unit)
Pen cartridge set for pens 1 to 10	10 colors	**B9937PC**	Low speed	(10 pens/unit)
Pen cartridge set for pens 1 to 10	10 colors	**B9937PE**	High speed	(10 pens/unit)
Pen cartridge set for pens 1 to 12	12 colors	**B9937PB**	Standard	(12 pens/unit)
Pen cartridge set for pens 1 to 12	12 colors	**B9937PD**	Low speed	(12 pens/unit)
Pen cartridge set for pens 1 to 12	12 colors	**B9937PF**	High speed	(12 pens/unit)

The models and selection criteria for pen cartridges are as follows:
Standard: General-purpose recording at pen speeds up to approx. 800 mm/s
High-speed: High-speed recording at pen speeds above approx. 800 mm/s
Low-speed: Low-speed recording at chart speeds below approx. 100 mm/h

■ LR8100E/LR4100E/LR4200E

Name	Part No.	Description	Order Q'ty
Pen cartridge for pen 1	**B9586☐A**	Red (3 pens/unit), standard	1 unit
Pen cartridge for pen 2	**B9586☐B**	Green (3 pens/unit), standard	1 unit
Pen cartridge for pen 3	**B9586☐C**	Blue (3 pens/unit), standard	1 unit
Pen cartridge for pen 4	**B9586☐D**	Brown (3 pens/unit), standard	1 unit
Pen cartridge for pen 5	**B9586☐E**	Black (3 pens/unit), standard	1 unit
Pen cartridge for pen 6	**B9586☐F**	Purple (3 pens/unit), standard	1 unit
Pen cartridge for pen 7	**B9586☐G**	Orange (3 pens/unit), standard	1 unit
Pen cartridge for pen 8	**B9586☐H**	Violet (3 pens/unit), standard	1 unit
Pen cartridge set, pens 1-4	**B9586☐R**	4 pens (1 pen color)/unit	1 unit
Pen cartridge set, pens 1-6	**B9586☐S**	6 pens (1 pen color)/unit	1 unit
Pen cartridge set, pens 1-8	**B9586☐T**	8 pens (1 pen color)/unit	1 unit

The models and selection criteria for pen cartridges are as follows:
Standard: **B9586 Y☐**, general-purpose recording at pen speeds up to approx. 800 mm/s
High-speed: **B9586 Z☐**, high-speed recording at pen speeds above approx. 800 mm/s
Low-speed: **B9586 X☐**, low-speed recording at chart speeds below approx. 100 mm/h

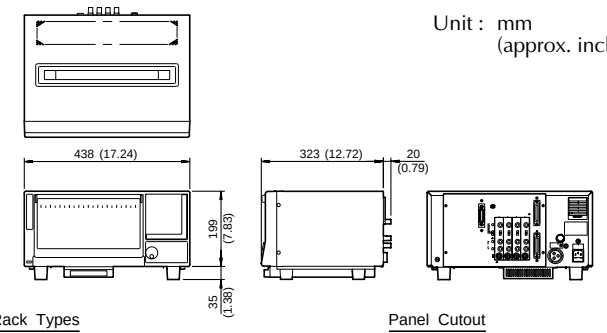
■ OPTIONAL ACCESSORIES

Name	Part No.	Description
Rack mount kit	**378981**	for **LR12000E/8100E** (w/o FDD)
Rack mount kit	**378982**	for **LR4100E** (w/o FDD)
Rack mounting kit	**378984**	for **LR12000E/8100E** w/FDD
Rack mounting kit	**378985**	for **LR4100E** w/FDD
IC memory card	**378904**	256 KB, for setup information and measured value storage
IC Memory card	**378905**	512 KB, for setup information and measured value storage
IC memory card	**378906**	1 MB, for setup information and measured value storage

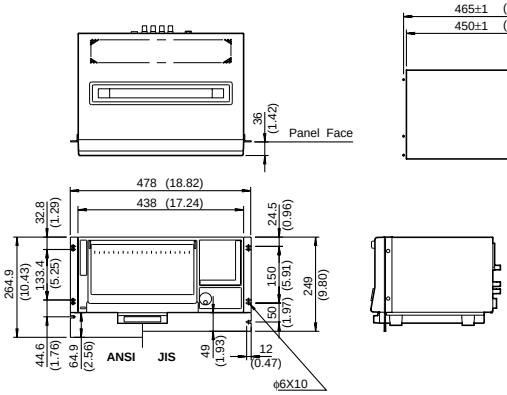
DIMENSIONS

● LR12000E

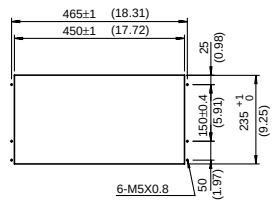
Unit : mm
(approx. inch)



Rack Types

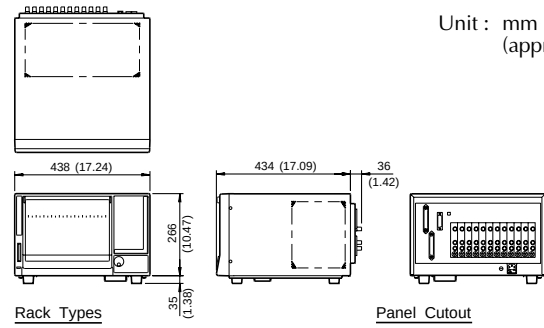


Panel Cutout



● LR4100E

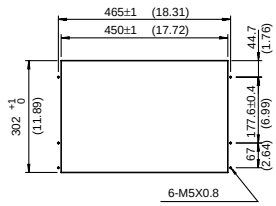
Unit : mm
(approx. inch)

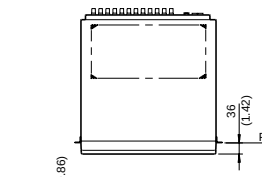


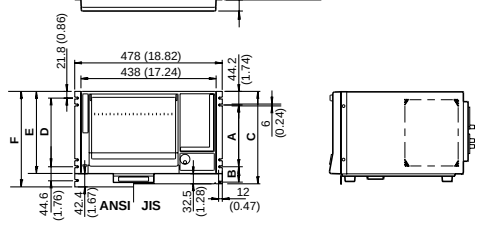
Rack Types

Rack Types	A	B	C	D	E	F
JIS	200 (7.87)	50 (1.97)	299.5 (11.79)			
ANSI				222.4 (8.76)	266 (10.47)	309.4 (12.18)

Panel Cutout

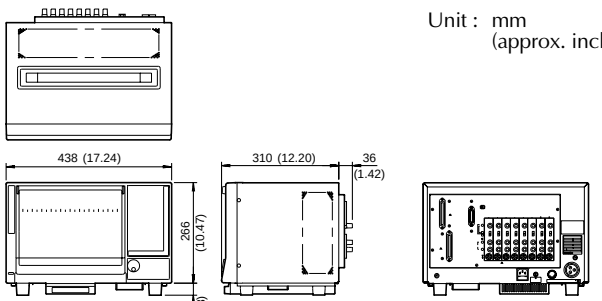






● LR8100E

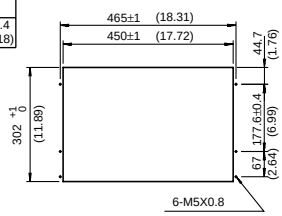
Unit : mm
(approx. inch)

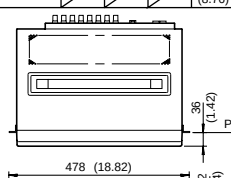


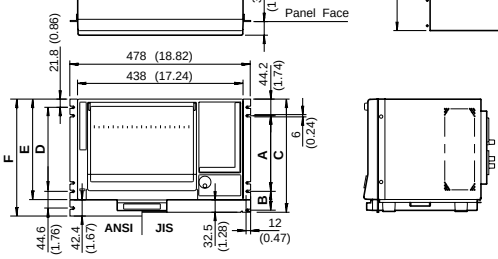
Rack Types

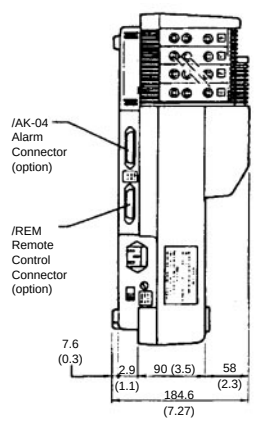
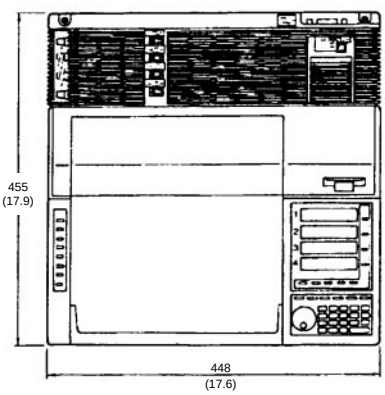
Rack Types	A	B	C	D	E	F
JIS	200 (7.87)	50 (1.97)	299.5 (11.79)			
ANSI				222.4 (8.76)	266 (10.47)	309.4 (12.18)

Panel Cutout







● LR4200E

Unit : mm
(approx. inch)