KEYENCE

L92GB

Separate Amplifier Digital Proximity Sensor ER-N Series User's Manual



Details on IO-Link can be found in the "ER Series IO-Link Instruction Manual." The ER Series IO-Link Instruction Manual can be obtained from the website accessed from the following 2D code or URL.

www.keyence.com/ca21111402

Read this manual before using the product in order to achieve maximum performance.
Keep this manual in a safe place after reading it so that it can be used at any time.

■ Symbols

The following symbols alert you to important messages. Be sure to read these messages carefully.

DANGER	**Indicates a hazardous situation which, if not avoided, will result in death or serious injury.**
WARNING	**Indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
CAUTION	**Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**
NOTICE	**Indicates a situation which, if not avoided, could result in product damage as well as property damage.**
Point	**Indicates additional information on proper operation.**
Reference	Indicates tips for better understanding or useful information.

1 Before Operation

Safety Precautions

DANGER	• **This product is only intended to detect objects. Do not use this product for the purpose of protecting a human body or a part of a human body.** • **This product is not intended for use as an explosion-proof product. Do not use this product in a hazardous location and/or potentially explosive atmosphere.**
WARNING	**This is a direct current (DC) power supply type sensor. Application of an alternating current may result in explosion or fire.**
NOTICE	• **Use separate conduits for power lines and high-voltage lines. Use of a common conduit may result in device malfunction due to noise or damage to the sensor.** • **Because this sensor detects magnetic fields, do not use it in environments where strong magnetic fields are present.** • **Always ground the frame ground terminal when using an off-the-shelf switching regulator.** • **Do not use this product outdoors.**

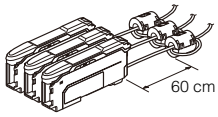
Precautions on Regulations and Standards

■ CE and UKCA Markings

KEYENCE Corporation has confirmed, on the basis of the following specifications, that this product complies with the essential requirements of the applicable EU Directive(s) and UK regulations. Be sure to consider the following specifications when using this product in the member states of the European Union.

● Attaching a ferrite core

When using the ER-NH035F or ER-NH048F with the response time set to 4 ms or less, wrap the power and output cable of the ER-N Series amplifier unit and of each connected unit twice around a ferrite core (OP-84289) as shown in the figure.
(This is not required for the PoE cable of the NU-EP1.)



● EMC Directive, applicable standard: EN60947-5-2, Class A

Ensure that the cable length is 30 meters or less.
These specifications do not give any guarantee that the end-product with this product incorporated complies with the essential requirements of the EMC Directive. The manufacturer of the end-product is solely responsible for the compliance of the end-product itself according to the EMC Directive.
Install this product in a location not affected by surges. (The amplifier unit cable must be 30 m or less and the head cable 2.8 m or less in length.)
Ground from the FG terminal of the amplifier unit (the main unit).
Ground the sensor head.

■ CSA Certificate

This product complies with the following CSA and UL standards and has been certificated by CSA.

- Applicable standard CAN/CSA C22.2 No.60947-5-2
  UL60947-5-2

Be sure to consider the following specifications when using this product as a product certified by CSA.

- Use a CSA/UL certified power supply that provides Class 2 output as defined in the CEC (Canadian Electrical Code) and NEC (National Electrical Code).
- Do not apply excessive tensile force to the cable.

Handling

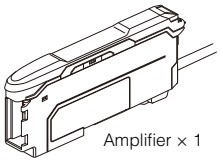
If this sensor is heavily soiled, clean it with a soft cloth moistened with a neutral detergent.

Packaged Items

Before using the device, make sure that the following equipment and accessories are included in the package.
We thoroughly inspect the package contents before shipment; however, in the event of defective or broken items, contact the nearest KEYENCE office.

Reference The ER-N Series is an amplifier. Each amplifier unit must be used with a separately sold sensor head. This allows for the selection of a sensor head that best suits the intended application.

ER-N Series

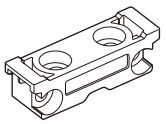


Amplifier × 1

Instruction manual × 1

■ Optional Products

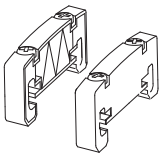
OP-88245



Amplifier securing bracket (for main unit) ×1

"Attaching the Amplifier Unit" (page 2)

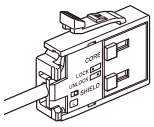
OP-26751



End unit × 2

"Attaching the Amplifier Unit" (page 2)

OP-89152/ 89153/19154



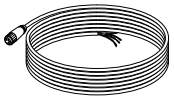
Sensor head connector S/M/L × 1

OP-87625



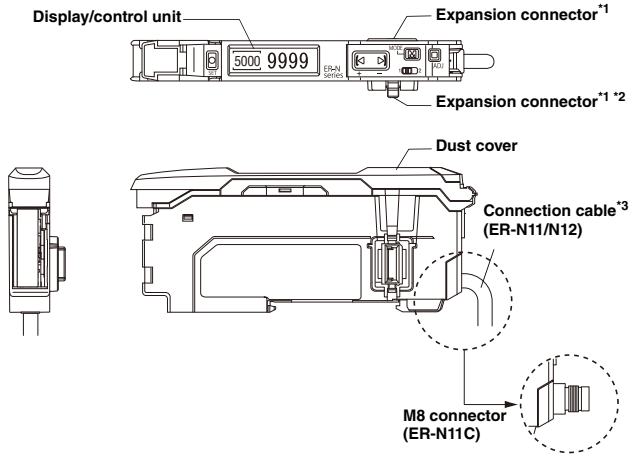
M8 connector cable (2 m) × 1
Input/output cable for the ER-N11C

OP-87626



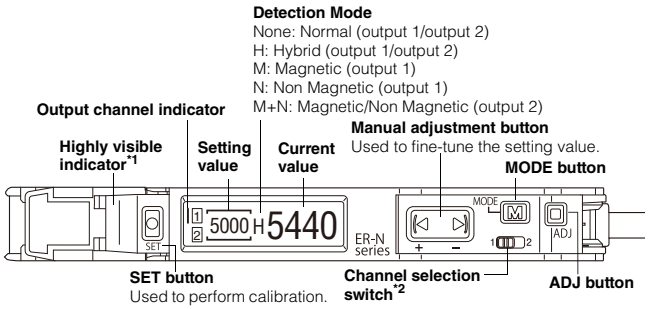
M8 connector cable (10 m) × 1
Input/output cable for the ER-N11C

Part Names



*1 A protection cover is installed over the expansion connector prior to shipment. This cover is not available on the connector type (ER-N11C).
*2 Not available on the main unit type.
*3 There is no connection cable on the zero line type (ER-N10) or connector type (ER-N11C).

■ **Display/control unit**



*1 Operates according to the selected output channel. (When the output is ON: orange, when the output is OFF: unlit)
*2 Not present on the zero line type (ER-N10).

Model Number Description

An overview of each model is as follows.

Model	(1) Type	(2) Output type (cable type)
ER-N10	Expansion unit (zero line)	-
ER-N11C	Main unit I/O (switchable*)	PNP/NPN switchable (M8 connector)
ER-N11	Main unit (dual output and single input)	PNP/NPN switchable (2 m cable)
ER-N12	Expansion unit (dual output and single input)	PNP/NPN switchable (2 m cable)

* Single output + single input or dual output + 0 inputs

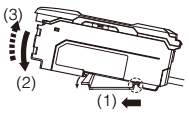
2 Installation and Wiring

Attaching the Amplifier Unit

■ **Attaching to DIN rail**

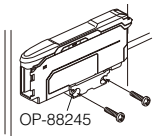
1 Align the claw at the bottom of the main unit with the DIN rail, as shown in the figure. While pushing the main unit in the direction of arrow (1), push down in the direction of arrow (2).

2 To remove the main unit, raise it in the direction of arrow (3) while pushing it in the direction of arrow (1).



■ **Horizontal installation (main unit only)**

1 Attach the main unit to the optional mounting adapter (OP-88245), and then insert M3 screws into the two locations shown in the figure to secure the main unit in place.



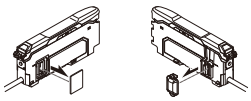
■ **Connecting multiple amplifiers**

Up to eight expansion units can be connected to one main unit. Up to 16 ER-N10 (zero line type) amplifiers can be connected to an NU Series networking unit.

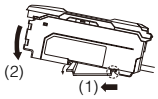
CAUTION	**When connecting to multiple amplifiers or when mounting main units together, mount the units on a DIN rail installed on a metal surface.**

NOTICE	**• Be sure to turn the power off before connecting an expansion unit. • Do not touch the expansion connector.**

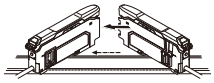
1 Remove the expansion protection covers from the main unit and expansion unit(s).



2 Install the amplifiers on the DIN rail one at a time. Slide the main unit and expansion unit(s) together.

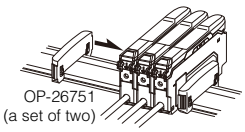


3 Mate the two claws of the expansion unit with the recesses on the main unit side until a click is heard/felt.



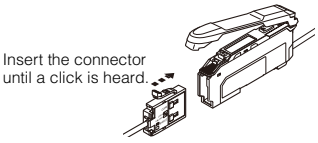
4 Attach the end units (sold separately: OP-26751) to the DIN rail on both sides of the amplifiers in the same way as step (2).

5 Match the core wire with the CORE side on the sticker and the shield wire with the SHIELD side on the sticker, and then insert these wires, reaching the dotted line on the connector tip.



Connecting the Head and the Amplifier

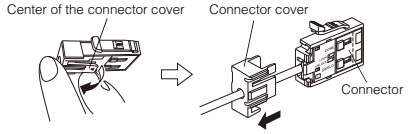
Insert the head connector into the amplifier with the power turned off.



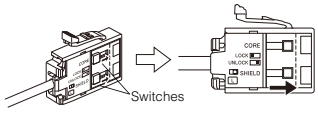
Shortening the Head Cable

■ **When cutting the cable shorter, use the following method to attach the connector.**

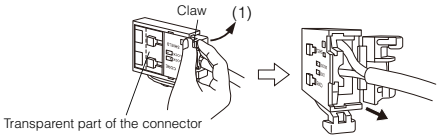
1 Raise the center of the connector cover toward the front and pull the connector out in the direction of the black arrow.



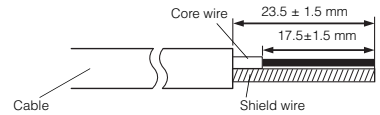
2 Set the black CORE and SHIELD switches to the UNLOCK position.



3 Hold the transparent part of the connector surface in front, lower the claw at the top in the direction indicated by (1), and then pull the cable out.

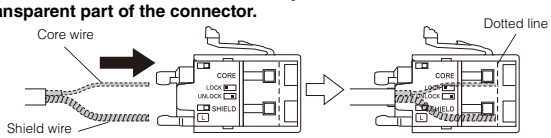


4 Cut the cable to the appropriate length, and then process the cable tip as described below. Be sure to strip the shield wire and core wire.

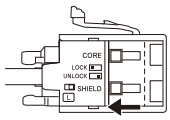


- Strip 23.5 ± 1.5 mm of sheath from the end of the cable.
- Strip 17.5 ± 1.5 mm of sheath from the end of the core wire.
- Using a narrow pair of tweezers or a similar tool, unravel the shield wire to the base, and then gather together the shield wire and core wire.

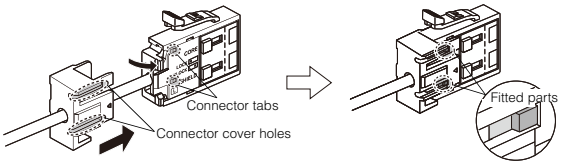
5 Match the core wire with the CORE hole and the shield wire with the SHIELD hole, and then insert these wires until they reach the dotted line marked on the transparent part of the connector.



6 After inserting the cable, set the black CORE and SHIELD switches to the LOCK position to prevent the cable from coming loose.



7 Engage the connector claw, and then firmly insert the connector into the connector cover until the tabs on the connector fit into the holes on the cover.

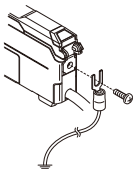


NOTICE	**• Do not reattach the connector more than 10 times. After the 10th time you reconnect, use the OP-89152, OP-89153, or OP-89154 (Sensor head connector S/M/L: sold separately), depending on the sensor head model. • For corresponding connector models, see the following table.**

Name	Model	Applicable model
Connector S	OP-89152	ER-NH028/NH028U/NH035F
Connector M	OP-89153	ER-NH038
Connector L	OP-89154	ER-NH054/NH054G/NH080/NH080G/ NH100/NH100G/NH048F

Grounding the Amplifier Unit

There is a grounding terminal on the back of the amplifier unit. To improve resistance against noise, it is recommended that you ground the amplifier unit.



■ **Screw conditions**

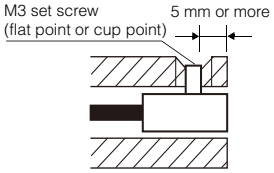
M3 (connected to the amplifier), recommended tightening torque: 0.6 N·m

■ **Terminal size**

Round terminal: ø8 mm or less, Y terminal: width of 8 mm or less

Tightening Torque

- When mounting a cylindrical type with a set screw, place the set screw at least 5 mm away from the tip of the sensor head, and tighten with a torque of 0.2 N·m or less.
- With the ER-NH028U, place the set screw at least 15 mm away from the tip.
- Depending on the screw type, tighten with a torque that does not exceed the value shown in the following table.

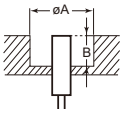


Model	Tightening torque
ER-NH100(G)	10 N·m or less

Influence of Surrounding Metal

Shielded sensors can be embedded in metal. Use unshielded sensors with at least the distances in the following table.

Distance(mm) / Model	A	B
ER-NH028U	20	15



Interference

When installing the same model sensors such that the sensors face, or are parallel to each other, ensure that the sensors are separated by at least the distances in the following table or use "L Interference Prevention."
If you use the interference prevention function, you can connect units close together. (This does not apply to the ER-N11C.)
When you use "L Interference Prevention," the response time changes. (For details, see L Interference Prevention [page 9].)

Distance / Model	Facing (mm)	Parallel (mm)
ER-NH028	6	6
ER-NH038	8	8
ER-NH054(G)	16	13
ER-NH080(G)	18	15
ER-NH100(G)	10	10
ER-NH035F	10	10
ER-NH048F	25	25
ER-NH028U	25	25

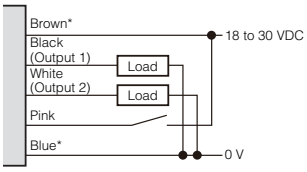
* This data corresponds to the case in which the setting of the amplifier unit is within the stable detection range.

Amplifier Wiring

NOTICE	• Be sure to turn OFF power before wiring. • Insulate each input or output wire that will not be used.

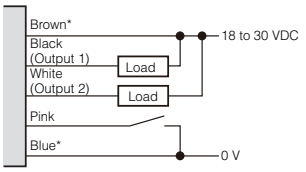
■ Wiring (cable type: ER-N11/N12)

● **Set to PNP**



* ER-N11 only

● **Set to NPN**



* ER-N11 only

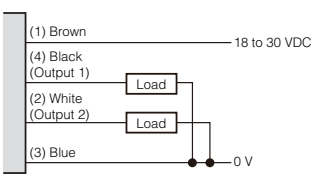
■ Wiring (M8 connector type: ER-N11C)

Select PNP or NPN and the function of the I/O pin (2) during the initial settings.

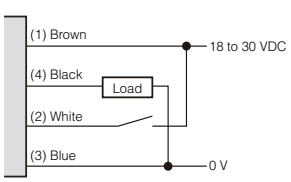
Sensor pin layout 

● **When using the sensor in PNP mode**

OUT1 + OUT2

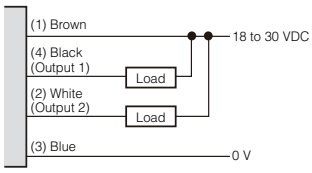


OUT1 + INPUT

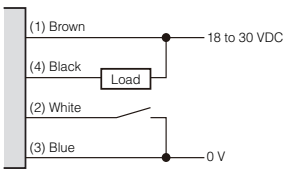


● **When using the sensor in NPN mode**

OUT1 + OUT2



OUT1 + INPUT

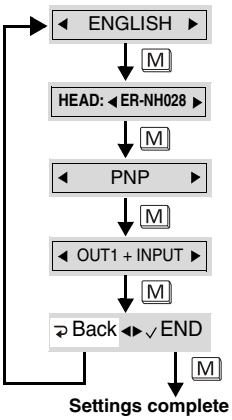


The wire colors indicate the colors when using an OP-87625/87626 M8 connector cable (sold separately).

3 Initial Settings

Initial Settings

When turning on the sensor for the first time, or when the sensor has been initialized/factory reset, select the initial settings shown below.



Use ◀ ▶ to select the language. (ENGLISH/日本語/中文/DEUTSCH)

Use ◀ ▶ to select the sensor head.

Use ◀ ▶ to select PNP or NPN.

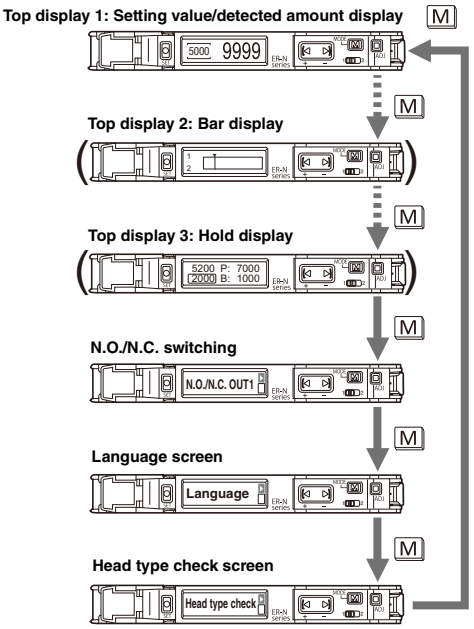
Use ◀ ▶ to select the I/O.* (OUT1 + INPUT/OUT1 + OUT2)
* This item is only displayed on the ER-N11C.

After completion, if these settings need to be changed again, perform an initialization. (page 5).

4 Basic Settings

Top Display Transitions

Each time that M is pressed, the top display switches as shown below.
In the default state and when output channel 2 is selected, the "bar display" screen and "hold display" screen are hidden.



Point **If no operations are performed for 6 seconds or more on the Output style switching screen, Language screen, or Head type check screen, the sensor returns to the top display that was last displayed.**

Switching the Output Channel

You can use the channel selection switch to change the output channel.
The setting value and current detected amount of the selected output channel are displayed.

Output Selection (N.O./N.C.)

1 Press [M] once or multiple times to display [N.O./N.C. (OUT1)].

2 Use [◁] [▷] to switch the output logic.

3 Press [M].

Language

1 Press [M] multiple times to display [Language].

2 Use [◁] [▷] to switch the language.

3 Press [M].

Detection Mode

This product has four detection modes.
Origin adjustment is necessary when "Detection Mode" is set to a value other than [Normal].
For the setting method, see "8 Detailed settings" (page 6).

Detection mode	Detection target		Description
	Output 1	Output 2	
Normal (initial value)	Magnetic/ non-magnetic	Magnetic/ non-magnetic	You can only select the high-speed response (response time: 150 µs/300 µs) when using this detection mode. The detecting distance may decrease when detecting non-magnetic metals.
Magnetic	Magnetic	Magnetic/ non-magnetic	Use this mode if you do not want to detect non-magnetic metals with output 1. Output 2 detects both magnetic and non-magnetic targets. The detecting distance for outputs 1 and 2 is shorter than the Normal mode.
Non Magnetic	Non-magnetic	Magnetic/ non-magnetic	Use this mode if you do not want to detect magnetic metals with output 1. Output 2 detects both magnetic and non-magnetic targets. The detecting distance for outputs 1 and 2 is shorter than the Normal mode.
Hybrid	Magnetic/ non-magnetic	Magnetic/ non-magnetic	Use this mode if you want to detect magnetic and non-magnetic metals. The difference in detecting distances depending on the material is smaller than with the Normal mode.

5 Optimizing the Detection Operation

Consider the object to detect, the fixture, the temperature, and similar aspects of the area around the sensor when optimizing the detection operation. Configure settings in the actual environment where the sensor will be used.

2-point Adjustment

This function optimizes the detection operation between two points: one where the object to detect is present and one where it is not.
At the same time, the detected amount display is corrected to "9999" and "0."
Configure settings with the sensor secured in the actual fixture that will be used.
Ensure that the distance to the object to detect is within the stable detecting area.

1 Press [ADJ] to display [2-point Adjustment]. ◂ 2-point Adjustment ▸

2 Press [◁] [▷] to display [Execute]. ◂ Execute ▸

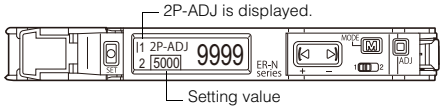
3 Press [ADJ] to start executing the function.

4 Press [SET] with the object to detect present. SET 1 4000

5 Press [SET] with the object to detect not present. SET 2 1000

The display becomes "9999" with the object to detect present and "0" with the object to detect not present, and the setting value becomes "5000".

Screen display when using the 2-point adjustment function.



Point **When you are using interference prevention, set it before executing 2-point adjustment.**

Reference You cannot execute 2-point adjustment if the difference in detected amount is small. ("Failed" will appear during step 5.)

Origin Adjustment

This function records the state with the object to detect not present, optimizing the detection operation. At the same time, it corrects the detected amount with the object to detect not present to "0."
Origin adjustment is necessary when "Detection Mode" is set to a value other than [Normal].
After attaching the sensor, carry out this procedure with the object to detect not present.

1 Press [ADJ] to display [Origin Adjustment]. ◂ Origin Adj. ▸

2 Press [◁] [▷] to display [Execute]. ◂ Execute ▸

3 Press [ADJ] to start executing the function.

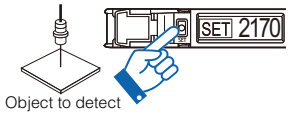
Setup is complete after the whole screen flashes momentarily, and then stops (lights up).

6 Adjusting Setting Values

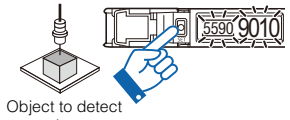
Adjust the setting value to adjust the position at which the sensor actually detects the object.

2-point Calibration

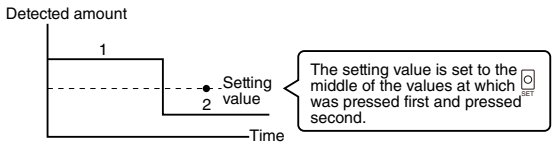
1 Press [SET] once with no object to detect present.



2 Press [SET] once with the object to detect present.



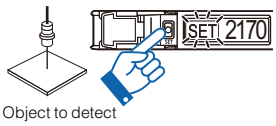
Calibration is complete after the whole screen flashes momentarily, and then stops (lights up).
The settings can be configured even if the SET button is pressed with the object to detect present and is then pressed with the object to detect not present.
If "---" is displayed for the setting value after settings are configured, the difference in detected amount is small, so detection may be unstable.



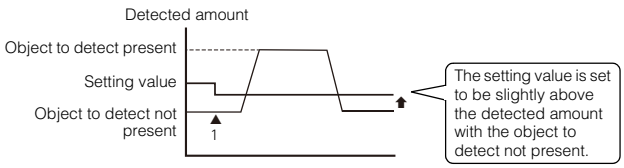
Maximum Sensitivity Calibration

Use this when performing calibration with no object to detect present.

1 Hold down [SET] for 3 seconds or more with no object to detect present.
Release the button when "SET" flashes.



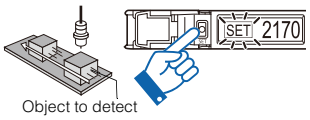
Calibration is complete after the whole screen flashes momentarily, and then stops (lights up).



Full Auto Calibration

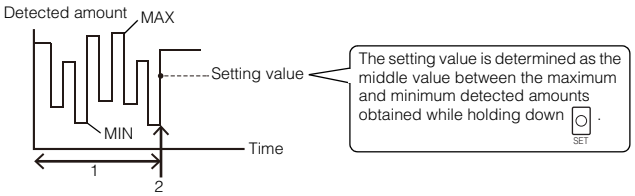
This method automatically adjusts the setting value using a moving object to detect. The sensitivity can be set without shutting down the equipment, as it can be set by referencing a moving target.

1 While the object to detect passes the sensor, hold down SET until "SET" flashes.



2 After the object to detect has completely passed the sensor, release SET.

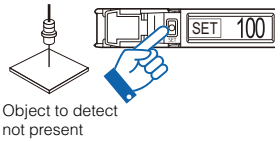
Calibration is complete after the whole screen flashes momentarily, and then stops (lights up).



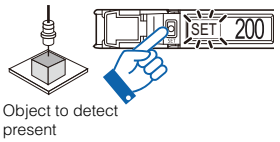
Positioning Calibration

Set the detected amount at the time this is executed to the setting value.

1 Press SET once with no object to detect present.



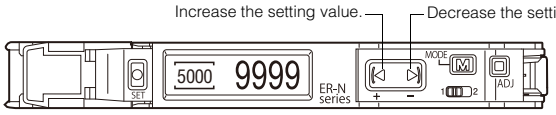
2 Position an object to detect in the location where you want to detect it. Then, hold down SET for 3 seconds or more.



Release the button when "SET" flashes.
Press ◀ ▶ to adjust the setting value.

Fine-tuning the Setting Value (Threshold)

Use ◀ ▶ to adjust the setting value. Hold down either button to make adjustments more quickly.



7 Useful Functions

Disabling the Key Operations

Disable button operations.

- **When "Standard" (default setting) is selected for "Key lock method" (page 6)**

1 Hold down M and ◀ ▶ or ◀ ▶ for 3 seconds or more.



To clear the key lock, use the same procedure.

- **When "With password" is selected for "Key lock method"**

1 Hold down M and ◀ ▶ or ◀ ▶ for 3 seconds or more.



To clear the key lock:

1 Hold down M and ◀ ▶ or ◀ ▶ for 3 seconds or more.
2 Press ◀ ▶ to specify the password, and then press M.

Initialization

Initialize all the settings and return the sensor to its factory default state.

1 Press SET and ADJ for 3 seconds or more. ◀ Initialize ▶
2 Press M once. ◀ Back ▶
3 Press ◀ ▶ once. ◀ Execute ▶
4 Press M once.

Setting the Current Detected Amount Display to 0 (Zero Shift)

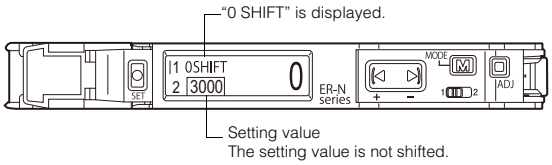
This function shifts the current detected amount to display "0."
If the detected amount does not display "0" due to the background when no object to detect is present, this function can be used to shift the detected amount to "0." This makes the difference in detected amount easier to distinguish.

1 Press ADJ and ◀ ▶.

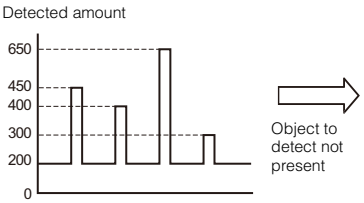


To cancel the zero shift function, hold down ADJ and ◀ ▶ for 3 seconds or more.

Screen display while using the zero shift function



Operating Principle of the Zero Shift Function



Point **The setting value will not be changed automatically even if you use the zero shift function. After using the zero shift function, change to an appropriate setting value.**

Saving/Reading Settings

Saving Settings

The current setting value and the advanced function settings can be saved in the amplifier.

Point **Saving the settings will overwrite the previously saved settings with the current settings.**

1 Hold down SET and ADJ for 3 seconds or more. ◀ Initialize ▶
2 Press ◀ ▶ to display "Save settings," and then press M. ◀ Save settings ▶
3 Press ◀ ▶ to display "Execute," and then press M. ◀ Execute ▶

Reading Settings

Saved settings can be read.

Point **Reading settings will overwrite all the previous settings with the saved settings.**

1 Hold down SET and ADJ for 3 seconds or more. ◀ Initialize ▶
2 Press ◀ ▶ to display "Read settings," and then press M. ◀ Read settings ▶
3 Press ◀ ▶ to display "Execute," and then press M. ◀ Execute ▶

8 Detailed settings

Set the language to English before use to match the displays below.

Hold down [M] for 3 seconds or more to enter the settings menu. Then, press [M] to change the item or press [◁] [▷] to switch the setting value.

- Press [M] + [◁] [▷] to return to the previous item.
- While in the settings menu, hold down [M] for 3 seconds or more to complete the settings.
- Underlined items are the default setting values.

Top display

Hold down [M] for 3 seconds or more.

A Detection Mode — Press [◁] [▷] to select the value.

[M] • Normal • Magnetic • Non Magnetic • Hybrid

*1 **B Response Time** — Press [◁] [▷] to select the value.

[M] • 150 µs (Normal) • 300 µs (Normal) • 1 ms • 4 ms • 16 ms • 64 ms

*2 **C External Input** — Press [◁] [▷] to select the value.

[M] • OFF • Pause Detection • Tuning • Zero Shift Calibration • Held Value Reset

"Pause Detection" selected

C1 Output During Pause Detection Input — Press [◁] [▷] to select the value.

[M] • OFF • ON • HOLD

[END] ◀▶ [ADVANCED] — Press [◁] [▷] to select the value.

END [M] ADVANCED

Settings complete

D Operation Mode 1 — Press [◁] [▷] to select the value.

[M] • Standard • Percentage Calibration • Zero Shift Calibration • Rising edge*3

"Percentage Calibration" selected

D1 Percent Target — Press [◁] [▷] to select the value.

[M] • −99% to 99% (initial value: −10%)

E N.O./N.C. Out 1 — Press [◁] [▷] to select the value.

[M] • N.O. • N.C.

F Output Timer 1 — Press [◁] [▷] to select the value.

[M] • OFF • Off-Delay • On-Delay • One-Shot • On/Off-Delay • On-Del/1Shot

Value other than "OFF" selected

F1 Duration 1-1 — Press [◁] [▷] to select the value.

[M] • 1 to 9999 ms (initial value: 10 ms)

"On/Off-Delay" or "On-Del/1Shot" selected

F2 Duration 1-2 — Press [◁] [▷] to select the value.

[M] • 1 to 9999 ms (initial value: 10 ms)

*4 **G Operation Mode 2** — Press [◁] [▷] to select the value.

[M] • Standard • Alert • Same as Output 1*5

*4 **H N.O./N.C.OUT 2** — Press [◁] [▷] to select the value.

[M] • N.O. • N.C.

*4 **I Output Timer 2** — Press [◁] [▷] to select the value.

[M] • OFF • Off-Delay • On-Delay • One-Shot • On/Off-Delay • On-Del/1Shot

Value other than "OFF" selected

I1 Duration 2-1 — Press [◁] [▷] to select the value.

[M] • 1 to 9999 ms (initial value: 10 ms)

"On/Off-Delay" or "On-Del/1Shot" selected

I2 Duration 2-2 — Press [◁] [▷] to select the value.

[M] • 1 to 9999 ms (initial value: 10 ms)

J Hysteresis — Press [◁] [▷] to select the value.

[M] • Standard • Custom

"Custom" selected

J1 Hysteresis Value 1 — Press [◁] [▷] to select the value.

[M] • 0 to 9999 (initial value: 50)

*4 **J2 Hysteresis Value 2** — Press [◁] [▷] to select the value.

[M] • 0 to 9999 (initial value: 50)

*6 **K Zero Shift Calibration** — Press [◁] [▷] to select the value.

[M] • Back • Execute • Cancel

*7 **L Interference Prevention** — Press [◁] [▷] to select the value.

[M] • OFF • 4 Sensors • 8 Sensors

Value other than "OFF" selected

*8 **L1 Expansion Model** — Press [◁] [▷] to select the value.

[M] • ER-N or None • Other

M Language — Press [◁] [▷] to select the value.

[M] • ENGLISH • 日本語 • 中文 • DEUTSCH

N Flip Display — Press [◁] [▷] to select the value.

[M] • Standard • Flipped

*6 **O Display Bar** — Press [◁] [▷] to select the value.

[M] • OFF • ON

P Hold Display — Press [◁] [▷] to select the value.

[M] • OFF • Peak/Bottom • Peak Max/Min • Btm Max/Min • P Min/B Max • P Max/B Min

Q Brightness — Press [◁] [▷] to select the value.

[M] • Brightness 1 • Brightness 2 • Brightness 3 • Off when no operation

R Key Lock Method — Press [◁] [▷] to select the value.

[M] • Standard • With password

"With password" selected

R1 Password — Press [◁] [▷] to select the value.

[M] • 0 to 9999 (initial value: 0)

*9 **S IO-Link Mode** — Press [◁] [▷] to select the value.

[M] • IO-Link On • IO-Link Off

*10 **T Input/Output Confirmation** — Press [◁] [▷] to select the value.

[M] • Initial settings confirmation

U Initialize — Press [◁] [▷] to select the value.

[M] • Back • Execute

V Save/Read — Press [◁] [▷] to select the value.

[M] • Back • Save settings • Read settings

[END]

*1 When a value other than [Normal] is selected for the "A Detection Mode" setting, the response times that can be selected vary.

*2 This item is only displayed when [OUT1 + INPUT] is selected for the I/O selection setting on the M8 connector type (ER-N11C). Also, [Zero Shift Calibration] is not displayed when [Rising edge] is selected for the "D Operation Mode 1" setting.

*3 This item is not displayed when a value other than [Normal] is selected for the "A Detection Mode" setting.

*4 This item is only displayed when "OUT1 + OUT2" is selected for the I/O selection setting on the M8 connector type (ER-N11C). It is not displayed on the zero line type.

*5 This item is only displayed when [OUT1 + OUT2] is selected for the I/O selection setting on the M8 connector type (ER-N11C).

*6 This item is not displayed when [Rising edge] is selected for the "D Operation Mode 1" setting. The option [Cancel] for "K Zero Shift Calibration" is only displayed after [Execute].
*7 This item is not displayed on the M8 connector type (ER-N11C). When [4 Sensors] or [8 Sensors] is selected for the number of mutual interference prevention units, the response time changes as shown in the following table.

Response time / Interference prevention	[150 µs (Normal)]	[300 µs (Normal)]	[1 ms]	[4 ms]	[16 ms]	[64 ms]
[4 Sensors]	5 ms		10 ms	40 ms	170 ms	700 ms
[8 Sensors]	10 ms		20 ms	70 ms	300 ms	1.2 s

*8 This item is only displayed on the cable-type expansion unit (ER-N12) and the zero line type (ER-N10).
*9 This item is only displayed on the M8 connector type (ER-N11C).
*10 This can be used to check the current setting status. This item is not displayed on the ER-N10.

9 Function Explanations

A Detection Mode

See "Basic Settings" (page 4).

B Response Time

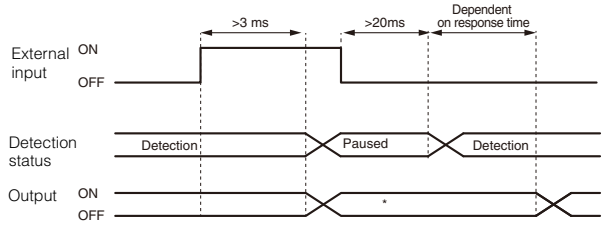
You can stabilize detection by increasing the response time.
You can only select [150 µs (Normal)] and [300 µs (Normal)] when "Detection Mode" is set to [Normal].

C External Input

You can turn on the external input wire (apply a signal for more than 3 ms) to execute the following functions.

- Pause Detection
- Tuning
- Zero Shift Calibration
- Held Value Reset

● Pause Detection: Pauses the detection operation.

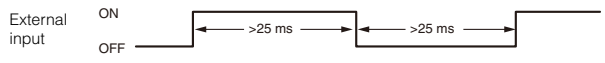


* The output varies depending on C1 Output During Pause Detection Input.

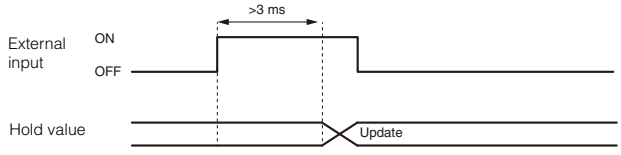
C1 Output During Pause Detection Input

Screen display	Function overview
OFF	The output is locked in the OFF state during external input (default setting).
ON	The output is locked in the ON state during external input.
HOLD	The output is locked in its existing state when the external input is received.

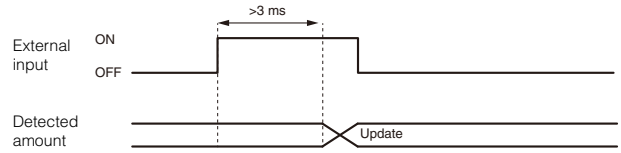
● Tuning: Executes the same function as the SET button.



● Held Value Reset



● Zero Shift Calibration



Writing of External Input to EEPROM

Setting "Saving by Input" to [OFF] when [tuning] or [Zero Shift Calibration] is selected for "External Input" will prevent the settings modified by external input from being written to the EEPROM.
This prevents writing to the EEPROM even when frequent external inputs are performed and thus prevents the EEPROM from reaching the end of its service life (1 million write operations) too quickly.

1 With the current value displayed, hold down the M, ◁, and ○ SET buttons for 3 seconds or more.
To restrict the writing of settings, use ◁▷ to select "OFF."
2 Press M.

- When "OFF" is set, if the settings are changed using the external input and the power is then turned OFF and ON, the values changed using the external input will not be recorded.
- When "ON" (the initial value) is set, the settings are written to the EEPROM approximately 3 seconds after the settings are changed using the external input.

D G Detection Mode

The table below lists the detection modes that can be selected.

Screen display	Function
Standard	Normal detection mode (default setting)
Percentage Calibration*2	During calibration, the setting value is established as a percentage of the current detected amount.
Zero Shift Calibration*2	This sensitivity setting method executes the zero shift function and performs basic calibration*1 at the same time during calibration.
Rising edge*2	Detection is performed only when the detected amount increases sharply. This option can only be used when Detection Mode is set to "Normal."
Alert*3	When an error occurs, output is generated.
Same as Output 1*3	Use this mode if you want to generate the same output as output 1 on output 2 when using IO-Link.

*1 2-point calibration, maximum sensitivity calibration, full auto calibration
*2 This can only be selected for D Operation Mode 1.
*3 This can only be selected for G Operation Mode 2.

● Restrictions for settings in each detection mode

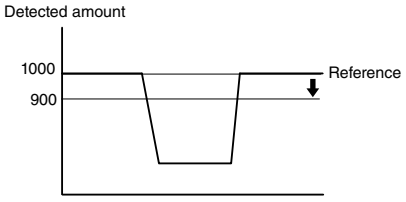
✓: Usable, -: Not usable

Setting method (calibration)	Operation Mode					
	Standard	Percentage Calibration	Zero Shift Calibration	Rising edge	Alert	Same as Output 1
2-point	✓	-	✓	-	-	-
Maximum	✓	-	✓	-	-	-
Full auto	✓	-	✓	-	-	-
Positioning	✓	-	-	-	-	-

Percent (Percentage Calibration)

The setting value can be established as a percentage (%) of the current detected amount. For example, if "Percent Target," the target value of the setting value, is set to −10%, the setting value is set to a value that is 10% lower than the detected amount when the SET button is pressed.
"Percent Target" can be set in the range of −99% to 99%.
Initial value: −10%

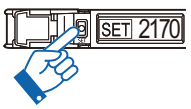
Setting example When "Percent Target" is set to "−10%"



To set the target value, see "D1 Percent Target" (page 6).

1 When the detected amount is at the level to be set as the reference, press ○ SET.

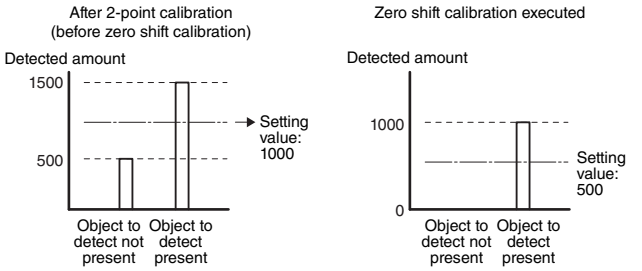
Setup is complete after the whole screen flashes momentarily, and then stops.



Reference When [tuning] is selected for "External Input," periodic percentage calibration is possible from external devices, enabling stable detection even when the difference in detected amount is small.

Zero Shift (Zero Shift Calibration)

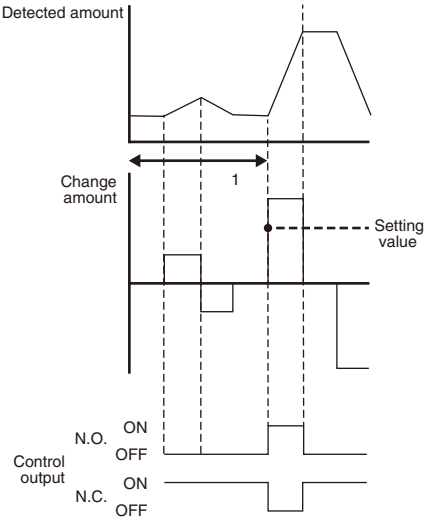
This setting (Zero Shift Calibration) performs the zero shift function and basic calibration (2-point calibration/maximum sensitivity calibration/full auto calibration) simultaneously.
The lower of the detected amounts at the time of setting will automatically be shifted to “0.”



Reference On the two output type, regardless of the channel on which zero shift is performed, the detected amount of each channel is corrected by the same amount.

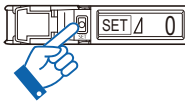
Rising edge (Edge Maximum Sensitivity Calibration)

This option can only be used when “Detection Mode” is set to [Normal].
On a rising edge, the sensor detects changes in the detected amount over a fixed period.



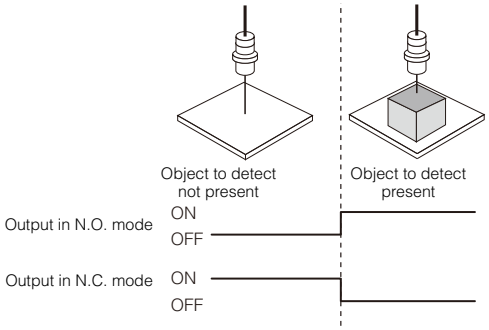
1 Press SET with no object to detect present.

The sensor is now configured to ignore changes in detected amount while SET is pressed. Setup is complete after the whole screen flashes momentarily, and then stops (lights up).



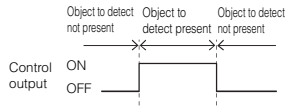
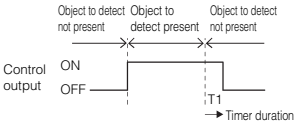
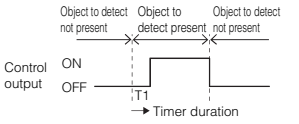
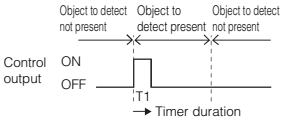
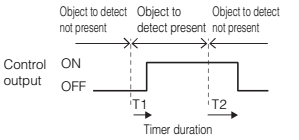
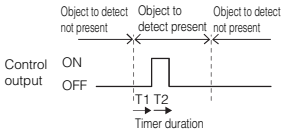
E H N.O./N.C.

The output status changes depending on whether you select “N.O.” or “N.C.”



F I Output Timer

There are five types of output timers available.

Screen display	Function	Timing chart*
OFF	Uses no output timer. (Default setting)	
Off-Delay	Turns OFF the output at a specified time after the detection signal turns OFF. Setting range: 1 to 9999 ms Initial value: 10 ms	
On-Delay	Turns ON the output at a specified time after the detection signal turns ON. Setting range: 1 to 9999 ms Initial value: 10 ms	
One-Shot	Turns ON the output and keeps it ON for a specified period after the detection signal turns ON. Setting range: 1 to 9999 ms Initial value: 10 ms	
On/Off-Delay	This is a composite timer that includes both an on-delay timer (Duration 1: T1) and an off-delay timer (Duration 2: T2). Each timer’s specified time can be set separately. Setting range: 1 to 9999 ms Initial value: 10 ms	
On-Del/1Shot	This is a composite timer that includes both an on-delay timer (Duration 1: T1) and a one-shot timer (Duration 2: T2). Each timer’s specified time can be set separately. Setting range: 1 to 9999 ms Initial value: 10 ms	

* N.O. examples

Reference Different timer functions and timer durations can be set separately for output channels 1 and 2.
You can set T1 in the table with F1 Duration 1-1 and I1 Duration 2-1 and T2 in the table with F2 Duration 1-2 and I2 Duration 2-2.

J Hysteresis

Hysteresis is the difference between the value at which the output turns ON and the value at which the output turns OFF. Select [Standard] (default setting) or [Custom].

If vibrations cause sensor chattering, select [Custom] and set a large hysteresis.
To detect even smaller detected amount differences, select [Custom] and set a small hysteresis.
However, selecting this setting may lead to unstable detection, so ensure that the output is stable.

Reference You can use J1 Hysteresis Value1 to set the hysteresis of output 1 and J2 Hysteresis Value2 to set the hysteresis of output 2.

K Zero Shift

This is the same function as “Setting the Current Detected Amount Display to 0 (Zero Shift)” under “7 Useful Functions” (page 5).

L Interference Prevention

This item is not displayed on the M8 connector type (ER-N11C). When [4 Sensors] or [8 Sensors] is selected for the number of mutual interference prevention units, the response time changes as shown in the following table.

Response time / Interference prevention	[150 µs (Normal)]	[300 µs (Normal)]	[1 ms]	[4 ms]	[16 ms]	[64 ms]
[4 Sensors]	5 ms		10 ms	40 ms	170 ms	700 ms
[8 Sensors]	10 ms		20 ms	70 ms	300 ms	1.2 s

L1 Expansion Model

When the ER Series interference prevention function is used, any non-ER Series expansion units that are connected, and feature an interference prevention function, may experience unstable detection. In this case, change the "L1 Expansion Model" setting on the "ER-N12/N10" that is connected directly to the non-ER Series expansion unit to "Other."

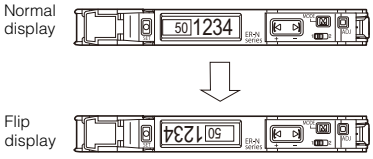
M Language (Language Selection)

This is the same function as "Language" under "4 Basic Settings."
Select from the following four languages.
ENGLISH (default setting), 日本語 (Japanese), 中文 (Chinese), and DEUTSCH (German)

N Flipped Display

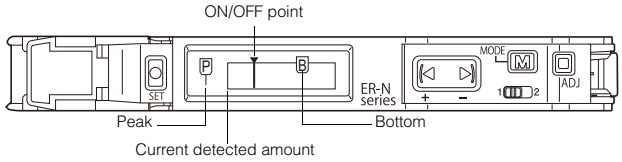
The current value and setting value displays can be flipped.

Screen display	Function
Standard	Normal display (default setting)
Flipped	Flip display

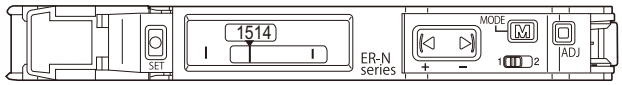


O Display Bar

The bar display shows the current detected amount on a bar graph.
On the setting screen, select "ON" to enable the bar display, which will be shown the next time the top display appears.



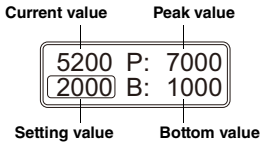
Press ◁ ▷ to display the setting value as shown below.



P Hold Display

■ Hold Display

The maximum peak value and the minimum bottom value of the detected amount can be displayed continuously.



The following five display combinations are available.

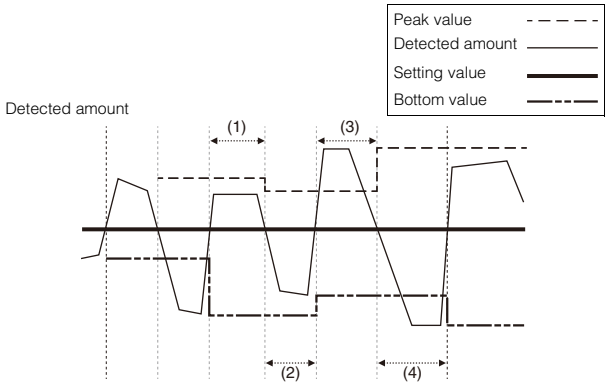
Screen display	Display contents
OFF	No hold display (default setting)
Peak/Bottom	Updates the peak or bottom value each time the detected amount falls below or rises above the setting value, respectively.
Peak Max/Min	Displays the maximum and minimum of the peak values since power was turned ON (cumulative).
Btm Max/Min	Displays the maximum and minimum of the bottom values since power was turned ON (cumulative).
P Min/B Max	Displays the minimum of the peak values and the maximum of the bottom values since power was turned ON (cumulative).
P Max/B Min	Displays the maximum value and the minimum value since power was turned ON (cumulative).

● How to reset the hold values

To reset the peak and/or bottom values that are currently held, use one of the following methods.

- Hold down M and ADJ.
- Perform a reset using the external input.
  "External Input" (page 7)
- Turn the power OFF, and then turn it back ON.

● Timing chart for the peak/bottom



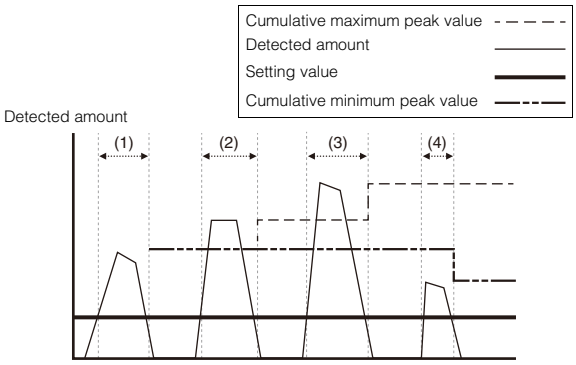
[Peak value]

- Samples while the detected amount > the setting value ((1), (3), etc.).
- When the current detected amount drops lower than the setting value, the peak value is updated.

[Bottom value]

- Samples while the detected amount < the setting value ((2), (4), etc.).
- When the current detected amount raises higher than the setting value, the bottom value is updated.

●Timing chart for the peak value



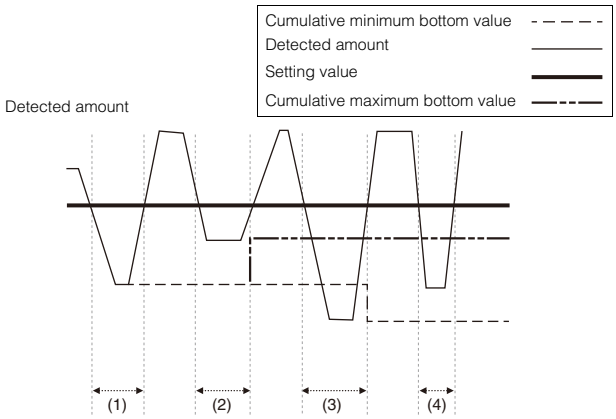
[Cumulative maximum peak value]

- Samples while the detected amount > the setting value ((1) to (4)).
- When the detected amount drops lower than the setting value, the previous peak value and current peak value are compared. If the current peak value is higher, the value is updated.

[Cumulative minimum peak value]

- Samples while the current detected amount > the setting value ((1) to (4)).
- When the current detected amount drops lower than the setting value, the previous peak value and current peak value are compared. If the current peak value is lower, the value is updated.

●**Timing chart for the bottom value**



[Cumulative maximum bottom value]

- Samples while the detected amount < the setting value ((1) to (4)).
- When the detected amount raises higher than the setting value, the previous bottom value and current bottom value are compared. If the current bottom value is higher, the value is updated.

[Cumulative minimum bottom value]

- Samples while the detected amount < the setting value ((1) to (4)).
- When the detected amount raises higher than the setting value, the previous bottom value and current bottom value are compared. If the current bottom value is lower, the value is updated.

Q Brightness

The screen brightness can be selected from the following four levels.
"Brightness 1," "Brightness 2," "Brightness 3" (default setting), "Off when no operation" (when there are no operations for 30 seconds, the screen turns off and only "-" blinks)
The default setting of "Brightness 3" makes the screen the brightest.

R Key Lock Method

Disable button operations to prevent unauthorized use.

Screen display	Function
Standard	Normal operation (default setting)
With password	A personal identification number can be set when activating the key lock. Only users who know the personal identification number can operate the unit.

S IO-Link Mode

This can only be set on the ER-N11C.
This function prevents the unit from unexpectedly switching to IO-Link communication.

Screen display	Function
IO-Link On	Normal (default setting)
IO-Link Off	Prevents switching to IO-Link communication.

T Input/Output Confirmation

The details configured in the initial settings (Initial Settings (page 3)) can be checked.
To change the settings (Initialization (page 10)) the unit.

ER-N11/N12

Screen display
PNP
NPN

ER-N11C

Screen display
PNP/OUT+IN
NPN/OUT+IN
PNP/2 OUT
NPN/2 OUT

* This item is not displayed on the ER-N10.

U Initialization

You can also initialize the sensor (return it to its factory default state) with a shortcut operation from the top display.

1 Press SET and ADJ for 3 seconds or more. ◄ Initialize ►

2 Press M once. ◄ Back ►

3 Press ◁ ▷ once. ◄ Execute ►

4 Press M once.

10 Specifications

Sensor head

Type		Separate amplifier ER-N										
		Shielded										Unshielded
Appearance		Cylinder						Threaded		Thin		Cylinder
		ø2.8	ø3.8	ø5.4		ø8		M10		t= 3.5 mm	t= 4.8 mm	ø2.8
Model		ER-NH028	ER-NH038	ER-NH054	ER-NH054G	ER-NH080	ER-NH080G	ER-NH100	ER-NH100G	ER-NH035F	ER-NH048F	ER-NH028U
Cable		Standard			Stainless steel spiral tube	Standard	Stainless steel spiral tube	Standard	Stainless steel spiral tube	Standard		
Stable detecting area[*1]		0 to 0.6 mm	0 to 0.8 mm	0 to 1 mm		0 to 2 mm				0 to 1 mm	0 to 5 mm	0 to 3 mm
Max. operating distance[*2]		1.2 mm	2 mm	3 mm		5 mm				3 mm	8 mm	7 mm
Hysteresis distance		Variable										
Repeatability[*3]		1 µm				2 µm				1 µm	2 µm	
Object to detect[*4]		Magnetic and non-magnetic metal										
Standard object to detect (t= 1 mm)		5 × 5 mm				10 × 10 mm				5 × 5 mm	15 × 15 mm	10 × 10 mm
Temperature characteristics[*5]		±10% or less of the detecting distance at +25°C (within the temperature range of 0 to +50°C), ±15% or less of the detecting distance at +25°C (within the temperature ranges of –10 to 0°C and +50 to +60°C) However, on the ER-NH028/038/035F/028U: +15/-10% or less of the detecting distance at +25°C (within the temperature range of 0 to +50°C) +20/-15% or less of the detecting distance at +25°C (within the temperature ranges of –10 to 0°C and +50 to +60°C)										
Environmental resistance	Enclosure rating	IP67(IEC60529)										
	Operating ambient temperature	–10 to +60°C (no freezing)										
	Operating ambient humidity	Up to 85%RH (no condensation)										
	Vibration resistance	10 to 500 Hz; power spectral density: 0.816 G^2/Hz; X, Y, and Z directions										
	Shock resistance	1000 m/s^2 (100 G); 10 times each for X, Y, and Z axes										
Materials	Detecting surface	Epoxy resin	Epoxy resin	PVC	PVC	Phenol Resin	Phenol Resin	Phenol Resin	Phenol Resin	Epoxy resin	Epoxy resin	Ceramic
	Case	SUS304	SUS304	SUS304	SUS304	SUS304	SUS304	Chrome-plated brass	Chrome-plated brass	SUS304	SUS303	SUS304
	Cable	PVC	PVC	PVC	Cable: PVC Sheath: SUS304	PVC	Cable: PVC Sheath: SUS304 End cap: nickel-plated brass	PVC	Cable: PVC Sheath: SUS304 End cap: nickel-plated brass	PVC	PVC	PVC
	Sensor head connector	PA66, polycarbonate										
	Accessory	—	—	—	—	—	—	Nut: chrome-plated brass		M2 screw, nut, spring washer, flat washer: iron nickel plating	—	—
Weight		Approx. 30 g	Approx. 40 g	Approx. 60 g	Approx. 85 g	Approx. 60 g	Approx. 90 g	Approx. 65 g	Approx. 100 g	Approx. 40 g	Approx. 65 g	Approx. 35 g
Accessories		—						M10 nut × 2		M2 screw, nut, spring washer, flat washer (2 each)	—	

* The stable detecting area, maximum operating distance, repeatability, and temperature characteristic are all values when "Detection Mode" is set to [Normal] and a standard detectable object is used.

*1 This is the area where 2-point adjustment can be performed normally with the object to detect present and not present therein. The stable detecting area becomes narrower in magnetic metal/non-magnetic metal mode.

*2 This is the distance at which detection is possible with a stable temperature when the settings are configured appropriately and the 2-point adjustment function is used with the maximum distance of the stable detecting area and with the object to detect not present.

*3 This is the detecting distance converted from the fluctuation of the detected amount in a stable environment with the default settings specified by KEYENCE.

*4 The detecting distance varies depending on the material and size. For details, see the characteristics diagram.

*5 This is the value when the 2-point adjustment function is used with 25% of the distance of the stable detecting area and with the object to detect not present and when the standard detectable object is placed at 50% of the distance of the stable detecting area.

Amplifier unit

Type		Separate amplifier ER-N			
Model		ER-N11	ER-N12	ER-N11C[*1]	ER-N10
Cable/connector		Cable		M8 connector[*2]	—
Main unit/expansion unit		Main unit	Expansion unit	Main unit (expansion not possible)	Expansion unit
No. of control outputs		2	2	2[*3]	None[*4]
No. of external inputs		1	1	1[*3]	-
Temperature characteristics[*5]		±8% or less of the detecting distance at +25°C within the temperature range of –25 to +55°C			
Response time		150 µs[*6]/300 µs[*6]/1 ms/4 ms/16 ms/64 ms selectable			
Network compatibility		—	Compatible with the NU Series	IO-Link: Specification v1.1 /COM2 (38.4 kbps)	Compatible with the NU Series
Function	Detection mode	Normal, Magnetic, Non Magnetic, Hybrid			
	Timer function	Timer OFF, Off-Delay, On-Delay, One-Shot, On/OFF-Delay, On-Del/1Shot			
Input/Output	Control output	Open collector, 30 VDC or less, PNP/NPN selectable 100 mA or less per output / 100 mA or less total for 2 outputs (when used as a solitary unit), 50 mA or less total for 2 outputs (when used as an expansion unit) Residual voltage NPN: 1.7 V or less (output current: 10 mA or less)/2.4 V or less (output current: 10 to 100 mA)			
	External input	Tuning/Pause Detection/Zero Shift Calibration/Held Value Reset selectable Short circuit current: 1.5 mA or less Input time: 3 ms or more ON, 20 ms or more OFF (25 ms or more ON, 25 ms or more OFF only when "tuning" is selected)			
Unit expansion (excluding the ER-N11C)		Up to 8 units (9 units connected in total including the main unit). However, up to 16 units when connecting the ER-N10 to the NU Series.			
Protection circuit		Protection against reverse power connection, output overcurrent, output surge, and reverse output connection			
Interference prevention (excluding the ER-N11C)		OFF, 4 Sensors, 8 Sensors selectable[*7]			
Power supply	Power voltage	18 to 30 VDC[*8] (including ripple (p-p) 10% or less), Class 2			
	Power consumption (excluding the load current)	1110 mW (47 mA or less at 24 V, 62 mA or less at 18 V)			830 mW (35 mA or less at 24 V, 47 mA or less at 18 V)
Environmental resistance	Operating ambient temperature	Operation: –25 to +55°C[*9], storage: –30 to +70°C (no freezing)			
	Ambient humidity range	Operation and storage: up to 85%RH (no condensation)			
	Vibration resistance	10 to 500 Hz; power spectral density: 0.816 G^2/Hz; X, Y, and Z directions			
	Shock resistance	500 m/s^2 (50 G); 10 times each for X, Y, and Z axes			
Case material		Main unit and cover: polycarbonate, Grounding terminal: copper/iron, metal plate: aluminum alloy, metal part of M8 connector: nickel-plated brass			

Type	Separate amplifier ER-N			
Model	**ER-N11**	**ER-N12**	**ER-N11C*1**	**ER-N10**
Weight	Approx. 90 g	Approx. 90 g	Approx. 55 g	Approx. 50 g
Accessories	Instruction manual			

*1 IO-Link: Compatible with specification v1.1/COM2 (38.4 kbps).
*2 Ensure that the "M8 connector" power cable length is 30 meters or less. Ensure that the cable length is 20 meters or less when utilizing IO-Link communication.
*3 Output 2 and the external input are selectable.
*4 This counts as one output when connecting multiple units to the FS-MC8P/MC8N, NU Series.
*5 This is the value when "Detection Mode" is set to [Normal], when the 2-point adjustment function is used with 25% of the distance of the stable detecting area and with the object to detect not present, and when the standard detectable object is placed at 50% of the distance of the stable detecting area.
*6 150 µs and 300 µs can only be selected when [Normal] is selected for the "Detection Mode" setting.
*7 When 4 Sensors or 8 Sensors is selected for the number of mutual interference prevention units, the response time changes as follows.
4 Sensors selected: 5 ms/10 ms/40 ms/170 ms/700 ms selectable, 8 Sensors selected: 10 ms/20 ms/70 ms/300 ms/1.2 s selectable
*8 When expanding the system by 4 or more expansion units, use a power voltage of 20 V or higher.
*9 When the system is expanded by 1 or 2 units: –25 to +55°C, by 3 to 10 units: –25 to +50°C, by 11 to 16 units: –25 to +45°C When using a 2 output model, it is counted as 2 units.
The prescribed values for the ambient temperature assume that the sensor amplifier has been mounted on a DIN rail installed on a metal surface. Exercise special care when installing the product in an airtight space.

11 Appendix

Troubleshooting

■ Frequently asked questions

Problem	Cause	Action
The detected amount is not stable.	The sensor is affected by noise.	• Connect the amplifier unit. • Ground nearby sources of noise such as motors and inverters or move the sensor away from sources of noise. • Attach a ferrite core. • Increase the response time.
	The sensor is affected by a close proximity sensor.	• If multiple ER-N separate amplifier types are affecting each other, enable the interference prevention setting or increase the distance between the sensor heads. • If the sensor is affected by another proximity sensor, increase the distance between them until the sensor is no longer affected.
	The distance between the point where the object to detect is present and the point where this object is not present is too small during the execution of 2-point adjustment.	During 2-point adjustment, operate the sensor with the object to detect within the stable detecting area and with this object not within this area (the far state).
	A non-magnetic metal moving at a high speed is being detected.	When a large non-magnetic metal moves at a high speed, the detected amount may not be stable. Decrease the movement speed or the size of the object to detect.
Chattering occurs in the output.	The sensor is affected by noise or interference.	• Increase the "Response Time" or set "Hysteresis" to [Custom] and increase the hysteresis value. • Implement countermeasures against noise (see above). • Set the "Interference Prevention." • Increase the distance between the sensor heads.
The detected amount is "---."	The origin adjustment/2-point adjustment has not been performed correctly.	Perform origin adjustment/2-point adjustment in the actual environment where the sensor will be used.
	The sensor head settings are incorrect.	Initialize the sensor and set the sensor head correctly. Then, perform origin adjustment/2-point adjustment again.
Nothing is displayed.	The power is OFF or the power cable is disconnected.	Review the wiring of the amplifier unit and the power voltage.
"-" scrolls from left to right on the display.	"Brightness" is set to [Off when no operation].	Select a setting other than "Off when no operation." "Brightness" (page 10)
The detected amount at which the output turns ON and the detected amount at which the output turns OFF are slightly different.	The timer function has been set.	Review the timer function settings. "Output Timer" (page 8)
	Hysteresis	Hysteresis has been set to prevent chattering in the output. If this level of detected amount is notable during detection, the detection tolerance may be low. Review the detection details.
Even if you perform origin adjustment/ 2-point adjustment, the detected amount does not become zero.	The sensor head has moved after origin adjustment/2-point adjustment was performed.	Fix the sensor head in place when performing origin adjustment/2-point adjustment.
	The sensor is affected by the ambient temperature.	Perform origin adjustment/2-point adjustment with the temperature in the environment the same as when you will use the sensor or perform "Zero Shift Calibration."
"Keys Locked" appears on the display.	The keys are locked.	See "Disabling the Key Operations" (page 5).
	You cannot unlock the keys.	• The [Communication Lock] has been set. Use communication to unlock the keys. • If a password has been set on the key lock and you have forgotten this password, contact your nearest KEYENCE office.
The detecting distance is short. The detected amount is small.	You are using an object that is difficult to detect.	• Small/thin objects may be difficult to detect. • In the Normal mode, the detecting distance is short for non-magnetic metals. For details, see the characteristics accessed from the 2D code under "Characteristics" (page 13).
	The origin adjustment/2-point adjustment has not been performed.	Perform origin adjustment/2-point adjustment in the actual environment where the sensor will be used.
	The zero shift function is in use.	Disable the zero shift function.
	"Detection Mode" is set to [Magnetic]/[Non Magnetic].	When "Detection Mode" is set to [Magnetic]/[Non Magnetic], the detecting distance shortens for both output 1 and output 2. If you want to increase the detecting distance, use [Normal] or [Hybrid]. For details, see "Detection Mode" (page 4).
The response time is too slow.	"Interference Prevention" has been set.	When "Interference Prevention" is set, the response time increases to allow for synchronization between sensors. For details on the response time when "Interference Prevention" is set, see "Interference Prevention" (page 9).
The sensor cannot detect objects with the [Rising edge] setting.	The objects to detect are moving too slowly for the set "Response Time."	Increase the speed of the objects to detect or the "Response Time."

■ Error displays

Error display	Cause	Action	Output Condition		Alert Condition	
			N.O.	N.C.	N.O.	N.C.
Overcurrent 1/ Overcurrent 2	An overcurrent is flowing through the control or alarm output.	• Check the load and return it to a value within the rated range. • Check that the output wire is not contacting any other wire or frame. • Check that the power voltage is within the specified range.	OFF	OFF	ON*	OFF
Head Error	The head cable is broken or the sensor head is not connected.	• Check whether the sensor head is connected. • Check whether the head cable is broken. • Check the wiring of the head cable to the connector. • After checking the above items, turn the power OFF and ON.	OFF	ON	ON	OFF
EEPROM Error	The attempt to write/ read internal data failed.	Turn the power OFF and ON. If the data is not recovered, initialize the settings.	Normal operation		ON	OFF
Origin Adj.	Origin adjustment has not been performed.	When “Detection Mode” is set to [Hybrid]/ [Magnetic]/[Non Magnetic], perform origin adjustment.	OFF	ON	OFF	ON
Failed	The 2-point adjustment or origin adjustment failed.	• During 2-point adjustment, operate the sensor with the object to detect within the stable detecting area and with this object not within this area (the far state). • The sensor is in a state in which detection is not possible (a head error has occurred or detection is paused). Eliminate the state in which detection is not possible, and then try again.	Normal operation		Normal operation	
Check Dip Switch	When [OUT1 + INPUT] is selected on the ER-N11C, the Channel selection switch is set to 2.	Return the Channel selection switch to 1.	Normal operation		Normal operation	

* If the alarm output is overcurrent, the alarm output is turned off.

12 Factory Default Settings List

The default settings are as follows.

Item	Initial Settings	Reference page
A Detection Mode	Normal	page 4
B Response Time	16 ms	page 7
C External Input	OFF	page 7
D Operation Mode 1	Standard	page 7
E N.O./N.C.OUT1	N.O.	page 8
F Output Timer 1	OFF	page 8
G Operation Mode 2	Standard	page 7
H N.O./N.C.OUT2	N.O.	page 8
I Output Timer 2	OFF	page 8
J Hysteresis	Standard	page 8
K Zero Shift Calibration	-	page 5
L Interference Prevention	OFF	page 9
M Language	ENGLISH	page 9
N Flip Display	Standard	page 9
O Display Bar	OFF	page 9
P Hold Display	OFF	page 9
Q Brightness	Brightness 3	page 10
R Key Lock Method	Standard	page 10
S IO-Link Mode	IO-Link On	page 10
T Input/Output Confirmation	-	page 10
U Initialize	-	page 10
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13 Characteristics

To view the characteristics, access the website from the 2D code on the left or the following URL.

www.keyence.com/um-en-ern-characteristic

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