High-speed Analog Input Unit
NX Series  NX-HAD401/402

Analog inspection without PC

- PLC systems can acquire analog data at high speeds
- Easy system configuration and maintenance
High-speed analog inspection with PLC system —No special devices and no PC required

Improving quality in parts inspections requires as detailed analog data as possible. Most automotive and other manufacturers are using PC and special measuring devices such as data loggers for measurements. Being among the first to work on IoT at manufacturing sites, Omron now offers the High-speed Analog Input Unit that can reliably, precisely, and easily acquire synchronized analog data. It will help you improve quality.

Reliable

Industry’s fastest\(^*1\) sampling speed of 5 μs to catch every minute change

- **Conventional PLC**
  - Some data could not be obtained when an error occurred
  
- **NX-HAD**
  - Sampling as fast as every 5 μs catches all changes in behavior

Industry’s fastest sampling speed\(^*1\): Same speed\(^*2\) regardless of the number of channels

- **Conventional PLC**
  - Sampling period becomes longer as data is obtained from multiple channels
  - | No. of channels | 1 Ch | 2 Ch | 3 Ch | 4 Ch |
  - | 20 μs | 40 μs | 60 μs | 80 μs |

- **NX-HAD**
  - Achieves high-speed sampling every 5 μs from 4 channels at the same time
  - | No. of channels | 1 Ch | 2 Ch | 3 Ch | 4 Ch |
  - | 5 μs | 20 μs | 40 μs | 60 μs | 80 μs |

\(^*1\) Based on Omron’s surveys as of January 2018. \(^*2\) When using 4 channels.

Precise

Fully insulated channels to obtain precise data without noise

- **Conventional PLC**
  - Mutual interference occurred between channels

- **NX-HAD**
  - Precise data can be obtained from multiple channels

Easy comparative analysis of data obtained synchronously from multiple channels

- **Conventional PLC**
  - Difficult to compare data obtained at different times

- **NX-HAD**
  - Precise data can be obtained from multiple channels

Furthermore, the Time-Stamp function in EtherCAT\(^*\) ensures accurate synchronization between units

Simple system configuration ideal for global manufacturing

Conventional system
- Special measuring devices don’t have flexibility in configuration
- PC requires programming skills in C
- Difficult to change programs concealed in dedicated controllers
- Some technical skills are required to configure PC that is connected to database

- Characteristic inspection of rotating equipment

NX-HAD
- PLC system reduces initial costs
- Programs can be created without any special knowledge of PC
- Programs can be changed for additional inspection items
- Database connection controller*3 brings IoT into manufacturing sites without connecting PC

- Characteristic inspection of rotating equipment

Applications

Characteristic inspection of rotating equipment
PLC systems can be used for machines to inspect characteristics of bearings, motors, and other rotating equipments

Welding quality inspection
Quality can be inspected using the data acquired at the moment of welding. The data linked to individual products can be used for traceability

Machine vibration inspection
Vibration data of machining tools is acquired and monitored to maintain machining quality

*3. When using the NJ/NX Machine Automation Controller Database Connection CPU Unit or the Industrial PC Platform NY IPC Machine Controller.
### Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of points</th>
<th>Analog input section</th>
<th>Trigger input section</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Input range</td>
<td>Resolution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage:</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>-10 to 10 V (32000~32000)</td>
<td>-10 to 10 V or -5 to 5 V 1/64000 (full scale)</td>
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<tr>
<td></td>
<td></td>
<td>-5 to 5 V (32000~32000)</td>
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<tr>
<td></td>
<td></td>
<td>0 to 10 V (0~32000)</td>
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<tr>
<td></td>
<td></td>
<td>0 to 5 V (0~32000)</td>
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<td></td>
<td></td>
<td>1 to 5 V (0~32000)</td>
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<td>Current:</td>
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<td></td>
<td>-0 to 20 mA (0~32000)</td>
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<tr>
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<td></td>
<td>-4 to 20 mA (0~32000)</td>
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### Collection of software functional components Sysmac Library

Please download it from following URL and install to Sysmac Studio.

http://www.ia.omron.com/sysmac_library/

#### Typical Model

<table>
<thead>
<tr>
<th>Product</th>
<th>Features</th>
<th>Model</th>
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<tbody>
<tr>
<td>High-Speed Analog Inspection Library</td>
<td>The High-speed Analog Inspection Library records analog input values acquired by the NX series High-speed Analog Input Units in time. This library provides functions required for product inspections during production processes, including calculation of feature values (e.g., maximum, minimum, and mean), comparison with master data, and data file storage.</td>
<td>SYSMAC-XR016</td>
</tr>
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### Combination Table

<table>
<thead>
<tr>
<th>Model</th>
<th>Model version</th>
<th>Unit version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CPU Unit or Industrial PC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EtherCAT® Coupler Unit</td>
</tr>
<tr>
<td>NX-HAD401</td>
<td></td>
<td>NX701-□□□□□□□□ Ver.1.18 or later</td>
</tr>
<tr>
<td>NX-HAD402</td>
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<td>NX102-□□□□□□□□ Ver.1.30 or later</td>
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<td>NJS01-□□□□□□□□ Ver.1.18 or later</td>
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<td>NJ301-□□□□□□□□ Ver.1.18 or later</td>
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<td>NJ101-□□□□□□□□ Ver.1.18 or later</td>
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<td>NX1P2-□□□□□□□□□□□□□□□□□□ Ver.1.18 or later</td>
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<td>NYS□□□-1 Ver.1.18 or later</td>
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<tr>
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<td>NX-ECC203 Ver.1.0 or later</td>
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</tbody>
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