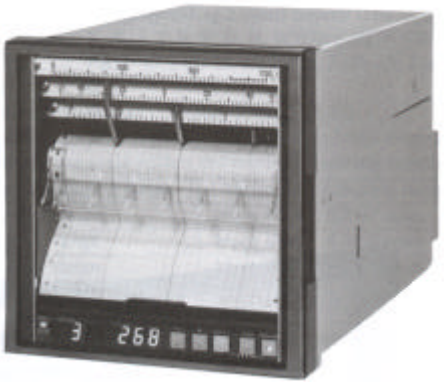
BL SERIES 100MM CHART PEN TYPE HYBRID RECORDER

PERFORMANCE SPECIFICATION
CHINO

MODEL BL □□□□□□□

The BL series 100mm-chart pen-writing hybrid recorder can easily be operated in the same way as in operating an analog recorder, and it comprises one-pen, two-pen, and three-pen types.
It is provided with the scale plates conforming to its input types and measuring inputs to be able to read measured values directly at a glance, and also, these values are indicated digitally.
The one-pen recorder is only 195mm in depth and lightweight. (The two-pen and three-pen types are 240mm in depth.) This compact type recorder offers the analog/digital recording function, individual ranges for each input, time-axis synchronization, and other convenient functions as a hybrid recorder.



Time-axis synchronization, external drive, alarm outputs, and other abundant functions are provided to comply with flexible needs.

■ FEATURES

• Ready to run immediately
As the recorders are pre-set to meet individual customer specifications and precise application requirements, the units start indicating and recording as soon as they are switched on.

•Analog scale and digital display conforming to measuring inputs
Measured values can be read at a glance on an analog scale conforming to the measuring inputs. A scale plate is for each pen, and these scale plates independently graduated.

• Compact and easy to install
The BL recorders are designed for use in applications where space is at a premium. With a reduced depth of 195mm(1-pen type) and weighing 3.0kg (1-pen type); the instruments are ideally suited for panel mounted installations.

• Detachable terminal board for easy wiring
A detachable terminal board is provided to enable convenient on-site connection of the cable.

• Easy instrumentation with a communication function
Communication interfaces RS-422A, RS-232C, and RS-485 are prepared at option. Data can be easily collected by connecting the recorder with a personal computer.

• Input signal shift function
Indications can be corrected by shifting them every pen according to the input signals of the input sensor. Indicating & recording scale positions can also be corrected.

• Abundant functions
Date (year, month, day) printing, key lock, and other easy-to-use functions are provided abundantly.

■ MODELS

BL □□□□□□□□

1st pen input signals
1: Thermocouple, DC voltage Single range
2: Resistance thermometer Single range

No. of input points (No. of pens) E: 1pen F: 2pens G: 3pens

2nd pen input signals
Same as in 1st pen input signals (0 in case of one-pen recorder)

3rd pen input signals
Same as in 1st pen recorder
(0 in case of one-pen recorder and two-pen recorder)

CE-marking (option)
-:Not provided
E: With CE-marking

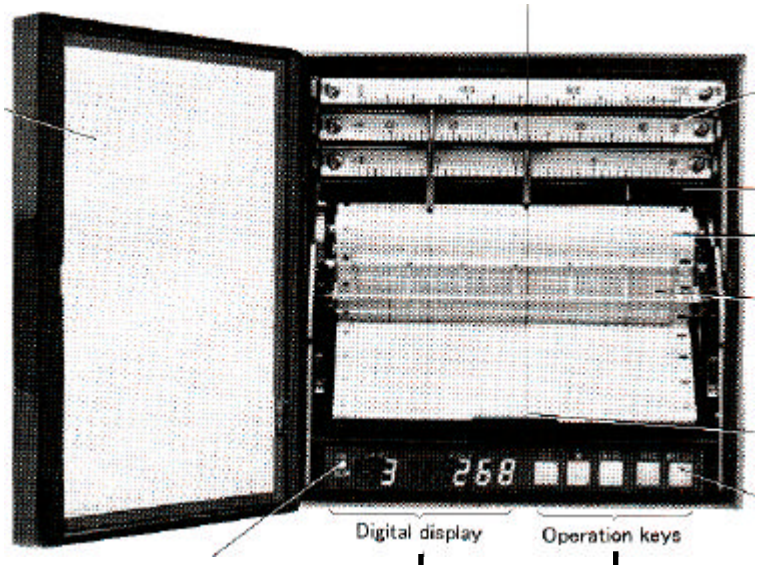
Communication interface (option)
N: None A: RS-422A
R:PS-232C 5: RS-485

Time-axis synchronization (option)
D:Not provided
2: Time-axis synchronization provided

External drive + Individual alarm outputs (option)
N: None D: External drive
1: 6 alarm output points*
2: External drive + 6 alarm output points*
A: External drive + mechanical relay "a contact alarm output 6 points (conforming to CE-marking)

* Not conforming to CE-marking ones will be 'mechanical relay "c" contact' alarm outputs.
Conforming to CE-marking ones will be 'MOS relay' alarm outputs.

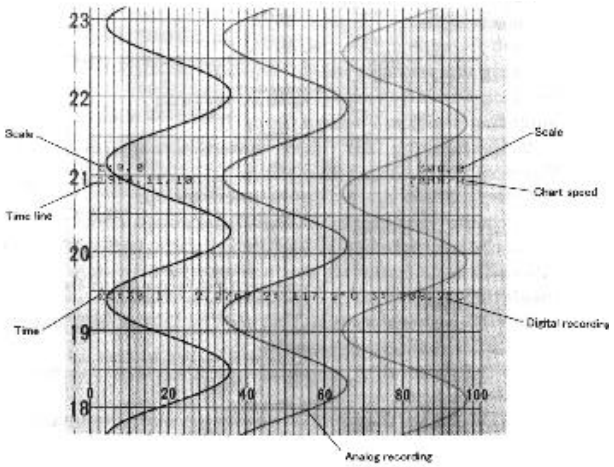
■ NAMES AND FUNCTIONS OF COMPONENT PARTS



■ RECORDING FORMAT

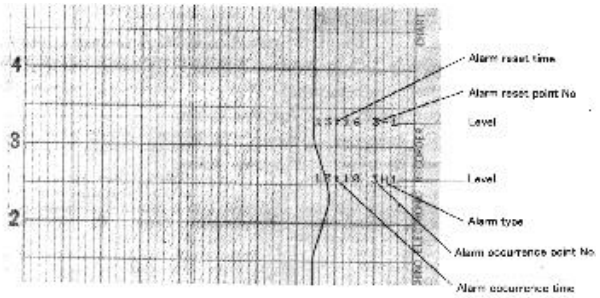
• Fixed time digital printing

Time, scale, chart speed, setting change mark, and time line are printed on analog recording at optional time intervals, and data are also recorded.



• Printing of occurence and reset of alarms

Time, point No., alarm type, and level are printed when an alarm occured and the alarm was reset.



■ GENERAL SPECIFICATIONS

Input signals:

DC voltage ... ± 7mV, ± 14mV, ± 25mV, ± 70mV, ± 5V
DC current ... Applicable by adding a shunt resistor (100Ω, 250Ω)
Thermocouples ..K, E, J, T, R, S, B, N, WWRe5-26, WWRe 0-26, PR20-40, PR5-20, Ni-NiMo, AuFe-Cr, Platinel, U, L
Resistance thermometer ... Pt100, JPt100, Pt-Co
Specify input signals out of the standard scale table every pen.

Scale : Specify the scale within the minimum setting range.

Reference measuring range	Minimum measuring range
7.0mV range	More than 3.2mV span
14.0mV range	More than 6.3mV span
25.0mV range	More than 11.3mV span
70.0mV range	More than 31.5mV span
5.0V range	More than 2.3V span
1 20 Ω range	More than 20.0 Ω span
140 Ω range	More than 20.0 Ω span
160 Ω range	More than 27.0 Ω span
220 Ω range	More than 54.0 Ω span
340Ω range	More than108.0Ω span

*The reference voltage input is 0mV (0V), while the reference resistance input is 100 Ω
*See the reference measuring range.

Accuracy rating:

Digital indications and printing
Thermocouple, resistance thermometer
±0.3% of the scale range ±1 digit. When the scale range less 300t, accuracy rating is it.
DC voltage ± 0.2% of the reference measuring range ± 1 digit
Analog indication ± 0.5% of the scale range
[Note: Accuracy at a room temperature of 23t ± 2'C

*Note: For thermocouple inputs, the reference junction compensating accuracy is excluded.

*Exceptional provisions of accuracy rating

Input type	Scale	Accuracy rating (with reference to the reference measuring range)
WWRe0-26	0 to 100°C	±0.3% ±1 digit
PR20-40	0 to 300°C 300 to 800°C	±1.5% ±1 digit ±0.8% ±1 digit
PR5-20	0 to 100°C 100 to 200°C	4% ±0.5% ± 1 digit
AuFe -Cr	0 to 20K 20 to 50K	±0.5% ± 1 digit ±0.3% ± 1 digit
Pt-Co	4 to 20K 20 to 50K	±0.5% ± 1 digit ±0.3% ± 1 digit

Reference junction compen8ation accuracy:
K, E, J, T, N, Platinel Lower than ± 0.5'C
R, S, WWRe5-26, WWRe0-26, Ni-NiMo, AuFe-Cr, U, L
Lower than ± Lot *A*/D resolution:Approx. 1/18000

Allowable signal source resistance:
Thermocouple input, DC voltage input
Lower than 1k ohm (without burnout function)
TResistance thermometer input, Lower than 10 ohm per wire (without burnout function)

Input resistance:
Thermocouple input, DC voltage input Approx 8MΩ
*Approx 1MΩ when a voltage divider is used.

Common mode rejection ratio: More than 130dB
Serie8 mode rejection ratio: More than 50dB
No. of measuring point8: Max.3 points
Measuring cycle: About 125ms every pen
Temperature drift: ± 0.01% of full scale/t (equivalent to E. M.

F. for thermocouple input)

Terminal board: Detachable (Removable during connection)

Recording system:
Analog recording ... Continuous recording with cartridge pens
Digital recording .... Dot printing with a plotter pen

Recording color:
Analog recording ... 1st pen: Red, 2nd pen: Green, 3rd pen: Blue
Digital recording ... Purple
Kinds: Fixed time digital recording
Data printing
Date (year, month, day) and Time printing
Scale, Chart Speed, Setting change mark, Alarm occurrence/reset printing (option)

Recording chart:
Fan-fold type 114mm total width 10m total length
100mm effective recording width

Chart speed:
10, 20, 40mm/h (standard) 3-speed selection by DIP switches.
* The speeds are optionally settable.
1 to 599mm/h, 10 to 200mm/mm. (1mm step)

Fixed time digital recording:
Time, pen No., measured values, and units are printed on analog recording every specified time interval.

Data printing:
Time, pen No., measured values, and units are printed on analog recording whenever requested.

Date (year, month, day), time, and chart speed printing:
Time is printed at the time line and chart 0% position every hour sharp.
Date (year, month, day) is printed at zero hour sharp.
*If this printing overlaps digital recording, time may be not printe
* The printing intervals depends upon the chart speeds.

Scale printing:
A scale is printed at the 0% and 100% positions of the chart at the time printing timing in the order of pens.
* If digital printing is done halfway or if the chart speed is high, the printing interval is extended.

Alarm occurrence and reset printing:
Time, pen No., alarm type, and level are printed on the 100% side of the chart when an alarm occured.
Time, pen No., and level are printed on the 100% side of the chart when the alarm was reset.

Setting change mark printing:
Characters showing a change item are printed on the 100% side of the chart when a setting change ends. (When the communication option are added.)

Skip function:
None of analog indications of each pen, digital display, and printing is done collectively.

Analog indications: Scale plate and scale pointer (scale index for 1-pen type)

Scale plate: Max. dual scale, max. 80 equal divisions

Status display:
Recording ON/OFF .... Green LED, illumination switch
ALM ... Red LED flickers during the occurrence of an alarm.
PW... Green LED lights when power supply is turned ON.

Digital display: 7-segment LED Character height 8mm
2 digits Pen No.
5 digits Data display -9999 to 99999

Display items: Multipoint sequential display, one-point continuous display, and time display are switched.

Setting mode display (setting, check, and operation):
Digital display part is shared by key operation.
Data,print operation, chart speed setting, time setting, alarm setting (when the alarm option is added), data interval setting, skip setting.

Kinds of keys: REC. ON, FEED, ENTRY, ↑, SEL

Recording operation: REC. ON....Recording operation ON/OFF
FEED.... Fast feed of chart

Rated supply voltage: 90 to 120VAC, or 180 to 240VAC (to be specified)

Rated 8upply frequency: 50Hz/60Hz(selectable by DIP switches)

Maximum power consumption:
1-pen recorder Approx. 30VA
2-pen recorder Approx. 35VA
3-pen recorder Approx. 40VA

Working temperature range: 0 to 50°C

Working humidity range: 20 to 80%RH

Mounting position: Forward tilting .... 0°
Backward tilting ... 0°C to 30°C Lateral tilting ...0°

Warm-up time: Longer than 30mm

Countermeasure against power interruption:
Set contents are held by EEPROM.
The clock is backed up by a soldered lithium battery for longer than 10 years (assuming that it is used for 8 hours a day.)

Insulation resistance:
500VDC, higher than 20MΩ between measuring terminals and protective conductor terminal
500VDC, higher than 20MΩ between power terminals and protective conductor terminal
500VDC, higher than 20MΩ between measuring terminals and power terminals

Dielectric strength:
500VAC, 1mm, between measuring terminals and protective conductor terminal
1500VAC, 1mm, between power terminals and protective conductor terminal
1500VAC, 1mm, between measuring terminals and power terminals

Casing materials:
Door … ABS resin (heat resisting temperature Max.80°C)
Rear casing … Steel plate
Power supply … Steel plate

Color: Door…Black (Munsell code N3.0 or equivalent)
Rear casing ... Gray (Munsell code N7.0 or equivalent)

Mounting: Panel Flush-mount

Weight: 1- pen recorder ..... Apporx. 3.0kg
2- pen recorder ..... Apporx. 4.0kg
3- pen recorder ..... Apporx. 4.5kg

- **Transporting and storage conditions**

Temperature: -20 to +60°C
Humidity: 5 to 95%RH (No condensing)
Vibrations: 10 to 60Hz 0.5G
Shock: Less than 40G

This also offers the following maintenance functions. However these functions are performed by IBM-PC at CHINO's agents, world wide.

- **ENG1 mode** (Specifications check):
  Input parameters (ranges, scales, units)
  Alarm (mode, output destinations, AND/OR when an alarm option is provided.)
  Key lock(Key lock condition check by means of communi- cation)
- **ENG2 mode** (Communication option setting and external drive option output specifications check):
  Communication setting (address, baud rates, character con figuration)
  External drive information
- **Calibration:**
  Indications are calibrated on every pen.
  Indication are shifted on every pen.
  Chart scale position is corrected.
- **Memory clear.**
  Initialization of set values (Input types, ranges, scales, units, and chart speed are reset to the set values at the delivery time from the works, and alarm is initialized to no setting)
  Clock initialization (The clock is initialized to Jan. 1, 1994)
  Calibration data are initialized.
- **Hardware check:**
  Printer check, indicator check, DIP switches check, external- drive check, version check, and alarm output contact check

■ OPTIONS

Name of option	Contents
External drive	The following operation can be done by external contact signals Operat~n type: 3 c art speeds selection, recording stop & data printing No. of contact points: 3 no-voltage contacts Contact capacity: 12VDC, 2mA or higher *The depth is increased by 16mm when this option is added.
Communication interface	One of RS-232C, RS-422A, and RS-485 is to be specified. Communication contents: Transmission of measured values and status information. Setting and confirmation of parameters are settable by keys. * The depth is increased by 16mm when this optiori is added.
Alarm outputs	No. of output points: 6 points Alarm type: Absolute value alarm OR output * Differential alarm, change rate alarm, standby alarm and AND output can be offered on reguest. Differential alarm"An alarm is judged by differential values (high limit, low limit) from other channels. Change rate alarm" An alarm is judged when a change rate per measuring cycle is large. OR output~ An alarm is output if one of plural alarm points becomes an alarm condition. AND output" An alarm is output when all alarm points become an alarm condition. Setting level: 2 levels/channels Contact capacity: Mecahanical relay output: 100V AC, 0.5A, (Resistive load) (Common to "a" contact and "c" contact): 240V AC, 0.2A, (Resistive load) MOS relay output: 240V (AC, DC), 50mA The depth is increased by 16mm when this option is added. And the depth in increased by 27mm when mechanical relay "a" contact is added.
Time axis synchronization	The mechanical positions of pens are corrected with time in case of 2-pen & 3-pen recorders.
Non-standard scale	Voltage-dividing input: Higher than 5VDC, but lower than 60VDC (Voltage dividing resistor is built in: Channel fixed) Current input: Lower than 50mA (Resistor is built in. Channel fixed. Resistor is externally mounted.)
Bumput	The recording pointer overshoots the high limit when input signal is interrupted. (Except for voltage dividing inputs and voltage current inputs)
16m chart	114mm total width 15.6m total length 100mm ef- fective recording width
Math function	One of addition substruction multiplication, square root, logarithm (conmon, natural), temperature humidity, integration is to be specified.
CE-marking	Standards EN55011 group 1 class A EN50082-2 (industrial environment) EN61010-1 + A2 Rated supply voltage 100 to 240VAC • Case: Steel • Reference junction compensation stability ± 5°C under EMC test environment

■REFERENCE MEASURING RANGES

Input type		Reference measuring range	Scale	Display resolution	Minimum measuring range
DC voltage		± 7mV ±14mV ±25mV ±70mV ± 5V	-7 to + 7mV -14 to +14mV -25 to +25mV -70 to +70mV -5 to +5V	1 µV 10 µV 10 µV 10 µV 1 mV	3.2 mV 6.3 mV 11.3mV 31.5mV 2.3V
Thermocouple	K	±7mV ±14mV ±25mV ±70mV	-150 to +150°C -200 to +300°C -200 to +600°C -200 to +1370°C	0.1°C 0.1°C 0.1°C 1°C	100°C 200°C 400°C 800°C
	E	±25mV ±70mV	-200 to +350 °C -200to +900 °C	0.1°C 1°C	200°C 500°C
	J	±25mV +70mV	-200 to +450 °C -200 to +1200°C	0.1°C 1°C	300°C 600°C
	T	± 7mV ±14mV ±25mV	-150 to +150°C -200 to +250°C -200 to +400°C	0.1°C 0.1°C 0.1°C	100°c 200°C 300°C
	R	±25mV	0 to +1760°C	1°C	1200°C
	S	±25mV	0 to +1760°C	1°C	1200°C
	B	±14mV	400 to +1820°C	1°C	1200°C
	N	± 7mV ±14mV ±25mV ±70mV	0 to +200°C 0 to +350°C 0 to +700°C 0 to +1300°C	0.1°C 0.1°C 0.1°C 1°C	150°C 300°C 400°C 900°C
	WWRe5 -26	±70mV	0 to +2320°C	1°C	1900°C
	WWRe0 -26	±70mV	0 to +2320°C	1°C	1900°C
	PR20-40	± 7mV	0 to +1880°C	1°C	1500°C
	PR5-20	±14mV	0 to +1800°C	1°C	1200°C
	Ni-NiMo	±10mV	0 to +1310°C	1°C	700°C
	AuFe-Cr	± 7mV	0 to 300K	1°C	180K
	Platinel	± 7mV ±l4mV ±25mV ±70mV	-100 to+150°C -100 to+300°C -100 to+600°C -100 to+1390°C	0.1°C 0.1°C 0.1°C 1°C	100°C 200°C 400°C 800°C
	U	± 7mV ±14mV ±25mV ±70mV	-150 to +150°C -200 to +250°C -200 to +450°C -200 to +600°C	0.1°C 0.1°C 0.1°C °C	100°C 200°C 300°C 600°C
	L	±25mV ±10mV	-200 to +450°C -200 to +900°C	0.1°C 1°C	300°C 600°C
Resistance thermometer	Pt100	120Ω 140Ω 160Q 220Ω 340Ω	- 50 to + 50 °C -100 to+100°C -140 to+150°C -200 to+300 t -200 to+649°C	0.1°C 0.1°C 0.1°C 1°C 0.1°C	50°C 100°C 150°C 200°C 400°C
	JPt100	120Ω 140Ω 160Ω 220Ω 340Ω	- 50 to +50°C -100 to +100°C -140 to +150°C -200 to +300°C -200 to +300°C	0.1°C 0.1°C 0.1°C 1°C 0.1°C	50°C 100°C 150°C 200°C 400°C
	Old Pt50	220Ω	-200 to +649°C	0.1°C	300°C
	Pt-Co	220Ω	4 to 374K	0.1K	200K

*Caution) The minimum measuring ranges of the temperature scale are reference values. (They vary more or less according to the temperature ranges.)

■ STANDARD SCALES

Input type		Working reference measuring range	Standard scale
DCvoltage/ current		± 7mV ±14mV ±25mV ±10mV ± 5V	-5 to + 5mV, 0 to 5mV -10 to +10mV, 0 to 10mV 0 to 20mV 0 to 50mV 1 to 5V, 4 to 20mA, 10 to 5 0mA (Scale plate is equally divided from 0 to 100)
Thermocouple	K	± 7mV ±14mV ±25mV ±10mV	0 to 100°C , 0 to 150°C, 50 to +100°C -50 to +150°C, -100 to +50°C 0 to 200°C, 0 to 250°C, 0 to 300°C -50 to +200°C, -100 to +200°C 0 to 400°C, 0 to 500°C, 0 to 600°C 0 to 800°C, 0 to 1000°C, 0 to 1200°C
	E	±25mV ±10mV	0 to 200°C, 0 to 300°C, -50 to +150°C 0 to 500°C, 0 to 600°C, 0 to 800°C
	J	±25mV ±10mV	0 to 300°C, 0 to 400°C 0 to 600°C, 0 to 800°C, 0 to l000°C 0 to 1200°C
	T	± 7mV ±14mV ±25mV	0 to 100°C, 0 to 150°C -50 to +150°C 0 to 200°C, 0 to 250°C 0 to 300°C, 0 to 400°C
	R	±25mV	0 to 1200°C, 0 to 1400°C, 0 to 1600°C
	S	±25mV	0 to 1400°C, 0 to 1600°C
	B	±14m	0 to 1200°C, 0 to 1400°C 0 to 1600°C
	N	± 7mV ±14mV ±25mV ±70mV	0 to 150°C, 0 to 200°C 0 to 300°C 0 to 400°C, 0 to 500°C, 0 to 600°C 0 to 1000°C, 0 to 1200°C
	PR20-40	± 7mV	0 to 1600°C
	PR5-20	±14mV	0 to 1200°C, 0 to 1400°C to 1600°C
	Nr-NiMc	±70mV	0 to 800°C, 0 to 1000°C, 0 to 1200°C
	Platinel	± 7mV ±14mV ±25mV ±70mV	0 to 100°C, 0 to 150°C 0 to 200°C, 0 to 250°C, 0 to 300°C 0 to 400°C, 0 to 500°C, 0 to 600°C 0 to 800°C, 0 to 1000°C, 0 to 1200°C
	U	± 7mV ±14mV ±25mV ±70mV	0 to 100°C, 0 to 150°C 0 to 200°C, 0 to 250°C 0 to 300°C, 0 to 400°C 0 to 600°C
	L	±25mV ±10mV	0 to 300°C, 0 to 400°C 0 to 600°C, 0 to 800°C
Resistance thermometer	Pt100	120Ω 140Ω 160Ω 220Ω 340Ω	-50 to +50°C, 0 to 50°C 0 to +100°C, -20 to +80°C 0 to 150°C, -50 to +150°C 0 to 200°C, 0 to 300°C 0 to 400°C, 0 to 500°C, 0 to 600°C
	JPt100	120Ω 140Ω 160Ω 220Ω 340Ω	-50 to +50°C, 0 to 50°C 0 to 100°C, -20 to +80°C 0 to 150°C, -50 to +150°C 0 to 200°C, 0 to 300°C 0 to 400°C, 0 to 500°C, 0 to 600°C

■ ACCESSORIES

Name of accessory	Q'ty	Remarks
Recording chart	1 pad	Fan-fold type, total length 10 m
Mounting bracket	2 pcs.	Used for mounting the recorder on a panel
Channel indicating card	1 sheet	This card is attached to the door for describing the name of measurement in each channel. (The functions of DIP switches are described on the rear panel.)
Cartridge pen	1 pc. each	For analog recording, 1 each according to No. of pens (No.1 pen: Red, No.2 pen: Green, No.3 pen: Blue)
Plotter pen	1 pc.	For digital recording (purple)
Auxiliary terminal screw	5 pcs.	Use these input (alarm) terminal screws if they are missing. (Screw diameter 3.5mm)
Lubricating oil	1 bottle	Contains 10cc (for maintenance)
Instruction manual	1 pad	A separate manual is attached when the communication interface is provided.
Inspection certificate	1 sheet	Inspection certificate to show that the recorder has passed the delivery inspection.

■ CONSUMABLES

Article name	Sales unit
Recording chart	15 pads/case
Cartridge pen	Each color 3 pcs/bag
Plotter pen	3 pcs/bag
Lubricating oil	1 bottle
Mounting bracket	2 pcs. (for one unit)

■ TERMINAL BOARD

(In case of 3-pen recorder)

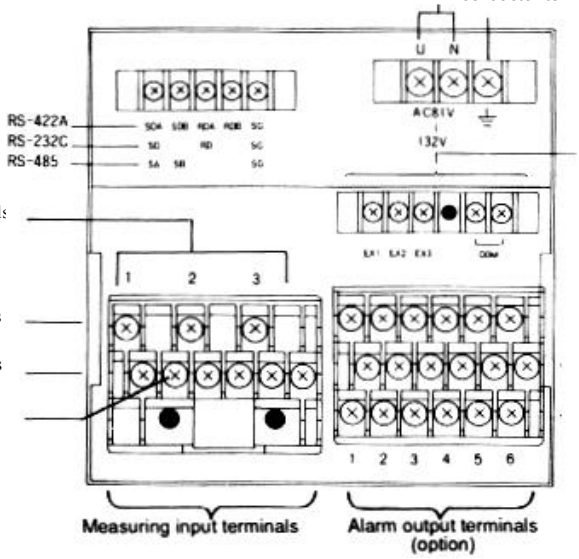
Communication interface terminals (option)

	1	2	3	4	5
PS-422A	SDA	SDB	RDA	RDB	SG
PS-232C	SD	-	RD	-	SG
PS-485	SA	SB	-	-	SG

External drive signal terminals (option)

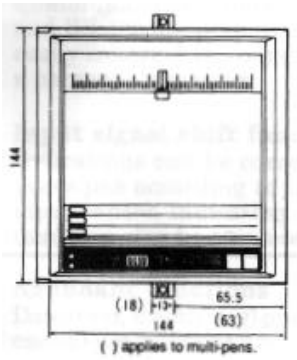
1	2	3	4	5	6
EX_1	EX_2	EX_3	EX_4	COM	

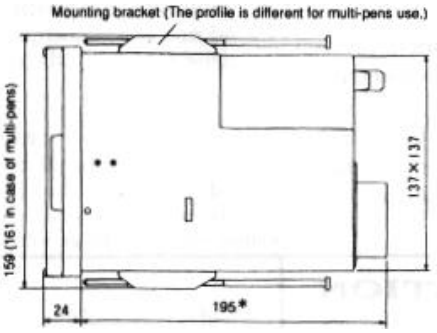
<Mechanical relay "c" contact with alarm output*>
*: The terminal of MOS relay output with "a" contact is not available. Normally Closed will be Common terminals.



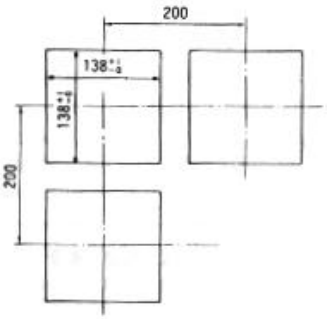
※ Normally closed (NC) terminals are not available for CE-marking option.

■ EXTERNAL DIMENSIONS





• **Panel Cutout/Minimum Instrument mounting space**



*: 195 (1-pen)/240 (2,3-pen)
*: Additional 16mm (for external drive, alarm output and communication interface)
Additional 27mm (for mechanical relay "a" contact output)

Unit: mm

■ HOW TO ORDER

1. Model : BL□□□□ - □D□
2. Power voltage : 100VAC line or 200VAC line (To be specified)

* No need to specify the above for CE-marking (100 to 240VAC free power source)

3. Chart speed : Standard 10, 20, 40mm/h
   Specified speed _____ , _____ , _____ mm/h or
   _____ , _____ , _____ mm/mm
4. Input type and scale:

Point No.	Input type	Scale range (inc.deci.point)	Printing unit
1.		to	
2.		to	
3.		to	

* Printing unit: 2 digits. (°C shows 2 digits.)
Shunt resistor for current input:
Built-in or external

5. Scale plate:

	Scale range	Unit
1.	to	
	to	
2.	to	
	to	
3.	to	
	to	

*Max. dual scale Unit: Max. 10 characters(Single scale)
Max. 6 characters (Multi scale)

6. Alarm option:
Alarm designation: Standard □, Exclusive □

* Fill the following table with the exclusive specifications, if so specified.

Points	Level	Alarm type	Output No.	Output	Alarm set value	Parameters
1	1	(H)	(1)	(OR)		
	2	(L)	(1)	(OR)		
2	1	(H)	(2)	(OR)		
	2	(L)	(2)	(OR)		
3	1	(H)	(3)	(OR)		
	2	(L)	(3)	(OR)		

*Parenthesized ( ) settings show the standard settings.
*Enter the alarm set value by keys.
*Alarm output is up to 2 levels per channel.
*Alarm type: H; Higher-limit absolute value alarm,
L; Lower-limit absolute value alarm.
B; Differential higher-limit alarm S; Differential lower-limit alarm U; Change ratio increase limit alarm D; Change rate decrease limit alarm.

These alarms are setta.ble. Fifi the option parameters with a reference channel when the differential alarm is selected, or fill the option parameter with scanning cycle (1 to 9) when the change ratio alarm is selected. Add W to the alarm type, if a standby alarm is necessary.(Example: WH, WL)

*An alarm output AND connection is possible. Write in the option parameters.
OR output: Alarm output is executed when one of alarm points becomes alarm condition.
AND output: Alarm output is executed when all alarm points become alarm condition.

*Alarm output numbers are freely settable in the range of 1 to 6

Specifications subject to change without notice. Original 1999.1

CHINO CORPORATION
Distributor: mawi-therm Temperatur-Prozeßtechnik GmbH
Louise-Schroeder-Weg 2 ; D-40789 Monheim
PHONE: +49 2173 51094 ; FAX: +49 2173 58623
E-mail: info@mawi-therm.com
Website: http://www.mawi-therm.com