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

NEW

New Type with Communications

Handles Diverse Measurement Applications

Durable
Space-saving
Advanced

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.)

Amplifier Units

Straight Type
- E9NC-TH5S 2M
- E9NC-TH5L 2M
- E9NC-TH5SF 2M
- E9NC-TH5LF 2M
- E9NC-TH12S 2M
- E9NC-TH12L 2M
- E9NC-TH12SF 2M
- E9NC-TH12LF 2M

Preset Values

· 0.1 μm
· 5 mm

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance (Head size)</th>
<th>Model</th>
<th>Precision</th>
<th>Resolution</th>
<th>Measuring range (Moving range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON/OFF Output Type Communications Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 input + 2 outputs
- E9NC-TA21 2M
- E9NC-TA51 2M

Amplifier Unit Accessories

Mounting bracket
- 1

Connection Cable between Preamplifier and Amplifier Unit

- Cable length
  - 0.5 m
  - 5 m
  - 10 m
  - 20 m
- Model
  - E9NC-TXC05
  - E9NC-TXC5
  - E9NC-TXC10
  - E9NC-TXC20

Model Quantity

- ●

Sensor Head Accessories

- Probe
  - 1
  - 1
  - 1

Type
- 3-dia. probe
- Nylon probe
- Probe for flat surfaces
- E9NC-TB1
- E9NC-TB2
- E9NC-TB3

Appearance Model Quantity

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

Related Products

- Sensor Communications Units
  - Type
    - Sensor Communications Unit for EtherCAT
    - Sensor Communications Unit for CC-Link
    - Distributed Sensor Unit
  - Appearance Model
    - E3NW-ECT
    - E3NW-CCL
    - E3NW-DS

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

*2.
*2

Accessories (Sold Separately)

- ●

Sensor Head Accessories

- Probe
  - 1
  - 1
  - 1

Type
- 3-dia. probe
- Nylon probe
- Probe for flat surfaces
- E9NC-TB1
- E9NC-TB2
- E9NC-TB3

Appearance Model Quantity

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

*1

*1.

*2

*2

*2

*2
Handles Diverse **Measurement** Applications

Sensor Head (Flanged Type)

Preamplifier

Amplifier Unit (Communications Type)

Connection Cable between Preamplifier and Amplifier Unit (Sold separately)

E3NW Sensor Communications Unit (Sold separately)

Compatible with Air Lifters

Mount the accessory hose elbow to lift a probe with air pressure.

Flanged type is also available. (Refer to page 5.)

Measuring Range:
- **12 mm**
- **5 mm**

Sensor Head (Flanged Type)

Preamplifier

Amplifier Unit (Communications Type)

Connection Cable between Preamplifier and Amplifier Unit (Sold separately)

E3NW Sensor Communications Unit (Sold separately)

Height Measurement for Assembled Watch Gears

Angle Inspections for Camshafts

Measurement of Machined Part Precision

Handles Advanced Measurement Applications

Advanced Data Communications via Field Networks

High-precision Data Transmission (0.1-µm Resolution)

Connect Many Sensors

Connect Up to 30 Sensors with Reduced Wiring

Eight Calculation Functions
- Maximum Value
- Minimum Value
- Flatness
- Average
- Step
- Twist
- Warp
- Thickness

Mount the accessory hose elbow to lift a probe with air pressure.

* 1.

* 2.

* 3.

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

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

Handles Advanced Measurement Applications *1

**Advanced**

- **Data Communications via Field Networks**
  - High-precision Data Transmission (0.1-µm 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

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*1. E3NC-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.  

**Resists Water and Oil**
IP67 Degree of Protection*¹ 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.**

**Cross-sectional Area**

<table>
<thead>
<tr>
<th>Previous Method</th>
<th>E9NC-T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Held at points.</td>
<td>Held with grooves.</td>
</tr>
</tbody>
</table>

**Point**

**Full-stroke Sliding Operations**
Over 92 Million Operations*²

Hard materials that resist abrasion are used, and normal operation has been confirmed for more than 92 million sliding operations.  
* ¹. For the right-angle type, this applies only when a hose elbow and air hose are connected. Straight type with IP67 protection is scheduled for release in the near future. For details, please contact your OMRON sales representative.  
* ². Test results from more than two years of full-stroke slide testing (as of March 2014).

**Withstands Bending**
Robot Cables*³

*Head (conceptual illustration)  

* ³. Robot cable specifications apply to the Sensor Head cable and the Connection Cable between the Preamplifier and the Amplifier Unit.
Space-saving

**Slim, Short Sensor Heads**
8-mm outside diameter

![Image of Slim, Short Sensor Heads]

- **Dense Mounting**
- **107.8 mm** even including the bending radius
- **For permanent bend**

**Point**

**Flanged Type to Simplify Installation**

1. **Easy to Secure**
   - Make a 9.7-mm-dia. hole.

2. **Easy Positioning**
   - The flange is secured with the mounting plate, which simplifies positioning the case.

**Slim Amplifier Units**

Slim Body Only 10 mm Wide

![Image of Slim Amplifier Units]

- **Actual Size**
  - *E9NC-TH55 (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**

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

- **For the above connection example.**
Data Communications via Field Networks

High-precision Data Transmission (0.1-μm 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 μm is transmitted as digital data without losing any precision or accuracy.

Connect Many Sensors

Connect Up to 30 Sensors with Reduced Wiring

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.

*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

Total: 15 wires
- Output wires (black): 5
- Power wires (brown/blue): 10

Total: 3 wires
- Communications wires (light blue): 1
- Power wires (brown/blue): 2

Eight Calculation Functions

From Maximum/Minimum Values to Warp and Thickness

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

Wires do not get in the way.

OMRON provides the function blocks. *2

*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.

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**Check Component Heights or Assembly Conditions**

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**

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 Component is within a Specified 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.

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**Determine If a Workpiece is within Tolerances**

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.

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**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.

<table>
<thead>
<tr>
<th>Outputs (Set for NO Operation) in Hybrid Output Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control output 1</td>
</tr>
<tr>
<td>Control output 2</td>
</tr>
</tbody>
</table>

---
### 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.*

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance (Head size)</th>
<th>Measuring range (Moving range)</th>
<th>Resolution</th>
<th>Precision</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight Type</td>
<td>8 dia.</td>
<td>82.8</td>
<td>5 mm</td>
<td>0.1 µm</td>
<td>E9NC-THSS 2M</td>
</tr>
<tr>
<td>Right-angle Air Type</td>
<td>8 dia.</td>
<td>82.7</td>
<td></td>
<td>1 µm</td>
<td>E9NC-TH5L 2M</td>
</tr>
<tr>
<td>Flanged Type/</td>
<td>M9</td>
<td>82.8</td>
<td></td>
<td></td>
<td>E9NC-THSSF 2M</td>
</tr>
<tr>
<td>Straight Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E9NC-TH5LF 2M</td>
</tr>
<tr>
<td>Flanged Type/</td>
<td>M9</td>
<td>82.7</td>
<td></td>
<td></td>
<td>E9NC-TH12S 2M</td>
</tr>
<tr>
<td>Right-angle Air Type</td>
<td>8 dia.</td>
<td>109.7</td>
<td></td>
<td></td>
<td>E9NC-TH12L 2M</td>
</tr>
<tr>
<td>Flanged Type/</td>
<td>M9</td>
<td>109.7</td>
<td></td>
<td></td>
<td>E9NC-TH12SF 2M</td>
</tr>
<tr>
<td>Straight Type</td>
<td>8 dia.</td>
<td>109.7</td>
<td></td>
<td></td>
<td>E9NC-TH12LF 2M</td>
</tr>
<tr>
<td>Right-angle Air Type</td>
<td>8 dia.</td>
<td>12 mm</td>
<td></td>
<td></td>
<td>E9NC-TH12LF 2M</td>
</tr>
<tr>
<td>Flanged Type/</td>
<td>M9</td>
<td></td>
<td></td>
<td></td>
<td>E9NC-TH12LF 2M</td>
</tr>
</tbody>
</table>

#### Amplifier Units

<table>
<thead>
<tr>
<th>Type</th>
<th>Inputs/outputs</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Type</td>
<td>Data communication</td>
<td>E9NC-TA0</td>
</tr>
<tr>
<td>ON/OFF</td>
<td>1 input + 2 outputs</td>
<td>E9NC-TA21 2M</td>
</tr>
<tr>
<td>Output Type</td>
<td></td>
<td>E9NC-TA51 2M</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 m</td>
<td>E9NC-TXC05</td>
<td>1</td>
</tr>
<tr>
<td>5 m</td>
<td>E9NC-TXC5</td>
<td>1</td>
</tr>
<tr>
<td>10 m</td>
<td>E9NC-TXC10</td>
<td>1</td>
</tr>
<tr>
<td>20 m</td>
<td>E9NC-TXC20</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Accessories (Sold Separately)

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
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<tr>
<td>3-dia. probe</td>
<td>E9NC-TB1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Nylon probe</td>
<td>E9NC-TB2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Probe for flat surfaces</td>
<td>E9NC-TB3</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E39-L143</td>
<td>1</td>
</tr>
</tbody>
</table>

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**
  - **Sensor Communications Unit for EtherCAT**
    - E3NW-ECT
  - **Sensor Communications Unit for CC-Link**
    - E3NW-CCL
  - **Distributed Sensor Unit**
    - E3NW-DS

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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