

Programmable Multi-Axis Controller

CK3E

CSM_CK3E_DS_E_4_6

A controller with a width of only 28.6 mm provides complete control



Features

High-speed multi-axis control

- Up to 32 axes of control
- Motion control period: 250 μ s or more

Flexibility

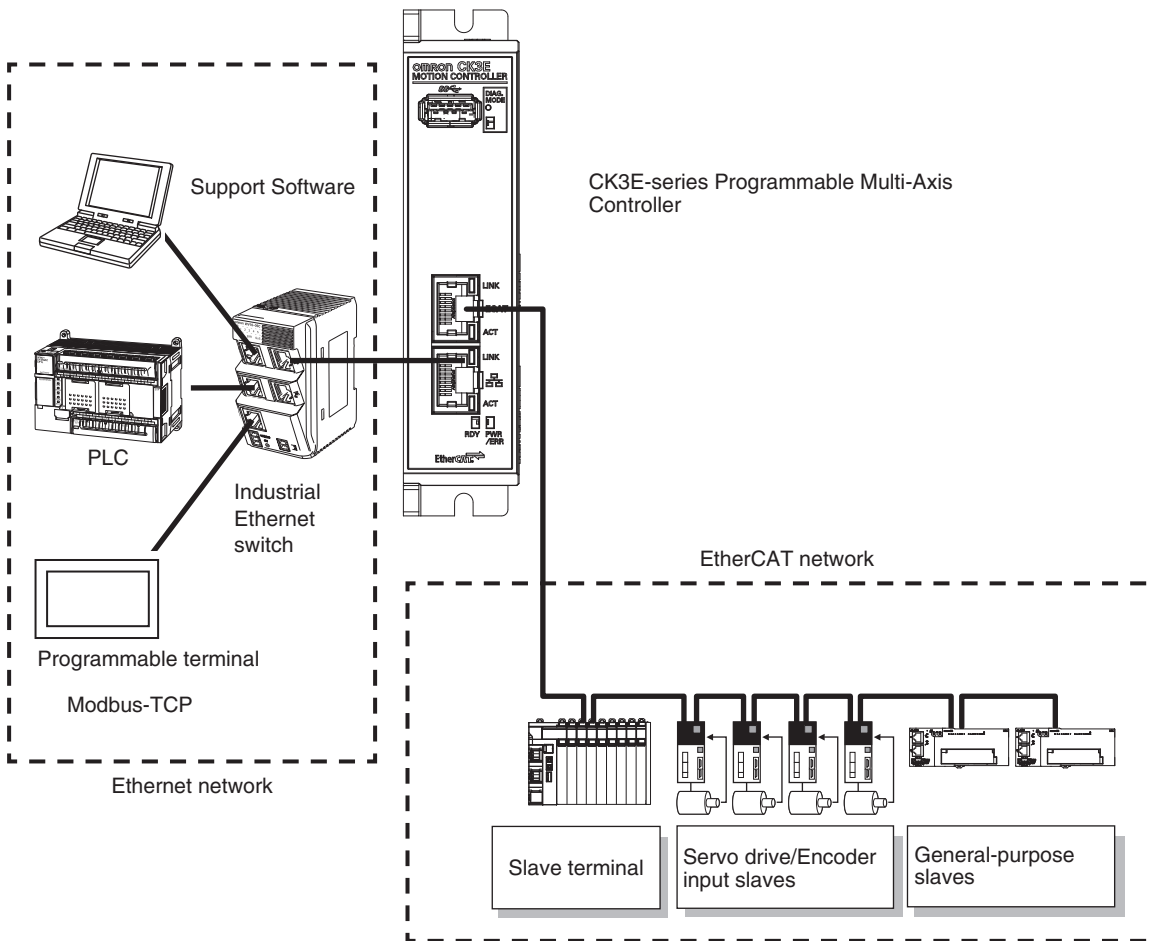
- CAD/CAM for easy motion control
- Flexible function development capability enables high-precision curve machining

Saving space & wiring

- Footprint reduced to 1/4 (Based on Omron investigation)
- EtherCAT for flexible system configuration
Advanced security function with 32 digit security password

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.
The product photographs and figures that are used in this catalog may vary somewhat from the actual products.

System Configuration



Ordering Information

| Product | Specifications | | | Model |
|------------------------------------|---|---|--|-----------|
| | Memory | Ports | Max. no. of controlled axes at EtherCAT port | |
| Programmable Multi-Axis Controller | Main memory: 1 GB Flash memory: 1 GB | EtherNet/IP port: 1 EtherCAT port: 1 | 8 | CK3E-1210 |
| | | | 16 | CK3E-1310 |
| | | | 32 | CK3E-1410 |

Optional Hardware

| Product name | Specifications | Model |
|------------------|------------------------|--------------|
| USB Flash Drives | Capacity: 2 GB | FZ-MEM2G |
| | Capacity: 8 GB | FZ-MEM8G |
| Power supply | Output voltage: 24 VDC | S8FS-G□□□24□ |

Recommended EtherCAT Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT. For EtherCAT, use a shielded twisted-pair cable (double shielding with aluminum tape and braiding) of Ethernet category 5 (100BASE-TX) or higher, and use straight wiring.





For Ethernet, required specification for the communications cables varies depending on the baud rate.

For 100BASE-TX/10BASE-T, use an STP (shielded twisted-pair) cable of Ethernet category 5 or higher. You can use either a straight or cross cable.

For 1000BASE-T, use an STP (double shielding with aluminum tape and braiding) cable of Ethernet category 5e or higher. You can use either a straight or cross cable.

In the table, materials indicated available for Ethernet 100BASE-TX are available for both of 100BASE-TX and 10BASE-T.

Cable with Connectors

| Item | Appearance | Recommended manufacturer | Cable length (m) | Model |
|-----------------------|--|--------------------------|------------------|----------------------|
| Products for EtherCAT |  Cable with Connectors on Both Ends (RJ45/RJ45) Standard RJ45 plugs type *1 Wire Gauge and Number of Pairs: AWG27, 4-pair Cable Cable Sheath material: LSZH *2 Cable color: Yellow *3 | OMRON | 0.3 | XS6W-6LSZH8SS30CM-Y |
| | | | 0.5 | XS6W-6LSZH8SS50CM-Y |
| | | | 1 | XS6W-6LSZH8SS100CM-Y |
| | | | 2 | XS6W-6LSZH8SS200CM-Y |
| | | | 3 | XS6W-6LSZH8SS300CM-Y |
| | | | 5 | XS6W-6LSZH8SS500CM-Y |
| |  Cable with Connectors on Both Ends (RJ45/RJ45) Rugged RJ45 plugs type *1 Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Right blue | OMRON | 0.3 | XS5W-T421-AMD-K |
| | | | 0.5 | XS5W-T421-BMD-K |
| | | | 1 | XS5W-T421-CMD-K |
| | | | 2 | XS5W-T421-DMD-K |
| | | | 5 | XS5W-T421-GMD-K |
| |  Cable with Connectors on Both Ends (M12 Straight/ M12 Straight) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black | OMRON | 0.5 | XS5W-T421-BM2-SS |
| | | | 1 | XS5W-T421-CM2-SS |
| | | | 2 | XS5W-T421-DM2-SS |
| | | | 3 | XS5W-T421-EM2-SS |
| | | | 5 | XS5W-T421-GM2-SS |
| |  Cable with Connectors on Both Ends (M12 Straight/ RJ45) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Rugged RJ45 plugs type Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black | OMRON | 0.5 | XS5W-T421-BMC-SS |
| | | | 1 | XS5W-T421-CMC-SS |
| | | | 2 | XS5W-T421-DMC-SS |
| | | | 3 | XS5W-T421-EMC-SS |
| 5 | | | XS5W-T421-GMC-SS | |
| 10 | XS5W-T421-JMC-SS | | | |

*1. Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20 m are available.

Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15 m are available.


For details, refer to Cat.No.G019.

*2. The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use. Although the LSZH cable is single shielded, its communications and noise characteristics meet the standards.

*3. Cables colors are available in blue, yellow, or Green.

*4. For details, contact your OMRON representative.

Cables / Connectors

| Item | | Recommended manufacturer | Model | |
|--|---|--|------------------------------|-----------------------------------|
| Products for EtherCAT or Ethernet (1000BASE-T/100BASE-TX) | Wire Gauge and Number of Pairs: AWG24, 4-pair Cable | Cables | Hitachi Metals, Ltd. | NETSTAR-C5E SAB 0.5 × 4P CP *1 |
| | | | Kuramo Electric Co. | KETH-SB *1 |
| | | | SWCC Showa Cable Systems Co. | FAE-5004 *1 |
| Products for EtherCAT or Ethernet (100BASE-TX) | Wire Gauge and Number of Pairs: AWG22, 2-pair Cable | RJ45 Connectors | Panduit Corporation | MPS588-C *1 |
| | | Cables | Kuramo Electric Co. | KETH-PSB-OMR *2 |
| | | | JMACS Japan Co., Ltd. | PNET/B *2 |
| | | RJ45 Assembly Connector  | OMRON | XS6G-T421-1 *2 |

*1. We recommend you to use above cable for EtherCAT and Ethernet, and RJ45 Connector together.

*2. We recommend you to use above cable for EtherCAT and Ethernet, and RJ45 Assembly Connector together.

Note: Connect both ends of cable shielded wires to the connector hoods.

Support Software

The following table shows the Support Software used to configure, monitor, program, and debug the Programmable Multi-Axis Controller.

| Software Name | | Application | How to Procure |
|------------------|-------------------------|---|--|
| Power PMAC IDE * | | This computer software is used to configure the Controller, create user programs, and debug the programs. | This is free software. Contact your OMRON representative for information on how to procure. |
| Power PMAC NC16 | Power PMAC-NC16 SDK | This computer software is used to control working machines and other CNC machines with the Controller. Use this software when you want to customize the HMI screen. The product contains extension source codes used for customization. | This is non-free software. Contact your OMRON representative for information on how to procure. |
| | Power PMAC-NC16 Runtime | This computer software is used to control working machines and other CNC machines with the Controller. Use this software when you do not customize the HMI screen. | This is non-free software. Contact your OMRON representative for information on how to procure. |
| EC Engineer | | This computer software is used to configure and monitor the EtherCAT network by using the Controller as the EtherCAT master. | This is free software. Contact your OMRON representative for information on how to procure. |

Note: PMAC is an abbreviation for Programmable Multi Axis Controller.

* For CK3E version 2.3 or earlier, use Power PMAC IDE version 2.2 or later. For CK3E version 2.4 or later, use Power PMAC IDE version 4.1 or later.

General Specifications

| Item | Specification | | |
|---------------------------------------|--|--|-----------|
| | CK3E-1210 | CK3E-1310 | CK3E-1410 |
| Enclosure | Mounted in a panel | | |
| Grounding method | Ground to 100 Ω or less | | |
| Dimensions (height × width × depth) | 130.4(H) × 28.6(D) × 170.9(W) mm | | |
| Weight | 540 g or less | | |
| Unit power supply rated voltage | 24 VDC (20.4 to 26.4 VDC) | | |
| Unit power supply current consumption | 660 mA or less | | |
| Operating environment | Ambient operating temperature | 0 to 45°C | |
| | Ambient operating humidity | 10 to 95% RH (without condensation and icing) | |
| | Atmosphere | Must be free from corrosive gases. | |
| | Ambient storage temperature | -25 to +70°C (without condensation and icing) | |
| | Vibration resistance | Conforms to IEC 60068-2-6. 5 to 8.4 Hz with amplitude of 3.5 mm, 8.4 to 150 Hz, acceleration of 9.8 m/s ² 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total) | |
| | Shock resistance | Conforms to IEC 60068-2-27, 147 m/s ² , 3 times each in X, Y, and Z directions | |
| Applicable standards * | EU: EN 61326, RCM, KC Registration, UL | | |

* For the latest applicable standards for each model, visit the OMRON website (www.ia.omron.com), or contact your OMRON representative.

Performance/Function Specifications

| Item | | Specification | | |
|--|--|--|---|-----------|
| | | CK3E-1210 | CK3E-1310 | CK3E-1410 |
| Memory | | Main memory: 1 GB Flash memory: 1 GB | | |
| External terminals | | Communications Connector For EtherCAT communications. • RJ45 × 1 (Shield supported) For Ethernet communications. • RJ45 × 1 (Shield supported) | | |
| | | Power supply input terminal For Unit power supply × 1 | | |
| | | USB port For external memory connection, USB 3.0 host × 1 Type A | | |
| Motion control | Maximum Number of Controlled Axes | 8 axes | 16 axes | 32 axes |
| | Motion control period | 250 μs or more | | |
| | Control method | Issuing control commands using EtherCAT communications | | |
| EtherCAT communications specifications | Communications protocol | EtherCAT protocol | | |
| | Baud rate | 100 Mbps | | |
| | Physical layer | 100BASE-TX (IEEE 802.3) | | |
| | Topology | Line, daisy chain, and branching | | |
| | Transmission media | Twisted-pair cable of category 5 or higher (double-shielded cable with aluminum tape and braiding) | | |
| | Transmission distance | Distance between nodes: 100 m or less | | |
| | Maximum number of slaves | 32 | | |
| | Range of node addresses that can be set | 1 to 32 | | |
| Ethernet Port | Baud rate | 100 Mbps | | |
| | Physical layer | 100BASE-TX (IEEE 802.3) | | |
| | Frame length | 1,514 bytes max. | | |
| | Media access method | CSMA/CD | | |
| | Modulation | Baseband | | |
| | Topology | Star | | |
| | Transmission media | Twisted-pair cable of category 5, 5e, or higher (shielded cable) *1 | | |
| | Maximum transmission distance between Ethernet switch and node | 100 m | | |
| | Maximum number of cascade connections | There are no restrictions if an Ethernet switch is used. | | |
| | EtherNet/IP tag data link (cyclic communications) *2 | Number of connections | 32 | |
| | | Requested packet interval (RPI) | 1 to 1,000 ms (0.5 ms units) | |
| | | Allowed communications bandwidth per Unit | 3,200 pps *3 | |
| | | IO connection size | Input: 504 bytes max. Output: 504 bytes max. | |
| EtherNet/IP CIP message service *2 | UCMM (unconnected message) | Number of servers that can perform communications simultaneously: 32 | | |
| EtherNet/IP conformance test | | CT17 compliant | | |
| USB port | Physical layer | USB 3.0-compliant A-type connector, Output voltage 5 V, 0.9 A max. | | |
| | Transmission distance | 3 m max. | | |

*1. Always use shielded cables for EtherNet/IP communications.

*2. EtherNet/IP is available only for targets and not available for originators. EtherNet/IP is available only for PMAC firmware revision version 2.6.0 or later whose date of production is September ??, 2020 or later (Lot number ??920 and later). Use Power PMAC IDE Ver.4.4.1 or a later version.

*3. Represents Packet Per Second and indicates the number of sent or received packets that can be processed in a second.

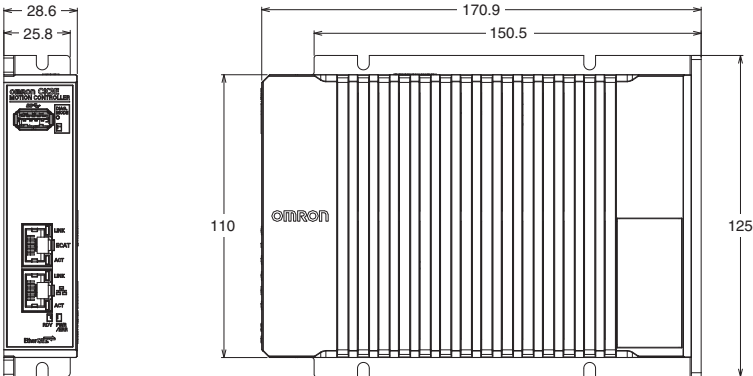
Restrictions on using the OMRON NX-Series Ethercat Coupler Unit

When OMRON NX-series EtherCAT Coupler Units are used as slaves of the Programmable Multi-Axis Controller as the EtherCAT master, the following models and unit versions of EtherCAT Coupler Units can be connected.

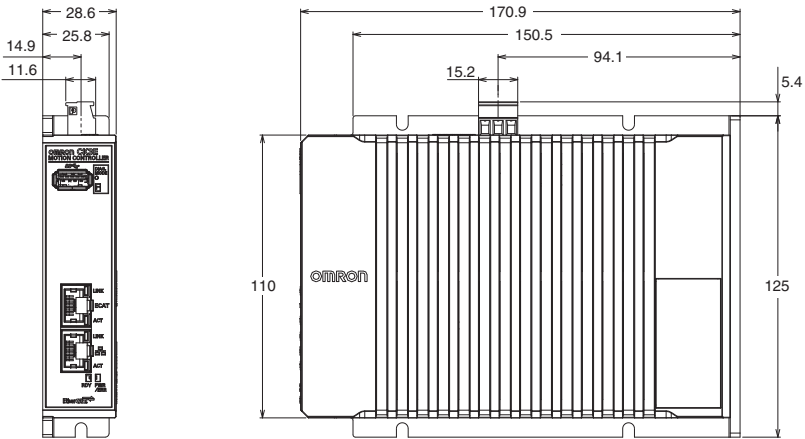
| Model | Unit version | Connectable/Unconnectable |
|-----------|---------------------|---------------------------|
| NX-ECC203 | Ver. 1.4 or later | Connectable |
| | Ver. 1.3 or earlier | Unconnectable |
| NX-ECC202 | All versions | |
| NX-ECC201 | All versions | |

Dimensions

Main Body Only



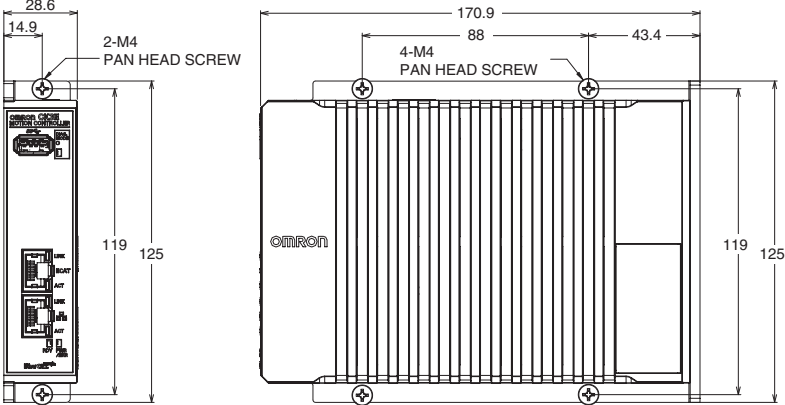
With Power Connector



Mounting Dimensions

Front mounting

Sideways mounting



Related Manuals

Contact your OMRON representative for details.

| Man.No | Manual name | Application | Description |
|--------|---|---|---|
| I610 | CK3E-series Programmable Multi-Axis Controller Hardware User's Manual | Learning all basic information about the CK3E-series Programmable Multi-Axis Controller. This includes introductory information, installation, operating procedures and maintenance. Mainly hardware information is provided. | An introduction to the CK3E-series Programmable Multi-Axis Controller is provided along with the following information: <ul style="list-style-type: none">• Overview• System Configurations• Specifications• Installation• Operating Procedures• Maintenance |

Terms and Conditions Agreement

Read and understand this catalog.

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

See <http://www.omron.com/global/> or contact your Omron representative for published information.

Limitation on Liability: Etc.

OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

2020.9

In the interest of product improvement, specifications are subject to change without notice.

OMRON Corporation
Industrial Automation Company

<http://www.ia.omron.com/>

(c)Copyright OMRON Corporation 2020 All Right Reserved.