

COMPACT SELF-BALANCING RECORDER

DATA SHEET

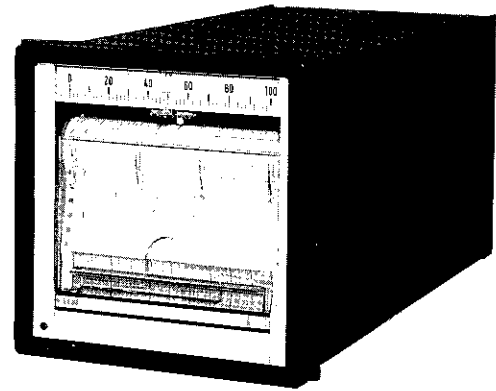
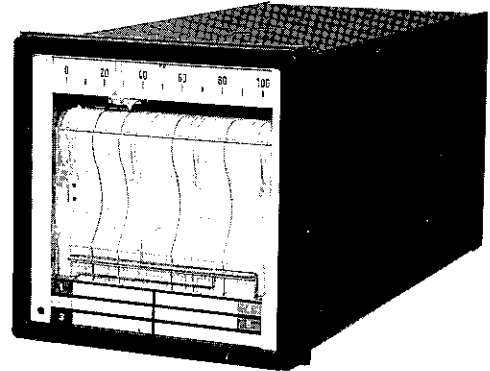
PGK

The Model PGK is a compact and reliable self-balancing recorder usable for a wide range of applications. It can receive various electrical signals including those from a resistance bulb or thermocouple, for recording variables on process from a variety of manufacturing and test equipment and signals from instruments used for monitoring the environment.

This recorder comes in many types; 1-pen, 2-pen, 3-point, 6-point and up to 2 ranges for multi-points. In addition, alarm function and variable chart speed are available. (optional)

FEATURES

- 1. Compact, lightweight instrument of DIN size**
The front panel dimension only 144 × 144mm, complying with the internationally recognized DIN standards, and the depth is 285mm. It weighs only about 5kg.
- 2. One month of continuous recording**
The chart length is 15.5m, and at the standard chart speed of 20mm/h, it will last for one month of continuous recording.
- 3. Easily replaceable cartridge pen**
Use of a felt-tip cartridge pen makes for very clear recordings. There is no need to supply ink, and maintenance is very easy, and besides there is no soiling of the hands or the chart.
- 4. Alarm device which assures reliability**
An electronic alarm device is equipped which has no mechanical contacting parts and assures high reliability. Besides, common setting and individual alarms is possible when used as a multi-point recorder.
- 5. A portable model is also available which is convenient for carrying around.**



SPECIFICATIONS

Input signal: 1 to 5V DC,
4 to 20mA DC,
10 to 50mA DC
Thermocouple input of 4mV span or more
or 10mV span or more*^{2,3}
(with reference junction compensator,
with or without burnout (upscale) circuit)
Resistance bulb input of 50°C span or
more, 3 wire type, Pt100Ω (at 0°C)
(linearizer built in)

Potentiometric transducer, 3 wire type
0 to 4mV 30V DC, without base
4mV DC span or more (max. voltage
30V)*¹

*¹ Base/span less than 2

*² Minimum temperature range (span) of thermocouple

Kind	4mV span or more	10mV span or more
K	150°C	250°C
J	100°C	200°C
E	100°C	150°C
T	150°C	220°C
R	—	1000°C
S	—	1000°C
B	—	1200°C
N	—	350°C

*³ Linearizer can be built in on request.

Input resistance and allowable signal source resistance:
Voltage input;

Es; input span	When balanced	When power cut off	Allowable signal source resistance
4 ≤ Es < 10mV	$R_i = \frac{E_s \text{ (mV)}}{0.04 \text{ (}\mu\text{A)}} \text{ (k}\Omega\text{)}$	10MΩ	$R_i \times \frac{1}{1000} \text{ (}\Omega\text{)}$ or less
	* $R_i = \frac{E_s}{0.1} \text{ (k}\Omega\text{)}$		
10 ≤ Es ≤ 100mV	$R_i = \frac{E_s}{0.1} \text{ (k}\Omega\text{)}$	5.6MΩ	
	* $R_i = \frac{E_s}{0.3} \text{ (k}\Omega\text{)}$		
0.1 < Es ≤ 1V	100kΩ	100kΩ	
1 < Es ≤ 30V	1MΩ	1MΩ	

* Value with burnout circuit

Current input;

Is; input span	Input resistance	Input resistance or voltage drop when input not being measured with multi-point recorder
0.1 ≤ Is ≤ 1mA	100Ω	100Ω
1 < Is ≤ 10mA	10Ω	10Ω
10 < Is ≤ 100mA	1Ω	5Ω
100 < Is ≤ 200mA	0.5Ω	5Ω
10 to 50mA	1.25Ω	* Voltage drop 0.75V or less
4 to 20mA	1.25Ω	* Same as above

* Forward voltage drop of diode

Note) Wiring resistance with resistance input should be 6Ω or less per wire (resistances of all wires should be balanced within ±0.1Ω).

- Accuracy:** Within ±0.5% of input span
- Dead band:** Within 0.2% of input span
- No. of measuring points and recording colors:**
 - 1 pen (red)
 - 2 pen (1st pen red, 2nd pen green)
 - 3 points (purple, red and green, from 1st point)
 - 6 points (purple, red, black, green, blue and orange, from 1st point)
- No. of measuring ranges:**
 - 2 ranges available with multi-point recorder, on request
- Scale length:** 100mm
- Response time:** Approx. 2 sec or less
- Dotting interval:** 5 sec (60Hz) or 6 sec (50Hz)
- Chart feed method:**
 - Synchronous motor (but pulse motor used for changing over between multiple chart speeds)
- Chart storage method:**
 - Folding method
- Chart length:** 15.5m (lasts 1 month at 20mm/h), remaining chart indicating scale printed
- Chart speed:**
 - 20mm/h (fixed)
 - 10mm/h (fixed), external drive and multi-speed changeover can be provided on request.

- Multi-speed changeover specifications (a through e equipped)
 - a. Low speed side . . . 10, 20, 24, 30, 60, 120, 200, 300, 600, 1200mm/h (selected by rotary switch on front panel)
 - b. High speed side . . . 1000, 1200, 2000, 2400, 3000, 4000, 6000, 12000mm/h (selected by rotary switch on front panel)
 - c. Fast feed . . . 12000mm/h (20cm/min) (selected by fast feed switch on front panel)
 - d. External changeover . . . changed over to present high speed side via external contact input signal; external terminals F-F shorted (contact capacity 5V, 10mA)
 - e. External drive . . . chart feed provided by external contact input signal; external terminals D-D shorted (contact capacity 30V, 0.1A)

Power supply: 100V/200V ± 10% AC, 50 or 60Hz
Following power supplies also available on request; 110/220V, 115/120V, 230/240V AC

Power consumption:
Approx. 5VA with 1 pen
Approx. 7VA with 2 pens
Approx. 8VA with 3 or 6 points

Power indicator lamp:
LED (green)

Ambient temperature:
0 to 50°C (-20 to +60°C for storage)

Ambient humidity:
30 to 90%RH

Enclosure: Casing; steel plate
Front door (with packing); ABS resin
External terminals (with cover); flame-resistant ABS resin

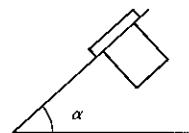
External dimension (H × W × D):
144 × 144 × 285mm

Structure: Panel mounted type or portable type

Weight: Approx. 4.5kg with 1 pen
Approx. 5kg with 2 pens
Approx. 5kg with 3 or 6 points

Finish color: Casing; Munsell 5Y 3/0.5
Front door; N1.5 (black) (color molded)

Mounting method:



∠ α = 90 to 60°

CODE SYMBOLS

1 2 3 4 5 6 7 8 9 10 11 12 13
 PGK 2

		Description																											
1		No. of recording points																											
2		1 pen																											
4		2 pens																											
5		3 points, single range																											
6		3 points, double range																											
7		6 points, single range																											
7		6 points, double range																											
A		Input signal																											
B		Uniform signal 1 to 5V DC																											
C		4 to 20mA DC																											
H		10 to 50mA DC																											
K		Resistance bulb JPt100Ω, at 0°C. 50°C span or more, 3 wire type, with linearizer																											
		Pt100Ω, at 0°C. 50°C span or more, 3 wire type, with linearizer																											
R		Thermocouple (with reference junction compensator)																											
S		10mV span or more, without linearizer and burnout circuit																											
M		10mV span or more, without linearizer, with burnout circuit																											
N		10mV span or more, with linearizer, without burnout circuit																											
T		10mV span or more, with linearizer and burnout circuit																											
X		4mV to 10mV span, without linearizer and burnout circuit																											
P		4mV to 10mV span, without linearizer, with burnout circuit																											
U		4mV to 10mV span, with linearizer, without burnout circuit																											
		4mV to 10mV span, with linearizer and burnout circuit																											
		Note) Minimum temperature range (span) of thermocouple is as follows:																											
		<table border="1"> <thead> <tr> <th>Kind</th> <th>10mV span or more</th> <th>4mV span or more</th> </tr> </thead> <tbody> <tr> <td>R</td> <td>1000°C or more</td> <td>—</td> </tr> <tr> <td>K (CA)</td> <td>250°C</td> <td>150°C</td> </tr> <tr> <td>J (IC)</td> <td>200°C</td> <td>100°C</td> </tr> <tr> <td>E (CRC)</td> <td>150°C</td> <td>100°C</td> </tr> <tr> <td>T (CC)</td> <td>220°C</td> <td>150°C</td> </tr> <tr> <td>S</td> <td>1000°C</td> <td>—</td> </tr> <tr> <td>B</td> <td>1200°C</td> <td>—</td> </tr> <tr> <td>N</td> <td>350°C</td> <td>—</td> </tr> </tbody> </table>	Kind	10mV span or more	4mV span or more	R	1000°C or more	—	K (CA)	250°C	150°C	J (IC)	200°C	100°C	E (CRC)	150°C	100°C	T (CC)	220°C	150°C	S	1000°C	—	B	1200°C	—	N	350°C	—
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S	1000°C	—																											
B	1200°C	—																											
N	350°C	—																											
E		Voltage 0 to 10mV 30V DC (without base)																											
G		10mV span to 30V span DC																											
Q		0 to 4mV 10mV DC (without base)																											
V		4mV span to 10mV span DC																											
		Note) Base/span should be 2 or less; max. voltage 30V or less																											
J		Resistance Potentiometric transducer, 3 wire type																											
F		Current 0 to 100μA 200mA DC (without base),																											
		100μA span to 200mA span DC																											
		Note) Base/span should be 2 or less; max. current 200mA																											
		Note) Make entries as follows in 5th and 6th digits for specifying input signal.																											
		Enter input signal code in □ digit and Y in space digit. That is;																											
		• For 1 pen, enter input signal code in 5th digit and Y in 6th digit. <input type="checkbox"/> Y																											
		• For 2 pens, enter input signal codes in 5th and 6th digits. <input type="checkbox"/> <input type="checkbox"/>																											
		• For multi-point single range, enter input signal code in 5th digit and Y in 6th digit. <input type="checkbox"/> Y																											
		• For multi-point double range, enter input signal codes in 5th and 6th digits. <input type="checkbox"/> <input type="checkbox"/>																											
A		Power supply																											
B		100V/200V AC 50Hz																											
C		100V/200V AC 60Hz																											
D		110V/220V AC 50Hz																											
E		110V/220V AC 60Hz																											
F		115V/120V AC 50Hz																											
G		115V/120V AC 60Hz																											
H		230V/240V AC 50Hz																											
H		230V/240V AC 60Hz																											
1		Structure																											
2		Panel mounting type																											
2		Portable type																											
Y		Application																											
A		For general use																											
		For connection with zener barrier																											
		Note 1) Specify A for connection with zener barrier (PWZ) and with input signals from resistance bulb, thermocouple.																											
		Note 2) When there are inputs of both intrinsic safety and non-intrinsic safety type, then the range cards must be divided into those for intrinsic safety and for non-intrinsic safety, and a double range specification must be made in the 4th digit.																											
		Note 3) All inputs are adjusted for connection with a zener barrier. So when there are both intrinsic safety and non-intrinsic safety type, enter a descriptive code for Z in the 10th digit and clarify whether each input point is of intrinsic safety or non-intrinsic safety.																											
Y		Recording chart speed																											
A		20mm/h Fixed																											
B		10 to 1200mm/h Multi-speed changeover (low/high speed changeover, fast feed, external changeover, external drive)																											
C		20mm/h Fixed, with external drive																											
D		10mm/h Fixed																											
D		10mm/h Fixed, with external drive																											
Y		Alarm device																											
A		None																											
B		Upper/lower limit alarm for 1st pen																											
C		Upper/lower limit alarms for 1st, 2nd pens																											
D		3 point recording, single range, common setting, common alarms (upper/lower limit alarms equipped)																											
E		3 point recording, single range, common setting, individual alarms (upper/lower limit alarms equipped)																											
F		6 point recording, single range, common setting, common alarms (upper/lower limit alarms equipped)																											
G		6 point recording, single range, common setting, individual alarms (upper limit alarm equipped)																											
H		6 point recording, single range, common setting, individual alarms (lower limit alarm equipped)																											
J		3 point recording, double ranges, common setting, common alarms (upper/lower limit alarms equipped)																											
K		3 point recording, double ranges, common setting, individual alarms (on request)																											
L		6 point recording, double ranges, common setting, common alarms (upper/lower limit alarms equipped)																											
M		6 point recording, double ranges, common setting, individual alarms (upper limit alarm equipped)																											
M		6 point recording, double ranges, common setting, individual alarms (lower limit alarm equipped)																											
Y		Indication lock device																											
A		None																											
A		Equipped (for pen recorder only)																											

Notes) Symbols of resistance bulbs are as follows: JPt100 . . . Previous JIS standard, Pt100 . . . New JIS standard

LIST OF CHART NOS. FOR PGK

Standard chart

Item	Scale	Chart No.	Item	Scale	Chart No.	Item	Scale	Chart No.
J thermo-couple	0 to 200°C	HN-4036-S	Linear (without numerals)	40 divisions	HL-4000-S	Linear (with numerals)	0 to 35	HL-7001-S
	0 to 300°C	HN-6021-S		50	HL-5000-S		0 to 70	
	0 to 400°C	HN-4046-S		60	HL-6000-S		0 to 14	
	0 to 500°C	HN-5022-S		70	HL-7000-S		0 to 80	
	0 to 600°C	HN-6022-S		75	HL-7500-S		0 to 160	
K thermo-couple	0 to 300°C	HN-6041-S	Linear (with numerals)	0 to 20	HL-4001-S		0 to 75	HL-7501-S
	0 to 400°C	HN-4041-S		0 to 40			0 to 150	
	0 to 600°C	HN-6018-S		0 to 25			-50 to +50	
	0 to 1000°C	HN-5041-S		0 to 50			50 to 100	
	0 to 1200°C	HN-6051-S		0 to 100			100 to 200	
R thermo-couple	0 to 1400°C	HN-7031-S		0 to 30	HL-6001-S			
	0 to 1600°C	HN-8015-S		0 to 60				
	800 to 1600°C	HN-8036-S		0 to 120				

Note: For resistance bulb (Pt) or thermocouple (linearizer built in) input, select from the linear scales.

Non-standard chart (delivered in sets of 24 rolls)

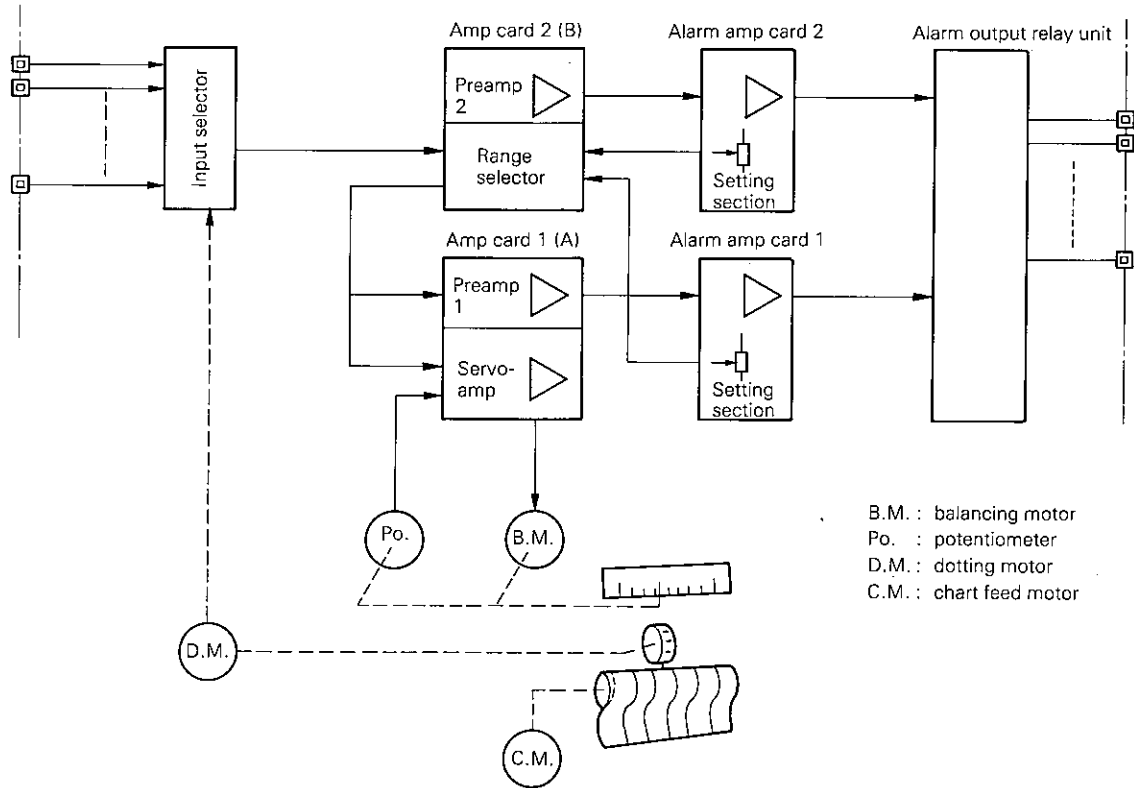
Item	Scale	Chart No.	Item	Scale	Chart No.	Item	Scale	Chart No.
J thermo-couple	0 to 250°C	HN-5021-S	K thermo-couple	400 to 1000°C	HN-6091-S	R thermo-couple	400 to 1400°C	HN-5091-S
	0 to 350°C	HN-7046-S		500 to 800°C	HN-6029-S		400 to 1600°C	HN-6036-S
	100 to 300°C	HN-4014-S		500 to 1000°C	HN-5001-S		600 to 1600°C	HN-5036-S
	200 to 400°C	HN-4016-S		600 to 1000°C	HN-4004-S	E thermo-couple	0 to 200°C	HN-4076-S
	300 to 500°C	HN-4018-S		700 to 1000°C	HN-6076-S		0 to 250°C	HN-5006-S
K thermo-couple	0 to 250°C	HN-5051-S		400 to 1200°C	HN-8031-S		0 to 300°C	HN-6011-S
	0 to 500°C	HN-5056-S		500 to 1200°C	HN-7051-S		0 to 400°C	HN-4051-S
	0 to 800°C	HN-8021-S		600 to 1200°C	HN-6046-S		0 to 500°C	HN-5016-S
	100 to 500°C	HN-4023-S		700 to 1200°C	HN-5011-S		0 to 600°C	HN-6016-S
	200 to 500°C	HN-6020-S		R thermo-couple	0 to 1000°C		HN-5066-S	200 to 400°C
	200 to 700°C	HN-5023-S	0 to 1200°C		HN-6031-S			
	300 to 800°C	HN-5024-S	0 to 1500°C		HN-7536-S			
	400 to 800°C	HN-4066-S		400 to 1200°C	HN-8026-S			

Note: The time scale on the chart is graduated for 20mm/h standard. (the endcord of chart No. "S").
For 10, 30, 60 120mm/h, the time scale is available on request.

SELECTION OF CHART NO.

1	2	3	4	5	6	7	Description
H	-						
L	-						Chart for PGK (HL denotes linear sections) (HN denotes non-linear sections)
N	-						Number of sections
							Numeral or other marks indicating sections
							Chart speed
						L	10mm/h
						S	20mm/h (standard)
						T	30mm/h
						X	60mm/h
						Y	120mm/h

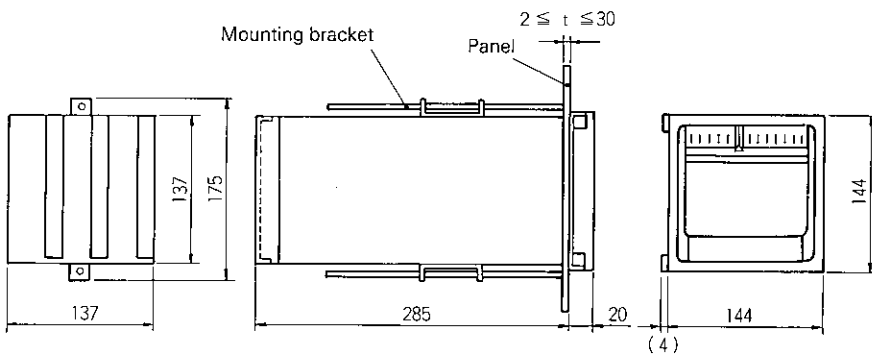
FUNDAMENTAL PRINCIPLE DIAGRAM (for 6-point double range, with alarm device)



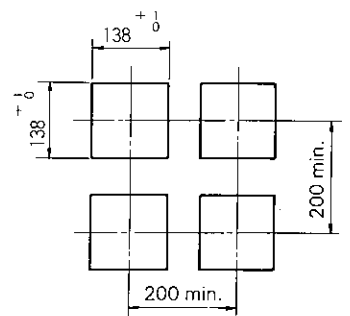
B.M. : balancing motor
 Po. : potentiometer
 D.M. : dotting motor
 C.M. : chart feed motor

OUTLINE DIAGRAM (Unit: mm)

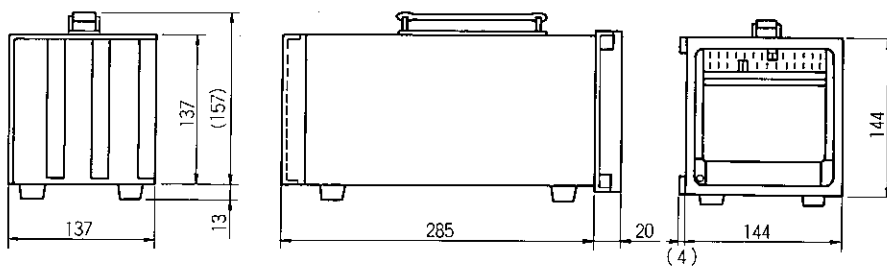
Panel mounting type



Panel cutout

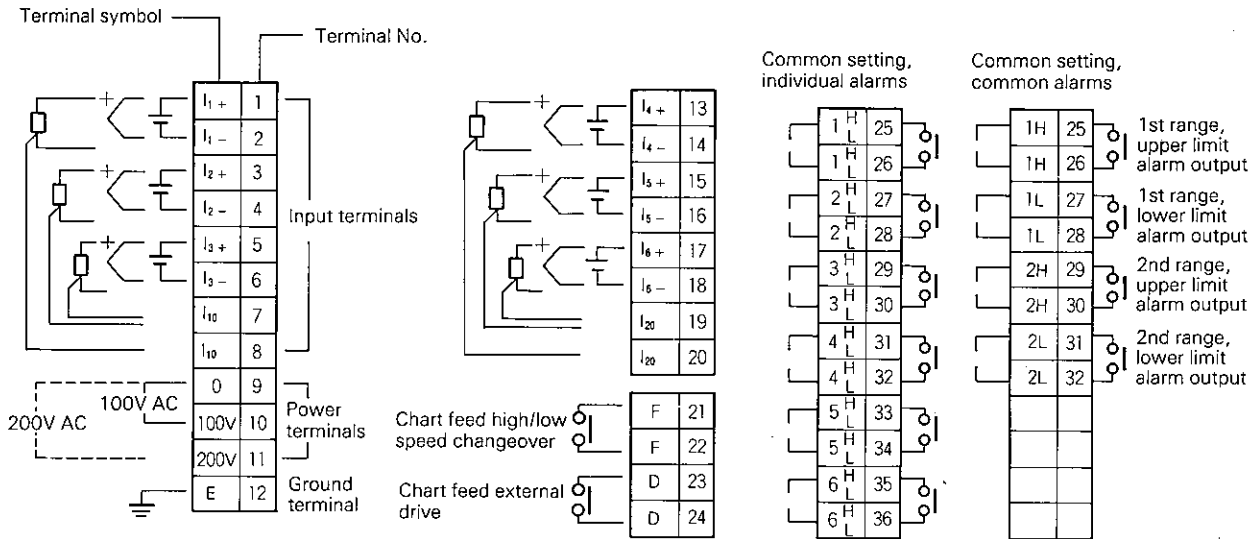


Portable type

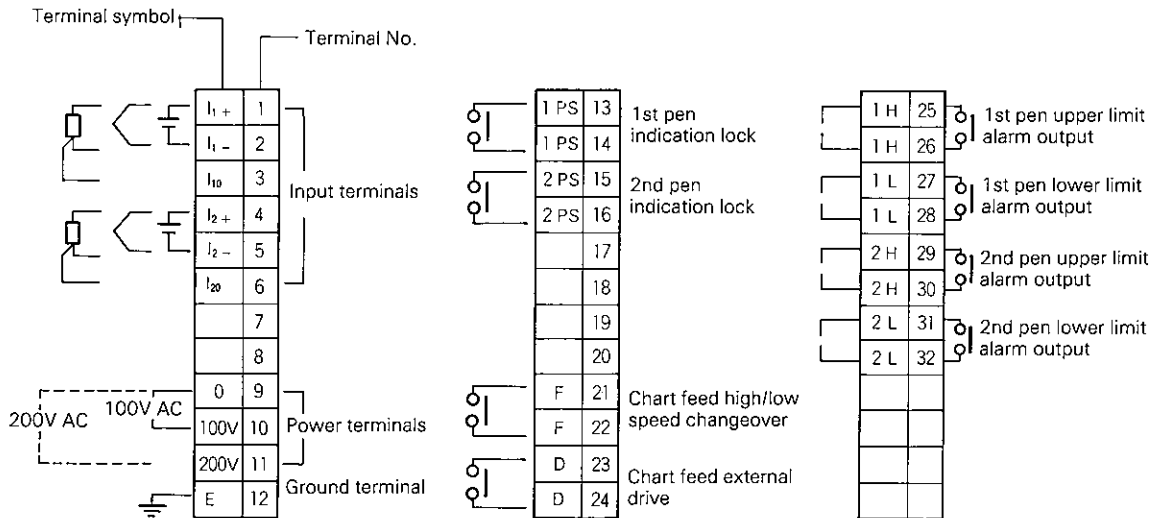


CONNECTION DIAGRAM

Multi-point type



Pen recording type



Fuji Electric Co.,Ltd.

12-1 Yurakucho 1-chome, Chiyoda-ku, Tokyo, 100 Japan
 Phone: Tokyo 3211-7111
 Telex: J22331 FUJIELEA or FUJIELEB