High precision digital contact displacement sensor

HK-S series



Product features

- Multi digit display of measured values
- Resolution can reach 0.1um
- The accuracy can up to 1μm
- The amplifier is a switching output
- The detection head can be used independently, with RS485 communication output

Application

- Evenness inspection
- Precision displacement measurement
- Glass production testing
- Automotive parts inspection
- Shaft diameter and segment difference detection

Product specifications

Amplifier

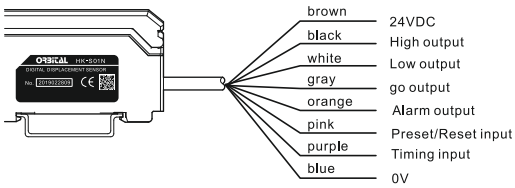
Type		NPN	PNP
Model		HK–S01N	HK–S01P
Display Range		-29.999 to 29.999	
Display resolution		1um	
Response time		10ms，50ms，100ms，500ms，1000ms	
Power voltage		12-24V DC with 10% pulse (P-P) , Class 2	
Power consumption		Max. 2200mw (when 30V, max. 73.3mA)	
Output control		NPN open collector 40V, maximum 50mA, residual voltage: maximum 1V	PNP open collector 40V, maximum 50mA, residual voltage: maximum 1V
Control input		input time: min 10ms	
Reaction time		max. 1ms	
Consumption current		max. 20mA	
Environmental resistance	Ambient temperature	-10℃ to +50℃， No freezing	
	Ambient humidity	35 to 85%RH, no condensation	
	Vibration	10 to 55Hz, complex amplitude 1.5mm, X, Y, Z axis direction, 2 hours each	
Material	Shell	PC	
	Key	PC	
Weight		about 140g with cable	

Sensor head

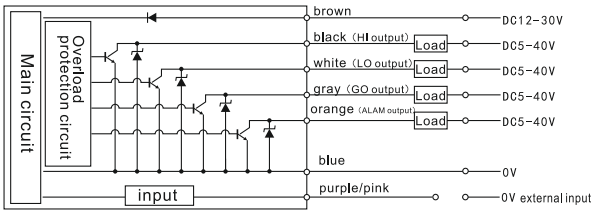
Type		HK–L10	HK–L12
Appearance			
Sensing range		0-12.5mm	0-12.5mm
Variable range		0–12.5mm	0-12.5mm
Detection accuracy		1um	1um
Resolution ratio		0.1um	0.1um
Power voltage		5V	5V
Measuring force		⩽1.5N	
Spring		1N	
Protection level	Amplifier	IP40	
	sensor head	IP65	
Mechanical life		More than ten million times	
Ambient temperature		Working: 0 to +50℃， storage: -10 to +60℃	
Ambient humidity		Working: 35 to 85%RH， No condensation	
Vibration resistance		10 to 55Hz, Single amplitude 0.35mm, X,Y,Z axis, each direction 50 min	
Impact resistance		150m/s² 6 directions, each direction 3 times (Up, down, left, right, front, back)	
Connection method		cable connection	
Weight (with packing)		about 100g	
Shell material	Sensor head	stainless steel	
	Rubber sheath	Viton	

Input output circuit diagram

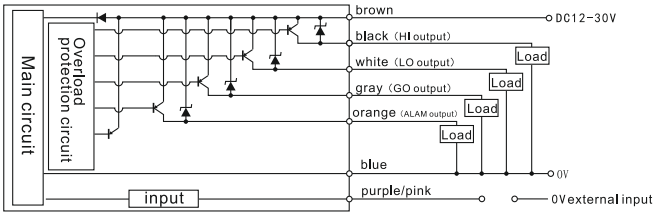
Power cord (I/O cable)



NPN output

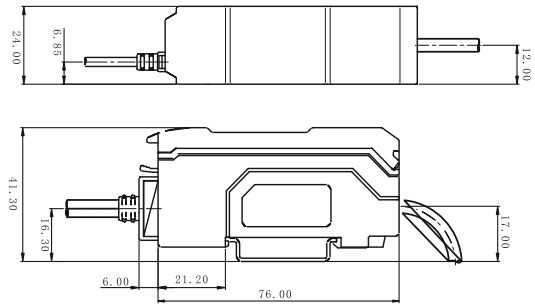


PNP output

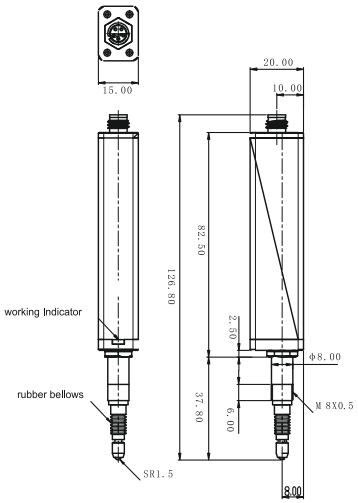


Dimension

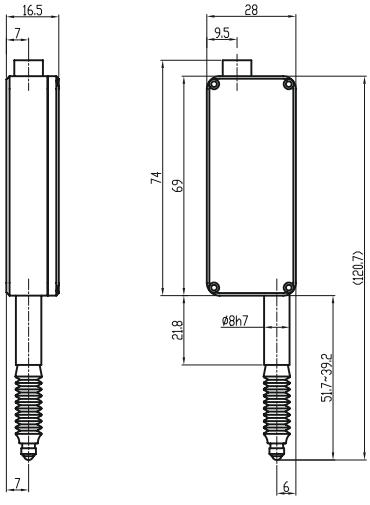
HK-S01



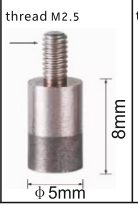
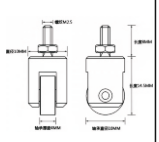
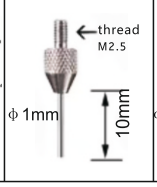
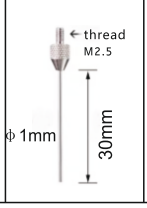
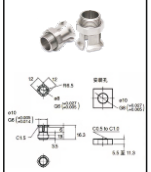
HK-L10



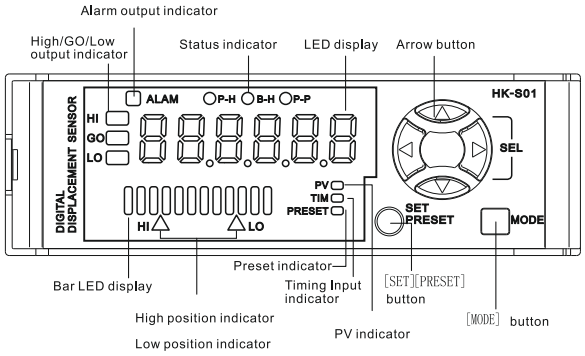
HK-L12



Accessories selection

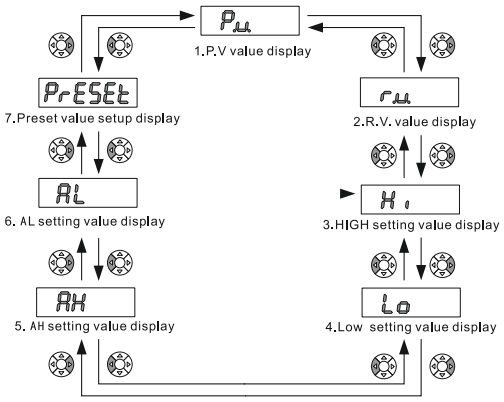
Model	HK-D4L8	HK-D5L8	HK-D6L8	HK-D8L8	HK-77680	HK-F10L10	HK-F10L30	HK-76874
Appearance								

Product specifications



Digital LED display

The main display during detection can be switched to the displays as shown below by pressing the left/right Arrow buttons.



1. P.V. value display ([P.V. = Present Value] Criterion value display)Displays a value to be used for output judgment.
2. R.V. value display ([R.V. = Raw Value] Raw value display)Displays an actual detection value of the detection target
3. HIGH setting value display--Displays/Sets an upper limit value of the range of the detection target
4. LOW setting value display--Displays/Sets a lower limit value of the range of the detection target
5. AH setting value display--Display/sets an value to set above the HIGH setting value
6. AL setting value display--Display/sets an value to set below the LOW setting value
7. Preset value setup display--Displays/Sets an arbitrary value to be added to or subtracted from the display value.

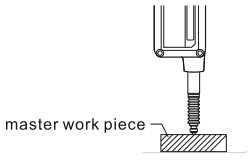
Zero-Point Correction

When you use this equipment for the first time or after the sensor head is changed, be sure to correct the reference zero point

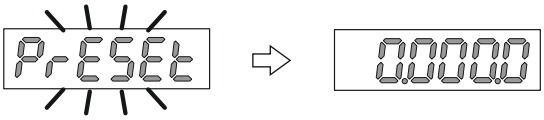
Reference
- When "------" is displayed, zero-point correction is disabled
- Zero-point correction can be performed approx. 1 million times. When zero-point calibration is frequently used, you can perform setting so that the zero-point calibration will not be written into the memory.

Setup using buttons

1. Set any main display and perform the detection of the detection target (master workpiece) to serve as a reference for zero-point correction.



2. Press the [PRESET] button (2S or more) with the master workpiece being detected.
After "PrESEt" has blinked several times on the digital LED display of the amplifier, "0.000.0"* will appear.
The zero-correction is completed.



Setup using external input (Pink wire)

1.Perform detection of the target (master workpiece) to serve as a reference for zero-point correction.
2.Connect the pink wire to the appropriate terminal.

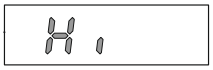
Setup of Limit Values

The limit values are an upper limit value (HIGH setting value) and a lower limit value (LOW setting value). Setting these values enables three types of judgment (display/output): above the upper limit (HIGH), below the lower limit (LOW), and within the range (GO).

Manual setup of limit values

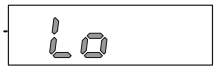
The following shows how to set manually an upper limit value (HIGH setting value) and a lower limit value (LOW setting value).

1.When in the main display, press the left/right Arrow buttons until the HIGH setting value display appears.



2.Enter an upper limit value (HIGH setting value) with the top/bottom Arrow buttons

3.Press the bottom right Arrow button to display the LOW setting value display.



4.Enter an upper limit value (LOW setting value) with the top/bottom Arrow buttons

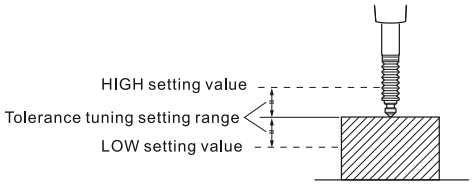
The setup of range criteria values is completed.
To return to the P.V. value display, press the left/right Arrow buttons

Automatic setup of limit values

This function automatically sets an upper limit value (HIGH setting value) and a lower limit value (LOW setting value).
For master work pieces, set by "tolerance tuning"; and for actual works (good or defective), set by "two-point tuning".

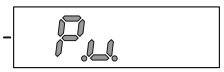
● Tolerance tuning

This is a method for setting a range based on the detection value of a master workpiece when the master workpiece is available.



Reference
When "------" is displayed, tolerance tuning is disabled. When "-FFFF" or "FFFF" is displayed, the settings cannotbe set correctly.

1.When in the main display, press the left/right Arrow buttons until the P.V. value display appears, then perform detection ofthe master workpiece.



Reference Tolerance tuning is enabled only when in the P.V. valuedisplay.

2.Press the [SET] button while the master workpiece is being detected to capture the detected value.

3.Press the upper/bottom Arrow buttons to enter a tolerance tuning setting range.

4.Press the [SET] button to fix the tolerance tuning setting range.

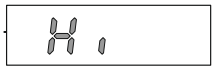
After [SEt] blinks several times on the digital LED display of the amplifier, the P.V. value display automatically appears.
Tolerance tuning is completed.

● Two-point tuning

This is the method of setting the median values of the detected good and/or defective work pieces as a range when the good workpiece and HIGH/LOW defective work pieces are available.

Reference
Two-point tuning is disabled when "------" is displayed as aR.V. value. When "- FFFF" or "FFFF" is displayed, setting cannot be done accurately.

1.When in the main display, press the left/right Arrow buttons until the HIGH setting value display appears.

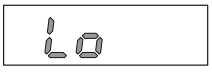


HIGH setting value display

2.Detect the good workpiece and press the [SET] button to capture the detected value.
"Set" and the detected value blink alternately, and the value of the good workpiece is fixed.

3.Detect the HIGH defective workpiece and press the [SET] button to capture the detected value.
The median value of this detected value and the one captured in step 2 blinks.
HIGH setting value is fixed.

4.Press the right Arrow button until the LOW setting value display of the main display appears.



LOW setting value display

5.Detect the good workpiece again and press the [SET] button to capture the detected value.

6.Detect the LOW defective workpiece and press the [SET] button to capture the detected value.

The median value of this detected value and the one captured in step 5 blinks.
LOW setting value is fixed.
Two-point tuning is completed.
Press the left/right Arrow buttons to return to the P.V. value display.



Preset

This function displays the value obtained by adding or subtracting a preset value to or from the detected value.
By using this function and the zero point correction function together, you can set an arbitrary value as a reference point of the work.
Refer to "Preset Function" in the "GT2-70 Series User's Manual" for details about the preset function.

Limit output function

This function can detect and output the mechanical movement of the spindle on the contraction and extension sides.
The stroke end of both sides can be detected, so this function can be used for interlocking the device.

Keylock

The keylock allows you to avoid erroneous button operation during detection.
When the keylock is active, setup operations other than changing the display are disabled.

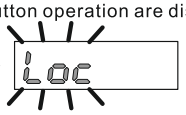
Reference The keylock can be set on the main display only

● Set the keylock

When keylock is active, setup operations other than main display switching and the [PRESET] button operation are disabled.

When in the main display, while pressing the [MODE] button, press the upper Arrow button for at least two seconds.
The keylock display will appear for several seconds and then change to the main display.

MODE + (Press for at least two seconds)

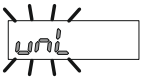


Keylock display

● Cancel the keylock

Press "up or down" Arrow button for at least two seconds while pressing the [MODE] button in the main display when the keylock is active.
The keylock cancel display will appear for several seconds and then change to the main display.

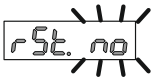
MODE + or (Press for at least two seconds)



Keylock cancel display

Initialize (Reset to the default state)

1.When in the main display, while pressing the [MODE] button, press the [SET] button five times.
"rSt.no" will appear.



2.Press the top/bottom Arrow buttons to select "rSt.YES".

3.Press the [MODE] button.
"rSt.End" will appear.
Initialization is completed.



● Default value list

Default values of function settings

Setting item		Initial value
01.	Detection mode	Std
02.	Hold update method	tim
03.	Response time	100
04.	Timing type	t-in
05.	Self timing level	0.500
06.	Self timing delay type	t.d
07.	Static hold delay stability width	0.030
08.	User specified delay time	t=1000

Static hold delay stability width

Setting item		Initial value
21.	Output format	no
22.	Input Selection	PrESEt
23.	Hysteresis	0.0030
24.	Change of measurement direction	nor
25.	Preset memory	yES
26.		

Setup using external input (Pink wire)

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2.Connect the pink wire to the appropriate terminal.

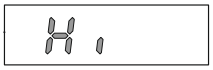
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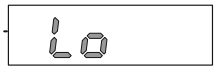
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3.Press the bottom right Arrow button to display the LOW setting value display.



4.Enter an upper limit value (LOW setting value) with the top/bottom Arrow buttons

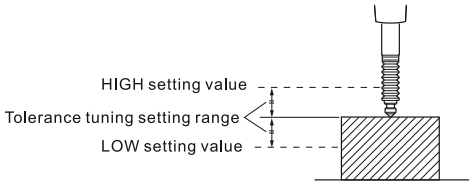
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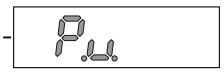
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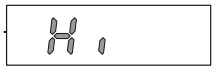
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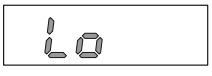


HIGH setting value display

2.Detect the good workpiece and press the [SET] button to capture the detected value.
"Set" and the detected value blink alternately, and the value of the good workpiece is fixed.

3.Detect the HIGH defective workpiece and press the [SET] button to capture the detected value.
The median value of this detected value and the one captured in step 2 blinks.
HIGH setting value is fixed.

4.Press the right Arrow button until the LOW setting value display of the main display appears.



LOW setting value display

5.Detect the good workpiece again and press the [SET] button to capture the detected value.

6.Detect the LOW defective workpiece and press the [SET] button to capture the detected value.

The median value of this detected value and the one captured in step 5 blinks.
LOW setting value is fixed.
Two-point tuning is completed.
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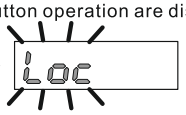
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MODE + (Press for at least two seconds)

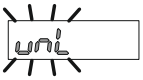


Keylock display

● Cancel the keylock

Press "up or down" Arrow button for at least two seconds while pressing the [MODE] button in the main display when the keylock is active.
The keylock cancel display will appear for several seconds and then change to the main display.

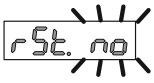
MODE + or (Press for at least two seconds)



Keylock cancel display

Initialize (Reset to the default state)

1.When in the main display, while pressing the [MODE] button, press the [SET] button five times.
"rSt.no" will appear.



2.Press the top/bottom Arrow buttons to select "rSt.YES".

3.Press the [MODE] button.
"rSt.End" will appear.
Initialization is completed.



● Default value list

Default values of function settings

Setting item		Initial value
01.	Detection mode	Std
02.	Hold update method	tim
03.	Response time	100
04.	Timing type	t-in
05.	Self timing level	0.500
06.	Self timing delay type	t.d
07.	Static hold delay stability width	0.030
08.	User specified delay time	t=1000

Static hold delay stability width

Setting item		Initial value
21.	Output format	no
22.	Input Selection	PrESEt
23.	Hysteresis	0.0030
24.	Change of measurement direction	nor
25.	Preset memory	yES
26.		