

Linear Sensor Indicator K3HB-S

CSM_K3HB-S_DS_E_11_3



Linear Sensor Indicator for High-speed, High-precision Measurement and Discrimination

- Easy recognition of judgement results using color display that can be switched between red and green. *
- Equipped with a position meter that represents measured amounts and relative positions.
- Develop a variety of measurement and discrimination applications using external event inputs.
- Series expanded to include DeviceNet models.
- Short body with depth of only 95 mm (from behind the front panel), or 97 mm for DeviceNet models.
- UL certification approval (Certification Mark License).
- CE Marking conformance by third party assessment body.
- Water-resistant enclosure conforms to NEMA 4X (equivalent to IP66).
- Visual confirmation of judgement results is not supported on models that do not have an output or models that do not support DeviceNet.
You can change the display color by setting it, but you cannot switch it based on the judgement results.



Refer to *Safety Precautions for All Digital Panel Meters*.



For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Model Number Structure

■ Model Number Legend

Base Units and Optional Boards can be ordered individually or as sets.

Base Units

K3HB-S
1 5

1. Input Sensor Code

SD: DC Process input

5. Supply Voltage

100-240 VAC: 100 to 240 VAC

24 VAC/VDC: 24 VAC/VDC

Base Units with Optional Boards

K3HB-S
1 2 3 4 5

2. Sensor Power Supply/Output Type Code

None: None

CPA: Relay output (PASS: SPDT) + Sensor power supply
(12 VDC +/-10%, 80 mA) (See note 1.)

L1A: Linear current output (0 to 20 or 4 to 20 mA DC) + Sensor power supply
(12 VDC +/-10%, 80 mA) (See note 2.)

L2A: Linear voltage output (0 to 5, 1 to 5, or 0 to 10 VDC) + Sensor power supply
(12 VDC +/-10%, 80 mA) (See note 2.)

A: Sensor power supply (12 VDC +/-10%, 80 mA)

FLK1A: Communications (RS-232C) + Sensor power supply

(12 VDC +/-10%, 80 mA) (See note 2.)

FLK3A: Communications (RS-485) + Sensor power supply

(12 VDC +/-10%, 80 mA) (See note 2.)

Note: 1. CPA can be combined with relay outputs only.

2. Only one of the following can be used by each Digital Indicator: RS-232C/RS-485 communications, a linear output, or DeviceNet communications.

3. Relay/Transistor Output Type Code

None: None

C1: Relay contact (H/L: SPDT each)

C2: Relay contact (HH/H/LL/L: SPST-NO each)

T1: Transistor (NPN open collector: HH/H/PASS/L/LL)

T2: Transistor (PNP open collector: HH/H/PASS/L/LL)

BCD *: BCD output + transistor output (NPN open collector: HH/H/PASS/L/LL)

DRT: DeviceNet (See note 2.)

* A Special BCD Output Cable (sold separately) is required.

4. Event Input Type Code

None: None

1: 5 inputs (M3 terminal blocks), NPN open collector

2 *: 8 inputs (10-pin MIL connector), NPN open collector

3: 5 inputs (M3 terminal blocks), PNP open collector

4 *: 8 inputs (10-pin MIL connector), PNP open collector

* There is no bank selection for "None" and "DeviceNet" types of "Transistor Output Type Code".

Optional Board

Sensor Power Supply/Output Boards

K33-
2

Relay/Transistor Output Boards

K34-
3

Event Input Boards

K35-
4

Note: The following combinations are not possible.

- Communications (FLK□A) + DeviceNet (DRT)
- Communications (FLK□A) + BCD output (BCD)
- Linear current/voltage (L□A) + DeviceNet (DRT)

Accessories (Sold Separately)

K32-DICN: Special Cable (for event inputs, with 8-pin connector)
 K32-BCD: Special BCD Output Cable

Watertight Cover

Model
Y92A-49N

Rubber Packing

Model
K32-P1

Note: Rubber packing is provided with the Controller.

Specifications

■ Ratings

Power supply voltage	100 to 240 VAC (50/60 Hz), 24 VAC/VDC, DeviceNet power supply: 24 VDC												
Allowable power supply voltage range	85% to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC												
Power consumption (See note 1.)	100 to 240 V: 18 VA max. (max. load) 24 VAC/DC: 11 VA/7 W max. (max. load)												
Current consumption	DeviceNet power supply: 50 mA max. (24 VDC)												
Input	DC voltage/current												
A/D conversion method	Sequential comparison system												
External power supply	12 VDC ±10%, 80 mA (models with external power supply only)												
Event inputs (See note 2.)	<table border="1"> <tr> <td>Timing input</td> <td>NPN open collector or no-voltage contact signal ON residual voltage: 3 V max. ON current at 0 Ω: 17 mA max. Max. applied voltage: 30 VDC max. OFF leakage current: 1.5 mA max.</td> </tr> <tr> <td>Startup compensation timer input</td> <td>NPN open collector or no-voltage contact signal ON residual voltage: 2 V max. ON current at 0 Ω: 4 mA max.</td> </tr> <tr> <td>Hold input</td> <td>Max. applied voltage: 30 VDC max.</td> </tr> <tr> <td>Reset input</td> <td>OFF leakage current: 0.1 mA max.</td> </tr> <tr> <td>Forced-zero input</td> <td></td> </tr> <tr> <td>Bank input</td> <td></td> </tr> </table>	Timing input	NPN open collector or no-voltage contact signal ON residual voltage: 3 V max. ON current at 0 Ω: 17 mA max. Max. applied voltage: 30 VDC max. OFF leakage current: 1.5 mA max.	Startup compensation timer input	NPN open collector or no-voltage contact signal ON residual voltage: 2 V max. ON current at 0 Ω: 4 mA max.	Hold input	Max. applied voltage: 30 VDC max.	Reset input	OFF leakage current: 0.1 mA max.	Forced-zero input		Bank input	
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Output ratings (depends on the model)	<table border="1"> <tr> <td>Relay output</td> <td>250 VAC, 30 VDC, 5 A (resistive load) Mechanical life expectancy: 5,000,000 operations, Electrical life expectancy: 100,000 operations</td> </tr> <tr> <td>Transistor output</td> <td>Maximum load voltage: 24 VDC, Maximum load current: 50 mA, Leakage current: 100 μA max.</td> </tr> <tr> <td>Linear output</td> <td>Linear output 0 to 20 mA DC, 4 to 20 mA DC: Load: 500 Ω max, Resolution: Approx. 10,000, Output error: ±0.5% FS Linear output 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC: Load: 5 kΩ max, Resolution: Approx. 10,000, Output error: ±0.5% FS (1 V or less: ±0.15 V; no output for 0 V or less)</td> </tr> </table>	Relay output	250 VAC, 30 VDC, 5 A (resistive load) Mechanical life expectancy: 5,000,000 operations, Electrical life expectancy: 100,000 operations	Transistor output	Maximum load voltage: 24 VDC, Maximum load current: 50 mA, Leakage current: 100 μA max.	Linear output	Linear output 0 to 20 mA DC, 4 to 20 mA DC: Load: 500 Ω max, Resolution: Approx. 10,000, Output error: ±0.5% FS Linear output 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC: Load: 5 kΩ max, Resolution: Approx. 10,000, Output error: ±0.5% FS (1 V or less: ±0.15 V; no output for 0 V or less)						
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Display method	Negative LCD (backlit LED) display 7-segment digital display (Character height: PV: 14.2 mm (green/red); SV: 4.9 mm (green))												
Main functions	Scaling function, 2-input calculation function, measurement operation selection, averaging, previous average value comparison, forced-zero, zero-limit, output hysteresis, output OFF delay, output test, teaching, display value selection, display color selection, key protection, bank selection, display refresh period, maximum/minimum hold, reset												
Ambient operating temperature	-10 to 55°C (with no icing or condensation)												
Ambient operating humidity	25% to 85%												
Storage temperature	-25 to 65°C (with no icing or condensation)												
Altitude	2,000 m max.												
Accessories	Watertight packing, 2 fixtures, terminal cover, unit stickers, instruction manual. DeviceNet models also include a DeviceNet connector (Hirose HR31-5.08P-5SC(01)) and crimp terminals (Hirose HR31-SC-121) (See note 3.)												

Note:

1. DC power supply models require a control power supply capacity of approximately 1 A per Unit when power is turned ON. Particular attention is required when using two or more DC power supply models. The OMRON S8VS-series DC Power Supply Unit is recommended.
2. PNP input types are also available.
3. For K3HB-series DeviceNet models, use only the DeviceNet Connector included with the product. The crimp terminals provided are for Thin Cables.

■ Characteristics

Display range	-19,999 to 99,999	
Sampling period	One input: 0.5 ms; Two inputs: 1.0 ms	
Comparative output response times (transistor outputs)	One input	OFF to ON: 1 ms max., ON to OFF: 1.5 ms max. (The time until the comparative output is output when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%.)
	Two inputs	OFF to ON: 2 ms max., ON to OFF: 2.5 ms max. (The time until the comparative output is output when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%.)
Linear output response time	One input	51 ms max. (The time until the final analog output is reached when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%.)
	Two inputs	52 ms max. (The time until the final analog output is reached when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%.)
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	2,300 VAC for 1 min between external terminals and case	
Noise immunity	100 to 240 VAC models: ±1,500 V at power supply terminals in normal or common mode (waveform with 1-ns rising edge and pulse width of 1 µs/100 ns) 24 VAC/VDC models: ±1,500 V at power supply terminals in normal or common mode (waveform with 1-ns rising edge and pulse width of 1 µs/100 ns)	
Vibration resistance	Frequency: 10 to 55 Hz; Acceleration: 50 m/s ² , 10 sweeps of 5 min each in X, Y, and Z directions	
Shock resistance	150 m/s ² (100 m/s ² for relay outputs) 3 times each in 3 axes, 6 directions	
Weight	Approx. 300 g (Base Unit only)	
Degree of protection	Front panel	Conforms to NEMA 4X for indoor use (equivalent to IP66)
	Rear case	IP20
	Terminals	IP00 + finger protection (VDE0106/100)
Memory protection	EEPROM (non-volatile memory) Number of rewrites: 100,000	
Applicable standards	UL61010-1, CSA C22.2 No. 61010-1-04 EN61010-1 (IEC61010-1): Pollution degree 2/Overvoltage category II EN61326-1	
EMC	EMI: EN61326-1 Industrial electromagnetic environment Electromagnetic radiation interference CISPR 11 Group 1, Class A Terminal interference voltage CISPR 11 Group 1, Class A EMS: EN61326-1 Industrial electromagnetic environment Electrostatic Discharge Immunity EN61000-4-2: 4 kV (contact), 8 kV (in air) Radiated Electromagnetic Field Immunity EN61000-4-3: 10 V/m 1 kHz sine wave amplitude modulation (80 MHz to 1 GHz, 1.4 to 2 GHz) Electrical Fast Transient/Burst Immunity EN61000-4-4: 2 kV (power line), 1 kV (I/O signal line) Surge Immunity EN61000-4-5: 1 kV with line (power line), 2 kV with ground (power line) Conducted Disturbance Immunity EN61000-4-6: 3 V (0.15 to 80 MHz) Power Frequency Magnetic Immunity EN61000-4-8: 30 A/m (50 Hz) continuous time Voltage Dips and Interruptions Immunity EN61000-4-11: 0.5 cycle, 0°/180°, 100% (rated voltage)	

■ Input Ranges (Measurement Ranges and Accuracy)

Input	Input type	Measurement range	Indication range	Input impedance	Accuracy (at 23±5°C)	Maximum absolute rated input
K3HB-SSD DC voltage/current input	0 to 20 mA	0.000 to 20.000 mA	-2.000 to 22.000 mA	120 Ω max.	One input: ±0.1% F.S. ±1 digit max.	±31 mA
	4 to 20 mA	4.000 to 20.000 mA	2.000 to 22.000 mA			±10 V
	0 to 5 V	0.000 to 5.000 V	-0.500 to 5.500 mA	1 MΩ min.	Two inputs: ±0.2% F.S. ±1 digit max.	±14.5 V
	1 to 5 V	1.000 to 5.000 V	0.500 to 5.500 V			
	±5 V	±5.000 V	±5.500 V			
	±10 V	±10.000 V	±11.000 V			

Note: The accuracy is for an ambient temperature of 23±5°C.

Input type	DC current input		Input type	DC voltage input			
Connected terminals	0-20	4-20	Connected terminals	0-5	1-5	5	10
Input A	In- <i>tR</i> (E2) – (E3)		Input A	In- <i>tR</i> (E4) – (E3)			
Input B	In- <i>tB</i> (E1) – (E3)		Input B	In- <i>tB</i> (E5) – (E3)			
DC current range (mA)	24.000	22.000	DC voltage range (V)	10.000	5.500	5.500	11.000
	20.000			5.000			
	16.000			0.000	0.500		
	12.000			-5.000		-5.500	
	8.000			-10.000			
	4.000						-11.000
	0.000						
	-4.000						
	-2.000	2.000					

The range shown in dark shading indicates the factory setting.

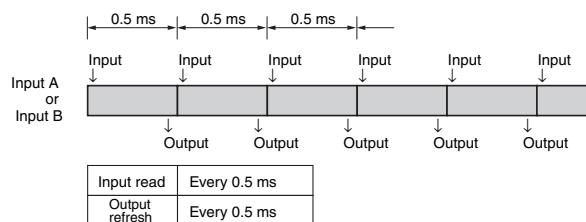
Sampling and Comparative Output Response Times

The K3HB-S sampling and comparative output response times depend on the calculation methods, timing hold type, and, for simple averaging, the averaging times. Refer to the following description for details.

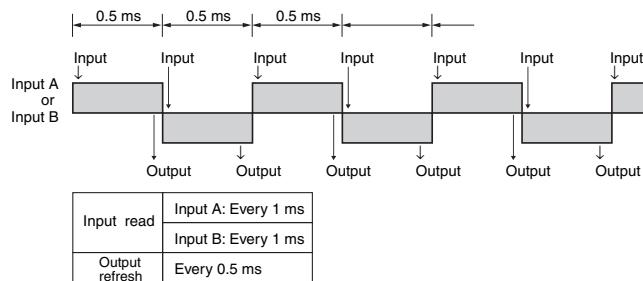
■ Output Refresh Period

The K3HB-S repeats input reads, calculation, and judgement output processing. The output refresh period differs depending on whether there are one or two inputs, as outlined below.

One Input



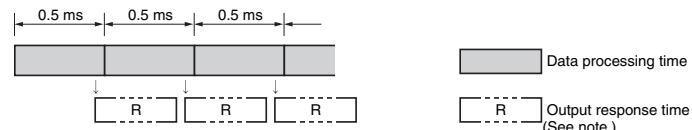
Two inputs



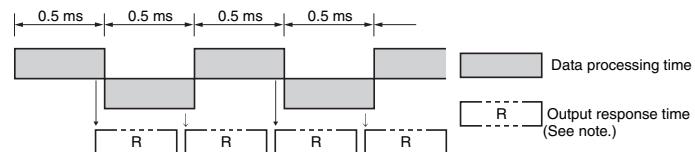
■ Output Response Time

The comparative output response time is the sum of the data processing time and the output (relay or transistor) response time.

One Input



Two Inputs



Note: For transistor outputs:

For one input: OFF to ON 1 ms and ON to OFF 1.5 ms

For two inputs: OFF to ON 2 ms and ON to OFF 2.5 ms

For relay outputs:

The relay operation time of 15 ms is added to the transistor output response times.

Common Specifications

■ Event Input Ratings

Input type	S-TMR, HOLD, RESET, ZERO, BANK1, BANK2, BANK4	TIMING
Contact	ON: 1 kΩ max., OFF: 100 kΩ min.	---
No-contact	ON residual voltage: 2 V max. OFF leakage current: 0.1 mA max. Load current: 4 mA max. Maximum applied voltage: 30 VDC max.	ON residual voltage: 3 V max. OFF leakage current: 1.5 mA max. Load current: 17 mA max. Maximum applied voltage: 30 VDC max.

■ Output Ratings

Contact Output

Item	Resistive loads (250 VAC, $\cos\phi=1$; 30 VDC, L/R=0 ms)	Inductive loads (250 VAC, closed circuit, $\cos\phi=0.4$; 30 VDC, L/R=7 ms)
Rated load	5 A at 250 VAC 5 A at 30 VDC	1 A at 250 VAC 1 A at 30 VDC
Mechanical life expectancy	5,000,000 operations	
Electrical life expectancy	100,000 operations	

Transistor Output

Maximum load voltage	24 VDC
Maximum load current	50 mA
Leakage current	100 μA max.

Linear Output

Item	0 to 20 mA	4 to 20 mA	0 to 5 V	1 to 5 V	0 to 10 V
Allowable load impedance	500 Ω max.		5 kΩ min.		
Resolution	Approx. 10,000				
Output error	±0.5%FS		±0.5%FS (1 V or less: no output for ±0.15 V; 0 V or less)		

Serial Communications Output

Item	RS-232C, RS-485
Communications method	Half duplex
Synchronization method	Start-stop synchronization
Baud rate	9,600, 19,200, or 38,400 bps
Transmission code	ASCII
Data length	7 bits or 8 bits
Stop bit length	2 bits or 1 bit
Error detection	Vertical parity and FCS
Parity check	Odd, even

Note: For details on serial and DeviceNet communications, refer to the *Digital Indicator K3HB Communications User's Manual* (Cat.No. N129).

BCD Output I/O Ratings (Input Signal Logic: Negative)

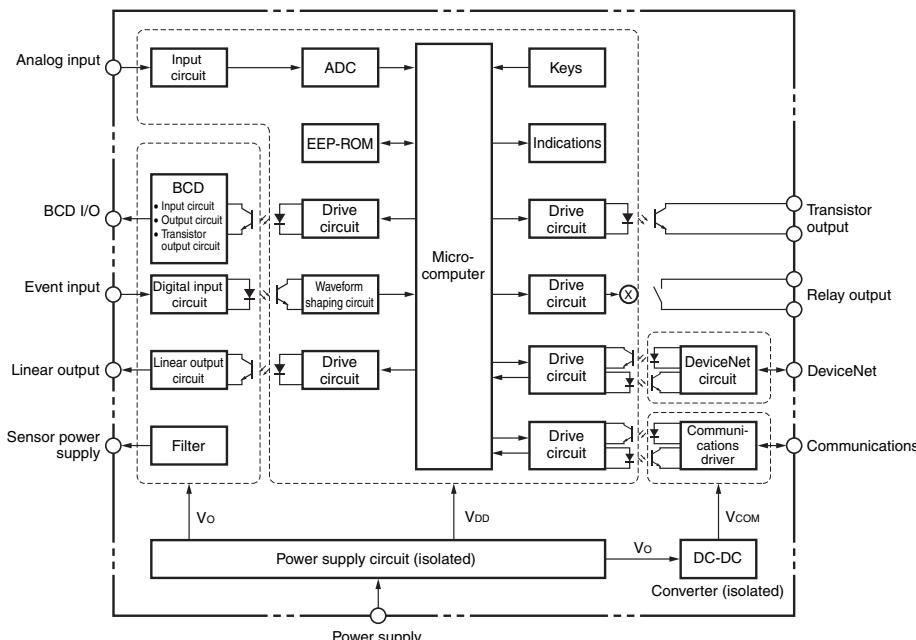
I/O signal name		Item	Rating
Inputs	REQUEST HOLD MAX MIN RESET	Input signal	No-voltage contact input
		Input current for no-voltage input	10 mA
	Signal level	ON voltage	1.5 V max.
		OFF voltage	3 V min.
		Maximum load voltage	24 VDC
Outputs	DATA POLARITY OVER DATA VALID RUN	Maximum load current	10 mA
		Leakage current	100 μA max.
		Maximum load voltage	24 VDC
	HH H PASS L LL	Maximum load current	50 mA
		Leakage current	100 μA max.

Note: For details on serial and DeviceNet communications, refer to the *Digital Indicator K3HB Communications User's Manual* (Cat.No. N129).

DeviceNet Communications

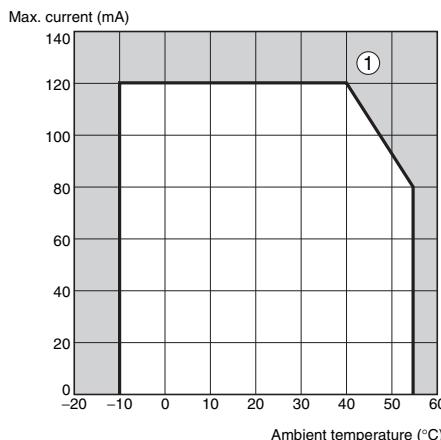
Communications protocol		Conforms to DeviceNet	
Supported communications	Remote I/O communications	Master-Slave connection (polling, bit-strobe, COS, cyclic) Conforms to DeviceNet communications standards.	
	I/O allocations	Allocate any I/O data using the Configurator. Allocate any data, such as DeviceNet-specific parameters and variable area for Digital Indicators. Input area: 2 blocks, 60 words max. Output area: 1 block, 29 words max. (The first word in the area is always allocated for the Output Execution Enabled Flags.)	
	Message communications	Explicit message communications CompoWay/F communications commands can be executed (using explicit message communications)	
Connection methods		Combination of multi-drop and T-branch connections (for trunk and drop lines)	
Baud rate		DeviceNet: 500, 250, or 125 Kbps (automatic follow-up)	
Communications media		Special 5-wire cable (2 signal lines, 2 power supply lines, 1 shield line)	
Communications distance	Baud rate	Network length (max.)	Drop line length (max.)
	500 Kbps	100 m (100 m)	6 m
	250 Kbps	100 m (250 m)	6 m
	125 Kbps	100 m (500 m)	6 m
The values in parentheses are for Thick Cable.			
Communications power supply		24-VDC DeviceNet power supply	
Allowable voltage fluctuation range		11 to 25-VDC DeviceNet power supply	
Current consumption		50 mA max. (24 VDC)	
Maximum number of nodes		64 (DeviceNet Configurator is counted as one node when connected)	
Maximum number of slaves		63	
Error control checks		CRC errors	
DeviceNet power supply		Supplied from DeviceNet communications connector	

Internal Block Diagram

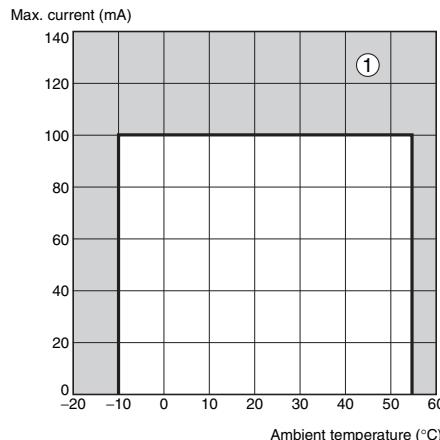


■ Power Supply Derating Curve for Sensor (Reference Value)

With 12 V



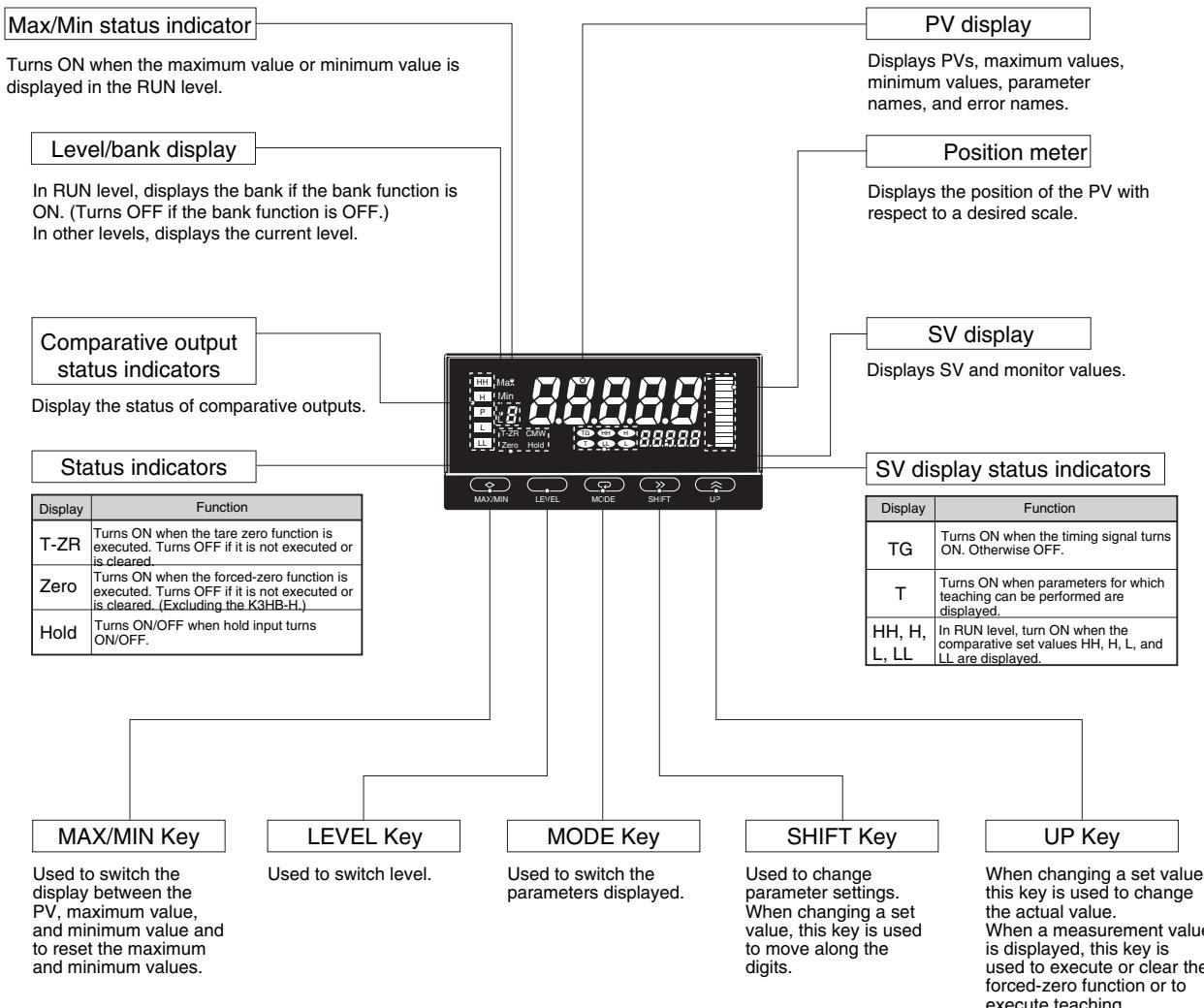
With 10 V



Note: 1. The above values are for standard mounting. The derating curve differs depending on the mounting conditions.

2. Do not use the Sensor outside of the derating area (i.e., do not use it in the area labeled A in the above graphics). Doing so may occasionally cause deterioration or damage to internal components.

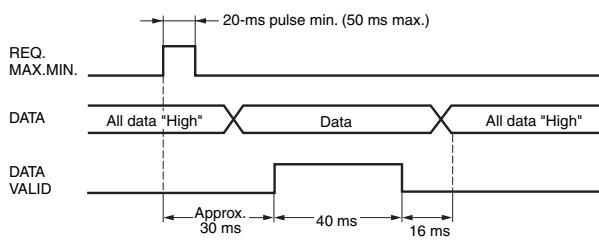
■ Component Names and Functions



■ BCD Output Timing Chart

A REQUEST signal from a Programmable Controller or other external device is required to read BCD data.

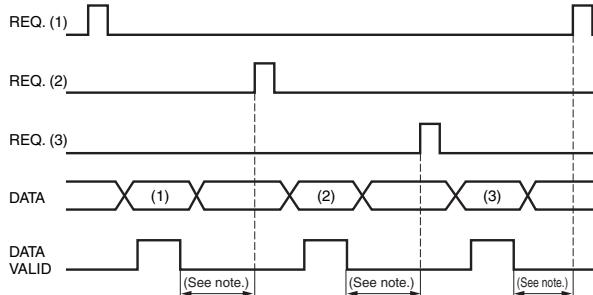
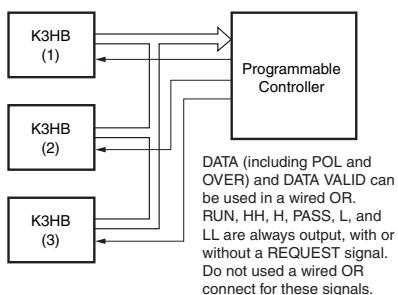
Single Sampling Data Output



The data is set in approximately 30 ms from the rising edge of the REQUEST signal and the DATA VALID signal is output.

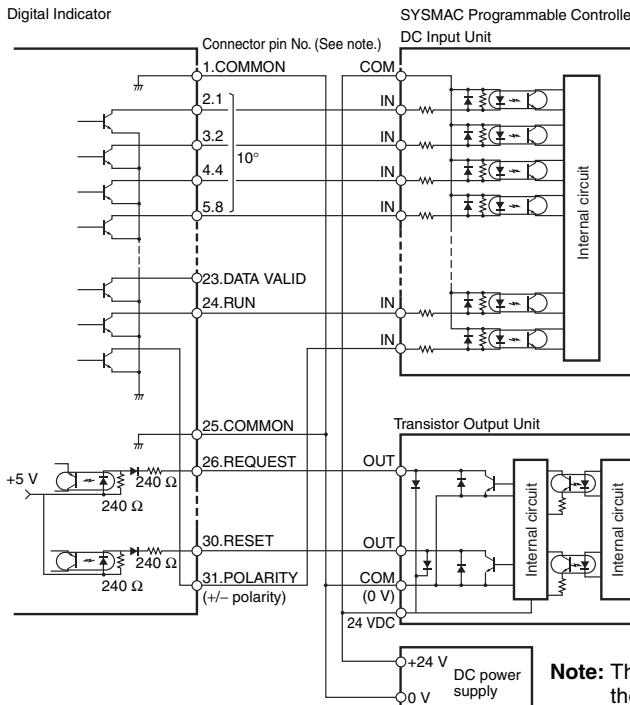
When reading the data from a Programmable Controller, start reading the data when the DATA VALID signal turns ON.

The DATA VALID signal will turn OFF 40 ms later, and the data will turn OFF 16 ms after that.

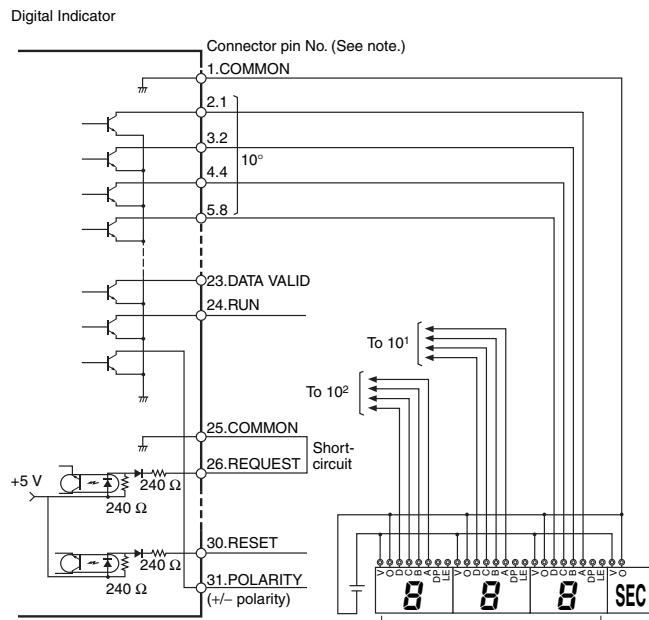


Note: Leave 20 ms min. between DATA VALID turning OFF and the REQUEST signal.

Programmable Controller Connection Example



Display Unit Connection Example



Note: The BCD output connector pin number is the D-sub connector pin number when the BCD Output Cable (sold separately) is connected. This number differs from the pin number for the Digital Indicator narrow pitch connector (manufactured by Honda Tsushin Kogyo Co., Ltd.).

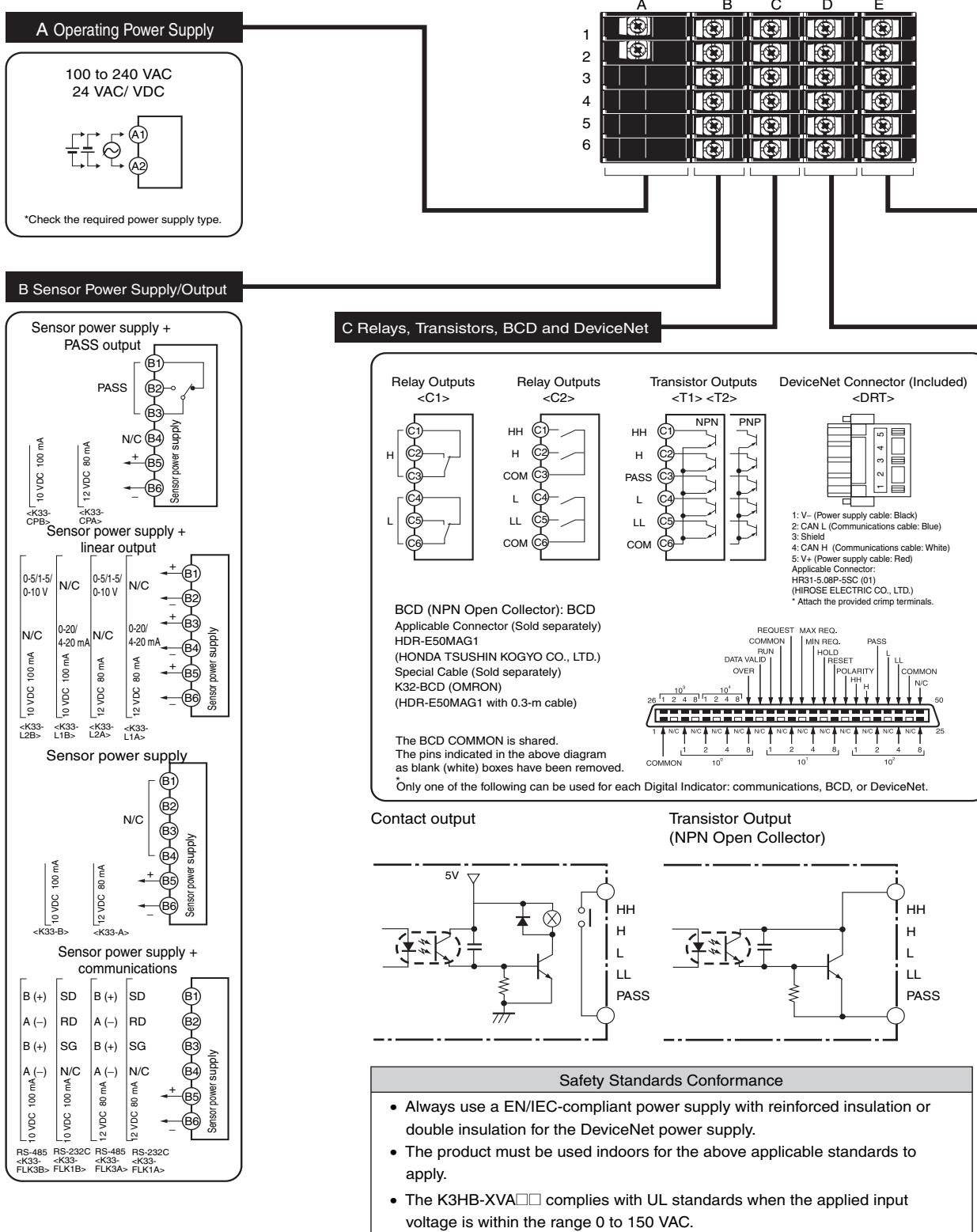
Refer to the following User's Manual for application precautions and other information required when using the Digital Indicator:
K3HB-S/-X/-V/-H Digital Indicator User's Manual (Cat. No. N128)

The manual can be downloaded from the following site in PDF format: OMRON Industrial Web <http://www.fa.omron.co.jp>

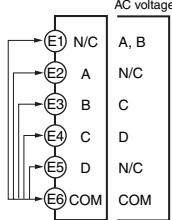
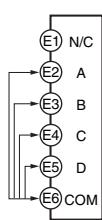
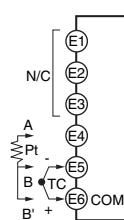
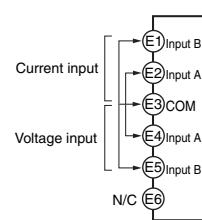
■ Connections

Terminal Arrangement

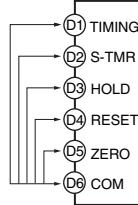
Note: Insulation is used between signal input, event input, output, and power supply terminals.



E Analog Input

Process Indicator
K3HB-X
AC voltage onlyWeighing Indicator
K3HB-V
A, B
N/C
C
D
N/C
COMTemperature Indicator
K3HB-H
N/C
A
Pt
B
TC
B' +
B'
COMLinear Sensor Indicator
K3HB-S
Current input
Voltage input
Input B
Input A
COM
Input A
Input B
N/C
E6

D Event Input

Models with Terminal Blocks
<K35-1>~<K35-3>

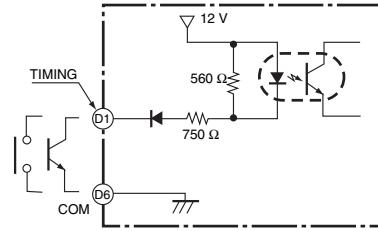
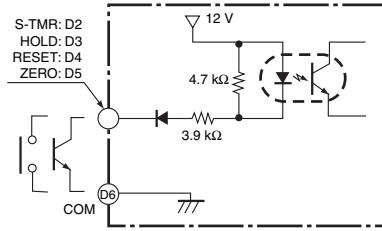
- Use terminal pin D6 as the common terminal.
- Use NPN open collector or no-voltage contacts for event input.

PNP types are also available.

Models with Connectors
<K35-2>~<K35-4>

1: TIMING	2: S-TMR
3: HOLD	4: RESET
5: ZERO	6: COM
7: BANK4	8: BANK2
9: BANK1	10: COM

- Applicable Connector (Sold separately)
XG4M-1030 (OMRON)
- Special Cable (Sold separately)
K32-DICN (OMRON)
(XG4M-1030 with 3 m cable)



BCD Output Cable

Model	Shape	Pin arrangement																																																							
K32-BCD	<p>Connected device end (PLC, display device, etc.)</p> <p>Cover: HDR-E50LPA5 (manufactured by Honda Tsushin Co., Ltd.) Connector: HDR-E50MAG1 (manufactured by Honda Tsushin Co., Ltd.)</p> <p>D-sub connector (37-pin female) Cover: 17JE-37H-1A (manufactured by DDK) Connector: Equivalent to 17JE-13370-02 (manufactured by DDK) Stand: 17L-002A (manufactured by DDK)</p>	<table border="1"> <tr> <td>COMMON</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10⁰</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10¹</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10²</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10³</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10⁴</td> </tr> </table> <p>OVER DATA VALID RUN COMMON REQUEST MAX REQ. MIN REQ. HOLD RESET POLARITY HH H PASS L LL COMMON</p>	COMMON	1	2	3	4	5	6	7	8	9	10 ⁰		1	2	3	4	5	6	7	8	9	10 ¹		1	2	3	4	5	6	7	8	9	10 ²		1	2	3	4	5	6	7	8	9	10 ³		1	2	3	4	5	6	7	8	9	10 ⁴
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	1	2	3	4	5	6	7	8	9	10 ³																																															
	1	2	3	4	5	6	7	8	9	10 ⁴																																															

Note: The BCD Output Cable has a D-sub plug. Cover: 17JE-37H-1A (manufactured by DDK); Connector: equivalent to 17JE-23370-02 (D1) (manufactured by DDK)

Special Cable (for Event Inputs with 8-pin Connector)

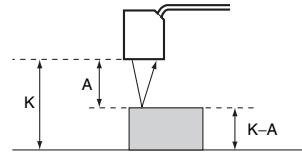
Model	Appearance	Wiring																						
K32-DICN	<p>9 10 1 2 Cable marking (3 m)</p>	<table border="1"> <thead> <tr> <th>Pin No.</th> <th>Signal name</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TIMING</td> </tr> <tr> <td>2</td> <td>S-TMR</td> </tr> <tr> <td>3</td> <td>HOLD</td> </tr> <tr> <td>4</td> <td>RESET</td> </tr> <tr> <td>5</td> <td>ZERO</td> </tr> <tr> <td>6</td> <td>COM</td> </tr> <tr> <td>7</td> <td>BANK4</td> </tr> <tr> <td>8</td> <td>BANK2</td> </tr> <tr> <td>9</td> <td>BANK1</td> </tr> <tr> <td>10</td> <td>COM</td> </tr> </tbody> </table>	Pin No.	Signal name	1	TIMING	2	S-TMR	3	HOLD	4	RESET	5	ZERO	6	COM	7	BANK4	8	BANK2	9	BANK1	10	COM
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■ Main Functions

Measurement

Input Calculation

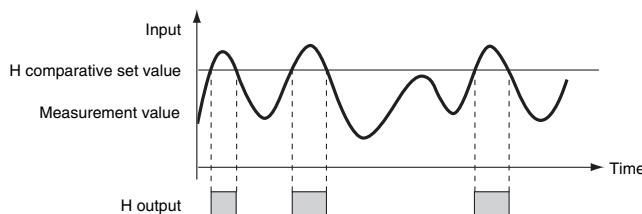
- Two input circuits are provided. The input ranges for these circuits can be set independently. For example, one can be set to 4 to 20 mA and the other can be set to 1 to 5 V.
- In addition to calculations such as K (constant)-A (input for one circuit), it is possible to perform calculations based on the inputs for both circuits, such as A+B and A-B, making it possible to perform thickness measurement and level-difference measurement using displacement and length-measuring sensors.



Timing Hold

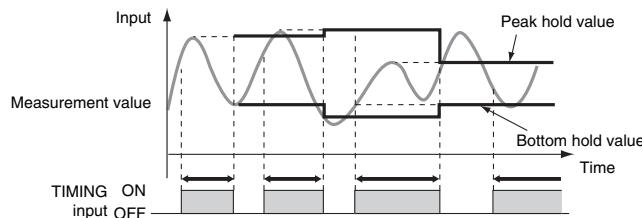
Normal

- Continuously performs measurement and always outputs based on comparative results.



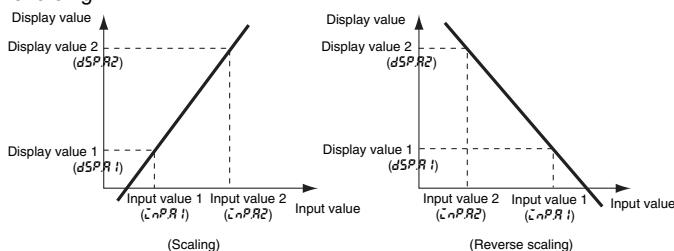
Peak Hold/Bottom Hold

- Measures the maximum (or minimum) value in a specified period.



Scaling

Scaling converts input signals in any way required before displaying them. The values can be manipulated by shifting, inverting, or $+$ / $-$ reversing.



Teaching

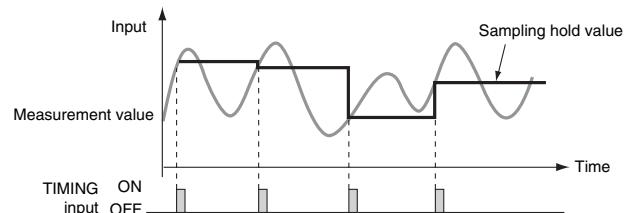
Settings for scaling can be made using the present measurement values instead of inputting values with the SHIFT and UP Keys. This is a convenient function for making the settings while monitoring the operating status.

Standby Sequence

Turns the comparative output OFF until the measurement value enters the PASS range.

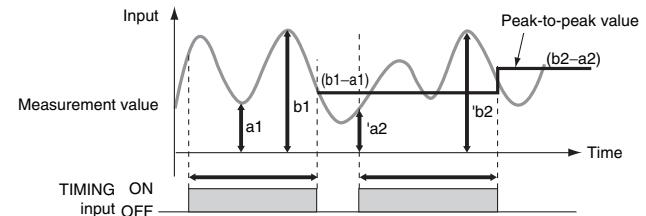
Sampling Hold

- Holds the measurement at the rising edge of the TIMING signal.



Peak-to-peak Hold

- Measures the difference between the maximum and minimum values in a specified period.



Average Processing

Average processing of input signals with extreme changes or noise smooths out the display and makes control stable.

Previous Average Value Comparison

Slight changes can be removed from input signals to detect only extreme changes.

■ Input Compensation/Display

Forced-zero

Forces the present value to 0. (Convenient for setting reference values or deducting tares for weight measurement.)

Tare Zero

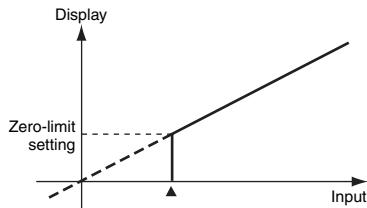
Shifts the current value measured with a forced zero to 0 again. It is possible to measure two or more compounds separately and then, by releasing the tare zero and forced-zero, measure the combined total.

Zero-trimming

Compensates for mild fluctuations in input signals due to factors such as sensor temperature drift, based on OK (PASS) data at measurement. (This function can be used with sampling hold, peak hold, or bottom hold.)

Zero-limit

Changes the display value to 0 for input values less than the set value. It is enabled in normal mode only. (This function can be used, for example, to stop negative values being displayed or to eliminate flickering and minor inconsistencies near 0.)



Interruption Memory

- The minimum and maximum values when the power supply is turned OFF can be saved if interruption memory is turned ON.
- If interruption memory is ON, the maximum and minimum values after the last resetting will be displayed.
- If interruption memory is OFF, the maximum and minimum values will be displayed after the power supply is turned ON (or after the reset input is performed).

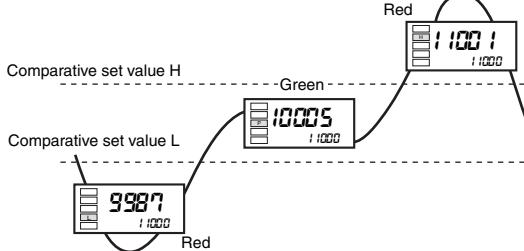
Display Refresh Period

The display refresh period can be lengthened to reduce flickering and thereby make the display easier to read.

Display Color Selection

Values can be displayed in either red or green. With comparative output models, the display color can also be set to change according to the status of comparative outputs (e.g., green to red or red to green).

Example) Setting: *Green*



Display Value Selection

The current display value can be selected from the present value, the maximum value, and the minimum value.

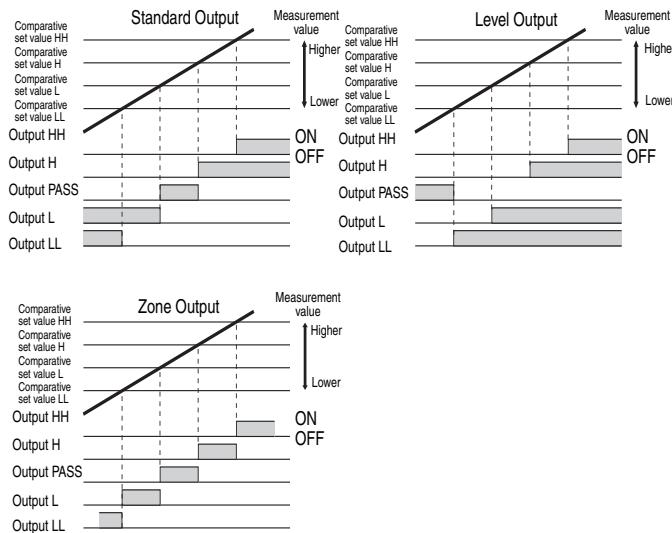
Step Value

It is possible to specify (i.e., restrict) the values that the smallest displayed digit can change by. For example, if the setting is 2, the smallest digit will only take the values 0, 2, 4, 6, or 8 and if the setting is 5, it will only take the values 0 or 5. If the setting is 10, it will only take the value of 0.

■ Output

Comparative Output Pattern

The output pattern for comparative outputs can be selected. In addition to high/low comparison with set values, output based on level changes is also possible. (Use the type of output pattern appropriate for the application.)



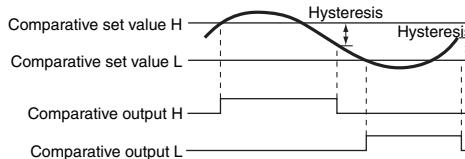
Output Logic

Reverses the output operation of comparative outputs for comparative results.

Hysteresis

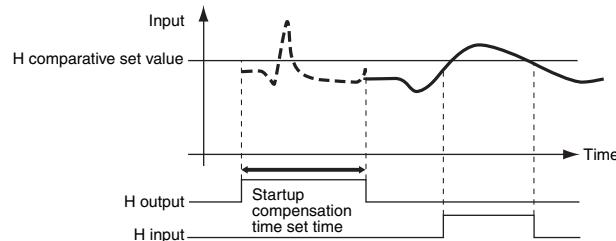
Prevents comparative output chattering when the measurement value fluctuates slightly near the set value.

Example: Comparative Output Pattern (Standard Output)



Startup Compensation Timer

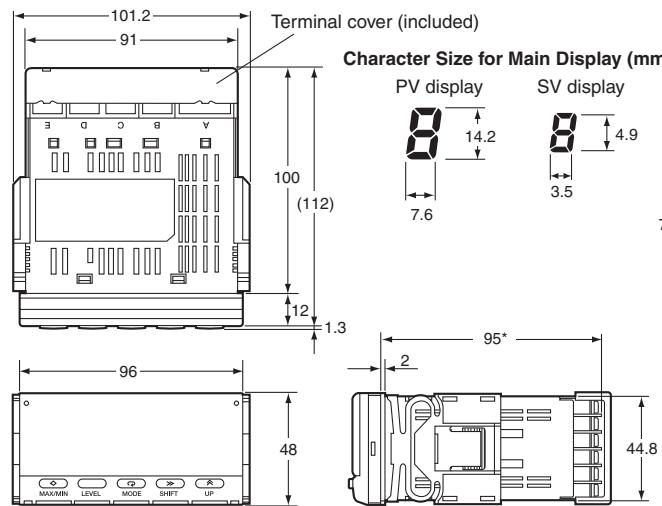
Measurement can be stopped for a set time using external input.



PASS Output Change

Comparative results other than PASS and error signals can be output from the PASS output terminal.

■ Dimensions



Mounting Recommended Panel Thickness
1 to 8 mm.
Mount the product horizontally.

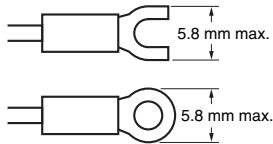
*DeviceNet models: 97 mm
Terminal: M3, Terminal Cover: Accessory

■ Wiring Precautions

- For terminal blocks, use the crimp terminals suitable for M3 screws.
- Tighten the terminal screws to the recommended tightening torque of approx. 0.5 N·m.
- To prevent inductive noise, separate the wiring for signal lines from that for power lines.

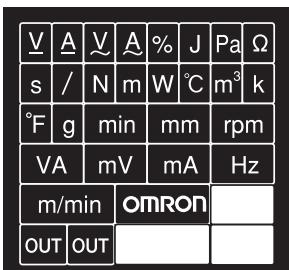
Wiring

- Use the crimp terminals suitable for M3 screws shown below.



Unit Stickers

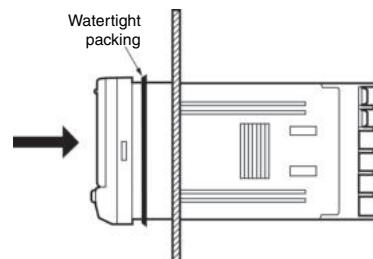
- Select the appropriate units from the unit sticker sheets provided and attach the sticker to the Indicator.



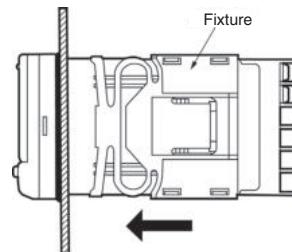
Note: When using for meters, such as weighing meters, use the units specified by regulations on weights and measures.

■ Mounting Method

- Insert the K3HB into the mounting cutout in the panel.
- Insert watertight packing around the Unit to make the mounting watertight.

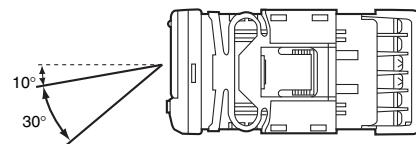


- Insert the fixture into the grooves on the left and right sides of the rear case and push until it reaches the panel and is fixed in place.



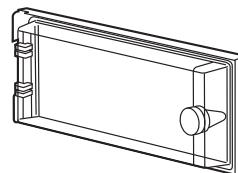
■ LCD Field of Vision

The K3HB is designed to have the best visibility at the angles shown in the following diagram.



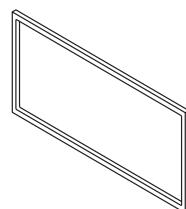
■ Watertight Cover

Y92A-49N



■ Rubber Packing

K32-P1



If the rubber packing is lost or damaged, it can be ordered using the following model number: K32-P1.

(Depending on the operating environment, deterioration, contraction, or hardening of the rubber packing may occur and so, in order to ensure the level of waterproofing specified in NEMA4, periodic replacement is recommended.)

Note: Rubber packing is provided with the Controller.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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