NC Integrated Controller
Machine Automation Controller NJ/NY Series

Integrated NC and PLC functionality for advanced processing machines
NC Integrated Controller brings further development of multi-purpose processing machines

Technological advancements and changes in consumer needs are making products more diverse and complex. Manufacturers are dealing with a greater variety of shapes and materials while also striving to achieve the high productivity rates necessary to stay in competitive.

To help manufacturers overcome today’s challenges as well as those of the near future, Omron offers a solution that maximizes the throughput of multi-purpose machines designed to handle multiple processes.

Our NC Integrated Controller provides three key benefits:

- NC and PLC functionality fully synchronized at high speed
- Versatile NC functions
- One software for NC setting and PLC programming

Experience new manufacturing with the NJ/NY NC Integrated Controller at the heart.
Experience new manufacturing with the NJ/NY NC Integrated Controller at the heart. One software for NC setting and PLC programming.

Minimize machine cycle time

Versatile NC functions Simplify complex profiling

Optimize engineering time

Technological advancements and changes in consumer needs are making products more diverse and complex. Manufacturers are dealing with a greater variety of shapes and materials while also striving to achieve the high productivity rates necessary to stay in competitive. To help manufacturers overcome today’s challenges as well as those of the near future, Omron offers a solution that maximizes the throughput of multi-purpose machines designed to handle multiple processes.

Our NC Integrated Controller provides three key benefits:

- NC and PLC functionality fully synchronized at high speed
- NJ/NY Series NC Integrated Controller
- Sysmac Automation Platform
- NC Integrated Controller brings further development of multi-purpose processing machines
Minimize machine cycle time

NC and PLC functionality fully synchronized at high speed

Efficient control of processing and other processes is crucial to performance and productivity of a multi-purpose machine which handles multiple processes. The NC Integrated Controller provides both NC and PLC functionality and synchronize all devices at high speed, significantly reducing the machine cycle time.

**Improved synchronization**

**Conventional system**  PLC+NC

As CPU control cycles are not synchronized, communication jitter occurs.

**NC Integrated Controller**

NC functionality and PLC functionality are fully synchronized in the same task period.

**Control cycle as you designed**

Programs for both PLC and NC are executed in the same task period, allowing both processes to be synchronized together within one cycle as you would expect from this unique controller.
High-speed synchronization reduces interlock time

Interlock time between NC (processing) and PLC (other processes) will be reduced to 1/4* as compared to when separate controllers are used. Cycle time of a multi-purpose machine that generates many interlocks can be reduced. *The NY Series is used under our measurement conditions.

Conventional system
Different controllers control different processes

NC Integrated Controller
Integrated control

<table>
<thead>
<tr>
<th>Conventional system</th>
<th>NC Integrated Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load (PLC)</td>
<td>Unloader (PLC)</td>
</tr>
<tr>
<td>Cutting (NC)</td>
<td>Cutting (NC)</td>
</tr>
<tr>
<td>Handling (PLC)</td>
<td>Handling (PLC)</td>
</tr>
<tr>
<td>Grinding (NC)</td>
<td>Grinding (NC)</td>
</tr>
</tbody>
</table>

Interlock (IL) time

- **Conventional system**
  - 12-22ms
  - Reduced to 1/4

- **NC Integrated Controller**
  - 3ms
  - Reduced cycle time
CAD/CAM software makes design easy

Versatile NC functions

G-Code reduces time required to design and program complex profiling.

### Conventional controller

Processing programs are designed based on CAD data. Programming using PLC instructions and debugging are required for each figure.

#### Program design
- Exploding components into lines
- Types of lines: straight line, arc, free curve
- Target positions of lines
- Travel velocities
- Transition path between figures, etc.

### NC Integrated Controller

**CAD/CAM software makes design easy**

**Parameter setting**
- Parameters are set using CAD/CAM software

**Automatic generation**
- NC program in G-Code is generated

**Transferred**
- Program is transferred to NC integrated controller

<table>
<thead>
<tr>
<th>Parameter setting</th>
<th>Automatic generation</th>
<th>Transferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**CAD/CAM**

**NC program in G-Code**

```
G00 Z10.000
G01 X10.000 Y5.000 Z20.000
G02 X15.000 Y5.000 I5.000 Z5.000
G01 X27.000 Y0.000 Z20.000
G03 X30.000 Y3.000 I27.000 J3.000
G01 X30.000 Y47.000 Z0.000
G03 X27.000 Y50.000 I27.000 J47.000
G01 X3.000 Y50.000 Z0.000
G01 X15.000 Y43.000 Z0.000
G02 X20.000 Y38.000 I15.000 J38.000
G00 X20.000 Y38.000 Z10.000
M30
```
NC functions for complex profiling applications

<table>
<thead>
<tr>
<th><strong>G-Code</strong></th>
<th><strong>High-speed control</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>G-Code NC programming language allows manual programming on operation software and use in combination with any CAD/CAM software.</td>
<td>Logic sequence, motion control and NC functionality with the fastest cycle time of 500 µs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cutter compensation 2D</strong></th>
<th><strong>Lookahead</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool diameter and shape compensation, matching the cutting point exactly as specified in G-Code.</td>
<td>Future instructions are analyzed in advance, movements are blended and optimized in speed and acceleration for a better performance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Block Retrace</strong></th>
<th><strong>Compensation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Path can be reverted in order to remove the tool from cutting area.</td>
<td>High-precision processing by compensating position of NC motors.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>3D interpolation</strong></th>
<th><strong>Coordinate systems</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Helical, spiral and conical interpolation for 3D profiling.</td>
<td>Various profiling using machine coordinate system, workpiece coordinate system, and local coordinate system.</td>
</tr>
</tbody>
</table>

---

**Milling**

```
G00 Z10.000
G01 X10.000 Y-5.000 Z0.000
G02 X15.000 Y-0.000 I15.000 J-5.000
G01 X27.000 Y-0.000 Z0.000
G03 X30.000 Y3.000 I27.000 J3.000
G01 X30.000 Y47.000 Z0.000
G03 X27.000 Y50.000 I27.000 J47.000
G01 X3.000 Y50.000 Z0.000
```

---

**Grinding**

```
G01 X15.000 Y43.000 Z0.000
G02 X20.000 Y38.000 I15.000 J38.000
G00 X20.000 Y38.000 Z10.000
```

---

**Dispensing**

```
G01 X15.000 Y43.000 Z0.000
G02 X20.000 Y38.000 I15.000 J38.000
G00 X20.000 Y38.000 Z10.000
```

---

**Sewing**

```
G01 X15.000 Y43.000 Z0.000
G02 X20.000 Y38.000 I15.000 J38.000
G00 X20.000 Y38.000 Z10.000
```
The Sysmac Studio provides a true Integrated Development Environment (IDE) for configuration, programming, monitoring, and 3D simulations. Programming based on IEC standard and PLCopen® Function Blocks (FBs) for motion control cuts programming time. FBs for NC control make program structure simple, even for synchronization between NC process and others.

Intuitive user interface reduces configuration time

For specific purpose machines
- Easy to find NC settings
- Parameter setting by device
- Description of parameters
  - Description with graphics gives parameter details

For general purpose machines
- A panel PC provides general-purpose HMI functionality that allows machine users to edit NC programs
  - Reliable and robust industrial panel PC
  - Omron's unique CNC Operator for editing NC programs and performing functions
  - Comes equipped with Windows OS, running Windows applications while performing motion control
  - Up to 32 synchronous axes, including NC processing and motion control
  - Intel® Core™ i7-4700EQ processor

One software for NC setting and PLC programming
A choice of two controllers

For specific purpose machines
A modular controller suitable for machines programmed for NC

- Combine with general-purpose HMI and your own PLC
- Traditional reliability and robustness
- Up to 16 synchronous axes, including NC processing and motion control

For general purpose machines
A panel PC provides general-purpose HMI functionality that allows machine users to edit NC programs

- Reliable and robust industrial panel PC
- Omron’s unique CNC Operator for editing NC programs and performing functions
- Comes equipped with Windows OS, running Windows applications while performing motion control
- Up to 32 synchronous axes, including NC processing and motion control
- Intel® Core™ i7-4700EQ processor

Graphic user interface for NC - CNC Operator

Operation software for PC to use NC functionality.
Customizable software allows adding functionality by users (Requires Microsoft Visual Studio).
Integration and functionality

Sysmac is an integrated automation platform dedicated to providing complete control and management of your automation plant. At the core of this platform, the controller series offers synchronous control of all machine devices and advanced functionality. This multidisciplinary concept allows you to simplify solution architecture, reduce programming and optimize productivity.

✓ Integrated machine controller
Logic sequence, motion, safety, I/O, vision, and NC in one. One integrated controller offers speed, flexibility and scalability of software centric architecture without compromising on the traditional reliability and robustness that you have come to expect from Omron PLCs.

✓ Perfect match between fast machine control and plant data management.
Built-in ports: Machine control network EtherCAT® and factory automation network EtherNet/IP™. The two networks with one connection purpose is the perfect match between fast real-time machine control and plant data management.

✓ A wide range of products for complete production line
Our industry-leading lineup: Input (photoelectric/proximity/vision sensors, switches), Logic (PLCs, controllers), Output (servo systems, inverters, relays), and Safety.
A wide range of products for complete production line

Vision

Robot Omron Adept Technologies Inc. robot

Sensing

ZW-7000

Displacement Sensor

I/O

NX I/O

Ethernet

IPC Machine Controller

NY NC Integrated Controller

Machine Automation Controller

NX NC Integrated Controller

Information technologies

Database

Smart factory

IT devices

Offices HQ

Sales force

Networks

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Perfect match between fast machine control and plant data management.

Integrated machine controller

Total solution to maximize machine throughput

Logic sequence, motion, safety, I/O, vision, and NC in one. One integrated controller offers speed, flexibility and scalability of software centric architecture without compromising on the traditional reliability and robustness that you have come to expect from Omron PLCs.

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Visualization eliminates machine downtime

Machine Automation Controller NJ/NY Series - NC Integrated Controller

Product family

MACHINE CONTROLLER

**Product name**  
NJ/NY series NC Integrated Controller

<table>
<thead>
<tr>
<th>Model</th>
<th>NY532-5400-3</th>
<th>NJ501-5300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td>Industrial Panel PC</td>
<td>Modular controller</td>
</tr>
<tr>
<td>Display</td>
<td>15.4” inch</td>
<td>12.1” inch</td>
</tr>
<tr>
<td>Storage</td>
<td>128 GB SSD MLC</td>
<td>64 GB SSD SLC</td>
</tr>
<tr>
<td>Storage</td>
<td>128 GB SSD MLC</td>
<td>64 GB SSD SLC</td>
</tr>
<tr>
<td>Operating system</td>
<td>Windows Embedded Standard 7 – 64 bit</td>
<td>-</td>
</tr>
<tr>
<td>Task</td>
<td>Multi-tasking program</td>
<td></td>
</tr>
</tbody>
</table>
| Control functionality | - Logic sequence  
- Motion  
- NC |
| Number of axes | Max. synchronous axis 32 | 16 |
| Number of axes | Synchronous axes per channel 4 | - |
| Number of channels | 8 | 4 |
| Fastest cycle time | 500 μs |
| Software tool | Integrated Development Environment | - Sysmac Studio:  
  - Ladder, Structured Text, In-Line ST  
  - IEC61131-3  
  - PLCopen for Motion Control and Safety  
  - G/M Code |
| Graphical user interface | CNC operator:  
  - G/M Code |
| Interpolation functions | Compensation:  
  - Tool Radius/Length, Cross, LeadScrew  
  - Interpolation:  
  - Linear, Circular, Helical, Conical, Spiral  
  - Coordinate system:  
  - MCS, WCS, LCS, Mirror, Scaling, Rotation, Plane Selection…  
  - Others:  
  - FeedRate Control, Accel/Decel Control, Lookahead, Machine Lock, Dry Run, Back Trace… |
| Program capacity | 40 MB | 20 MB |
| NC program buffer | 64 MB | 20 MB |
| Memory card | SD and SDHC |
| Built-in port | Ethernet, EtherNet/IP, EtherCAT, USB 3.0/2.0, DVI, RS-232C | EtherNet/IP, EtherCAT, USB |
| EtherCAT slaves | 192 |
| Mounting | On panel | DIN rail |
| Global standards | EU Directives, cULus, RCM and KC Registration |

**At a glance**

- Warning
- Mounting: On panel DIN rail
- Interface: Ethernet, EtherNet/IP, EtherCAT
- Safety: PNP/NPN selection
- Interface: SD and SDHC
- Interpolation: Linear, Circular, Helical, Conical, Spiral
- Machine function: Machine Lock, Dry Run, Back Trace
- Activity log: Data for troubleshooting
- Configuration: Confguration Tool SD Manager2
- Line shooting
- Trouble shooting
- Language support: English, Chinese, Italian, Korean, French, German, Spanish and Japanese
- Global standard: EU Directives, cULus, RCM and KC Registration

The F3SG-R is designed to be used in a variety of environments around the world, conforming to major international standards. The F3SG-RA is designed to be used in a variety of environments around the world, conforming to major international standards.

Data logging for quick troubleshooting

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**Others**

- FeedRate Control
- Accel/Decel Control
- Lookahead
- Machine Lock
- Dry Run
- Back Trace

**Language support**

- English, Chinese, Italian, Korean, French, German, Spanish and Japanese

**Network support**

- Ethernet, EtherNet/IP, EtherCAT, USB 3.0/2.0, DVI, RS-232C

**Part number**

- Model NY532-5400-3
- Model NJ501-5300

**Operating system**

- Windows Embedded Standard 7 – 64 bit

**Configuration Tool**

- SD Manager2

**Software tool**

- Sysmac Studio:
  - G/M Code
  - IEC61131-3
  - PLCopen for Motion Control and Safety
  - G/M Code

**Monitor**

- 15.4” inch
- 12.1” inch

**Operating environment**

- Global standards: EU Directives, cULus, RCM and KC Registration

**Built-in port**

- Ethernet, EtherNet/IP, EtherCAT, USB 3.0/2.0, DVI, RS-232C

**Memory card**

- SD and SDHC

**Built-in port**

- Ethernet, EtherNet/IP, EtherCAT, USB 3.0/2.0, DVI, RS-232C

**EtherCAT slaves**

- 192

**Mounting**

- On panel DIN rail

**Global standards**

- EU Directives, cULus, RCM and KC Registration

**Configuration Tool**

- SD Manager2

**Software tool**

- Sysmac Studio:
  - G/M Code
  - IEC61131-3
  - PLCopen for Motion Control and Safety
  - G/M Code

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**Memory card**

- SD and SDHC

**Built-in port**

- Ethernet, EtherNet/IP, EtherCAT, USB 3.0/2.0, DVI, RS-232C

**EtherCAT slaves**

- 192
The lamp notifies low light intensity. The lamp notifies when the incident light level drops due to dirt, which prevents the safety light curtain from switching ON.* The incident light level at which the light curtain turns OFF can be set to near the threshold.

Visualization eliminates machine downtime and predictive maintenance.

Stable operation and predictive maintenance:

- Reduce engineering and maintenance costs by using Omron libraries and IAGs.
- Advanced security function with 32 digit security password.

Functions:

- Sysmac Studio is the Integrated Development Environment to configure, program and maintain all Sysmac Controllers and devices.
- One single project file for the entire machine.
- Intuitive IDE for logic, motion, safety, robotics, drives, vision, HMI and networks NC.
- Reduce engineering and maintenance costs by using Omron libraries and IAGs. Develop your own libraries.
- IEC-61131-3 compliant.
- PLCopen FBs for motion and safety.
- G/M Code available
- Advanced functions for CAM editing, Drive tuning, 3D simulation, libraries and namespaces, vision algorithms, HMI design and complete machine maintenance.
- Full Digital Machine development environment including: EtherNet/IP, EtherCAT, IO-Link, SQL and FTP.
- Offline Simulation for logic, motion, robotics, safety and vision.
- Advanced security function with 32 digit security password.

Product name: Sysmac Studio

Model: SYSMAC-SE2

Functions:

- G-Code File Editor
- Execution monitor Active G/M code display
- Command terminal
- Jogging, homing

- The CNC Operator Software Development Kit provides a
  - Environment for customization of CNC Operator.

- English, Chinese, Italian, Korean, French, German, Spanish and Japanese

G-CODE

<table>
<thead>
<tr>
<th>Code</th>
<th>Function</th>
<th>Code</th>
<th>Function</th>
<th>Code</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>G00</td>
<td>Rapid Positioning</td>
<td>G41</td>
<td>Tool Compensation, Left</td>
<td>G58</td>
<td>5th work coordinate system</td>
</tr>
<tr>
<td>G01</td>
<td>Linear Interpolation</td>
<td>G42</td>
<td>Tool Compensation, Right</td>
<td>G59</td>
<td>6th work coordinate system</td>
</tr>
<tr>
<td>G02</td>
<td>Circular Interpolation in CW direction</td>
<td>G43</td>
<td>Tool Offset, Positive</td>
<td>G61</td>
<td>Exact Stop Mode</td>
</tr>
<tr>
<td>G03</td>
<td>Circular Interpolation in CCW direction</td>
<td>G44</td>
<td>Tool Offset, Negative</td>
<td>G64</td>
<td>Continuous-path Mode</td>
</tr>
<tr>
<td>G04</td>
<td>Dwell</td>
<td>G49</td>
<td>Cancels Tool Offset</td>
<td>G68</td>
<td>Enables rotation</td>
</tr>
<tr>
<td>G09</td>
<td>Exact Stop</td>
<td>G50</td>
<td>Cancel Scaling</td>
<td>G69</td>
<td>Disables rotation</td>
</tr>
<tr>
<td>G17</td>
<td>X-Y Plane Selection</td>
<td>G51</td>
<td>Scaling</td>
<td>G74</td>
<td>Left-handed Tapping Cycle</td>
</tr>
<tr>
<td>G18</td>
<td>Z-X Plane Selection</td>
<td>G50.1</td>
<td>Cancel Mirroring</td>
<td>G80</td>
<td>Fixed Cycle Cancel</td>
</tr>
<tr>
<td>G19</td>
<td>Y-Z Plane Selection</td>
<td>G51.1</td>
<td>Mirroring</td>
<td>G84</td>
<td>Tapping Cycle</td>
</tr>
<tr>
<td>G20</td>
<td>Inch Input</td>
<td>G52</td>
<td>Local Coordinate System Set</td>
<td>G90</td>
<td>Absolute command</td>
</tr>
<tr>
<td>G21</td>
<td>Metric Input</td>
<td>G53</td>
<td>Dimension Shift Cancel</td>
<td>G91</td>
<td>Incremental command</td>
</tr>
<tr>
<td>G28</td>
<td>Return to Reference Point</td>
<td>G54</td>
<td>1st work coordinate system</td>
<td>G98</td>
<td>Fixed Cycle Return to Initial Level</td>
</tr>
<tr>
<td>G30</td>
<td>Return to 2nd, 3rd or 4th Reference Point</td>
<td>G55</td>
<td>2nd work coordinate system</td>
<td>G99</td>
<td>Fixed Cycle Return to R Point Level</td>
</tr>
<tr>
<td>G31</td>
<td>Skip Function</td>
<td>G56</td>
<td>3rd work coordinate system</td>
<td>G500</td>
<td>Enables Multi-block Accelerization/Deceleration Rate</td>
</tr>
<tr>
<td>G40</td>
<td>Cancels Tool Compensation</td>
<td>G57</td>
<td>4th work coordinate system</td>
<td>G501</td>
<td>Disables Multi-block Accelerization/Deceleration Rate</td>
</tr>
</tbody>
</table>

*One CNC Operator License (SYSMAC-RTNC0001L) is bundled with a CPU Unit. Purchase additional licenses if required.
### SERVOMOTORS/LINEAR MOTORS/DRIVES

<table>
<thead>
<tr>
<th>Product name</th>
<th>GS Servo Drives</th>
<th>TS Servo Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Built-in EtherCAT Communications</td>
<td>Built-in EtherCAT Communications</td>
</tr>
<tr>
<td>100 V AC Applicable motor capacity/force</td>
<td>50 to 400 W</td>
<td>100 to 400 W</td>
</tr>
<tr>
<td>200 V AC Applicable motor capacity/force</td>
<td>50 W to 15 kW</td>
<td>100 to 3kW</td>
</tr>
<tr>
<td>400 V AC Applicable motor capacity/force</td>
<td>400 W to 15 kW</td>
<td>600 to 3kW</td>
</tr>
<tr>
<td>Applicable servomotor</td>
<td>GS rotary servomotor, GS linear motor</td>
<td>TS servomotor</td>
</tr>
<tr>
<td>Control mode</td>
<td>Position, speed and torque control</td>
<td>Position, speed and torque control</td>
</tr>
<tr>
<td>Safety approvals</td>
<td>• ISO 13849-1 (PL-c, d)</td>
<td>• ISO 13849-1 (PL-c, d)</td>
</tr>
<tr>
<td></td>
<td>• EN 60204-1 (SIL2)</td>
<td>• EN 60204-1 (SIL2)</td>
</tr>
<tr>
<td></td>
<td>• EN 62061 (SIL2)</td>
<td>• EN 62061 (SIL2)</td>
</tr>
<tr>
<td></td>
<td>• IEC 61800-5-2 (STO)</td>
<td>• IEC 61800-5-2 (STO)</td>
</tr>
<tr>
<td>Full closed loop</td>
<td>Built-in</td>
<td>No</td>
</tr>
<tr>
<td>Ordering information</td>
<td>GS Series Catalog (Cat. No.815)</td>
<td>TS Series Catalog (Cat. No.821)</td>
</tr>
</tbody>
</table>

### GS Servo Motors

<table>
<thead>
<tr>
<th>Product name</th>
<th>GS Servo Motors</th>
<th>TS Servo Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated rotation speed</td>
<td>3,000 r/min</td>
<td>2,000 r/min</td>
</tr>
<tr>
<td>Momentary maximum rotation speed</td>
<td>4,500 to 6,000 r/min</td>
<td>3,000 r/min</td>
</tr>
<tr>
<td>Rated torque</td>
<td>0.36 to 15.9 N·m</td>
<td>5000 to 6000 r/min</td>
</tr>
<tr>
<td>Capacity</td>
<td>50 W to 5 kW</td>
<td>0.318 to 9.59 m</td>
</tr>
<tr>
<td>Encoder resolution</td>
<td>20-bit incremental/17-bit absolute</td>
<td>23-bit absolute</td>
</tr>
<tr>
<td>Protective structure</td>
<td>IP67</td>
<td>IP67</td>
</tr>
<tr>
<td>Ordering information</td>
<td>GS Series Catalog (Cat. No.1815)</td>
<td>TS Series Catalog (Cat. No.1821)</td>
</tr>
</tbody>
</table>

### TS Servo Drives

<table>
<thead>
<tr>
<th>Product name</th>
<th>GS Servo Motors</th>
<th>TS Servo Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated rotation speed</td>
<td>1,500 r/min</td>
<td>1,000 r/min</td>
</tr>
<tr>
<td>Momentary maximum rotation speed</td>
<td>2,000 to 3,000 r/min</td>
<td>2,000 r/min</td>
</tr>
<tr>
<td>Rated torque</td>
<td>47.8 to 95.5 N·m</td>
<td>2000 to 3kW</td>
</tr>
<tr>
<td>Capacity</td>
<td>7.5 to 15 kW</td>
<td>8.59 to 28.7 N·m</td>
</tr>
<tr>
<td>Encoder resolution</td>
<td>17-bit absolute</td>
<td>20-bit incremental/17-bit absolute</td>
</tr>
<tr>
<td>Protective structure</td>
<td>IP67</td>
<td>IP67</td>
</tr>
<tr>
<td>Ordering information</td>
<td>GS Series Catalog (Cat. No.1815)</td>
<td>TS Series Catalog (Cat. No.1821)</td>
</tr>
</tbody>
</table>
The lamp notifies low light intensity when the incident light level drops due to dirt, which prevents sudden stops. Visualization eliminates machine downtime for global use.

Stable operation and predictive maintenance can be achieved without stopping the line. The safety light curtain turns OFF, which reduces maintenance time. The SD Manager2 can be used to check the status of safety light curtain with PC via Bluetooth®, providing an easy and safe solution.

No work is required after completing checks, and no possibility of blocking beams. Wireless connectivity is provided through FSoE – Safety over EtherCAT, making it easy to deploy around the world.

<table>
<thead>
<tr>
<th>Series</th>
<th>NX</th>
<th>GX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Modular I/O</td>
<td>Block I/O</td>
</tr>
<tr>
<td>Communications interface</td>
<td>EtherCAT</td>
<td>EtherCAT</td>
</tr>
<tr>
<td>Number of connectable units</td>
<td>63 units max. Input: 1,024 bytes max., output: 1,024 bytes max.</td>
<td>One expansion unit can be connected with one digital I/O terminal (16 inputs + 16 outputs)</td>
</tr>
<tr>
<td>I/O types</td>
<td>Digital I/O, Pulse output, Analog I/O, Temperature input</td>
<td>Digital I/O, Safety, Encoder input, Analog I/O, Expansion unit</td>
</tr>
<tr>
<td>Features</td>
<td>Over 100 models of I/O units including position interface, temperature inputs and integrated safety; High-speed I/O units synchronized with the EtherCAT cycle; NsioX technology provides deterministic I/O response with nanosecond resolution; Detachable front connector with push-in type screw-less terminals in all NX I/O units; Up to 32 digital inputs or outputs.</td>
<td>Wide variety of lineup: digital I/O, analog I/O, and encoder input units; Easy maintenance: removable I/O terminal; Easy set-up: automatic and manual address setting</td>
</tr>
<tr>
<td>Mounting</td>
<td>DIN track</td>
<td>DIN track</td>
</tr>
<tr>
<td>Ordering information</td>
<td>NX-series I/O System Catalog (Cat. No.R183)</td>
<td>GX Series Data Sheet</td>
</tr>
</tbody>
</table>

**SAFETY**

<table>
<thead>
<tr>
<th>Product name</th>
<th>NX Safety CPU Unit</th>
<th>NX Safety Input Unit</th>
<th>NX Safety Output Unit</th>
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</thead>
<tbody>
<tr>
<td>Network</td>
<td>FSoE – Safety over EtherCAT</td>
<td>FSoE – Safety over EtherCAT</td>
<td>FSoE – Safety over EtherCAT</td>
</tr>
<tr>
<td>Programming</td>
<td>IEC 61131-3 standard, PLCopen Function Blocks for Safety</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Number of safety master connections</td>
<td>32/128</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Number of safety input/output points</td>
<td>—</td>
<td>4 points, 8 points</td>
<td>2 points, 4 points</td>
</tr>
<tr>
<td>Number of test output points</td>
<td>—</td>
<td>2 points</td>
<td>—</td>
</tr>
<tr>
<td>Terminal block</td>
<td>Screwless clamping terminal block</td>
<td>Screwless clamping terminal block</td>
<td></td>
</tr>
<tr>
<td>Features</td>
<td>Freely mixing with standard NX I/O, Reusable certified programs, NX variables sharing in the NJ controller project</td>
<td>Freely mixing with standard NX I/O, The 4-point unit can be directly connected with OMRON non-contact switches and singlebeam sensors, I/O data monitoring in the NJ controller project</td>
<td>Freely mixing with standard NX I/O, The 2-point unit is characterized by large output breaking current of 2.0 A, I/O data monitoring in the NJ controller project</td>
</tr>
<tr>
<td>Mounting</td>
<td>DIN track</td>
<td>DIN track</td>
<td>DIN track</td>
</tr>
<tr>
<td>Ordering information</td>
<td>NX-SL/SI/SO Data Sheet</td>
<td>GX Series Data Sheet</td>
<td></td>
</tr>
</tbody>
</table>
Controllers & I/O
• Machine Automation Controllers (MAC) • Motion Controllers • Programmable Logic Controllers (PLC) • Temperature Controllers • Remote I/O

Robotics
• Industrial Robots • Mobile Robots

Operator Interfaces
• Human Machine Interface (HMI)

Motion & Drives
• Machine Automation Controllers (MAC) • Motion Controllers • Servo Systems • Frequency Inverters

Vision, Measurement & Identification
• Vision Sensors & Systems • Measurement Sensors • Auto Identification Systems

Sensing
• Photoelectric Sensors • Fiber-Optic Sensors • Proximity Sensors • Rotary Encoders • Ultrasonic Sensors

Safety
• Safety Light Curtains • Safety Laser Scanners • Programmable Safety Systems • Safety Mats and Edges • Safety Door Switches • Emergency Stop Devices • Safety Switches & Operator Controls • Safety Monitoring/Force-guided Relays

Control Components
• Power Supplies • Timers • Counters • Programmable Relays • Digital Panel Meters • Monitoring Products

Switches & Relays
• Limit Switches • Pushbutton Switches • Electromechanical Relays • Solid State Relays

Software
• Programming & Configuration • Runtime