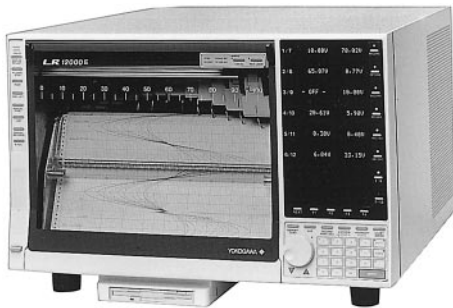
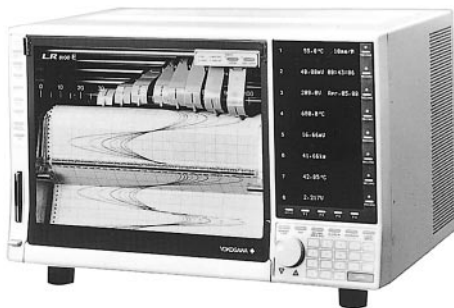


## 3702/3701/3711 & 3712/3721 & 3722 Recorders LR12000E/LR8100E/LR4100E/LR4200E



**LR12000E**  
438 × 301 × 470 mm 20.5 kg  
(17.24 × 11.85 × 18.51" 45.2 lbs)

★ Safety Standards; EN61010-1  
EMI Standard; EN55011 Group 1 Class A  
Immunity Standard; EN50082-2 : 1995



**LR8100E**  
438 × 301 × 346 mm 18.5 kg  
(17.24 × 11.85 × 13.62" 40.8 lbs)

★ Safety Standards; EN61010-1  
EMI Standard; EN55011 Group 1 Class A  
Immunity Standard; EN50082-2 : 1995



**LR4110E**  
438 × 234 × 343 mm 14.5 kg (4-pen)  
(17.24 × 9.21 × 13.51" 32.0 lbs)

★ Safety Standards; EN61010-1  
EMI Standard; EN55011 Group 1 Class A  
Immunity Standard; EN50082-2 : 1995



**LR4210E**  
448 × 185 × 445 mm 14.5 kg (4-pen)  
(17.6 × 7.27 × 17.9" 32.0 lbs)

★ Safety Standards; EN61010-1  
EMI Standard; EN55011 Group 1 Class A  
Immunity Standard; EN50082-2 : 1995

The best-selling LR Recorder Series has revolutionized the pen recorder world with its outstanding reliability and performance. How was it done? Electrical contacts and gears were eliminated in the recording mechanism. Data processing was digitized. A full range of models of up to 12 pens was developed. A memory function to facilitate PC-based data recording and analysis was created. A variety of application software is available. In today's PC-driven world, only the LR recorder truly delivers the required functionality.

### FEATURES

- **Crisp Color Analog Recording in up to 12 Colors**
- **As Simple to Use as an Analog Pen Recorder**  
The LR series offers easy dialog-based operation on a large vacuum-tube fluorescent display and multiple display functions.
- **Wealth of Digital Printing and Analog Recording Functions**  
Packed with a wealth of digital printing functions, including zone recording, partial compression and enlargement recording, a rapid pen response of 1600 mm/s and a phase synchronization function, the LR series captures the target event faithfully, records it, and makes playback a cinch.
- **Multiple Measurement Type**  
The LR series offers DC voltage, thermocouple, and RTD universal inputs, computation functions, IC memory card, a 3.5-inch FDD, and application software to cover every type of measurement.
- **3.5-Inch Floppy Disk Drive (Option)**
- **Windows 95 (32-bit) Application Software**  
YOKOGAWA's genuine software lets you set the measurement range and recording conditions, control the motion of the pen such as pen up/down, and even record and analyze the data on a PC.

\* The specifications for LR series recorders changes according to the type of power cord. Only the recorders having specification codes for power cords -D, -F, -G, or -J, which relate to the power cord attached, conform to EMC and safety standards; recorders with a -B specification code (with a JIS power cord attached) do not.

# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

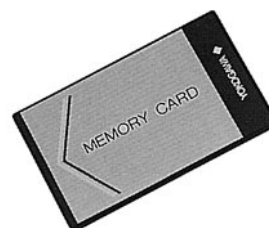
### SELECTION GUIDE

Features	Models		LR4100E		LR4200E	
	LR12000E	LR8100E	LR4110E	LR4120E	LR4210E	LR4220E
Form	Vertical				Flatbed	
Recording width	250 mm					
No. of pens	10, 12	4, 6, 8	1, 2, 3, 4			
Input ranges	Voltage (20 ranges): 0.1 mV to 200 V Thermocouple (12 types) R, S, B, K, E, J, N, T, W, L [DIN], U [DIN], KPsAu7Fe RTD (5 types): Pt100, JPt100, Pt50, Ni100, J263*B					
Printing functions	Periodic print, manual print, change of range print, message print, change of chart speed print, pen offset compensation ON/OFF print, alarm print, scale marking print, and program list print. *Printing functions not provided in LR4120E and LR4220E.					
Display	Digital values, Bar graph (2.5% resolution), Range					
	Switches between display of the first-half 6 pens and the second-half 6 pens.*1	All channels, simultaneous easy-to-read fluorescent screen				
Math	Standard: Scaling function, difference computation					
	Optional *2: Arithmetic operations, exponentials, logarithms, absolute value, square root					
IC memory card*3	8, 256, 512 KB, or 1 MB (8 KB card provided as standard)					
FDD *3 (option)	Built-in FDD with 768 KB RAM	Built-in FDD with 512 KB RAM	Built-in FDD with 256 KB RAM	—		
PC software	Can be used with all models for 4, 8, 12-pen applications					
Chart speed	10 to 600 mm/min 10 to 600 mm/hour	10 mm/hour to 1,200 mm/min				
Chart length	Z-fold: 30 m		Z-fold: 20 m	Z-fold: 20 m; Roll: 20 m		
Power	Allowable voltage: 90 to 132 VAC / 180 to 250 VAC (automatic switching) 48 to 63 Hz					
	Rated voltage: 100 to 120 VAC / 200 to 240 VAC 50/60 Hz					
	—	+10 to +32 V DC (optional)		—		

\*1 Digital measurement data can be displayed for all channels simultaneously.

\*2 These optional functions cannot be specified for the LR12000E.

\*3 IC memory card function is not available for suffix code /FDD.

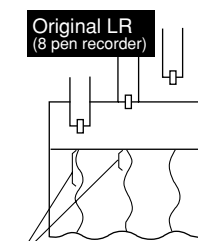


#### ● Capture Detailed Measurement Data (Optional Function)

The optional IC memory cards with 256 KB or more (sold separately) let you capture and store up to 32000 samples/channel. The data can be retrieved later in a variety of ways, and up to 47 files of settings can be stored.

#### ● Auto Sweepout of Pen Offset Data

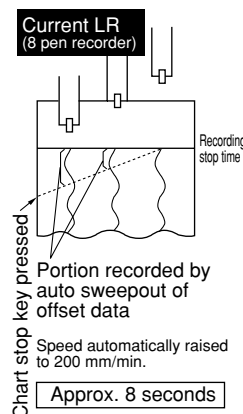
When you use pen offset compensation, the recorder stores data to compensate for the pen offsets in order to record all traces in real-time. Thus when recording stops, the pens must continue recording until all the data is plotted. Auto sweepout saves you time by automatically increasing the chart speed during this interval - a real advantage at slow chart speeds. For example, at 10 mm/h chart speed on an 8-pen LR, it would take nearly three hours after measurement to record all the stored offset data. In the current LR Series recorders, however, touching the chart stop key automatically increases the chart speed to 200 mm/min and stops it after all pen offset data have been swept out. This takes just eight seconds. This new function, not available on previous LR recorders, has been added at the request of many users.



Offset data is buffered in memory for each pen.

Example: 8 pens, 10 mm/h

Approx. 3 hours



Portion recorded by auto sweepout of offset data

Speed automatically raised to 200 mm/min.

Approx. 8 seconds

## FUNCTIONS

### FLOPPY DISK DRIVE

Install the floppy disk drive option (FDD) and you can save the LR recorder settings to several files on a floppy disk (FD).

The measurement data can also be saved to FD via the internal buffer memory provided by the FDD option.



### IC MEMORY CARDS

#### ● Save Settings for Permanent Storage (Standard Function)

By saving recorder settings such as range to an IC memory card, you can retrieve them later and start recording immediately—quicker than re-setting the parameters one by one.

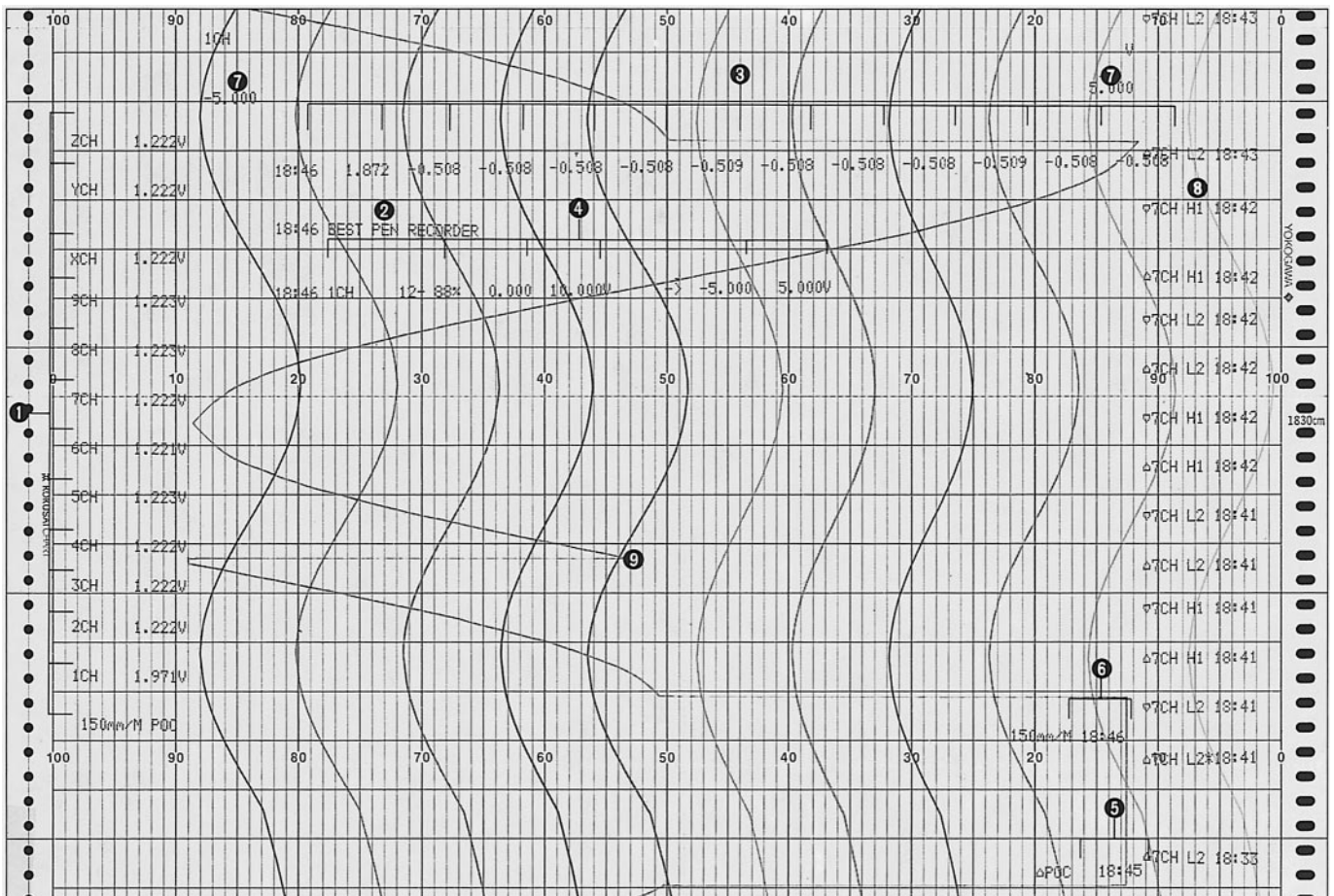
# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

### RECORDING EXAMPLE

LR12000E, 12 analog channels + digital printing



#### 1 Periodic Print

Prints digital data at a fixed time interval (min. 1 minute).

#### 2 Message Print

Prints user-defined messages up to 70 characters long (with time of day)  
MESSAGE (0): Printed when MESSAGE key is pressed  
MESSAGE (1 to 4): Available with REMOTE, GP-IB, or RS-232-C options

#### 3 Manual Print

Prints the time and measured values for all channels when the MANUAL PRINT key is pressed.

#### 4 Change-of-Range Print

When in auto span shift mode, prints the time and nature of change whenever the range changes.

#### 5 Pen Offset Compensation ON/OFF Print

Prints an ON/OFF mark and the time whenever you turn pen offset compensation ON or OFF.

#### 6 Change-of-Chart-Speed Print

When the chart speed changes, prints out the post-change chart speed and the time of the change.

#### 7 Scale Marking Print

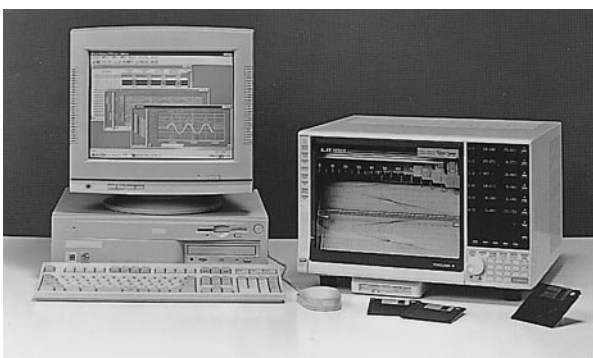
Prints out the 0 and 100% scale values with the same timing as the periodic print.

#### 8 Alarm Print

Prints out the channel number, alarm type and ON or OFF time.

#### 9 Auto Span Shift

This function automatically shifts an input's span  $\pm 50\%$  when its signal reaches its span limits, so that recording continues without data loss.



### LR PC SOFTWARE

LR PC software, a package software for PCs created exclusively for the LR series, runs under Windows 95 (32-bit), letting you set the LR recorder, control operations, perform real-time data logging and trend monitoring online (GP-IB or RS-232-C), and even redraw data that has been saved to an FD, or convert between Excel, Lotus 1-2-3 and ASCII formats offline.

The redraw function comes with both cursor and high-speed scroll functions to take advantage of the ease of use and performance of Windows 95. The software comes in three types, for up to 12, 8, or 4 pens (maximum number of pens) to suit your LR recorder model.

# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

### SPECIFICATIONS

Item	Model	LR12000E	LR8100E	LR4100E		LR4200E																																																											
				LR4110E	LR4120E	LR4210E	LR4220E																																																										
Measurement	Drive System	Automatic null-balancing digital servo																																																															
	Input Circuitry	Floating, 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% RH)	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) W ±(0.05% of rdg +1°C) RTD: KPvsAu7Fe ±(0.05% of rdg +0.5°C) (not guaranteed below 4 K or above 280 K) 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/s <sup>2</sup>																																																															
Number of Recording Pens		10 or 12		4, 6, or 8		1, 2, 3 or 4																																																											
Pen Colors		<table border="1"> <tr><td>Pen</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>Color</td><td>Red</td><td>Green</td><td>Blue</td><td>Brown</td><td>Black</td><td>Purple</td></tr> <tr><td></td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr> <tr><td></td><td>Orange</td><td>Violet</td><td>Light blue</td><td>Light green</td><td>Pink</td><td>Yellow</td></tr> </table>		Pen	1	2	3	4	5	6	Color	Red	Green	Blue	Brown	Black	Purple		7	8	9	10	11	12		Orange	Violet	Light blue	Light green	Pink	Yellow	<table border="1"> <tr><td>Pen</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>Color</td><td>Red</td><td>Green</td><td>Blue</td><td>Brown</td></tr> <tr><td></td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td></td><td>Black</td><td>Purple</td><td>Orange</td><td>Violet</td></tr> </table>		Pen	1	2	3	4	Color	Red	Green	Blue	Brown		5	6	7	8		Black	Purple	Orange	Violet	<table border="1"> <tr><td>Pen</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>Color</td><td>Red</td><td>Green</td><td>Blue</td><td>Brown</td></tr> </table>		Pen	1	2	3	4	Color	Red	Green	Blue	Brown
Pen		1	2	3	4	5	6																																																										
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	Black	Purple	Orange	Violet																																																													
Pen	1	2	3	4																																																													
Color	Red	Green	Blue	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.																																																																
Printing	Printing System	Wire dot, ink ribbon (one color)																																																															
	Printing Speed	Approx. 1.5 s/line																																																															
	Printing Character Set	Alphanumeric characters (upper-case)																																																															

# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

Item	Model	LR12000E		LR8100E		LR4100E		LR4200E		
		LR12000E		LR8100E		LR4110E	LR4120E	LR4210E	LR4220E	
Printing	Printout Types	TAG No. print: Alarm print: Scale print: Change of chart speed print: List print: Manual print: Message print: MESSAGE (0): MESSAGE (1 to 4): Change of range print: Pen offset compensation ON/OFF print: Periodic print:		User-set tag can be printed in place of channel number (7 characters max.) Channel number, alarm type, ON/OFF time Prints 0% and 100% scale values at same interval as for periodic print. Prints time and post-change chart speed when chart speed changes. Prints all setup information (ranges, alarms, etc.) on chart. Prints time and measured values of all channels on one line when MANUAL PRINT key is pressed. Prints user-defined messages up to 70 characters long, with time. Printed when MANUAL MESSAGE key is pressed. Provided with REMOTE option; printed on reception of external contact input (4 points max.) Prints time and change when range changes in auto span shift mode. Prints time and pen offset compensation ON/OFF mark when pen offset compensation is turned ON or OFF. Prints time, chart speed, channel No. (TAG), measured data, and units at fixed intervals.		Chart speed and printing interval for <b>LR8100E/4100E/4200E</b>		Chart speed and printing interval for <b>LR12000E</b>		
		mm/min	mm/h	Printing interval		mm/min	mm/h	Printing interval		
		1200 to 300	—	1 minute		600 to 300	—	1 minute		
	299 to 30	—	10 minutes		299 to 30	—	10 minutes			
	29 to 10	1200 to 120	1 hour		29 to 10	600 to 120	1 hour			
	—	119 to 60	2 hours		—	119 to 60	2 hours			
	—	59 to 40	3 hours		—	59 to 40	3 hours			
	—	39 to 20	6 hours		—	39 to 20	6 hours			
	—	19 to 10	12 hours		—	19 to 10	12 hours			
Display	Display	Fluorescent display (5 × 7 dot, matrix). 20 characters per channel								
	Display Modes	(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 ( <b>LR12000E</b> only): 7-digits measured, unit, alarm status Any of (1), (2), or (3) can be selected with the DISPLAY SELECT key.*: The <b>LR12000E</b> displays these items for the first six channels and the second six channels as selected.								
Other Functions	Alarm	Number of levels: 2 levels/channel: Types: High, low, delta high, delta low. Outputs (optional): 12 internal points ( <b>LR12000E</b> ), 8 internal points ( <b>LR8100E</b> ) or 4 internal points ( <b>LR4100E/LR4200E</b> ), all with 24 V AC, 1 A contact rating								
	Computation	(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								
General Specifications	IC Memory Card	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 <b>LR12000E</b> : Approx. 2 files; <b>LR8100E</b> : Approx. 3 files; <b>LR4100E/LR4200E</b> : Approx. 5 files								
	System Error Alarm (FAIL)	If CPU fails, "FAIL" LED (red) lights and FAIL contact signal (optional) is output.								
	Chart End Output	When chart end is reached, "CHART" LED (red) lights, pens lift, and recorder is placed in monitor status (relay output is optional).				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 <b>LR4120E</b> and <b>LR4220E</b> ).				
	Power Consumption	Max: 10 pens: 380 VA 12 pens: 450 VA	Max: 4 pens: 240 VA 6 pens: 290 VA 8 pens: 340 VA	Max: 1 pen: 155 VA 2 pens: 180 VA 3 pens: 205 VA 4 pens: 230 VA	Max: 1 pen: 155 VA 2 pens: 180 VA 3 pens: 205 VA 4 pens: 230 VA	Max: 1 pen: 155 VA 2 pens: 180 VA 3 pens: 205 VA 4 pens: 230 VA	Max: 1 pen: 155 VA 2 pens: 180 VA 3 pens: 205 VA 4 pens: 230 VA	Max: 1 pen: 155 VA 2 pens: 180 VA 3 pens: 205 VA 4 pens: 230 VA	Max: 1 pen: 155 VA 2 pens: 180 VA 3 pens: 205 VA 4 pens: 230 VA	Max: 1 pen: 155 VA 2 pens: 180 VA 3 pens: 205 VA 4 pens: 230 VA
		Balanced: 10 pens: 170 VA 12 pens: 190 VA	Balanced: 4 pens: 120 VA 6 pens: 135 VA 8 pens: 150 VA	Balanced: 1 pen: 90 VA 2 pens: 100 VA 3 pens: 105 VA 4 pens: 110 VA	Balanced: 1 pen: 90 VA 2 pens: 100 VA 3 pens: 105 VA 4 pens: 110 VA	Balanced: 1 pen: 90 VA 2 pens: 100 VA 3 pens: 105 VA 4 pens: 110 VA	Balanced: 1 pen: 90 VA 2 pens: 100 VA 3 pens: 105 VA 4 pens: 110 VA	Balanced: 1 pen: 90 VA 2 pens: 100 VA 3 pens: 105 VA 4 pens: 110 VA	Balanced: 1 pen: 90 VA 2 pens: 100 VA 3 pens: 105 VA 4 pens: 110 VA	Balanced: 1 pen: 90 VA 2 pens: 100 VA 3 pens: 105 VA 4 pens: 110 VA
	Dimensions (W) × (H) × (D)	Approx. 438 × 301 × 470 mm		Approx. 438 × 301 × 346 mm		Approx. 438 × 234 × 343 mm		Approx. 448 × 185 × 455 mm		
	Weight	10 pens: Approx. 19.5 kg 12 pens: Approx. 20.5 kg	4 pens: Approx. 16.5 kg 6 pens: Approx. 18 kg 8 pens: Approx. 18.5 kg	1 pen: Approx. 13 kg 2 pens: Approx. 13.5 kg 3 pens: Approx. 14 kg 4 pens: Approx. 14.5 kg	1 pen: Approx. 12 kg 2 pens: Approx. 12.5 kg 3 pens: Approx. 13 kg 4 pens: Approx. 13.5 kg	1 pen: Approx. 13 kg 2 pens: Approx. 13.5 kg 3 pens: Approx. 14 kg 4 pens: Approx. 14.5 kg	1 pen: Approx. 13 kg 2 pens: Approx. 13.5 kg 3 pens: Approx. 14 kg 4 pens: Approx. 14.5 kg	1 pen: Approx. 12 kg 2 pens: Approx. 12.5 kg 3 pens: Approx. 13 kg 4 pens: Approx. 13.5 kg	1 pen: Approx. 12 kg 2 pens: Approx. 12.5 kg 3 pens: Approx. 13 kg 4 pens: Approx. 13.5 kg	
	Clock	With calendar function								
	Position	Vertical						Horizontal (recording surface) or inclined (up to 10° forward or back)		
	Memory Backup	Internal lithium battery for memory backup (life approx. 10 years at room temperature)								
Operating Environment	0 to 40°C, 30 to 80% RH (5 to 40°C, 30 to 80% RH if suffix code/FDD is specified)									
Recommended Calibration Conditions	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)									
Withstanding Voltage	1,500 V AC between power supply and case for 1 minute									
Insulation Resistance	100 MΩ min. at 500 V DC between power supply and case, and between input terminals and case									
Power Supply	Allowable power supply voltage: 90 to 132 VAC/180 to 250 VAC 48 to 63 Hz. Rated power supply voltage: 100 to 120 VAC/200 to 240 V AC, 50/60 Hz (universal power supply for <b>LR8100E</b> , <b>LR4100E</b> , and <b>LR4200E</b> ), (automatic power supply selection for <b>LR12000E</b> )									

# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

### OPTIONAL SPECIFICATIONS

Item	Specifications	Remarks															
<b>GP-IB Interface (/GP-IB)</b>  <b>RS-232-C interface (/RS232C)</b>	Conforms to IEEE St'd 488-1978 Talker functions: <ul style="list-style-type: none"> <li>Measured value input/output (ASCII and binary output; ASCII input)</li> <li>Setup information input/output (ASCII)</li> <li>Memory data output (ASCII and binary)</li> </ul> Listener functions: <ul style="list-style-type: none"> <li>All functions can be remotely controlled and set except the following: POWER ON/OFF, KEY LOCK ON/OFF, CHART FEED</li> </ul>	Example of time required to transfer measured values from an <b>LR8100E</b> 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.															
	Conforms to <b>EIA RS-232-C</b> Modes: <ul style="list-style-type: none"> <li>Measured value input/output (ASCII and binary output, ASCII input)</li> <li>Setup information input/output (ASCII)</li> <li>Memory data output (ASCII and binary)</li> </ul> Communication rate: 75, 150, 300, 600, 1200, 2400, 4800, or 9600 bps																
<b>IC Memory Card</b>	Functions: Storage of setup information and measured values Data format: MS-DOS Sampling modes and sampling rates: <ul style="list-style-type: none"> <li>Free mode (manual start) or Trigger mode (started by trigger condition)</li> <li>Sampling rate: 135, 9, 5, 3, 1, 0.5, 0.2, 0.1, 0.05, 0.02, or 0.01 Hz</li> </ul> Memory capacity: 256, 512KB, 1MB Data length: 1000, 2000, 4000, 8000, 16000, or 32000 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																
<b>Remote Control (/REM)</b>	Functions: <ul style="list-style-type: none"> <li>Chart start/stop (paper feed start/stop)</li> <li>Chart speed change (toggle between speed 1 and 2)</li> <li>* Manual print (print time and measured data values)</li> <li>Chart speed control (control chart speed using external signal source)</li> </ul> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Waveform</th> <th>Sine, triangle or square wave</th> <th>Pulse train</th> </tr> </thead> <tbody> <tr> <td>Level</td> <td>   <math>4\text{ V} &lt; V_p &lt; 24\text{ V}</math> </td> <td>   <math>+4\text{ V} &lt; V_h &lt; +24\text{ V}</math>  <math>-24\text{ V} &lt; V_l &lt; +0.5\text{ V}</math>  <math>T_P &gt; 300\text{ }\mu\text{S}</math> </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> </tbody> </table> <ul style="list-style-type: none"> <li>* Message print (time, and message of up to 70 characters; 4 numbered messages available)</li> <li>* Pen lift (all pens lifted/lowered simultaneously)</li> <li>* Record ON/OFF selection (ON: Measurement + recording; OFF: Measurement only)</li> <li>* External trigger (start writing of data to accessory IC memory card)</li> <li>* Other (fail, chart end output)</li> <li>** Reroll (reroll start/stop)</li> </ul>	Waveform	Sine, triangle or square wave	Pulse train	Level	 $4\text{ V} < V_p < 24\text{ V}$	 $+4\text{ V} < V_h < +24\text{ V}$ $-24\text{ V} < V_l < +0.5\text{ V}$ $T_P > 300\text{ }\mu\text{S}$	Source output impedance	600Ω max.	50Ω max.	Chart speed	0.15 f cm/min (f in Hz or pps)		Max. frequency	800 Hz	800 pps	<ul style="list-style-type: none"> <li>Input signals may be TTL, open collector, or contact point.</li> <li>Alarms and variations in the remote contact input are detected at 125-ms intervals.</li> </ul> <ul style="list-style-type: none"> <li>Functions marked with * not available in <b>LR4120E</b> or <b>LR4220E</b>.</li> <li>Function marked with ** available on <b>LR4200E</b> with /REROL only.</li> </ul>
Waveform	Sine, triangle or square wave	Pulse train															
Level	 $4\text{ V} < V_p < 24\text{ V}$	 $+4\text{ V} < V_h < +24\text{ V}$ $-24\text{ V} < V_l < +0.5\text{ V}$ $T_P > 300\text{ }\mu\text{S}$															
Source output impedance	600Ω max.	50Ω max.															
Chart speed	0.15 f cm/min (f in Hz or pps)																
Max. frequency	800 Hz	800 pps															
<b>Alarm Output (/AK-04, /AK-08 or /AK-12)</b>	Number of output points: 12 internal points ( <b>LR12000E</b> ), 8 internal points ( <b>LR8100E</b> ) or 4 internal points ( <b>LR4100E, LR4200E</b> ) Contact capacity: 24 V DC/AC, 1 A Other: Fail and chart end outputs	<ul style="list-style-type: none"> <li>AK-04 (for <b>LR4100E, LR4200E</b>)</li> <li>AK-08 (for <b>LR8100E</b>)</li> <li>AK-12 (for <b>LR12000E</b>)</li> </ul>															
<b>Computing Functions (/MATH)</b>	Functions: Arithmetic operations, SQR (square root), ABS (absolute value), LOG (logarithm), EXP (exponent) Number of channels: Max. 8 channels ( <b>LR8100E</b> ), or max. 4 channels ( <b>LR4100E</b> and <b>LR4200E</b> ) Computational expressions: Up to 18 characters Output: Computed data can be recorded, saved to memory, or output via communications.	<ul style="list-style-type: none"> <li>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.)</li> <li>The <b>LR12000E</b> does not include computing functions (/MATH).</li> </ul>															

# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

Item	Specifications	Remarks
<b>DC Drive (/DC)</b>	Normal operating voltage: +10 to +32 VDC (ratings: 12 to 24 V) Power consumption: For <b>LR8100E</b> : 70 VA (when balanced), 200 VA (max.) For <b>LR4100E</b> : 50 VA (when balanced), 140 VA (max.) Accessories: Connector (1), fuse (1)	Available on <b>LR8100E</b> and <b>LR4100E</b> only.
<b>Roll Chart Function (/ROL)</b>	Function: Enables both Z-fold and roll chart to be used.	Available on <b>LR4200E</b> only.
<b>Reroll Function (/REROL)</b>	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 <b>LR4200E</b> only. This function includes /ROL.
<b>3.5-inch Floppy Disk Drive (/FDD)</b>	Number of drives: 1* Medium: 2HD Data capacity: 1.44 MB fixed ** Models in which FDD can be installed: <b>LR4100E, LR8100E, LR12000E</b> *** Buffer memory capacity: <b>LR4100E</b> /Built-in 256 Kbyte SRAM <b>LR8100E</b> /Built-in 512 Kbyte SRAM <b>LR12000E</b> /Built-in 768 Kbyte SRAM Data backup: It can save data for approx. 1 day at room temperature after the battery has been charged for 30 minutes and the power has been turned 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 <b>LR4200E</b> . **** 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.

# LR SERIES RECORDERS

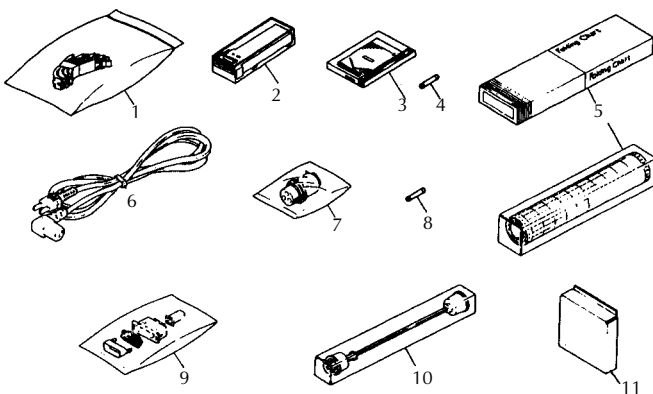


## LR12000E/LR8100E/LR4100E/LR4200E

### STANDARD ACCESSORIES

No.	Name	Part No.	Quantity	Remarks
1	Pen cartridge	<b>B9586YR</b>	1 unit	4 pens (1 pen color) /unit, standard
		<b>B9586YS</b>	1 unit	6 pens (1 pen color) /unit, standard
		<b>B9586YT</b>	1 unit	8 pens (1 pen color) /unit, standard
		<b>B9937PB</b>	1 unit	For <b>LR12000E</b> (12 pens, standard)
2	Ribbon cassette	<b>B9585SH</b>	1	Black*1
3	IC memory card	<b>378901</b>	1	8 KB, for setup information memory
4	Fuse	<b>A1111EF</b>	1	2 A time-lag (in fuse holder) (for <b>LR8100E</b> , <b>LR4100E</b> , and <b>LR4200E</b> )
		<b>A1113EF</b>	1	3.15 A time-lag (in fuse holder) (for <b>LR12000E</b> )
5	Z-fold chart	<b>B9585AH</b>	1	30 m (for <b>LR12000E</b> , <b>LR8100E</b> )
	Z-fold chart	<b>B9619AH</b>	1	20 m (for <b>LR4100E</b> , <b>LR4200E</b> without /ROL or /REROL option)
	Roll chart	<b>B9622AH</b>	1	20 m ( <b>LR4200E</b> with /ROL or /REROL option)
6	Power cord	<b>A1007WD</b>	1	Rated voltage, 125 V
7	DC power supply connector	<b>A1053JC</b>	1	For <b>LR8100E</b> or <b>LR4100E</b> with /DC option
8	Fuse (/DC)	<b>B9586UV</b>	1	For <b>LR8100E</b> or <b>LR4100E</b> , 20 A time-lag for DC option
9	Connector	<b>A1005JD</b>	1	For <b>LR8100E</b> with /AK-08, <b>LR4100E</b> or <b>LR4200E</b> with /AK-04 or /REM; AMPHENOL 57-30360
	Connector	<b>A1006JD</b>	2	For <b>LR12000E</b> with /AK-12
	Connector	<b>A1006JD</b>	1	For <b>LR8100E</b> with /AK-08, <b>LR12000E</b> or <b>LR8100</b> with /REM; AMPHENOL 57-30500
10	Chart stock roller	<b>B9623AA</b>	1	For <b>LR4200E</b> with /ROL; For use with roll chart
—	Instruction manual		1	Instruction manual for main unit (/DC) and IC memory card
—	Basic operation guidance	<b>IM3712-90</b>	1	For <b>LR4200E</b>
11	Terminal Cover	<b>B9937GK</b>	1	For <b>LR12000E</b>
		<b>B9585BH</b>	1	For <b>LR8100E</b> *2
		<b>B9619BC</b>	1	For <b>LR4100E</b> *2
		<b>B9622DK</b>	1	For <b>LR4200E</b>

Note \*1: Not included with LR4120E and LR4220E.  
\*2: LR8100E and LR4100E terminal covers come with two mounting screws.



### Pen cartridge



### 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)  
 Compatible with Windows 95  
 Mouse: Compatible with Windows 95 (driver is necessary)  
 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 redispays 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  
 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  
 Multiple files can be displayed simultaneously.  
 Display file: Marks can be made and comments entered within the analog trend on the time axis.  
 Comment: Up to 6 standard-width characters. Displayed near the channel(s).  
 Unit: The span grid corresponding to each analog trend is displayed as numerical values and lines.  
 Grid: Selectable between 1/1000 and 20.  
 Magnification change: The analog trend screen switches to the numerical data sheet screen.  
 Data sheet: 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



# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

■ 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

### LR4200E

Model	Suffix Cpde	Description
3721 Number of channels	1	1-pen model
	2	2-pen model
	3	3-pen model
	4	4-pen model
3722 Number of channels	1	1-pen model
	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/LR4200E)
/DC	DC power (for LR8100E/LR4100E)
/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 battery	B9586JV	For 378904, 05, 06 (1 pc/unit)	2 units

### ORDER IF NECESSARY

Name	Code No.	Number of Copies
Test certificate	DOCTC	For LR12000E For LR4100E/LR4200E/8100E
Instruction manual	DOCIM	If another copy is requested

### APPLICATION SOFTWARE

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

## AVAILABLE MODELS

### LR12000E

Model	Suffix Cpde	Description
3702 (with printer & electrical pen lift)	14	10-pen low sensitivity (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
	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
	2	2-pen model
	3	3-pen model
	4	4-pen model
3712 Number of channels	1	1-pen model
	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

# LR SERIES RECORDERS



## LR12000E/LR8100E/LR4100E/LR4200E

### ■ 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	B9586QA	Red (3 pens/unit), standard	1 unit
Pen cartridge for pen 2	B9586QB	Green (3 pens/unit), standard	1 unit
Pen cartridge for pen 3	B9586QC	Blue (3 pens/unit), standard	1 unit
Pen cartridge for pen 4	B9586QD	Brown (3 pens/unit), standard	1 unit
Pen cartridge for pen 5	B9586QE	Black (3 pens/unit), standard	1 unit
Pen cartridge for pen 6	B9586QF	Purple (3 pens/unit), standard	1 unit
Pen cartridge for pen 7	B9586QG	Orange (3 pens/unit), standard	1 unit
Pen cartridge for pen 8	B9586QH	Violet (3 pens/unit), standard	1 unit
Pen cartridge set, pens 1-4	B9586QR	4 pens (1 pen color)/unit	1 unit
Pen cartridge set, pens 1-6	B9586QS	6 pens (1 pen color)/unit	1 unit
Pen cartridge set, pens 1-8	B9586QT	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

# LR SERIES RECORDERS

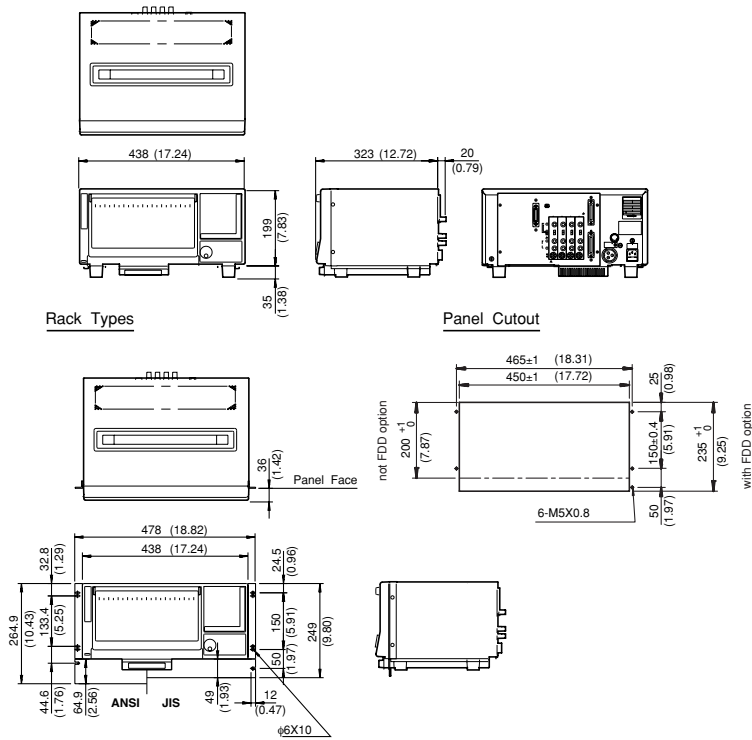


## LR12000E/LR8100E/LR4100E/LR4200E

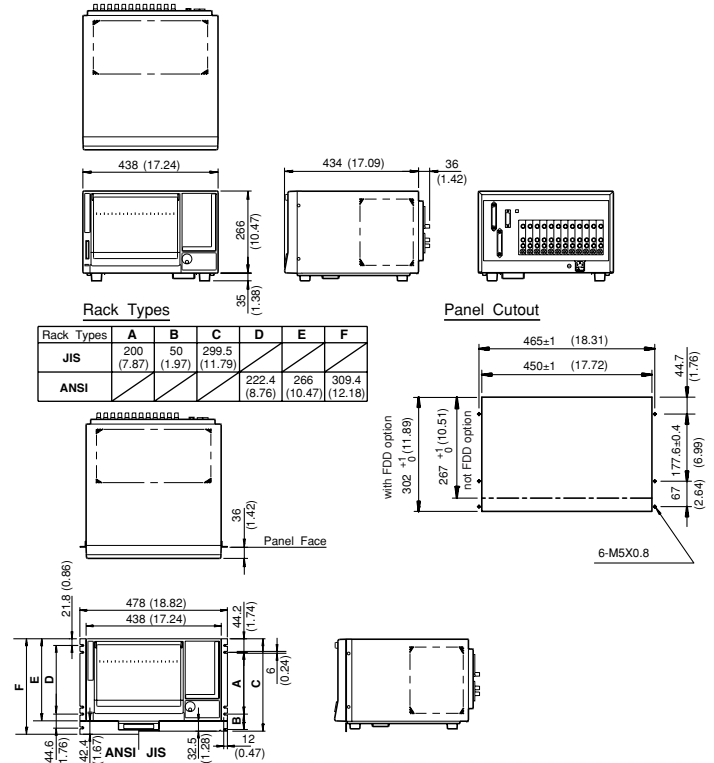
### DIMENSIONS

Unit : mm (inch)

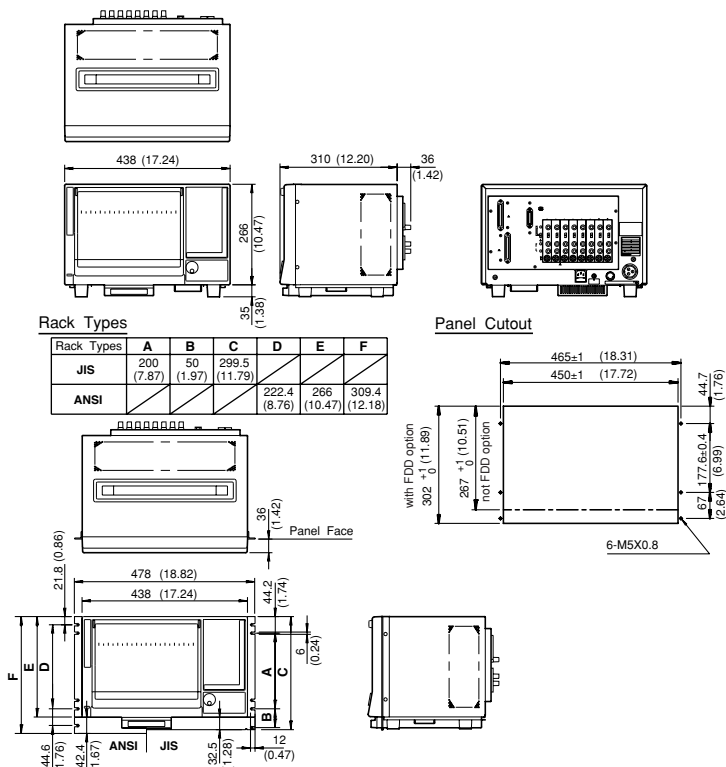
#### ● LR4100E



#### ● LR12000E



#### ● LR8100E



#### ● LR4200E

