EL3000 series is a dot printing type analog recorder sized 144x144mm with 100mm width chart. The unit starts recording as soon as the power supply and input are connected and it is also easy to operate. Scale plate, input range and function of the recorder can be selected for various purpose and applications as many kinds of options are prepared.

- **Universal power supply**
  Universal power supply with voltage range of 100 to 240V AC (50/60Hz) is applied.

- **Linear temperature scale**
  Temperature scale of thermocouple and resistance thermometer input is a linear scale that is excellent in reading indication value.

- **Standard 6 chart speeds**
  6 chart speeds (5, 10, 20, 40, 80, 160mm/h) are switchable as standard.
  5 chart speed and hour/minute change are prepared as option.

- **Alarm setting (common alarm) as standard**
  Higher and lower limit alarm can be programmed for every point. Alarm value is easy to be programmed by pointer location.
  You can check the alarm by front LED lighting. Alarm output is prepared as option.

- **CE marking**
  The EL recorder is conformed to the rules of safety standards of CE.

- **Unit structure and light-weight**
  Light-weight (50% of the previous unit weight) was realized by easy maintenance unit structure.

- **Employing removable type terminal board**
  Employing easy connecting removable type terminal board.

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**MODELS**

**EL3D**

- **Input point**
  1 : 1 point
  2 : 2 points
  3 : 3 points
  6 : 6 points

- **Input signals**
  5 : Thermocouple/DC voltage
  7 : Resistance thermometer
    Thermocouple with burnout/DC voltage
    Built-in voltage divider input (option)*1

- **Input and scale plate (option)*2**
  0 : Standard input + standard scale plate
  1 : Non-standard input (including current input, and built-in voltage divider) + standard scale plate
  2 : Standard input + non-standard scale plate
  3 : Non-standard input (including current input, and built-in voltage divider) + Non-standard scale plate

- **Alarm output**
  0 : None
  1 : 2 alarm outputs

- **Chart speed and burnout*3**
  0 : Standard 6-speed + burnout disabled
  1 : Standard 6-speed + up-scale burnout
  2 : Standard 6-speed + down-scale burnout
  A : Standard 5-speed hour / minute change + burnout disabled
  B : Standard 5-speed hour / minute change + up-scale burnout
  C : Standard 5-speed hour / minute change + down-scale burnout

*1 : Optional built-in voltage divider and thermocouple / resistance thermometer burnout input is only type *7*.
*2 : Double scale is available. Input and scale selection are needed for non-standard input and non-standard scale plate.
*3 : Burnout on all channels is programmed together for thermocouple / resistance thermometer input.
## INPUT SPECIFICATIONS

**Measurement point:**
1, 2, 3 and 6 points

**Reference range and types:**
- DC voltage: \( \pm 13.8mV, \pm 27.6mV, \pm 86mV, \pm 200mV, \pm 500mV, \pm 2V, \pm 5V \)
- Built-in voltage divider: \( \pm 10V, \pm 25V, \pm 50V \)
- DC current: External installation of shunt resistor (250Ω) is applied (option)
- Thermocouples: K, E, J, T, R, and B (option)
- Resistance thermometer: \( \pm 1% \) (P100/1997)

**Input designation:**
- Single scale (standard), double scale (option)
- 0.3% of input span

**Accuracy rating:**
- \( \pm 0.5% \) of input span (except for some input under standard operating condition)
- Refer to the table of standard range and minimum width of scale for non-standard input

**Indicating deadband:**
- Single scale (standard), double scale (option)
- \( \pm 0.5% \) of input span

**Reference junction compensation accuracy:**
- \( K, E, J, T = \pm 1.0°C \) or less (23°C ± 10°C)
- 2°C or less (0 to 50°C)
- (For internal reference junction compensation, the errors above are added to the accuracy rating)

**Temperature drift:**
- \( \pm 0.05%/°C \) (Converted into reference ranges)

**Measurement cycle:**
- 6 seconds/point

**Indicating resolution:**
- Approximately 1 / 2,000

**Burnout detection:**
- Voltage application method (approximately 8V, 1mA)

**Allowable signal source resistance:**
- Thermocouple inputs, DC voltage inputs: \( \pm 5V \) or less
- 1kΩ (burnout disabled) or less
- DC Voltage inputs: (input more than \( \pm 5V \)) --- 100Ω or less
- Resistance thermometer inputs --- per wire
- 1Ω or less (Same resistance for 3 wires)

**Input resistance:**
- Thermocouple inputs, DC voltage inputs: \( \pm 5V \) or less --- Approximately 8MΩ
- DC voltage inputs (more than \( \pm 5V \)) --- Approximately 1 MΩ

**Maximum input voltage:**
- Thermocouple inputs, DC voltage inputs --- \( \pm 10V \) DC or less
- DC voltage inputs (Voltage divider built-in) --- \( \pm 60V \) DC or less

**Resistance thermometer --- \( \pm 5V \) DC or less**

**Maximum common mode voltage:**
- 30V AC

**Common mode rejection ratio:**
- 120dB or more (50/60Hz ± 0.1%)

**Normal mode rejection ratio:**
- 50dB or more (50/60Hz ± 0.1%)

## RECORDING SPECIFICATIONS

**Recording accuracy:**
- \( \pm 0.5% \) of recording span

**Recording system:**
- Inkpad dotting

**Balancing time:**
- Input span movement --- approximately 2 seconds

**Recording color:**
- 1: red; 2: blue; 3: green; 4: violet; 5: purple
- 6: brown

**Chart paper:**
- Fan-fold type: total width of 114mm, total length of 10m, effective chart width of 100mm

**Chart speed:**
- 6-speed change, 5, 10, 20, 40, 80, 160mm/h (standard)
- \( \pm 0.1\% \) or less (It is based on the chart scale.)

## INDICATING SPECIFICATIONS

**Analog indication:**
- Scale plate and pointer

**Scale plate:**
- Single scale or double scale (minimum scale division: 80)

## ALARMS SPECIFICATIONS

**Alarm display:**
- Pointer and alarm-point seal pasted on scale.
- Alarm LED lamp lightens for alarming (All channels OR output)

**Alarm types:**
- Higher and lower-limit alarm

**Alarm programming:**
- Individual setting for higher and lower-limit value
- Programming percentage of input span by indicating pointer, input resolution 0.5%)
- 0.4% of input span

**Alarm deadband:**
- 1a contact and 2 outputs (common)

**Alarm output (option):**
- Maximum contact capacity: 2A (resistive load), 0.5A (inductive load)

## OPERATION / PROGRAMMING SPECIFICATIONS

**Switches:**
- POWER --- ON/OFF the recorder power supply
- AUTO CH --- Switching automatic channels change and fixed channel (Chart feed stops when 1 point indication mode set)
- CHART SPEED --- Selecting chart speed (Chart feed stops when all switches are OFF)
- SET - RUN --- Switching alarm setup/normal operation mode

**Indication:**
- LED (green) --- Power ON monitor
- LED (red) --- Alarm monitor (All channels or output)

## GENERAL SPECIFICATIONS

**Rated power voltage:**
- 100 to 240V AC, 50/60Hz (Universal power supply)

**Power consumption:**
- Maximum 12VA (100V AC)
- Maximum 20VA (240V AC)

**Environmental conditions:**
- Reference operation condition
  - Ambient temperature range: 21 to 25°C
  - Ambient humidity range: 45 to 65%RH
  - Power frequency: 50/60Hz ± 0.5% (Burnout disabled)
  - Power voltage: 100V AC ± 1%
  - Power frequency: 50/60Hz ± 0.5%
  - Power voltage: 20 to 80%RH
  - Power frequency: 50/60Hz ± 2%

**Insulation resistance:**
- Secondary terminals and protective conductor terminals --- 20MΩ or more at 500V DC
- Primary terminals and protective conductor terminals --- 20MΩ or more at 500V DC
- Primary and secondary terminals --- 20MΩ or more at 500V DC
- Notes: Primary terminals --- Power (L,N), Alarm terminals (mechanical relay)
- Secondary terminals --- Measurement input terminals

**Dielectric strength:**
- Secondary terminals and protective conductor terminals --- 1 minute at 2300V AC
- Primary and secondary terminals --- 1 minute at 2300V AC
- Notes: Primary terminals --- Power (L,N), Alarm terminals (mechanical relay)
- Secondary terminals --- Measurement input terminals

**Mounting:**
- Panel mounting

**Weight:**
- Approximately 1.7kg

**Power voltage fluctuation:**
- Indication fluctuation 0.2% or less (converted into reference ranges at 90 to 264V AC)

## STANDARDS

**CE marking:**
- EMC directive, low voltage directive conformity
- EN61326-A1+A2+A3, EN61010-1

* Under EMC directive test condition, indication equivalent to maximum 500mV fluctuates in case

## MAINTENANCE

**Input correction:**
- Zero/span correction for all channels
- Initializes indication adjustment value (User maintenance area)
### OPTION SPECIFICATIONS

<table>
<thead>
<tr>
<th>Options</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm output</td>
<td>Alarm relay — Mechanical relay 1a contact, 2 outputs (common)</td>
</tr>
<tr>
<td></td>
<td>Maximum contact rating — 250V AC 2A, 30V DC 2A (resistive load)</td>
</tr>
<tr>
<td></td>
<td>250V AC 0.5A, 30V DC 0.5A (inductive load)</td>
</tr>
<tr>
<td>DC current input</td>
<td>250Ω of shunt resistor is applied to measure voltage input</td>
</tr>
<tr>
<td>Built-in voltage divider</td>
<td>Built-in voltage divider (1/1000) measures input in the range of ±5V to ±50V (input type “7” only)</td>
</tr>
<tr>
<td>Non-standard input</td>
<td>Refer to the table of standard range and programmable minimum width of scale</td>
</tr>
<tr>
<td></td>
<td>DC voltage: 10mV DC width or more</td>
</tr>
<tr>
<td></td>
<td>Thermocouple: K: 250°C width or more</td>
</tr>
<tr>
<td></td>
<td>E, J, T: 200°C width or more</td>
</tr>
<tr>
<td></td>
<td>R: 800°C width or more</td>
</tr>
<tr>
<td>Non-standard scale plate</td>
<td>Scale plate for non-standard input</td>
</tr>
<tr>
<td>Double scale</td>
<td>Measures input with 2 types of scales (each scale is only serial channel)</td>
</tr>
<tr>
<td>Burnout</td>
<td>Function for detecting disconnection for sensor with thermocouple or resistance thermometer input. Up-scale and down scale burnout on all channels can be programmed (Input type “7” only), parallel operation is not possible</td>
</tr>
<tr>
<td>Chart speed Hour</td>
<td>Maximum length 15.6m</td>
</tr>
</tbody>
</table>

#### Standard range and minimum width of scale

<table>
<thead>
<tr>
<th>Input type</th>
<th>Standard range</th>
<th>Minimum width of scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-13.8 to 13.8mV</td>
<td>10mV</td>
<td></td>
</tr>
<tr>
<td>-27.6 to 27.6mV</td>
<td>17mV</td>
<td></td>
</tr>
<tr>
<td>-69 to 69mV</td>
<td>35mV</td>
<td></td>
</tr>
<tr>
<td>-200 to 200mV</td>
<td>100mV</td>
<td></td>
</tr>
<tr>
<td>-500 to 500mV</td>
<td>250mV</td>
<td></td>
</tr>
<tr>
<td>-2 to 2V</td>
<td>1 V</td>
<td></td>
</tr>
<tr>
<td>-5 to 5V</td>
<td>2.5V</td>
<td></td>
</tr>
<tr>
<td>-10 to 10V</td>
<td>5 V</td>
<td></td>
</tr>
<tr>
<td>-25 to 25V</td>
<td>13 V</td>
<td></td>
</tr>
<tr>
<td>-50 to 50V</td>
<td>25 V</td>
<td></td>
</tr>
<tr>
<td>DC current</td>
<td>4 to 20mA</td>
<td>10mA</td>
</tr>
</tbody>
</table>

#### Standard input and chart paper Nos.

<table>
<thead>
<tr>
<th>Input type</th>
<th>Scales</th>
<th>Chart paper Nos</th>
<th>Minimum scales</th>
<th>Input code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td>0 to 10mV</td>
<td>EM-008</td>
<td>0.2</td>
<td>M1</td>
</tr>
<tr>
<td></td>
<td>0 to 20mV</td>
<td>EM-519</td>
<td>0.5</td>
<td>M8</td>
</tr>
<tr>
<td></td>
<td>0 to 50mV</td>
<td>EL42003</td>
<td>1</td>
<td>M9</td>
</tr>
<tr>
<td></td>
<td>1 to 5V</td>
<td>EL42010</td>
<td>0.05</td>
<td>V6</td>
</tr>
<tr>
<td>T/C</td>
<td>0 to 250°C</td>
<td>EL05096</td>
<td>5</td>
<td>K2</td>
</tr>
<tr>
<td></td>
<td>0 to 300°C</td>
<td>EL05010</td>
<td>5</td>
<td>K3</td>
</tr>
<tr>
<td></td>
<td>0 to 400°C</td>
<td>EL05009</td>
<td>10</td>
<td>K4</td>
</tr>
<tr>
<td></td>
<td>0 to 600°C</td>
<td>EL05168</td>
<td>10</td>
<td>K6</td>
</tr>
<tr>
<td></td>
<td>0 to 800°C</td>
<td>EL05121</td>
<td>10</td>
<td>K8</td>
</tr>
<tr>
<td></td>
<td>0 to 1000°C</td>
<td>EL05157</td>
<td>20</td>
<td>KA</td>
</tr>
<tr>
<td></td>
<td>0 to 1200°C</td>
<td>EL05116</td>
<td>20</td>
<td>KC</td>
</tr>
<tr>
<td>K</td>
<td>0 to 200°C</td>
<td>EL05047</td>
<td>5</td>
<td>E2</td>
</tr>
<tr>
<td></td>
<td>0 to 300°C</td>
<td>EL05010</td>
<td>5</td>
<td>E3</td>
</tr>
<tr>
<td>J</td>
<td>0 to 200°C</td>
<td>EL05047</td>
<td>5</td>
<td>T2</td>
</tr>
<tr>
<td></td>
<td>0 to 300°C</td>
<td>EL05010</td>
<td>5</td>
<td>T3</td>
</tr>
<tr>
<td>T/RD</td>
<td>0 to 100°C</td>
<td>EL05052</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>0 to 150°C</td>
<td>EL05034</td>
<td>2</td>
<td>3A</td>
</tr>
<tr>
<td></td>
<td>0 to 200°C</td>
<td>EL05047</td>
<td>5</td>
<td>3B</td>
</tr>
<tr>
<td></td>
<td>0 to 300°C</td>
<td>EL05010</td>
<td>5</td>
<td>3C</td>
</tr>
<tr>
<td></td>
<td>0 to 500°C</td>
<td>EL05048</td>
<td>10</td>
<td>3S</td>
</tr>
<tr>
<td></td>
<td>-20 to 80°C</td>
<td>EL05035</td>
<td>2</td>
<td>3E</td>
</tr>
<tr>
<td></td>
<td>-50 to 50°C</td>
<td>EL05006</td>
<td>2</td>
<td>3F</td>
</tr>
<tr>
<td></td>
<td>-50 to 150°C</td>
<td>EL05007</td>
<td>5</td>
<td>3B</td>
</tr>
</tbody>
</table>

#### Exceptions of accuracy ratings

<table>
<thead>
<tr>
<th>Input type</th>
<th>Measuring range</th>
<th>Accuracy ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>K, E, J, T</td>
<td>-200 to -50°C</td>
<td>±0.1% of measuring range</td>
</tr>
<tr>
<td>B</td>
<td>0 to 400°C</td>
<td>None</td>
</tr>
</tbody>
</table>

Note: The accuracy ratings are converted into the measuring range
**TERMINAL BOARD**

- Alarm output terminals (option)
- Power/protective conductor terminals
- Thermocouple and DC voltage
  - (+) (A) Terminals
  - (−) (B) Terminals
- (B) Terminals Resistance thermometer
- Measurement input terminals

**DIMENSIONS**

- Panel cutout
- Minimum clearance for plural installation

**Specifications subject to change without notice. Printed in Japan (I) 2014. 4**