

NEW

# OMRON

## N-Smart

Presence / Detection / Measurement

Contact-Type Smart Sensor (Communications Type)  
E9NC-T

Durable

Space-saving

Advanced

Handles Diverse  
Measurement Applications

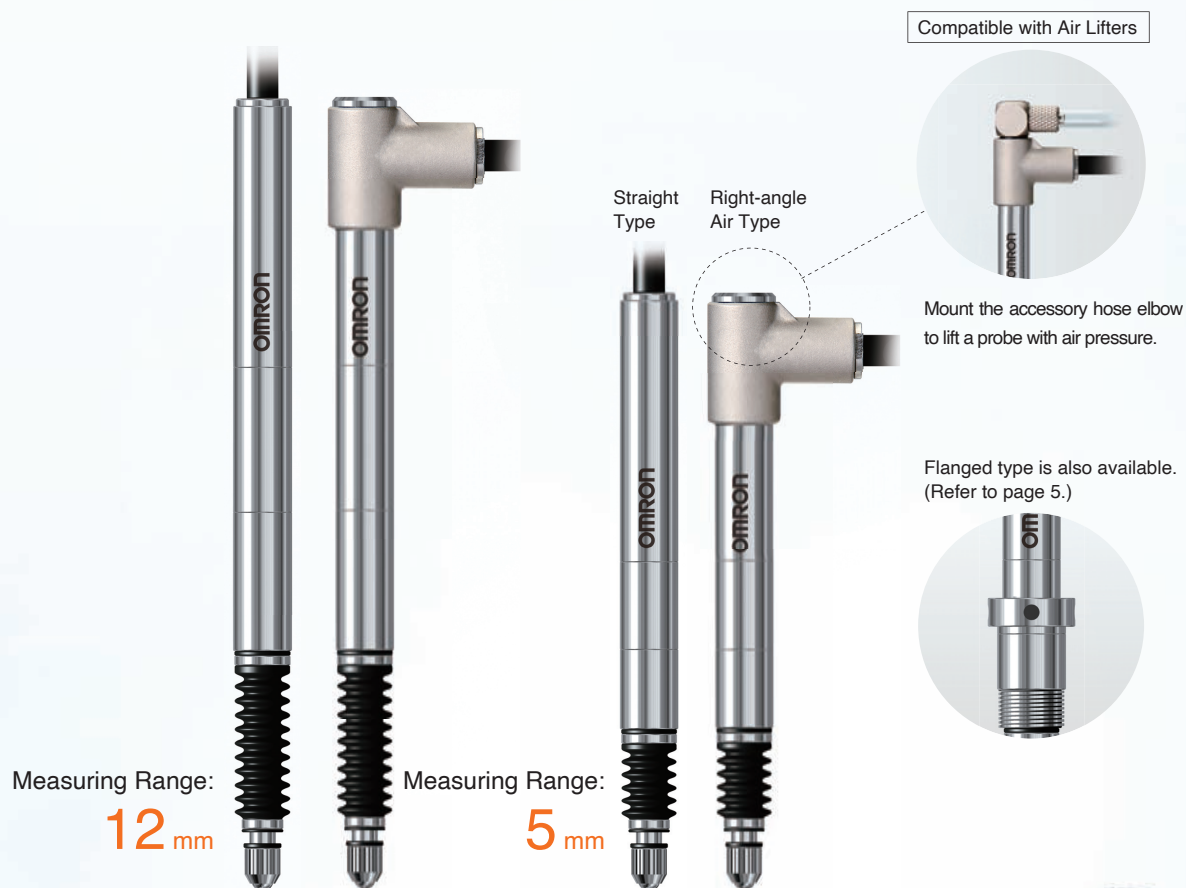
New Type  
with  
Communications



realizing

EtherCAT®  
CC-Link V2

# Handles Diverse Measurement Applications



## Handles Measurement Applications in Harsh Environments

### Durable

#### Tough under Vibration and Shock

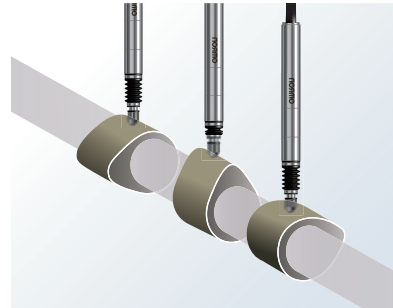
Ball Spline Mechanism

#### Resists Water and Oil

IP67 Degree of Protection and Magnetic Sensing Method

#### Withstands Bending

Robot Cables



Angle Inspections for Camshafts

## Handles Measurement Applications with Limited Space

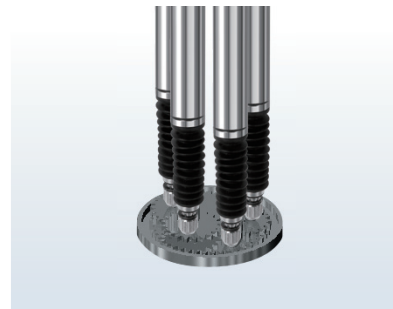
### Space-saving

#### Slim, Short Sensor Heads

8-mm outside diameter

#### Slim Amplifier Units

Slim Body Only 10 mm Wide



Height Measurement for Assembled Watch Gears

## Handles Advanced Measurement Applications \*1

### Advanced

#### Data Communications via Field Networks

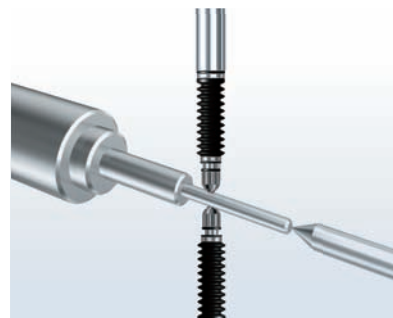
High-precision Data Transmission (0.1- $\mu$ m Resolution)

#### Connect Many Sensors

Connect Up to 30 Sensors with Reduced Wiring \*2

#### Eight Calculation Functions \*3

Maximum Value, Minimum Value, Flatness, Average, Step, Twist, Warp, and Thickness



Measurement of Machined Part Precision

\*1. E9NC-TA0 only.

\*2. You can connect up to 30 Sensors to an E3NW Sensor Communications Unit with EtherCAT (when using an OMRON NJ-series Controller) or up to 16 Sensors with CC-Link.

\*3. Calculations are performed on the host controller. Special function blocks are available separately. For details, please contact your OMRON sales representative.

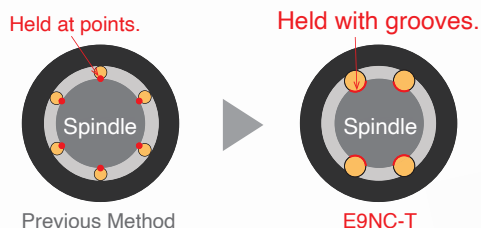
# Durable

## Tough under Vibration and Shock

### Ball Spline Mechanism

A ball spline mechanism is used to hold the balls in grooves (on the right in the following diagram). This helps prevent the balls from damaging internal parts due to vibration or shock to reduce the chance of malfunction. In comparison with the previous method (on the left in the following diagram), load capacity is increased and an exceptionally smooth sliding operation is achieved for long-term stable operation.

#### Cross-sectional Area



#### Point



### Full-stroke Sliding Operations

Over **92** Million Operations<sup>\*2</sup>

Hard materials that resist abrasion are used, and normal operation has been confirmed for more than 92 million sliding operations.

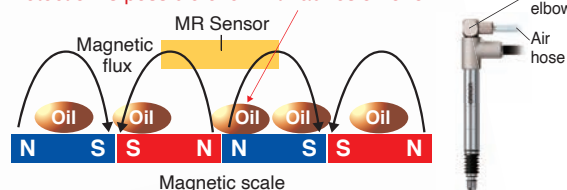
<sup>\*2</sup>. Test results from more than two years of full-stroke slide testing (as of March 2014).

## Resists Water and Oil

### IP67 Degree of Protection<sup>\*1</sup> and Magnetic Sensing Method

IP67 protection is combined with a magnetic sensing method. Even in the unlikely event that water, oil, or condensation enters the sensing section, this sensor is not affected by problems such as light scattering, which can occur with optical sensors. You therefore get stable detection even in harsh environments.

Detection is possible even with adhesion of oil.



<sup>\*1</sup>. For the right-angle type, this applies only when a hose elbow and air hose are connected.

#### Point



### Magnetic Sensing Method

There is a magnetic scale with north and south poles alternately positioned at a fine pitch on top of the spindle. The MR sensor detects a change in the magnetic flux from the north and south poles.

## Withstands Bending

### Robot Cables<sup>\*3</sup>



<sup>\*3</sup>. Robot cable specifications apply to the Sensor Head cable and the Connection Cable between the Preamplifier and the Amplifier Unit.



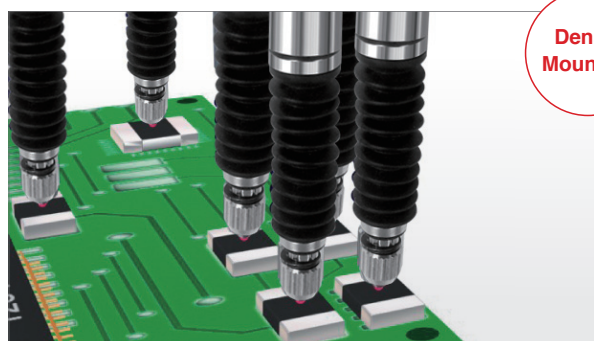
\*Head (conceptual illustration)



# Space-saving

## Slim, Short Sensor Heads

8-mm outside diameter



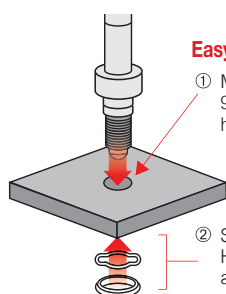
Dense Mounting

Measuring Dimensions of Electronic Components

### Point



### Flanged Type to Simplify Installation



#### Easy to Secure

- ① Make a 9.7-mm-dia. hole.
- ② Secure the Head with a washer and nut.

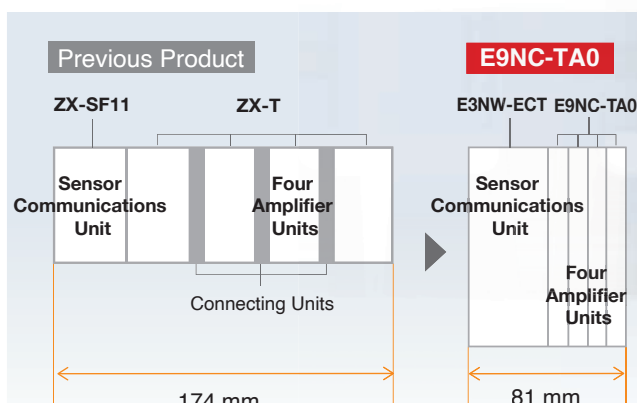
#### Easy Positioning

The flange is secured with the mounting plate, which simplifies positioning the case.



## Slim Amplifier Units

Slim Body Only 10 mm Wide



**1/2** the Space\* of Previous Product

\* For the above connection example.

107.8 mm\* even including the bending radius

\* For permanent bend

Save more space and design more freely with the right-angle air type.



Actual Size \*

\* E9NC-TH5S (on the left) and E9NC-TH5L (on the right)

Actual Size \*

\* On the left in the photo: E3NW-ECT (Sensor Communications Unit), on the right in the photo: E9NC-TA0 (four linked Units).

10 mm

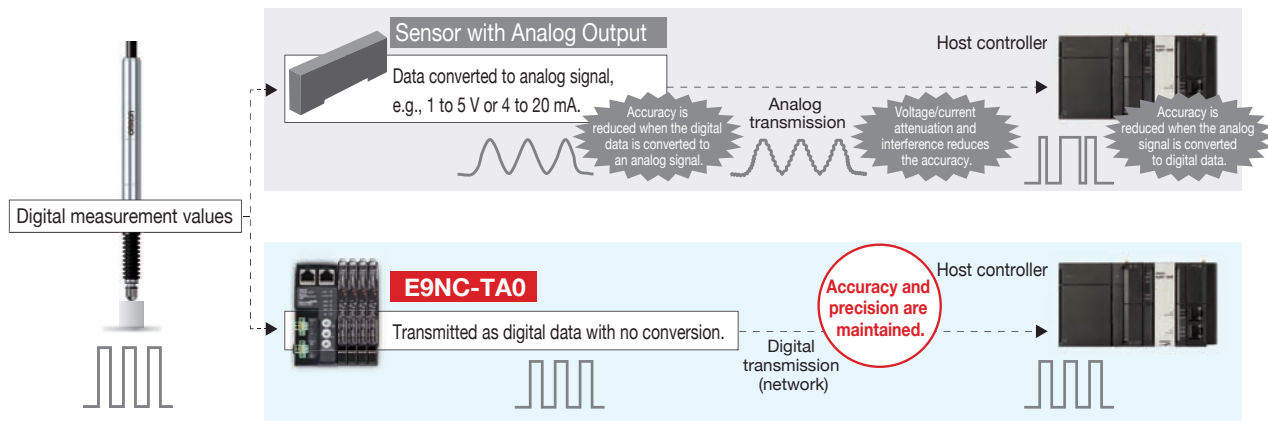


# Advanced

## Data Communications via Field Networks

### High-precision Data Transmission (0.1- $\mu$ m Resolution)

With a standard type with an analog output, accuracy is reduced when the data is sent.  
With the communications type, however, the high-precision data measured at a resolution of 0.1  $\mu$ m is transmitted as digital data without losing any precision or accuracy.



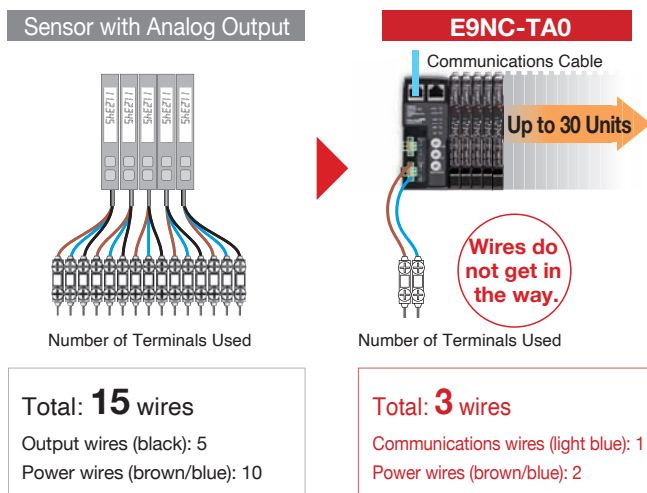
## Connect Many Sensors

### Connect Up to 30 Sensors with Reduced Wiring <sup>\*1</sup>

You can quickly and easily connect E9NC-TA0 Units to the E3NW-ECT Sensor Communications Unit. You can easily achieve simultaneous measurements or measurements for multiple processes. You can reduce wiring work in comparison with the analog output type.

<sup>\*1</sup> 1. When using EtherCAT with an OMRON NJ-series Controller. With CC-Link, you can connect up to 16 Sensors.

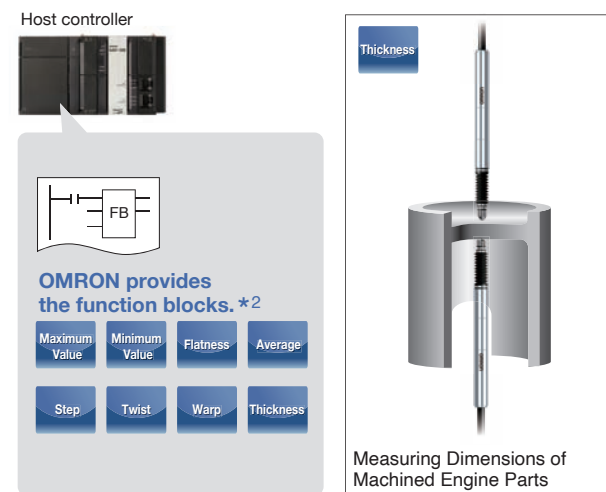
#### Comparison of Wiring When Connecting Five Sensors



## Eight Calculation Functions

### From Maximum/Minimum Values to Warp and Thickness

Just add function blocks to the host controller to easily perform various calculations.




<sup>\*2</sup> 2. Function blocks are available for Mitsubishi Q-series and L-series Controllers. For details, please contact your OMRON sales representative.

# ON/OFF Output Type for Determinations E9NC-TA21/TA51

## Easy Setup with One Button!

### Smart Tuning

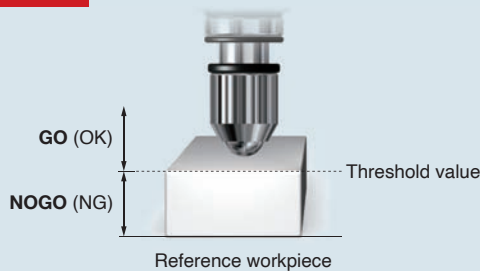
Just press the  **S-TUNE Button** to easily set up various types of determinations.



#### Check Component Heights or Assembly Conditions

##### Height Determination

Set a threshold value for the standard height.

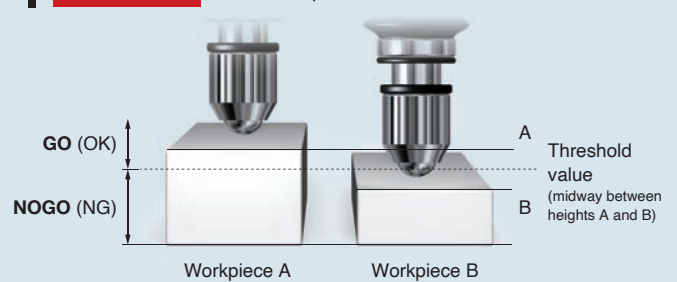


Set the Head against the reference workpiece and press the S-TUNE Button.

#### Determine the Heights of Two Workpieces

##### Model Determination

Determine the Difference in Heights between Two Workpieces



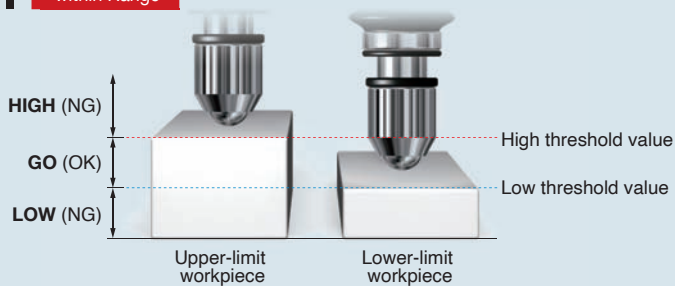
Set the Head against each of the two workpieces and press the S-TUNE Button once for each.

#### Determine If the Dimension of a Components is within a Specified Range

##### Hybrid Output

##### Determination within Range

Set upper and lower threshold values.



Set the Head against each of the upper-limit and lower-limit workpieces and press the S-TUNE Button once for each.

#### Determine If a Workpiece is within Tolerances

##### Hybrid Output

##### Determination within Tolerance

Set thresholds for the upper and lower limits of the plus-minus tolerance for the height of a reference workpiece.



Set the Head against the workpiece and press the S-TUNE Button.

### Hybrid Output

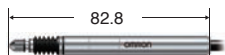
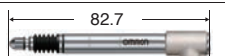
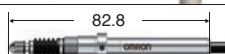
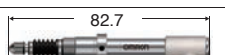
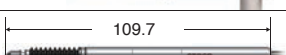
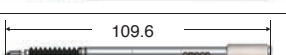
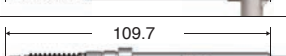

You can use the hybrid output with the two outputs from the Amplifier Unit to determine if the high threshold value is exceeded or if the low threshold value is exceeded.

Outputs (Set for NO Operation) in Hybrid Output Mode



|                  | LOW judgement | GO judgement | HIGH judgement | Error judgement or undetermined |
|------------------|---------------|--------------|----------------|---------------------------------|
| Control output 1 | OFF           | ON           | ON             | OFF                             |
| Control output 2 | ON            | ON           | OFF            | OFF                             |

## Ordering Information

**Sensor Heads** (Connection Cable between Preamplifier and Amplifier Unit is not provided with the Sensor Head. Be sure to have the Connection Cable ready when using the Sensor.)

| Type                                  | Appearance (Head size) |   | Measuring range<br>(Moving range) | Resolution | Precision | Model         |  |                |
|---------------------------------------|------------------------|---|-----------------------------------|------------|-----------|---------------|--|----------------|
| Straight Type                         | 8 dia.                 |  | 5 mm                              | 0.1 μm     | 1 μm      | E9NC-TH5S 2M  |  |                |
| Right-angle Air Type                  | 8 dia.                 |  |                                   |            |           | E9NC-TH5L 2M  |  |                |
| Flanged Type/<br>Straight Type        | M9                     |  |                                   |            |           | E9NC-TH5SF 2M |  |                |
| Flanged Type/<br>Right-angle Air Type | M9                     |  |                                   |            |           | E9NC-TH5LF 2M |  |                |
| Straight Type                         | 8 dia.                 |  | 12 mm                             |            |           |               |  | E9NC-TH12S 2M  |
| Right-angle Air Type                  | 8 dia.                 |  |                                   |            |           |               |  | E9NC-TH12L 2M  |
| Flanged Type/<br>Straight Type        | M9                     |  |                                   |            |           |               |  | E9NC-TH12SF 2M |
| Flanged Type/<br>Right-angle Air Type | M9                     |  |                                   |            |           |               |  | E9NC-TH12LF 2M |

## Amplifier Units

| Type   | Inputs/outputs      | Model                             |                                   |
|--|---------------------|-----------------------------------|-----------------------------------|
| Communications Type *1  | Data communication  | <b>E9NC-TA0</b>                   |                                   |
| ON/OFF Output Type     | 1 input + 2 outputs | NPN output<br><b>E9NC-TA21 2M</b> | PNP output<br><b>E9NC-TA51 2M</b> |

\*1. A Sensor Communications Unit is required if you want to use the Amplifier Unit on a network.

## Connection Cable between Preamplifier and Amplifier Unit




| Cable length | Model             | Quantity |
|--------------|-------------------|----------|
| 0.5 m        | <b>E9NC-TXC05</b> | 1        |
| 5 m          | <b>E9NC-TXC5</b>  | 1        |
| 10 m         | <b>E9NC-TXC10</b> | 1        |
| 20 m         | <b>E9NC-TXC20</b> | 1        |

## Accessories (Sold Separately)

### ● Sensor Head Accessories

#### Probe


The E9NC-TB1 is provided with the Sensor Head. Order replacements as required.

| Type  | Appearance | Model           | Quantity |
|---|------------|-----------------|----------|
| 3-dia. probe             |            | <b>E9NC-TB1</b> | 1        |
| Nylon probe              |            | <b>E9NC-TB2</b> | 1        |
| Probe for flat surfaces  |            | <b>E9NC-TB3</b> | 1        |

### ● Amplifier Unit Accessories

#### Mounting bracket




A Mounting Bracket is not provided with the Amplifier Unit. It must be ordered separately as required.

| Appearance  | Model           | Quantity |
|---|-----------------|----------|
|  | <b>E39-L143</b> | 1        |

We also supply other accessories, such as Rubber Boots for Sensor Heads and DIN Track and End Plates and Covers for Amplifier Units. For details, refer to the E9NC-T Compact-Type Smart Sensor datasheet (Cat. No. E434-E1).

## Related Products

### ● Sensor Communications Units

| Type  | Appearance | Model           |
|---|------------|-----------------|
| Sensor Communications Unit for EtherCAT  |            | <b>E3NW-ECT</b> |
| Sensor Communications Unit for CC-Link   |            | <b>E3NW-CCL</b> |
| Distributed Sensor Unit *2               |            | <b>E3NW-DS</b>  |

Refer to your OMRON website for details.

\*2. The Distributed Sensor Unit can be connected to any of the Sensor Communications Units.

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CC-Link is a registered trademark of Mitsubishi Electric Corporation. The trademark is managed by the CC-Link Partner Association.

**Note: Do not use this document to operate the Unit.**

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