AL4000 series is a hybrid recorder which employs bright and clear, easy to view LCD display. Measuring value display is prepared as 1 point display, multi-points simultaneous display and digital display + bar graph display. Various measuring and recording settings can be easily done by front key switch and confirmed by LCD digital display.

- **FEATURES**
  - **Corresponds to SD card**
    Equipped with SD card (sold separately) and it can record data, read and write setting value.
  - **Full multi range**
    Equipped with DC voltage 10 kinds, T/C 36 kinds, RTD 12 kinds, in total 58 kinds. Easily set the range per channels.
  - **Easy data management by communication interface**
    Provided with USB port and connect with PC directly. RS232C, RS422A, RS485 and Ethernet communication interface is optionally prepared. When Ethernet is selected, settings from the web and E-mail alarm notification are added.
  - **Package Software attached**
    By Data acquisition software, the use of application expands from recording/management to information processing.
  - **Standard alarm display/ Printing function**
    Set 4 types of alarm per each input points. When alarm occurs, status display “ALM” flashes and measuring value flashes at LCD operation screen.
  - **Chart end detection function available**
    Can set the alarm operation when chart end is detected.
  - **Various programming function**
    Process the measured data by programming setting and displayed/recorded data of each channels are shown as programmed result data.
  - **SD card playback function (option)**
    By replaying the saved data files in SD card, you can record or printing back to the chart paper.

- **MODELS**

  - **Input point**
    06 : 6 points
  - **Communication interface (option)**
    N : None
    E : Ethernet
    R : RS232C
    A : RS422A/RS485
    Q : RS232C+RS485
    C : RS422A/RS485+RS485
    G : Ethernet + RS422A/RS485 +RS485
    F : Ethernet + RS422A/RS485 +RS485 + Low-order communications
  - **Alarm output / remote contacts (option)**
    0 : None
    2 : Mechanical relay 2 points (’a’ contact)
    4 : Mechanical relay 4 points (’c’ contact) + remote contact 5 points
    A : Mechanical relay 6 points (’a’ contact) + remote contact 5 points
  - **Power supply**
    A : 100-240V AC
  - **Carrying handle and feet (option)**
    N: None
    T: With carrying handle and feet
  - **For OP/SP**
    N: None
    P: SD card playback
1. Graphic LCD display
Display measured data by digital display and analog indication by bar graph display.

1 point display

1 point display + bar graph display

6 points simultaneous display

2. Front key switch
Setting contents can be easily registered by front key switch.

Press Menu key and menu screen (list of setting items) will be displayed to graphic LCD.

3. SD card slot
Save measured data to SD card by designated interval (Fastest 6 points: 1sec). Also, register measuring / recording condition such as range, scale, chart speed and when required, setup the unit by registered conditions.

By using optional playback function you can perform the trace printing, digital recording / printing on the chart paper replaying the saved data files.

4. Prepare engineering port at the front
Connect with PC by mini-USB cable*. By attached setting software, you can set or change the parameter by PC.

*Purchase commercialized product separately.

5. White LED chart illumination
Set ON/OFF/AUTO (OFF after no operation for 3 minutes).
**RECORDING EXAMPLE**

- **Periodic data printing**
  Record the data over trace printing by arbitrary interval.

- **List printing**
  Print setting data such as range, scale, etc. for each channel.

- **Data print**
  When the latest data is required, trace printing will stop and record.

- **Alarm printing**
  When alarm activates/reset, prints time, channel no., alarm type and alarm no.

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**SD card playback function (option)**

By replaying the saved data files in SD card, you can record or printing back to the chart paper. It can reply even if the chart paper data is lost due to paper jam or no recording ink.

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*Time Digital recording Trace printing*

*Chart speed*

*Range*

*Scale, tag, burnout*

*Alarm*

*Alarm reset time Alarm reset channel number Level*

*Alarm activation time Alarm activation CH No.*

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**Record missing**

*Paper is jammed!*

---

*Data replay!!*

**Replay the data by specifying the time!**
**INPUT SPECIFICATIONS**

**Measuring points:** 6

**Input types:**
- DC voltage: +1.8mV, +2.7mV, +5.0mV, +20mV, +500mV, +3V, +5V, +10V, +20V, -50V
- DC current: Max 50mA by external shunt resistor (1000, 250Ω) (sold separately)
- Thermocouple: K, E, J, T, R, S, B, N, U, L, W-Re26, W-Re5-W-Re26, PtRh40-PtRh20, NiMo-Ni, CR-AuFe, Platinum II, Au/Pt

**Accuracy ratings:** Refer to the table of measuring range/accuracy ratings display resolution.

**Measuring interval:** 1 second / 6 points

**Input resolution:** About 1/40,000 or better (converted to 0...1V).

**Display area:** 106 x 16mm

**Dots:** 240 x 48 dots

**Measuring points:** 6

**Burnout:**
- Burnout detection function for thermocouple input and RTD input. Upper burnout, lower burnout or burnout disabled is selectable for each input.
- Maximum common mode voltage: 30V AC/60V DC
- Common mode rejection ratio: 130dB or more (50/60Hz)
- Normal mode rejection ratio: 50dB or more (50/60Hz)
- Terminal board: Removable when wiring.

**DISPLAY SPECIFICATIONS**

**Analogue display:**
- LCD bar graph 100mm
- Digital display: Monographic type LCD (Backlight AUTO / Always ON settable)
- Dots: 240 x 48 dots
- Display area: 106 x 16mm
- Display item: All channels simultaneous display, year/month/day, time, channel no., data, unit, digital print time and measuring value.
- Status display: REC, CARD, ALM

**ALARM DISPLAY**

**Alarm display:** Status display "ALM" flash, measuring value flush at operation screen.

**Alarm types:** Absolute alarm, differential alarm, rate-of-change alarm, FAIL, calendar timer, chart end.

**Alarm settings:**
- Individual settings, Max 4 levels/channel
- Alarm output: Mechanical relay 2 or 6 points (a’ contact)
- Mechanical relay 4 points (c’ contact)

**STANDARDS**

**CE marking:** EN61326-1
- EN61010-1
- EN61010-2-030
  - *Under EMC test condition, variation in indication value is ±2% or ±2mV at maximum, whichever is larger.

**UL:**
- UL61010-1 2nd edition
- CSA (C-UL): CAN/CSA C22.2 No.61010-1

**RECORDING SPECIFICATIONS**

**Dotting interval:** 5 seconds/point, 3 seconds/point

**Recording method:** Wire-dot type 6-color ribbon

**Record/Printed color:**
- Trace printing (default colors)
  - Channel no. 1: Red, Black, Blue
  - Channel no. 2: Green, Brown, Purple
- Alarm printing: Activate: Red, Reset: Green
- List printing: Black (channel each items color are same as trace printing color)

**Chart paper:** Fan-fold type
- Total width 114mm, total length 10m, effective chart width 100mm
- Chart speed: 1 to 1500 mm / h, in 1mm / h increments (12.5mm / h can be set exceptionally)
- Periodic data printing:
  - Digital printing is added to trace printing at month / day, time, chart end, channel no., data, unit, interval (hour/time) arbitrary setting.
- Data printing:
  - When required, interrupt trace printing and digital print time and measuring value.
- Alarm printing:
  - Alarm activated --- Time, channel no., alarm type and level
  - Alarm reset --- Time, channel no., alarm level
  - Memory capacity --- Max 48 data
- List printing:
  - When required, interrupt trace printing and print date, chart speed and setting information of each channel.
  - Message printing: Print when required
  - Up to 15 characters/message, register up to 20 characters.
- ON/OFF of display and recording:
  - Select ON / OFF of display per each channel, trace recording to chart, digital recording to SD card
- Subtract printing:
  - Record difference between reference channel and measuring value or between reference value (set value) and measuring value.
- Zone printing:
  - 2 divisions
  - Compressed/Expanded printing:
    - Range limit is made non-linear and specific chart recording lower/upper limit is shrunk or expanded.
- Automatic range shift printing:
  - Recording range is shifted automatically to another set range when measured value exceeds the current range. Overlap function available.
- Skip function:
  - No display or printing of channels of which ranges are not set.
### GENERAL SPECIFICATIONS

**Rated power voltage:**
- 100 to 240VAC, 50/60Hz

**Maximum power consumption:**
- Max 40VA
- 100V AC balanced: 20VA,
- 240V AC balanced: 27VA

**Normal operation condition:**
- Ambient temperature range: 0 to 50°C (20 to 65%)
- Ambient humidity range: 20 to 80%RH (5 to 40°C)
- Power voltage: 90 to 264V AC
- Power frequency: 50/60Hz ±2%
- Altitude: forward tilting 0°, backward tilting 0° to 20°, left/right 0 to 10°

**Case material:**
- Door --- Aluminum die-casting
- Front panel --- Glass

**Case color:**
- Door --- Black (equivalent of Munsell N3.0)
- Glass --- Clear and colorless
- Case --- Gray (equivalent of Munsell N7.0)

**Mounting:**
- Panel mounting

**Weight:**
- About 3.0kg

**Terminal screw:**
- Power terminal
- Protective conductor terminal --- M4.0
- Measuring input terminal, alarm output terminal
- Remote contact terminal --- M3.5
- Communication terminal --- M3.0

### OPTIONS

**Remote contact:**
- By external relay contact signal (digital contact: short or open), you can select chart speed or data printing

**Input points:**
- 5 points

**Input signal:**
- Digital contact signal or open collector signal

**Function:**
- 1. Record start/stop
- 2. Chart speed 3-speed switch
- 3. Data printing
- 4. List printing
- 5. Message printing
- 6. Operation record

**Alarm output:**
- Mechanical relay (’c’ contact) 4 points, 6 points
- Max. load 100 to 240VAC 0.2A
- 30V DC 0.2A
- Min. load 5V DC 10mA

**Mechanical relay (’c’ contact) 4 points**
- Max. load 100 to 240VAC 0.2A
- 30V DC 0.2A
- Min. load 5V DC 10mA

**Communication interface:**
- RS232C, RS422A, RS485, Ethernet

**Low order communication:**
- This instrument functions as host unit and reads data from the units* connected as low order unit complying with the set parameter content. The data is to be displayed and recorded as host unit data. Use COM2 port (RS485) to connect with the low order units.
- To write the measured/calculated data of this instrument to the low order unit (PLC) is also available.

*CHINO products and some of PLC (MELSEC, CEM, etc.)

**SD card playback:**
- This function is to perform trace recording of measured value, digital recording/printing of time, time line and maximum/minimum chart record, etc., on the chart paper by using the data files of measured values saved in SD card.
- To perform the playback recording/printing, select desired files and specify a time range.
- Dot printing is to be performed every 0.05mm as chart is fed, if any measured value data exists in the equivalent time scale.

### MEASURING RANGES/ACCURACY RATING/DISPLAY RESOLUTION

<table>
<thead>
<tr>
<th>Input type</th>
<th>Measuring range</th>
<th>Reference range</th>
<th>Accuracy ratings</th>
<th>Display resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td>Mv</td>
<td>-13.8 to 13.8mV</td>
<td>±1.38mV</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>-27.6 to 27.6V</td>
<td>±2.76V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>K</td>
<td>-200 to 200V</td>
<td>±200V</td>
<td>100mV</td>
</tr>
<tr>
<td></td>
<td>J</td>
<td>-500 to 500mV</td>
<td>±500mV</td>
<td>100mV</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>-5 to 5V</td>
<td>±5V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>-1 to 1V</td>
<td>±1V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>-10 to 10V</td>
<td>±10V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>-20 to 20V</td>
<td>±20V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>-50 to 50V</td>
<td>±50V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>U</td>
<td>-200 to 200mV</td>
<td>±200mV</td>
<td>100mV</td>
</tr>
<tr>
<td></td>
<td>W-WRe26</td>
<td>0 to 2315V</td>
<td>±69.0mV</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>WR55-WRe26</td>
<td>0 to 2315V</td>
<td>±69.0mV</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>NiMo-Ni</td>
<td>0 to 290V</td>
<td>±13.8V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>Platinel II</td>
<td>0 to 350V</td>
<td>±13.8V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>PRPH20</td>
<td>0 to 1880V</td>
<td>±13.8V</td>
<td>10mV</td>
</tr>
<tr>
<td></td>
<td>CR-AuFe</td>
<td>0 to 280K</td>
<td>±6.9mV</td>
<td>±0.1% +1digit</td>
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<tr>
<td></td>
<td>AuPt</td>
<td>0 to 1000V</td>
<td>±27.6mV</td>
<td>±0.1% +1digit</td>
</tr>
<tr>
<td></td>
<td>Pt100</td>
<td>-140 to 1500V</td>
<td>±1600Ω</td>
<td>0.1Ω</td>
</tr>
<tr>
<td></td>
<td>Old Pt100</td>
<td>-200 to 300V</td>
<td>±220Ω</td>
<td>0.1Ω</td>
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<tr>
<td></td>
<td>JPt100</td>
<td>-200 to 150V</td>
<td>±1600Ω</td>
<td>0.1Ω</td>
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<td>Pj50</td>
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<td>±340Ω</td>
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<tr>
<td></td>
<td>Pt-Co</td>
<td>4 to 374K</td>
<td>±220Ω</td>
<td>±0.1% +1digit</td>
</tr>
</tbody>
</table>

**Note:** The accuracy ratings are converted into the measuring range under reference condition. Thermocouple input does not contain reference junction compensation accuracy.

W-WRe26, NiMo-Ni, Platinel II, PRj50, Pt-Co: JIS C 1604-1989
CR-AuFe, AuPt: ASTM E1751
WR5-5W-Re26 : ASTM E988 U, L : DIN43710-1985

### ACCESSORIES

<table>
<thead>
<tr>
<th>SD Card</th>
<th>Model</th>
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<tbody>
<tr>
<td>512MB</td>
<td>RZ-SMC512</td>
</tr>
<tr>
<td>1GB</td>
<td>RZ-SMC1G</td>
</tr>
<tr>
<td>2GB</td>
<td>RZ-SMC2G</td>
</tr>
</tbody>
</table>
### TERMINAL ARRANGEMENT

#### Alarm relay output (6 points ‘a’ contact) + remote contacts and communication interface

<table>
<thead>
<tr>
<th>Communication terminal</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232C</td>
<td>SG</td>
<td>SD</td>
<td>RD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS422A</td>
<td>SG</td>
<td>SA</td>
<td>SB</td>
<td>SA</td>
<td>SA</td>
<td>SA</td>
<td>SA</td>
<td>SA</td>
</tr>
<tr>
<td>COM2 RS485</td>
<td>SA</td>
<td>SB</td>
<td>SG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Measurement input terminals: TC-mV(+), RTD(A) terminals, TC-mV(-), RTD(B) terminals, RTD(B) terminals
- COM terminal
- Alarm output terminals (option)
- N.O terminal
- Power/protective conductive terminals
- Remote contact terminals (option)
- Ethernet connector (option)

#### Alarm relay output (4 points ‘c’ contact) + remote contacts and communication interface

<table>
<thead>
<tr>
<th>Communication terminal</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</tr>
</thead>
<tbody>
<tr>
<td>RS232C</td>
<td>SG</td>
<td>SD</td>
<td>RD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>RS422A</td>
<td>SG</td>
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<td>SB</td>
<td>SA</td>
<td>SA</td>
<td>SA</td>
<td>SA</td>
<td>SA</td>
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<tr>
<td>COM2 RS485</td>
<td>SA</td>
<td>SB</td>
<td>SG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Measurement input terminals: TC-mV(+), RTD(A) terminals, TC-mV(-), RTD(B) terminals, RTD(B) terminals
- COM terminal
- Alarm output terminals (option)
- N.O terminal
- Power/protective conductive terminals
- Remote contact terminals (option)
- Ethernet connector (option)

### DIMENSIONS

- **Panel cutout**

![Panel cutout diagram](image)

- **Max 216** *Max216, When alarm output/remote contacts unit and communication unit are added*

### APPLICATION SOFTWARE (standard attached)

**Data Acquisition Software**
You can acquire data easily to your PC.

*Optional communication interface required

**Parameter Setting Software**
Control the setting information at PC by using communication interface or USB port (standard equipped)

**Data Analysis Software**
Open the binary file recorded in the SD card, replay display and edit the trend of acquired data file.

### Specifications
Specifications subject to change without notice. Printed in Japan (J) 2019.1