

Bar Graphic Temperature Indicators

KN-1000B Series
INSTRUCTION MANUAL

TCD210153AC

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using.

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc are subject to change without notice for product improvement

Some models may be discontinued without notice.

Follow Autonics website for the latest information.

Safety Considerations

- Observe all ‘Safety Considerations’ for safe and proper operation to avoid hazards.
- ▲ symbol indicates caution due to special circumstances in which hazards may occur.

▲ Warning Failure to follow instructions may result in serious injury or death

01. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.**(e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.
02. **Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
Failure to follow this instruction may result in explosion or fire.
03. **Install on a device panel to use.**
Failure to follow this instruction may result in fire or electric shock.
04. **Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire or electric shock.
05. **Check ‘Connections’ before wiring.**
Failure to follow this instruction may result in fire.
06. **Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire or electric shock.

▲ Caution Failure to follow instructions may result in injury or product damage

01. **Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage
02. **Use a dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire or electric shock.
03. **Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
Failure to follow this instruction may result in fire or product damage.
04. **Check the polarity of the measurement input before wiring.**
Failure to follow this instruction may result in explosion or fire.

Cautions during Use

- Follow instructions in ‘Cautions during Use’. Otherwise, it may cause unexpected accidents.
- For connecting the power, use the crimp terminal (M3.5, max. 7.2 mm).
- 24 VDC≐ power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Keep away from high voltage lines or power lines to prevent inductive noise. Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- Use twisted pair wire for communication line.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in ‘Specifications’)
 - Altitude Max. 2,000 m
 - Pollution degree 2
 - Installation category II

Ordering Information

This is only for reference, the actual product does not support all combinations.

For selecting the specified model, follow the Autonics website .

K	N	-	1	①	②	③	B
① Alarm output				② Option output		③ Power supply	
0: No mark				0: No mark		0: 100-240 VAC~ 50/60 Hz	
2: 2 alarm				1: PV Transmission		1: 24 VDC≐	
4: 4 alarm				4: Communication			

Product Components

- Product
- Instruction manual
- Bracket ×2
- Unit sticker ×1
- Connector (KN-10□□B: ×3, KN-12□□B: ×4, KN-140□B: ×4, KN-141□B: ×5, KN-144□B: ×5)

Software

Download the installation file and the manuals from the Autonics website.

■ DAQMaster

DAQMaster is comprehensive device management program. It is available for parameter setting, monitoring.

Specifications

Series	KN-1000B Series	
	AC voltage	DC voltage
Power supply	100 - 240 VAC~ 50/60 Hz	24 VDC≐
Permissible voltage range	90 to 110 % of rated voltage	
Power consumption	≤ 6 VA	≤ 4 W
Sampling period	• Thermocouple, RTD: 250 ms • Analog: 100 ms	
Input specification	Refer to 'Input Type and Using Range'.	
Digital input	Contact	• ON: ≤ 2 kΩ • OFF: ≥ 90 kΩ
	Non contact	• Residual voltage: ≤ 1.0 V • leakage current: ≤ 0.03 mA
	Outflow current	≈ 0.2 mA
Option output	Alarm	• 2 point relay: 250 VAC~ 3 A 1c • 4 point relay: 250 VAC~ 1 A 1a
	PV transmission	ISOLATED DC 4-20 mA (Load resistance: ≤ 600 Ω)
	RS485 comm.	Modbus RTU
Display type	7 Segment (red), Graph bar (green)	
Alarm output Hysteresis	1 to 999 digit	
Relay life cycle	Mechanical	• 2 point: ≥ 10,000,000 operations • 4 point: ≥ 20,000,000 operations
	Electrical	• 2 point: ≥ 100,000 operations (load resistance: 250 VAC~ 3 A) • 4 point: ≥ 500,000 operations (load resistance: 250 VAC~ 1 A)
Dielectric strength	Between the charging part and the case: 2,000 VAC~ 50/60 Hz for 1 min	
Vibration	0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours	
Insulation resistance	≥ 100 MΩ (500 VDC≐ megger)	
Noise immunity	± 2 kV square shaped noise (pulse width 1 μs) by noise simulator	
Memory retention	≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature	-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity	35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Certification	CE	
Unit weight (packaged)	≈ 182 g (≈ 304 g)	

Communication Interface

■ RS485	
Comm. protocol	Modbus 1.1 RTU
Maximum connection	32 units
Synchronous method	Asynchronous
Comm. method	Two-wire half duplex
Comm. effective range	≤ 1,200 m (≤ 700 m recommended)
Comm. speed	9,600 (default) / 4,800 / 2,400 / 1,200 bps (parameter)
Data bit	8 bit (fixed)
Parity bit	None (fixed)
Stop bit	1 bit (fixed)

Input Type and Using Range				
Input type	Display	Using range (°C)	Using range (°F)	
Thermo-couple	K (CA)	ℓℓℓ ℓ	200 to 1350	-328 to 2,462
	K (CA)	ℓℓℓℓℓ	-199.9 to 999.9	-328 to 1,832
	J (IC)	ℓℓ - ℓ	-199.9 to 800.0	-328 to 1,472
	E (CR)	ℓℓ - ℓ	-199.9 to 800.0	-328 to 1,472
	T (CC)	ℓℓ - ℓ	-199.9 to 400.0	-199.9 to 752.0
	B (PR)*	ℓℓ - ℓ	100 to 1,800	212 to 3,272
	R (PR)	ℓℓ - ℓ	0 to 1,750	32 to 3,182
	S (PR)*	ℓℓ - 5	0 to 1,750	32 to 3,182
	N (NN)*	ℓℓ - ℓ	-200 to 1,300	-328 to 2,372
	C (W5)*	ℓℓ - ℓ	0 to 2,300	32 to 4,172
	L (IC)*	ℓℓ - ℓ	-199.9 to 900.0	-328 to 1,652
	U (CC)*	ℓℓ - ℓ	-199.9 to 400.0	-199.9 to 752.0
	Platinel II*	ℓℓ - ℓ	0 to 1,390	32 to 2,534
	Cu50Ω*	ℓℓℓℓ	-199.9 to 200.0	-199.9 to 392.0
RTD	Cu100Ω*	ℓℓℓℓ	-199.9 to 200.0	-199.9 to 392.0
	JPt100Ω	ℓℓℓℓ	-199.9 to 600.0	-328 to 1,112
	DPt50Ω	ℓℓℓℓ	-199.9 to 600.0	-328 to 1,112
	DPt100Ω	ℓℓℓℓ	-199.9 to 850.0	-328 to 1,530
Analog	Current	0.00 - 20.00 mA	-1,999 to 9,999 (Display range is variable according to decimal point position.)	
		4.00 - 20.00 mA		
	Voltage	-50.0 - 50.0 mV		
		-199.9 - 200.0 mV		
		-1.000 - 1.000 V		
		-1.00 - 10.00 V		

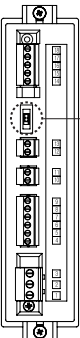
• Above input types which have the * mark are displayed only in Input specification expansion. Refer to 'Mode Setting' to check how to enter the mode.

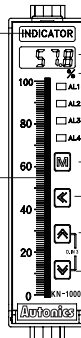
■ Display accuracy

Input type	Using temperature	Display accuracy
Thermocouple	At room temperature (25 °C ± 5 °C)	PV ± 0.2% F.S. ± 1 digit
RTD		• Thermocouple below -100 °C: (PV ± 0.4% F.S.) ± 1digit
Analog	Out of room temperature range	PV ± 0.3% F.S. ± 1 digit

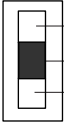
• In case of TC-T, TC-U, ± 2.0 °C will be added to the degree standard.

Unit Descriptions

- 

Back
- 

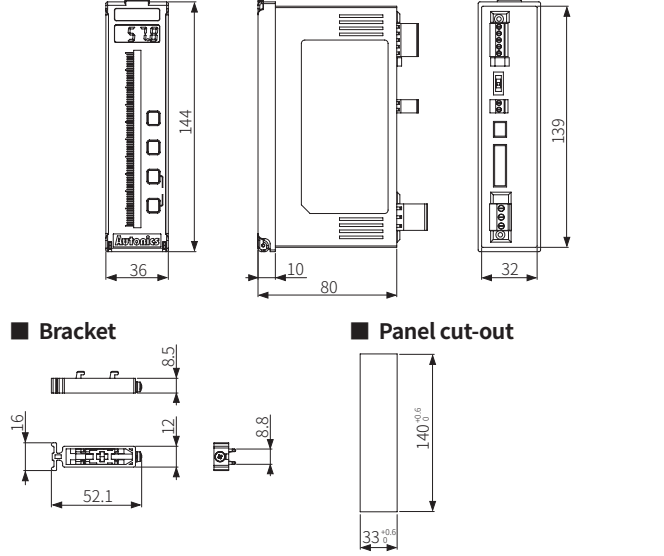
Front
1. **Display part (red)**
Run mode: Displays PV (Present value).
Setting mode: Displays parameter and setting value.
2. **Unit sticker part**
3. **Alarm output indicator**
Turns ON when the alarm output is ON.
4. **[M] key**
Used to enter parameter set mode, move to parameters, save SV and return to RUN mode.
5. **[◀], [▲], [▼] key**
Used to enter and change parameter setting value.
6. **Bar graph (green)**
Refer to 'Bar Graph'.
7. **Space for recognizing device by user**
8. **Selection switch for input specification**


 - 0 - 20 mA**: Select it for DC 0 (4) - 20 mA input (default)
 - 1 - 10 V**: Select it for -1 - 10 VDC≐ input
 - RTD / TC / mV / ± 1 V**: Select it for Thermocouple, RTD, ± 1 V, mV input

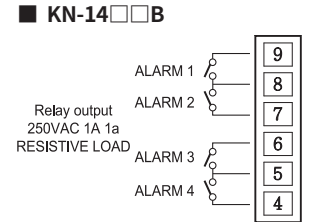
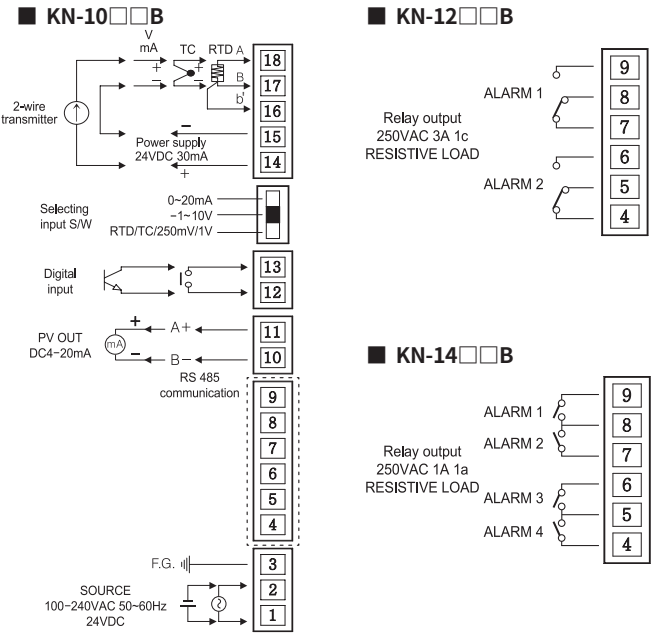
• The setting of input type selection switch and the setting value of input type parameter should be same and it can display the proper measurement value.

Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.
- Below is based on KN-1000B series.

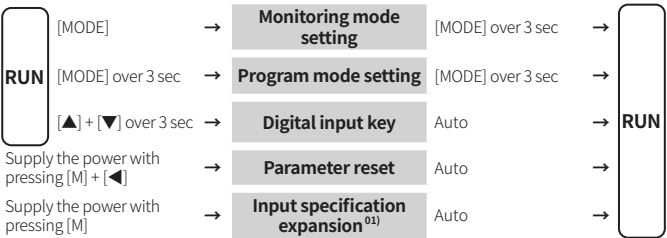


Connections



Display	Description	Troubleshooting
<i>b u r n</i>	Flashes when input sensor is disconnected or sensor is not connected.	Check input sensor status.
<i>H H H H</i>	Flashes when PV is higher than input range. ^(a)	When input is within the rated input range, this display disappears.
<i>L L L L</i>	Flashes when PV is lower than input range. ^(a)	
<i>E r r</i>	Flashes when there is an error of setting value	Check the setting condition and reset.

Mode Setting



Parameter Setting

- ### ■ Monitoring Mode

Parameter	Display	Default	Setting range	Condition
1-1 AL1 alarm temperature	AL 1	099.9	Sensor input: within using range Analog Input: L-SC ≤ AL□ ≤ H-SC	2-15/17/19/21 AL-1/2/3/4 alarm operation: AT1, AT2
1-2 AL2 alarm temperature	AL 2	099.9		
1-3 AL3 alarm temperature	AL 3	000.1		
1-4 AL4 alarm temperature	AL 4	000.1		
1-5 High peak	HPEP	---	Check only (not available to set) Displays high/low peak (Max./Min. input) value • Initial high/low peak is saved after 2 sec from supplying the power. • Value reset: + key over 3 sec in 1-5/6 High/Low peak parameter	-
1-6 Low peak	LPEP	---		

Parameter	Display	Default	Setting range	Condition												
2-1 Input specification	I n - P	R, A I	Refer to 'Input Type and Using Range'.	-												
2-2 Temperature unit	Unit	°C	°C, °F	2-1 Input specification: Thermocouple, RTD												
2-3 Low limit input	L - r G	0000	Using range low limit ≤ L-RG ≤ using range high limit - 10% of F.S.	2-1 Input specification: Analog												
2-4 High limit input	H - r G	2000	L-RG + 10% of F.S. ≤ H-RG ≤ using range high limit													
2-5 Decimal point	dP	00	0.0, 0.00, 0.000, 0													
2-6 Low limit scale	L - S C	0000	-1,999 ≤ L-SC < H-SC ≤ 9,999													
2-7 High limit scale	H - S C	1000	• When setting '2-24 Input special function': TUF L-SC: -760.0, H-SC: 0 to 9,999	2-1 Input specification: Thermocouple, RTD												
2-8 Input correction ^(a)	I n - b	0000	-999 to 999, L-SC < IN-B < H-SC													
			-999 to 999, L-SC ≤ L-RG ≤ IN-B ≤ H-RG ≤ H-SC	2-1 Input specification: Analog												
2-9 Bar graph display low limit scale	L - b S	0000	• Input: Thermocouple, RTD Input range low limit ≤ L-BS ≤ (H-BS-1) (L-BS+1) ≤ H-BS ≤ Input range high limit	-												
2-10 Bar graph display high limit scale	H - b S	1000	• Input: Analog L-SC ≤ L-BS ≤ (H-SC-1) (L-SC+1) ≤ H-BS ≤ H-SC	-												
2-11 Bar graph display method	b R r	F, b R r	F.BAR: Full bar, C.BAR: Center bar	-												
2-12 4 mA transmission output scale	L o U t	0000	[Transmission output model] • Input: Thermocouple, RTD: Within input range	-												
2-13 20 mA transmission output scale	H o U t	1000	• Input: Analog L-SC ≤ L.OUT ≤ 10% of F.S. ≤ H.OUT ≤ H-SC	-												
2-14 Input and transmission output extension ^(a)	E x t i D	5P	[Transmission output model] <table border="1"> <thead> <tr> <th>Setting value</th><th>Input range</th><th>Transmission output range</th></tr> </thead> <tbody> <tr> <td>0P</td><td>No extension</td><td>4 - 20 mA</td></tr> <tr> <td>5P</td><td>±5% extension</td><td>3.2 - 20.8 mA</td></tr> <tr> <td>10P</td><td>±10% extension</td><td>2.4 - 21.6 mA</td></tr> </tbody> </table>	Setting value	Input range	Transmission output range	0P	No extension	4 - 20 mA	5P	±5% extension	3.2 - 20.8 mA	10P	±10% extension	2.4 - 21.6 mA	2-1 Input specification: Analog
Setting value	Input range	Transmission output range														
0P	No extension	4 - 20 mA														
5P	±5% extension	3.2 - 20.8 mA														
10P	±10% extension	2.4 - 21.6 mA														
2-15 AL1 alarm operation	AL - 1	R t I A	[Alarm output model] □□□ ATO: Off AT1: Absolute high limit alarm AT2: Absolute low limit alarm SBA: Sensor break alarm	-												
2-16 AL1 alarm option			□□□■ A: Standard alarm B: Alarm latch C: Standby D: Alarm latch and sequence standby sequence • Enter to option setting: Press [◀] key in 2-15 AL-1 alarm operation.	-												
2-17 AL2 alarm operation	AL - 2	R t I A	[Alarm output model] Same as 2-15/16 AL1 alarm operation/option	-												
2-18 AL2 alarm option																
2-19 AL3 alarm operation	AL - 3	R t 2 A														
2-20 AL3 alarm option			[4 alarm output model] Same as 2-15/16 AL1 alarm operation/option	-												
2-21 AL4 alarm operation	AL - 4	R t 2 A														
2-22 AL4 alarm option																
2-23 Alarm output hysteresis	A - H y	001	001 to 999	2-15/17/19/21 AL-1/2/3/4 alarm operation: AT1, AT2												
2-24 Input special function	I n S F	L i n	LIN: Linear, ROOT: Root, SQAR: Square, TUF: Two unit function	2-1 Input specification: Analog												
2-25 Input digital filter	h R u F	04	01 (OFF) to 16 • It does not affect the display cycle.	-												
2-26 Digital input Terminal	d i - t	H o L d	HOLD: Hold, ZERO: Zero-point adjustment, AL.RE*: Alarm reset	* 2-16/18/20/22 AL1/2/3/4 Alarm option: B, D												
2-27 Digital input key	d i - k	H o L d	*[Alarm output model]													
2-28 Sensor break alarm output	b U r n	a F F	[Transmission output model] OFF: 4 mA, ON: 20 mA	-												
2-29 Comm. address	A d r r	01	[Communication output model] 01 to 99	-												
2-30 Comm. speed	b R U d	9600	[Communication output model] 9600, 4800, 2400, 1200 bps	-												
2-31 Lock	L o c k	a F F	OFF LOC1: Program mode lock (check only) Monitoring mode unlock LOC2: Checking and setting program mode lock Monitoring mode setting lock (check only)	-												

■ RUN status group

Address	Parameter	Display	Output range				
300001 (0000)	Display value output	-	Display value				
300002 (0001)	Alarm output	-	[2 alarm output model]: 0 to 3 [4 alarm output model]: 0 to 15				
			Output value	Alarm status			
				Alarm 1	Alarm 2	Alarm 3	Alarm 4
			0	OFF	OFF	OFF	OFF
			1	ON	OFF	OFF	OFF
			2	OFF	ON	OFF	OFF
			3	ON	ON	OFF	OFF
			4	OFF	OFF	ON	OFF
			5	ON	OFF	ON	OFF
			6	OFF	ON	ON	OFF
			7	ON	ON	ON	OFF
			8	OFF	OFF	OFF	ON
			9	ON	OFF	OFF	ON
			10	OFF	ON	OFF	ON
			11	ON	ON	OFF	ON
			12	OFF	OFF	ON	ON
			13	ON	OFF	ON	ON
14	OFF	ON	ON	ON			
15	ON	ON	ON	ON			

■ **Monitoring mode setting group**

Address	Parameter	Display	Setting range
302001 (07D0) to 302004 (07D3)	AL1 ~ 4 alarm temperature	AL 1 - AL 4	[Alarm output model] - Thermocouple, RTD input: Within input specification, Analog input: L-SC~ H-SC
302005 (07D4)	High peak	HPE P	-
302006 (07D5)	Low peak	LPE P	-

■ Program mode setting group

[illegible]

301002 (03E9)	Temperature unit	$U n t$	0: °C, 1: °F	
301003 (03EA)	Low limit Input	$L - r \bar{U}$	Same as parameter setting range	
301004 (03EB)	High limit Input	$H - r \bar{U}$		
301005 (03EC)	Decimal point	$d P$	0: 0, 1: 0.0, 2: 0.00, 3: 0.000	
301006 (03ED)	Low limit scale	$L - S \bar{C}$	Same as parameter setting range	
301007 (03EE)	High limit scale	$H - S \bar{C}$		
301008 (03EF)	Bar graph display low limit scale	$L - b \bar{S}$	Same as parameter setting range	
301009 (03F0)	Bar graph display high limit scale	$H - b \bar{S}$		
301010 (03F1)	Bar graph display method	$b \bar{A} r$	0: Full bar, 1: Center bar	
301011 (03F2)	4 mA transmission output scale	$L - o \bar{U} \bar{E}$	Same as parameter setting range	
301012 (03F3)	20 mA transmission output scale	$H - o \bar{U} \bar{E}$		
301013 (03F4)	Input and transmission output extension	$E \bar{h} i o$	0: 0 %, 1: 5 %, 2: 10 %	Same as each parameter setting condition
301014 (03F5) to 301017 (03F8)	AL 1 to 4 alarm operation	$\bar{A} L - i$ $\bar{A} L - \bar{y}$	1: Absolute high limit alarm , 2: Absolute low limit alarm, 3: Sensor break alarm, 4: Off	
301018 (03F9) to 301021 (03FC)	AL 1 to 4 alarm option	$\bar{A} L - i$ $\bar{A} L - \bar{y}$	10: Standard alarm, 11: Alarm latch, 12: Standby sequence, 13: Alarm latch and standby sequence, 14: No alarm (not settable)	
301022 (03FD)	Alarm output hysteresis	$\bar{A} - H \bar{y}$	Same as parameter setting range	
301023 (03FE)	Input special function	$i \bar{n} s F$	0: Linear, 1: Root, 2: Square, 3: Two unit function	
301024 (03FF)	Input correction	$i \bar{n} - b$	Same as parameter setting range	
301025 (0400)	Input digital filter	$\bar{n} \bar{A} u \bar{F}$	Same as parameter setting range	
301026 (0401)	Digital input Terminal	$d i - t$	0: Alarm reset, 1: Hold, 2: Zero-point adjustment	
301027 (0402)	Digital input key	$d i - \bar{P}$		
301028 (0403)	Sensor break alarm output	$b \bar{U} r n$	0: 20 mA, 1: 4 mA	
301029 (0404)	Comm. address	$\bar{A} d d r$	Same as parameter setting range	
301030 (0405)	Comm. speed	$\bar{B} u \bar{D}$	0: 9600, 1: 4800, 2: 2400, 3: 1200	
301031 (0406)	Lock	$L o c \bar{L}$	0: OFF, 1: LOC1, 2: LOC2	

■ Display method setting

Full bar

Displays the input from the bottom for bar graph scale following to bar graph display scale parameter setting value

- L-BS= 100, H-BS= 100, PV = 50

← **Bottom**

Center bar

Displays the input from zero point (0) for bar graph scale following to bar graph display scale parameter setting value

- L-BS= 100, H-BS= 100, PV = 50

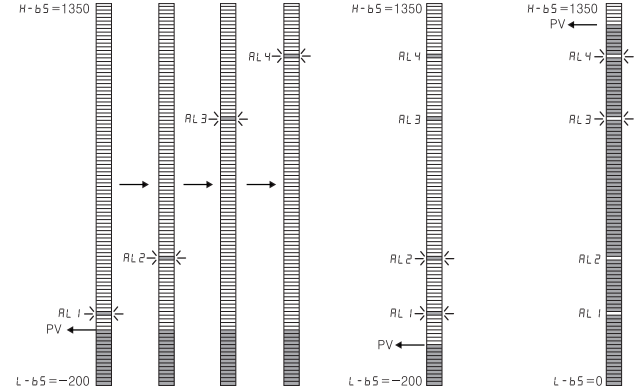
← **Zero point**

■ Alarm display in bar graph

- If alarm set value is out of bar graph scale when setting the value or in RUN mode, this value does not display in bar graph.

Run mode: alarm display

All set alarm values are displays and when it is alarm value, the bar LED for this alarm value flashes.



- AL3/4:
High limit alarm

■ Scale value relation

Refer to 'Parameter Setting' for the details about setting range and condition.

