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.
  *Optional communication interface required.
  Data analysis software can replay display, waveform process, editing and trend display.
  Parameter setting software can manage the setting information on PC.
- **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.

**MODELS**

<table>
<thead>
<tr>
<th>MODELS</th>
<th>AL47</th>
<th>P</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>NN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input point</td>
<td>1 : 1 pen</td>
<td>2 : 2 pen</td>
<td>3 : 3 pen</td>
<td>4 : 4 pen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm output / remote contacts (option)</td>
<td>0 : None</td>
<td>2 : Mechanical relay 2 points ('a' contact)</td>
<td>4 : Mechanical relay 4 points ('c' contact)</td>
<td>+ remote contact 5 points</td>
<td>A : Mechanical relay 6 points ('a' contact)</td>
<td>+ remote contact 5 points</td>
</tr>
<tr>
<td>Power supply</td>
<td>A : 100-240V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrying handle and feet (option)</td>
<td>N : None</td>
<td>T : With carrying handle and feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Graphic LCD display
Display measured data by digital display and analog indication by bar graph display.

- 1 point enlarged digital display
- 1 point enlarged digital display + bar graph display
- 4 points digital display
- 4 points pointer display

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

3. SD card slot
Save measured data to SD card by designated interval (Fastest 0.1sec). Also, register measuring / recording condition such as range, scale, chart speed and when required, setup the unit by registered conditions.

4. 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 with time, channel no., data, unit 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 recorded.

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

Measuring points: 1 to 4 points
Input types:
- DC voltage: ±13.8mV, ±27.6mV, ±69.0mV, ±200mV, ±500mV, ±1V, ±5V, ±10V, ±20V, ±50V
- DC current: Max 50mA by external shunt resistor

Input resistance:
- [Thermocouple/DC voltage: ±5V or lower range] 6MΩ or higher
- [DC voltage: ±10V or higher range] Approx. 1MΩ

Reference junction compensation accuracy:
At ambient temperature: 23°C ±10°C
- K, E, J, T, N, Platinel °F/K32 --- ±0.5°C or EMF 20µV, whichever greater
- Other than above --- ±1.0°C or EMF 40µV, whichever greater

Burnout:
- Burnout detection function for thermocouple input and RTD input. Upper burnout, lower burnout or burnout disabled is selectable for each input.

Allowable signal source resistance:
- [Thermocouple/DC voltage] Burnout disabled: 1kΩ or lower
- [Resistance thermistor] 10Ω or lower per wire (same resistance for 3 wires)

Maximum input voltage:
- [Thermocouple/DC voltage: ±5V or lower range] ±10V or lower
- [DC voltage: ±10V or higher range] ±60V or lower
- [Resistance thermistor] ±6V or lower

Measuring current: [Resistance thermistor] 1mA ±20%

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**

Analog display: LCD bar graph 100mm
Digital display: Full dot monochrome LCD

Display item:
- Dots: 240 x 48 dots
- Display area: 106 x 16mm

Status display:
- REC, CARD, ALM

**ALARM SPECIFICATIONS**

Alarm display:
- Status display “ALM” flash, measuring value flash 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 2,6 output ‘a’ contact
- Mechanical relay 4 output ‘c’ contact

**STANDARDS**

CE marking:
- EN61326-1
- EN61010-1

*Under EMC test condition, variation in indication value is ±20% or ±2mV at maximum, whichever is larger.

UL:
- UL61010-1

CSA (C-UL):
- CAN/CSA C22.2 No.61010-1

**RECORDING SPECIFICATIONS**

Data recording interval:
- 0.1, 0.2, 0.5, 1, 2, 3, 5, 10, 15, 20, 30sec, 1, 2, 3, 5, 10, 15, 20, 30, 60min

Recording method:
- Trace printing --- disposable felt-tip pen
- Digital printing --- dot type plotter pen

Record/Printed color:
- Trace printing ---1 pen/red, 2 pen/green, 3 pen/blue, 4 pen/brown
- Digital printing --- purple

Recording interval:
- 100ms

Step response:
- 90%/1 sec

Recording deadband:
- ±0.2%

Chart speed:
- Set arbitrarily from 1 to 600mm/h or 1 to 200mm/min, 1mm interval. 12.5mm/h can be set exceptionally.

Chart fast feed:
- Operated by FEED key
- Feed 0.1mm by one quick press of the key or feed continuously (approx. 600mm/min) by holding down the key.

Periodic data printing:
- Digital printing is added to trace printing at month / day, time, channel no., data, unit

Data printing:
- When required, interrupt trace printing and digital print time and measuring value.

**CONNECTIVITY**

SD card slot
USB port for PC
Web browser
Application
FTP server
Ethernet
PLC
KP
DB
LT
RS422A / RS485 *Option
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 types.
ON/OFF of display and recording: Select ON / OFF of display trace recording to chart, digital recording to chart, recording to SD card per each channel.
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: A part of printing area of each channel is printing compressed or expanded.
Automatic range shift printing: Recording range is shifted automatically to another set range when measuring value exceeds the current range. Overlap function available.
Printing at power-on: Year/month/date and time are printed at power-on.
Printing at recording start: Year/month/date and time are printed at recording start (Rec.OFF-->Rec.ON).
Calendar timer printing: Printing is performed with calendar timer ON and printing enabled. Trace printing is continued. Printed items: Year/month/date/time, calendar timer No, and a message, one message consists of up to 15 characters (alphabets, numbers, katakana, symbols, etc.) and up to 5 types of message is able to register. *Message is shared by message printing
Setting change mark: Is printed on the right side of chart when setting change occurs.
Operation recording: Remote contact ON/OFF status is recorded with straight line to specified area. Specified area: Within the range of 0 to 90% Up to 10 types can be recorded. *Only for the unit using remote contact and enabling operation recording.
Chart illumination: White LED ON/OFF/AUTO can be set.
Chart end detection: Notified on the operation screen. After detecting the end of the chart, automatically stops recording (the rest operated normally).
Pen up function: Performed automatically at recording stop and chart end.
Time axis synchronization (POC): ON/OFF can be set at using 2 pen, 3 pen and 4 pen.

**GENERAL SPECIFICATIONS**

Rated power voltage: 100 to 240VAC, 50/60Hz
Power consumption: MAX 40VA

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%
- Attitude: forward tilting 0°, backward tilting 0 to 30°, left/right 0 to 10°

Memory protection:
- Set contents and pen type POC data maintained by nonvolatile RAM.
- Clock data maintained by lithium battery. (Data saved for more than 10 years with 8-hour or more operation per day.)
- (Alarm message displayed when battery level drops.)

Clock accuracy: ±2 minutes in 30 days (under reference operating condition, error caused by power ON/OFF excluded)

Insulation resistance:
- Primary terminal – Protective conductor terminal: 20MΩ or more (500V DC)
- Secondary terminal – Protective conductor terminal: 20MΩ or more (500V DC)
- *Primary terminal: General power terminal, alarm output terminal
- Secondary terminal: All terminals other than primary terminals

Withstand voltage:
- Primary terminal – Protective conductor terminal: 1500V AC (one minute) basic insulation
- Secondary terminal – Protective conductor terminal: 500V AC (one minute) functional insulation
- *Primary terminal: General power terminal, alarm output terminal
- Secondary terminal: All terminals other than primary terminal.

Case material:
- Door --- Aluminum die-casting
- Front panel --- Glass
- Case --- Cold-rolled steel plate

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

Mounting:
- Panel mounting

Weight:
- Approx. 3.2kg (with full options)

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

**TRANSPORTATION & STORAGE SPECIFICATIONS**

Transportation condition:
- [Ambient temperature] -10 to 60°C
- [Ambient humidity] 5 to 90%RH (non-condensing)
- [Vibration] 4.9m/s² (10 to 60Hz)
- [Impact] 392m/s²
*These conditions are set assuming that the unit is packed in a similar way to that at shipment.

Storage condition:
- [Ambient temperature] -10 to 60°C
- [Ambient humidity] 5 to 90%RH (non-condensing)
- [Vibration] 0m/s² (10 to 60Hz)
- [Impact] 0m/s²
*These conditions are set assuming that the unit is packed in a similar way to that at shipment. Readjustment may required.
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. Contact capacity: 5V DC/2mA. Function: 1. Record start/stop, 2. Chart speed 3-speed switch, 3. Data printing, 4. List printing, 5. Message printing, 6. Operation record (Record ON/OFF condition to the designate location by bar line), 7. Integration/F value reset, 8. Memory card (record start/stop), 9. Alarm output rest, 10. Time correction.

Alarm output: Mechanical relay (‘a’ contact) 2 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.


Accessories

<table>
<thead>
<tr>
<th>SD Card</th>
<th>Model: RZ-SMC512</th>
</tr>
</thead>
<tbody>
<tr>
<td>1GB</td>
<td>Model: RZ-SMC1G</td>
</tr>
<tr>
<td>2GB</td>
<td>Model: RZ-SMC2G</td>
</tr>
</tbody>
</table>

Measuring ranges/accuracy rating/display resolution

<table>
<thead>
<tr>
<th>Input type</th>
<th>Measuring range</th>
<th>Reference range</th>
<th>Accuracy rating</th>
<th>Display resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>mV</td>
<td>-13.8 to 13.8mV</td>
<td>±13.8mV</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>DC voltage</td>
<td>-27.8 to 27.8mV</td>
<td>±27.8mV</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>V</td>
<td>-69.0 to 69.0mV</td>
<td>±69.0mV</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>K</td>
<td>-200 to 200mV</td>
<td>±200mV</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>E</td>
<td>-200 to 200mV</td>
<td>±200mV</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>J</td>
<td>-500 to 500mV</td>
<td>±500mV</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>T</td>
<td>-200 to 200°C</td>
<td>±200°C</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>R</td>
<td>0 to 1000°C</td>
<td>±100°C</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>S</td>
<td>0 to 1000°C</td>
<td>±100°C</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>B</td>
<td>0 to 1000°C</td>
<td>±100°C</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>N</td>
<td>0 to 1000°C</td>
<td>±100°C</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>U</td>
<td>0 to 1000°C</td>
<td>±100°C</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>L</td>
<td>0 to 1000°C</td>
<td>±100°C</td>
<td>±0.1%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>W-WRe26</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>WRe5-WRe26</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>NiMo-Ni</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>Platinel</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>Pt100</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>Old Pt100</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>JP100</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</td>
</tr>
<tr>
<td>Pt-Co</td>
<td>0 to 2315°C</td>
<td>±69.0mV</td>
<td>±0.15%</td>
<td>±1 digit</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, JPR90-JPR20: CR-AuFe, Au/Pt: ASTM E1751
WRe5-WRe26: ASTM E985 U L: DIN34710-1985
### Exceptions for accuracy ratings

<table>
<thead>
<tr>
<th>Input type</th>
<th>Exceptional range</th>
<th>Accuracy rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>K.E.J.N.U.L</td>
<td>-200 to 0°C</td>
<td>±0.2%±1digit or equivalent of 70µV, whichever is larger.</td>
</tr>
<tr>
<td>T</td>
<td>-200 to 0°C</td>
<td>±0.2%±1digit</td>
</tr>
<tr>
<td>R.S</td>
<td>0 to 400°C</td>
<td>±0.2%±1digit</td>
</tr>
<tr>
<td>B</td>
<td>0 to 400°C</td>
<td>Not defined</td>
</tr>
<tr>
<td>W-WRe26</td>
<td>0 to 400°C</td>
<td>±0.2%±1digit</td>
</tr>
<tr>
<td>PtRh40-PtRh20</td>
<td>0 to 400°C</td>
<td>±1.5%±1digit</td>
</tr>
<tr>
<td></td>
<td>400 to 800°C</td>
<td>±0.8%±1digit</td>
</tr>
<tr>
<td>CR-AuFe</td>
<td>0 to 20 K</td>
<td>±0.5%±1digit</td>
</tr>
<tr>
<td></td>
<td>20 to 50 K</td>
<td>±0.3%±1digit</td>
</tr>
<tr>
<td>Pt-Co</td>
<td>4 to 20 K</td>
<td>±0.5%±1digit</td>
</tr>
<tr>
<td></td>
<td>20 to 50 K</td>
<td>±0.3%±1digit</td>
</tr>
</tbody>
</table>

### TERMINAL ARRANGEMENT

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

![Communication terminal diagram](image)

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

![Communication terminal diagram](image)
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.

DIMENSIONS

*Max241, When alarm output/remote contacts unit and communication unit are added.

(Max220, When Ethernet unit are added.)

Panel cutout

Specifications subject to change without notice. Printed in Japan (I) 2017. 3