

# LR12000E/LR8100E/LR4100E/LR4200E

## SPECIFICATIONS

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), KPsAu7Fe 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) KPsAu7Fe ±(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)																																																															
	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>yellow 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	yellow 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
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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)																																																															

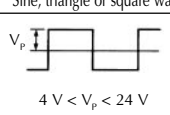
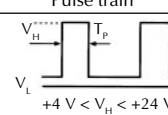
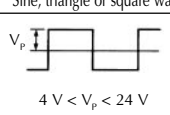
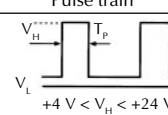
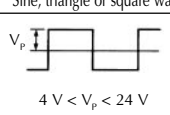
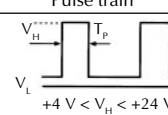
\* In case the measurement range is 1mV, a 0.1 Hz filter must be used. For ranges more than 1 mV, no filter is necessary.

# LR12000E/LR8100E/LR4100E/LR4200E

Item	Model	LR12000E		LR8100E		LR4100E		LR4200E			
						LR4110E	LR4120E	LR4210E	LR4220E		
Printing	Printout Types	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 <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			
General Specifications	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.									
	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									
	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  Balanced: 10 pens: 170 VA 12 pens: 190 VA	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	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: 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 × 273 × 434 mm		Approx. 438 × 273 × 310 mm		Approx. 438 × 206 × 323 mm		Approx. 448 × 455 × 185 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. 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										
Memory Backup	Internal lithium battery for memory backup (life approx. 10 years at room temperature)										
Operating Environment	0 to 40°C, 30 to 80% R.H. (5 to 40°C, 30 to 80% R.H. 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 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 <b>LR8100E</b> , <b>LR4100E</b> , and <b>LR4200E</b> ), (automatic power supply selection for <b>LR12000E</b> )										

# LR12000E/LR8100E/LR4100E/LR4200E

## OPTIONAL SPECIFICATIONS

Item	Specifications	Remarks																												
<b>GP-IB Interface (/GP-IB)</b>	<p>Conforms to IEEE St'd 488-1978</p> <p>Talker functions:</p> <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> <p>Listener functions:</p> <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>	<p>Example of time required to transfer measured values from an <b>LR8100E</b> and store them to disk on a personal computer:</p> <p>Personal computer used: 80286 CPU, 8 MHz GP-IB board N88 BASIC (86) (MS-DOS version) Disk is hard disk</p>																												
<b>RS-232-C interface (/RS232C)</b>	<p>Conforms to <b>EIA RS-232-C</b></p> <p>Modes:</p> <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> <p>Communication rate: 75, 150, 300, 600, 1,200, 2,400, 4,800, or 9,600 bps</p>	<table border="0"> <tr> <td>(GP-IB communications)</td> <td>(Readout time)</td> </tr> <tr> <td>ASCII</td> <td>4 CH model    Approx. 80 ms</td> </tr> <tr> <td></td> <td>8 CH model    Approx. 140 ms</td> </tr> <tr> <td></td> <td>12 CH model   Approx. 170 ms</td> </tr> <tr> <td>Binary</td> <td>4 CH model    Approx. 30 ms</td> </tr> <tr> <td></td> <td>8 CH model    Approx. 50 ms</td> </tr> <tr> <td></td> <td>12 CH model   Approx. 60 ms</td> </tr> <tr> <td>(RS-232-C communications)</td> <td>(Readout time)</td> </tr> <tr> <td>ASCII</td> <td>4 CH model    Approx. 110 ms</td> </tr> <tr> <td></td> <td>8 CH model    Approx. 200 ms</td> </tr> <tr> <td></td> <td>12 CH model   Approx. 250 ms</td> </tr> <tr> <td>Binary</td> <td>4 CH model    Approx. 60 ms</td> </tr> <tr> <td></td> <td>8 CH model    Approx. 100 ms</td> </tr> <tr> <td></td> <td>12 CH model   Approx. 120 ms</td> </tr> </table> <p>* 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.</p>	(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
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<b>IC Memory Card</b>	<p>Functions: Storage of setup information and measured values</p> <p>Data format: MS-DOS</p> <p>Sampling modes and sampling rates:</p> <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> <p>Memory capacity: 256, 512KB, 1MB</p> <p>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)</p> <p>Number of files: 47 files max.</p> <p>Trigger conditions: Alarm detection, CHART END, or external contact input (optional)</p> <p>Pre-trigger: 0 to 100% (set in 10% increments)</p> <p>Memory data: Measured data, communications input data, computed data</p> <p>Output: Communications output, or playback recording</p> <p>Battery backup: Lithium battery</p>																													
<b>Remote Control (/REM)</b>	<p>Functions:</p> <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>  <p><math>4\text{ V} &lt; V_p &lt; 24\text{ V}</math></p> </td> <td>  <p><math>+4\text{ V} &lt; V_p &lt; +24\text{ V}</math>  <math>-24\text{ V} &lt; V_p &lt; +0.5\text{ V}</math>  <math>TP &gt; 300\text{ }\mu\text{S}</math></p> </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> <p>* • Message print (time, and message of up to 70 characters; 4 numbered messages available)</p> <p>* • Pen lift (all pens lifted/lowered simultaneously)</p> <ul style="list-style-type: none"> <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> </ul> <p>** • Roll (reroll start/stop)</p>	Waveform	Sine, triangle or square wave	Pulse train	Level	 <p><math>4\text{ V} &lt; V_p &lt; 24\text{ V}</math></p>	 <p><math>+4\text{ V} &lt; V_p &lt; +24\text{ V}</math>  <math>-24\text{ V} &lt; V_p &lt; +0.5\text{ V}</math>  <math>TP &gt; 300\text{ }\mu\text{S}</math></p>	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> <p>• Functions marked with *** not available in <b>LR4120E</b> or <b>LR4220E</b>.</p> <p>• Function marked with **** available on <b>LR4200E</b> with /REROL only.</p>													
Waveform	Sine, triangle or square wave	Pulse train																												
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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>	<p>Number of output points: 12 internal points (<b>LR12000E</b>), 8 internal points (<b>LR8100E</b>) or 4 internal points (<b>LR4100E</b>, <b>LR4200E</b>)</p> <p>Contact capacity: 24 V DC/AC, 1 A</p> <p>Other: Fail and chart end outputs</p>	<ul style="list-style-type: none"> <li>AK-04 (for <b>LR4100E</b>, <b>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>	<p>Functions: Arithmetic operations, SQR (square root), ABS (absolute value), LOG (logarithm), EXP (exponent)</p> <p>Number of channels: Max. 8 channels (<b>LR8100E</b>), or max. 4 channels (<b>LR4100E</b> and <b>LR4200E</b>)</p> <p>Computational expressions: Up to 18 characters</p> <p>Output: Computed data can be recorded, saved to memory, or output via communications.</p>	<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>																												

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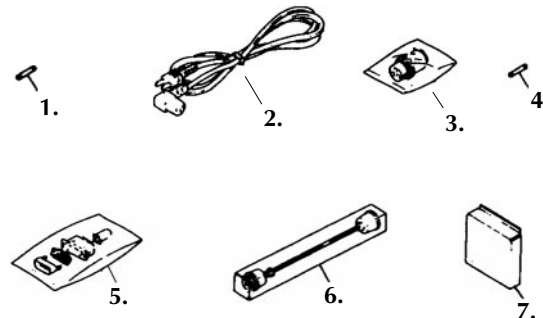
Item	Specifications	Remarks
<b>DC Drive (/DC)</b>	Normal operating voltage: +10 to +32 V DC (ratings: 12 to 24 V) Power consumption: For <b>LR8100E</b> : 70 VA (when balanced), 200 VA (max.) For <b>LR4100E</b> : 50 VA (when balanced), 140 VA (max.) Accessories: Connector (1), fuse (1)	Available on <b>LR8100E</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: 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 <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.

## STANDARD ACCESSORIES

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

Note : Not with **LR4120E** and **LR4220E**.

\***LR8100E** and **LR4100E** terminal covers come with two mounting screws.



# LR12000E/LR8100E/LR4100E/LR4200E

## 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.

Can be used with Windows 95.

RS-232-C:

Personal computer that supports Windows 95.

##### ■ Environment

PC:

The PC must have a CPU of at least Pentium 90MHz and at least 16 MB of RAM.

Windows 95

OS:

Display that is compatible with Windows 95

CRT:

640 × 480 minimum, at least 256 colors

Video:

(at least 1024 × 768 is recommended)

Compatible with Windows 95

Mouse:

Compatible with Windows 95 (driver is necessary)

Printer:

2HD/1.44 MB

FDD:

### 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 redisplay 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 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

# LR12000E/LR8100E/LR4100E/LR4200E

## ■ 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/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 battery	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 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

## ■ 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	B9586CA	Red (3 pens/unit), standard	1 unit
Pen cartridge for pen 2	B9586CB	Green (3 pens/unit), standard	1 unit
Pen cartridge for pen 3	B9586CC	Blue (3 pens/unit), standard	1 unit
Pen cartridge for pen 4	B9586CD	Brown (3 pens/unit), standard	1 unit
Pen cartridge for pen 5	B9586CE	Black (3 pens/unit), standard	1 unit
Pen cartridge for pen 6	B9586CF	Purple (3 pens/unit), standard	1 unit
Pen cartridge for pen 7	B9586CG	Orange (3 pens/unit), standard	1 unit
Pen cartridge for pen 8	B9586CH	Violet (3 pens/unit), standard	1 unit
Pen cartridge set, pens 1-4	B9586CR	4 pens (1 pen color)/unit	1 unit
Pen cartridge set, pens 1-6	B9586CS	6 pens (1 pen color)/unit	1 unit
Pen cartridge set, pens 1-8	B9586CT	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

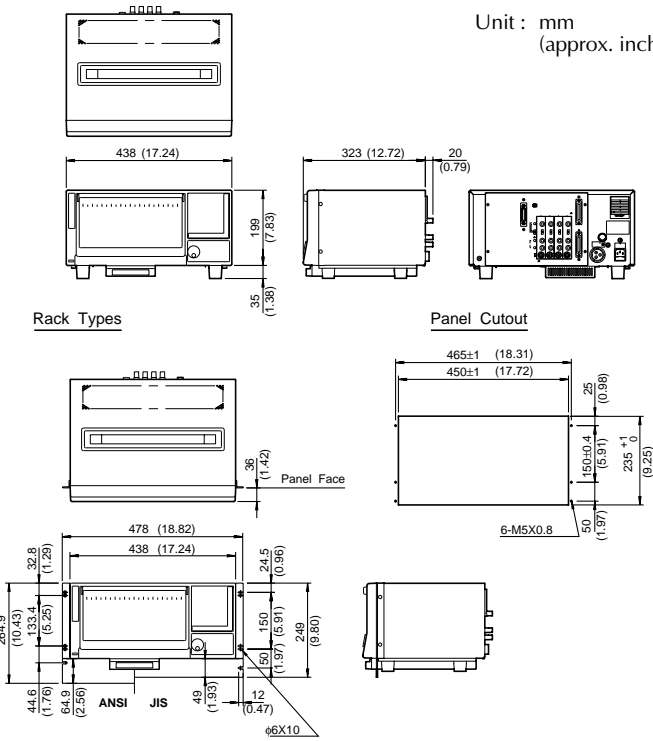
## ■ OPTIONAL ACCESSORIES

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

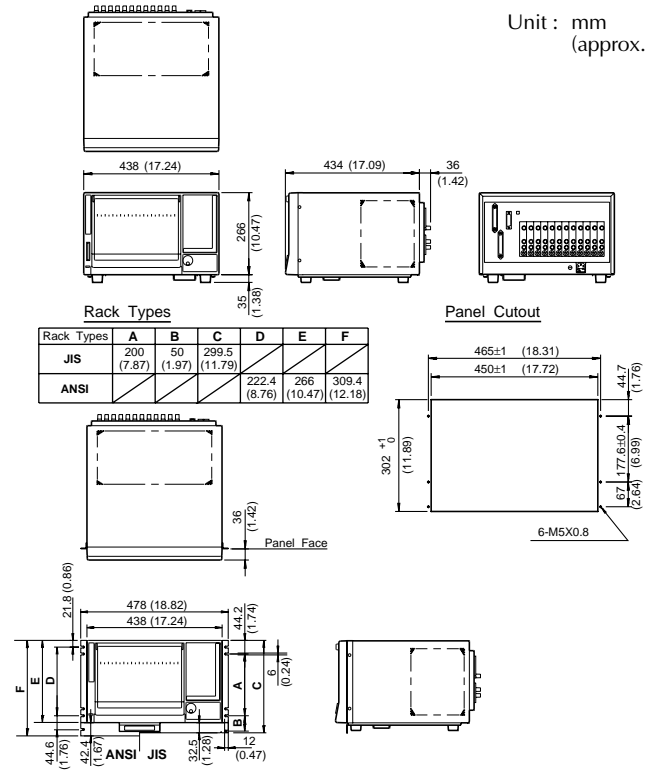
### ● LR12000E

Unit : mm  
(approx. inch)



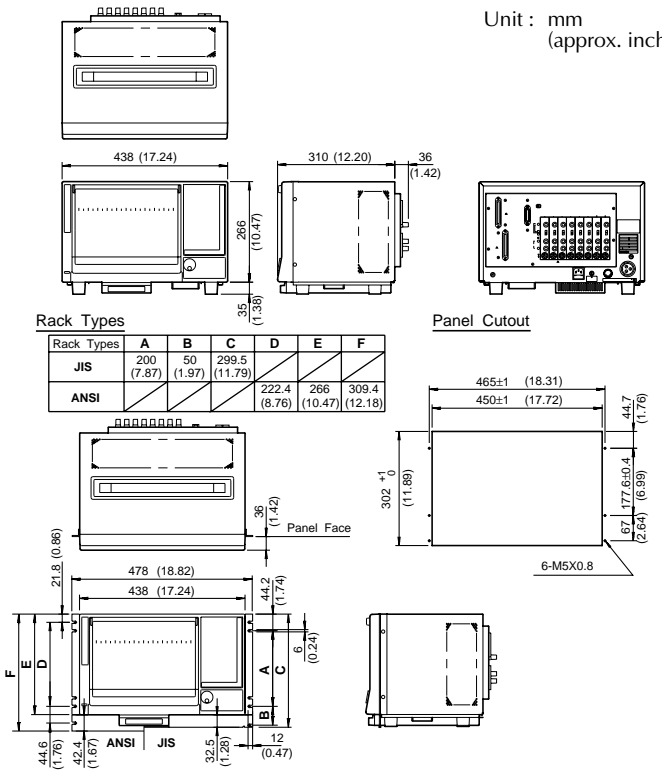
### ● LR4100E

Unit : mm  
(approx. inch)



### ● LR8100E

Unit : mm  
(approx. inch)



### ● LR4200E

Unit : mm  
(approx. inch)

