

AL3000 SERIES 100MM CHART MULTI-POINT TYPE HYBRID RECORDER



MODEL AL3765-□□□

AL3000 series conforming to CE-marking, UL and CSA are 100mm multi-point type hybrid recorders with a simultaneous display of multi-channel data, bargraph display and other unique features. A package software "KIDS" for data processing of measured values is available.



FEATURES

- **Simultaneous digital displays of multi-point data**

Simultaneous digital display of 6 points allows measured data to be viewed at a glance.

- **Universal input**

The recorders accept total 54 ranges of 7 DC voltage ranges, 36 thermocouple ranges and 11 resistance thermometer ranges, and these ranges can be programmed for each channel.

- **Package software "KIDS" for data acquisition**

The data acquisition software "KIDS" is available for data acquisition with real-time data/trend displays and historical data/trend displays.

- **CE-marking, UL and CSA**

The recorders manufactured in our ISO9001 certified facilities conform to the rules of safety standards of CE-marking, UL (approval pending) and CSA (approval pending).

- **Other features**

- **Universal power supply**

100 V to 240 VAC, 50/60Hz


- **Communications interface (option)**

RS232-C, RS-422A or RS-485 with MODBUS protocol for easy configuration with your personal computer.

- **Clear trend and digital printings**

Cassette type wire-dotting system 6-color ink ribbon for clear trend and digital printings.

MODELS

AL3 7 6 5 - 

Communications interface (option)

N: None A: RS-422A,
R: RS-232C S: RS-485

Alarm output/remote contacts (option)

0: None
1: 6 (MOS relay) alarm outputs + remote contacts
2: 6 (mechanical relay) alarm outputs + remote contacts (*see note)

Others

0: None
1: Printing format + high-speed trace printing (option)

Note : Not conforming to CE-marking, UL and CSA

INPUT SPECIFICATIONS

Number of measuring points:

6 points

Input signals:

Refer to the table of inputs

Range setup:

Program input types and ranges by keys

Scale setup:

Program maximum values, minimum values and engineering units by keys

Accuracy rating:

Refer to the table of inputs

(The indication equivalent to maximum 200µV may vary under the test environment requested by EMC directive.)

Temperature drift:

±0.01% of full scale/°C

[Input signals except resistance thermometer inputs: Converted into reference ranges (refer to the table of inputs)]

Measuring cycle:

About 5 seconds/6-point

Reference junction compensation accuracy:

K, E, J, T, N, Platinel Maximum ±0.5°C
R, S, Ni-NiMo, AuFe-Cr, WWR5-26, WWR0-26
U, L Maximum ±1.0°C

(The above errors are added to the accuracy ratings for an internal reference junction compensation.)

Input resolution:

About 1/56000 (converted into reference ranges)

Burnout:

With a function to detect input signal disconnection for thermocouple inputs and resistance thermometer inputs

Up-scale burnout, down-scale burnout or burnout disabled is selectable for each input.

Allowable signal source resistance:

Thermocouple inputs, DC voltage inputs ...
Maximum 1kΩ (burnout disabled)

Resistance thermometer inputs ...
Maximum 10Ω per wire: 3 wires – same resistance (Pt100, JPt100)

Input resistance:

Thermocouple inputs, DC voltage inputs ...
About 8MΩ
*About 1MΩ (with voltage-divider)

Maximum input voltage:

Thermocouple inputs, DC voltage inputs ...
Maximum ±10VDC
Resistance thermometer inputs ...
Maximum ±6VDC

Input compensation:

Zero compensation, span compensation and shift compensation, for each channel

Maximum common mode voltage:

30VAC

Common mode rejection ratio:

Minimum 130dB (50/60Hz)

Series mode rejection ratio:

Minimum 50dB (50/60Hz)

Terminal board: Detachable type, removable on wiring

PRINTING SPECIFICATIONS

Printing interval:

About 5 seconds/point

(Printing interval is longer for chart speeds of less than 6mm/hr.)

Printing dead band: 0.2%

Printing system: Wire-dot type 6-color ribbon

Printing color:

Trace printing

Channel No.	1	2	3	4	5	6
Colors	Red	Black	Blue	Green	Brown	Purple

Digital printing

Periodic data printing, digital data printing:

Repetition of red, black, blue, green, brown and purple

Alarm printing: Red

Channel number printing:
Same color as trace printing

Fixed-time printing:
Range, tag, engineering unit ... Same color as trace printing
Month/day or year/month/day, time, time line, chart speed ... black

List printing:
Programmed parameters ... Same color as trace printing, Others ... black

Programming change mark:
Black

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

Chart speed:
1 to 1500mm/hr (Default ... 20mm/hr)

Periodic data printing:
Digital printing of time, channel numbers and measured values on trace printing
Interval time (hour, minute) ... optional programming (limited by chart speeds)

Digital data printing:
Digital printing of time and measured values by interrupting trace printing on demand.

Alarm printing:
Alarm-on ... Time, channel number, alarm type and level in right side of a chart
Alarm-reset...Time, channel number and level in right side of a chart
Memory capacity ...Maximum 48 data

Programming change mark:
Mark in right side of chart whenever programmed parameters change.

List printing:
Print of year, month, day, parameters of each channel and others.

Subtract printing:
Print of difference of two channels or between channel and reference value (programmed value).

Fixed-time printing:
Print of month, day, time, time line, chart speed, ranges (scales), tags and engineering units every fixed-time (interlocking to chart speed)

Skip function:
No display or printing of channels of which ranges are not programmed.

■ DISPLAY SPECIFICATIONS

Display items:
Simultaneous display of 6-channel measured values, or time (year/month/day/hour/minute), alarm-on channels and chart speed (LCD)

Status display:
Printing status, key lock and alarm-on.

■ ALARM SPECIFICATIONS

Alarm display:
"ALARM" illumination and flashing alarm-on channels

Alarm types:
Absolute value alarm, differential alarm, rate-of-change alarm

Alarm programming:
Individual programming for each channel, Maximum 4 levels/channel

Alarm deadband:
0.1 to 9.9% of scale programming range (Default : 0.1%)

Alarm output:
Option (refer to list of options)

■ PROGRAMMING/OPERATION

Programming:
By key strokes

Programming parameters:
Time, chart speed, periodic data printing, ranges, scales, engineering units, tags, alarms, burnout, subtract printing, °C/°F, passcode (key lock) (Options: Communications, printing format)

Printing operation:
RECORD ON/OFF Printing on/off
FEED Fast-feeding of chart
LIST List printing
DATA PRINT Digital data printing

Data display selection: (Key selection):
Measured values display and multi-point sequential bargraph display, or Measured values display and 1-point continuous bargraph display, or Time/other displays and 1-point continuous bargraph display.

INPUTS

INPUTS					INPUTS							
Input signals	Measuring ranges	Reference ranges	Accuracy ratings	Display resolutions	Input signals	Measuring ranges	Reference ranges	Accuracy ratings	Display resolutions			
DC Voltage	-13.8 to 13.8mV	±13.8mV	±0.1%±1 digit	10μV	WVRe5-26	0 to 2320°C	±69.0mV	±0.2%±1 digit	1°C			
	-27.6 to 27.6mV	±27.6mV		10μV		PR5-20	0 to 1800°C		±13.8mV	1°C		
	-69.0 to 69.0mV	±69.0mV		10μV		PR20-40	0 to 1880°C		±13.8mV	1°C		
	-200 to 200mV	±200.0mV		100μV		Ni-NiMo	0 to 290°C		±13.8mV	0.1°C		
	-500 to 500mV	±500.0mV		100μV			0 to 600°C		±27.6mV	0.1°C		
	-2 to 2V	±2V		1mV			0 to 1310°C		±69.0mV	1°C		
	-5 to 5V	±5V		1mV		AuFe-Cr	0 to 300K		±13.8mV	0.1K		
Thermocouple	K	-200 to 300°C	±13.8mV	0.1°C	Thermocouple	100 to 350°C	±13.8mV	0.1°C	±0.15%±1 digit 0.1°C			
		-200 to 600°C	±27.6mV	0.1°C		Platinel	-100 to 650°C	±27.6mV		0.1°C		
		-200 to 1370°C	±69.0mV	1°C		-100 to 1390°C	±69.0mV	1°C				
	E	-200 to 200°C	±13.8mV	0.1°C		U	-200 to 500°C	±27.6mV		0.1°C		
		-200 to 350°C	±27.6mV	0.1°C		-200 to 600°C	±69.0mV	0.1°C				
		-200 to 900°C	±69.0mV	1°C		L	-200 to 250°C	±13.8mV		0.1°C		
	J	-200 to 500°C	±27.6mV	0.1°C			-200 to 500°C	±27.6mV		±0.1%±1 digit	0.1°C	
		-200 to 1200°C	±69.0mV	1°C			-200 to 900°C	±69.0mV		1°C		
	T	-200 to 250°C	±13.8mV	0.1°C		Resistance Thermometer	-140 to 150°C	160Ω		±0.15%±1digit	0.1°C	
		-200 to 400°C	±27.6mV	0.1°C			Pt100(1)	-200 to 300°C		220Ω	±0.1%±1digit 0.1°C	
	R	0 to 1200°C	±13.8mV	1°C			200 to 850°C	400Ω		±0.1%±1digit 0.1°C		
		0 to 1760°C	±27.6mV	1°C			-140 to 150°C	160Ω		±0.15%±1digit	0.1°C	
	S	0 to 1300°C	±13.8mV	1°C			Pt100(2)	-200 to 300°C		220Ω	±0.1%±1digit 0.1°C	
		0 to 1760°C	±27.6mV	1°C			-200 to 649°C	400Ω		±0.1%±1digit 0.1°C		
	B	0 to 1820°C	±13.8mV	1°C			-140 to 150°C	160Ω		±0.15%±1digit	0.1°C	
	N	-200 to 400°C	±13.8mV	0.1°C			JPt100	-200 to 300°C		220Ω	±0.1%±1digit	0.1°C
		-200 to 750°C	±27.6mV	0.1°C			-200 to 649°C	400Ω		±0.1%±1digit	0.1°C	
		-200 to 1300°C	±69.0mV	1°C			Pt50	-200 to 649		220Ω	±0.1%±1 digit	0.1°C
	WVRe0-26	0 to 2320°C	±69.0mV	1°C			Pt-C0	4 to 374K		220Ω	±0.15%±1digit	0.1K

K, E, J, T, R, S, B, N: IEC584, JIS C1602-1995

U(Cu-CuNi), L (Fe-CuNi): DIN43710

Platinal: Platinel alloy No. 5355 (+), Platinel alloy No. 7674 (-)

WVRe5-26: W-5% Re/W-26% Re (Hoskins manufacturing Company)

Note) Accuracy ratings are of measuring ranges at reference operation conditions. The reference junction compensation accuracy is not included with the accuracy ratings of thermocouple inputs.

Pt100(1): IEC751(1995), JIS C1604-1997

Pt100(2): IEC751(1983), JIS C1604-1989, JIS C1606-1989

JPt100: JIS C1604-1981, JIS C1606-1986

■ GENERAL SPECIFICATIONS

Rated power voltage:

100 to 240VAC, 50/60Hz

Power consumption:

Maximum 45VA

Environmental conditions:

- Reference operating condition ...

Ambient temperature/humidity range:

21 to 25°C, 45 to 65%RH

Power voltage: 100VAC ± 1%

Power frequency: 50/60Hz ± 0.5%

Attitude: Left/right 0°, Forward tilting 0°,

Backward tilting 0°

Warm-up time: More than 30 minutes

- Normal operating condition ...

Ambient temperature/humidity range:

0 to 40°C, 20 to 80%RH

Power voltage: 90 to 264VAC

Power frequency: 50/60Hz ± 2%

Attitude: Left/right 0 to 10°, Forward tilting

0°, Backward tilting 0 to 30°

- Transportation condition ...

At the packed condition on shipment from our factory

Ambient temperature/humidity range:

-20 to 60°C, 5 to 90%RH

(No dew condensation)

Vibration: 10 to 60Hz, Less than 0.5G

Impact: Less than 40G

- Storage condition ...

Ambient temperature/humidity range:

-20 to 60°C, 5 to 90%RH

(No dew condensation)

Power failure protection:

Programmed parameters stored into EEPROM memory

Clock circuit sustained for minimum 10 years by a lithium battery (at the operation more than 8 hours/day)

Insulation resistance:

Between secondary terminals and protective conductor terminal ...

More than 20M Ω at 500VDC

Between primary terminals and protective conductor terminal ...

More than 20M Ω at 500VDC

Between primary terminals and secondary terminals ...

More than 20M Ω at 500VDC

Between alarm terminals (mechanical relay) and other secondary terminals ...

More than 20M Ω at 500VDC

Dielectric strength:

Between secondary terminals and protective conductor terminal 1 minute at 500VAC

Between primary terminals and protective conductor terminal 1 minute at 1500VAC

Between primary terminals and secondary terminals 1 minute at 2300VAC

Between alarm terminals (mechanical relay) and other secondary terminals ...1 minute at 1000VAC

Note: Primary terminals:

Power (L, N), Alarm (MOS relay)

Secondary terminals:

Input, Alarm (mechanical relay),

Remote contacts, Communications

Case assembly material:

Door ... ABS resin (frame), Polycarbonate (front plate), Enclosure ... Steel

Color: Door ... Black (frame - equivalent to Munsell N3.0),

Transparent (front plate), Enclosure Gray

(equivalent to Munsell N7.0)

Mounting:

Panel mounting

Weight:

About 3.0kg (full options)

External dimensions and panel cutout:

144(H) x 144(W) x 237(D)mm (external

dimensions), 138 x 138mm (panel cutout)

Clock accuracy:

Within ± 2 minutes per 30-day (under reference

operating conditions)

Except errors by turning power supply on or off

Terminal screws:

Power terminals M4.0

Protective conductor terminals M4.0

Measuring input terminals M3.5

Alarm terminals M3.5

Remote contact terminals M3.5

Communications terminals M3.5

OPTIONAL SPECIFICATIONS

Options	Explanations
Remote contacts	By signals of 4-point contacts and 2-point common contacts, the following operations are executed. Selection of 3-chart-speed/stop, digital data printing and list printing
Alarm output	6-point individual output OR output possible Maximum contact rating: MOS relay output: 240V(AC, DC) 50mA(AC, DC) Resistive load Mechanical relay 100V AC 0.5A output*: 240V AC 0.2A 100V DC 0.2A Resistive load * [Not conforming to CE-marking, UL and CSA]
Printing format	Zone printing Printing area is divided into 2 zones
	Compressed/Expanded printing A part of printing area of each channel is printing compressed or expanded.
	Automatic range-shift printing Printing range is automatically changed into a new printing area in the event of overrange or underrange
Communications	3 kinds of RS-232C, RS-422A, RS-485 (to be specified) Parameter programming, operation and data dogging (MODBUS protocol)
High-speed trace Printing	Printing interval about 2.5 seconds (standard: 5 seconds) Note: Printing interval is longer for chart speeds of less than 12mm/hr.
Voltage divider	Voltage divider (1/1000) is externally added for inputs exceeding $\pm 5V$ to $\pm 60V$.
Shunt-resistor	Measurement of current by adding a resistor of 250Ω (for 20mA) or 100Ω (for 50mA)
16m chart	Total length of 15.6m

1 kind of the printed format is to be specified.

STANDARDS

CE-marking: EN55011 Group 1 Class A, EN50082-2, EN61010-1 + A2
UL: UL3111-1 (Approval pending)
CSA (C-UL): C22.2, No.1010(Approval pending)
IP: IEC529 IP54 (Front part)

Data acquisition package software "KIDS"

The data acquisition software "KIDS" is a package software for storing data being measured by AL3000 and AH3000 series recorders and for playing back of the stored data.

Main function and features

Data processing: Maximum 100 channels
(up to 5 sets)

Alarm output Real-time data,
real-time trend, historical data,
historical trend and daily report

- Communications interfaces:
RS-232C, RS-422A or RS-485
- Stored data: Can be exported to Microsoft Excel, Lotus 1-2-3 and other application software.

EXTERNAL DIMENSIONS

Specifications subject to change without notice. Original 2001.4