OMRON

Power and safety, outside the cabinet — building production lines ready for change.

Redesigning equipment architectures to adapt to changes in production

As the new energy vehicle (NEV) market expands and product diversification continues, manufacturing equipment must support flexible modifications and rapid deployment. Meanwhile, conventional equipment architectures centered around control cabinets require complex electrical designs and extensive wiring, making it difficult to adapt flexibly to equipment changes and line expansions while increasing commissioning and maintenance workloads. What is needed now is a shift to more adaptable equipment architectures.

Creating more adaptable equipment architectures by unified specifications for devices outside control cabinets

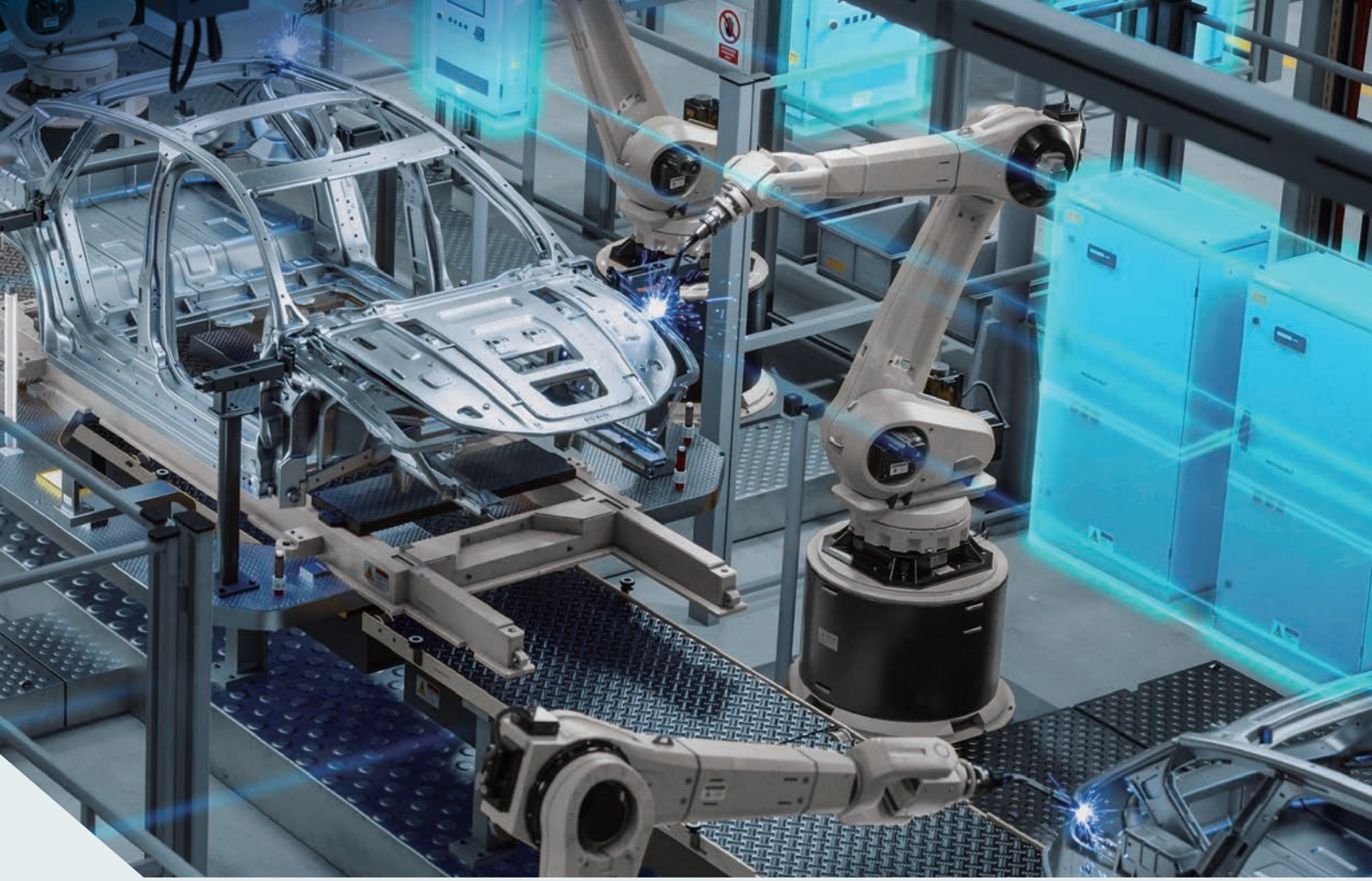
OMRON offers a range of products that enable optimal placement of power supply, safety, and I/O functions on the equipment side. Through unified specifications, OMRON's Cabinet-Free Solutions simplify complex wiring between control cabinets and production equipment, enabling the development of production systems that can flexibly adapt to equipment changes and line expansions.

Adaptability to production changes	Unified specifications	
Flexibility	Open network support	Enhanced usability of devices and configuration tools
Faster Deployment	Integrated functions	M12 SmartClick connector
Maintainability	Plug-and-play	Device and wiring status visibility

Circular connector cables
XS5 Series

IO-Link AD Converter
K3CV

DC Blocking box
Built-in safety relay(G7SA, G7S-□-E)
S8R-BB



IP67-rated Power Supply
S8NR-S

Environment-resistant remote terminal
- **Simple Logic Safety I/O Block for CIP Safety™**

NXR-S

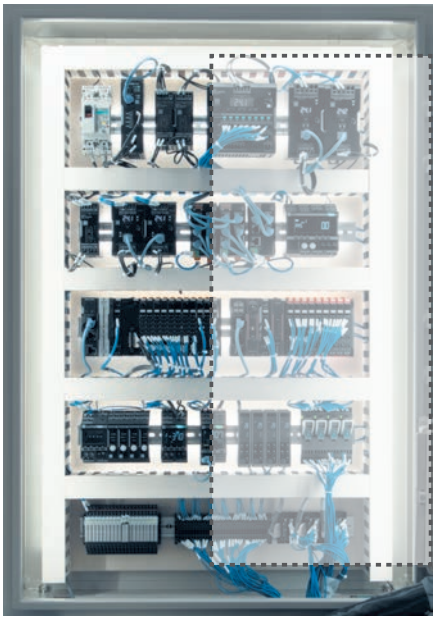
Environment-resistant remote terminal
NXR Series
- **IO-Link Master Unit for EtherNet/IP™**
- **IO-Link I/O Hub**

Optimal placement by moving components from inside control cabinets to the equipment side

Integrated functions

By moving functions traditionally consolidated within control cabinets—such as power supply, safety, and I/O—to the equipment side, complex cabinet–centric wiring can be simplified. This enables highly adaptable equipment architectures that can respond flexibly to equipment changes and line expansions.

Before **Complex device layout and wiring inside control cabinets**



After **Optimized layout and reduced on-site wiring by placing components close to the equipment through integrated functions, network connectivity, and out-of-cabinet installation**

Function integration and out-of-cabinet installation

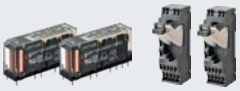
OMRON has developed control devices that incorporate multiple functions within a single unit.

- Power supply
- Mechanical circuit protector
- Terminal block

①

- Safety I/O
- Logic

②



- Safety relays ×2
- Sockets ×2

③

Enhancing production-site adaptability from design and commissioning to maintenance

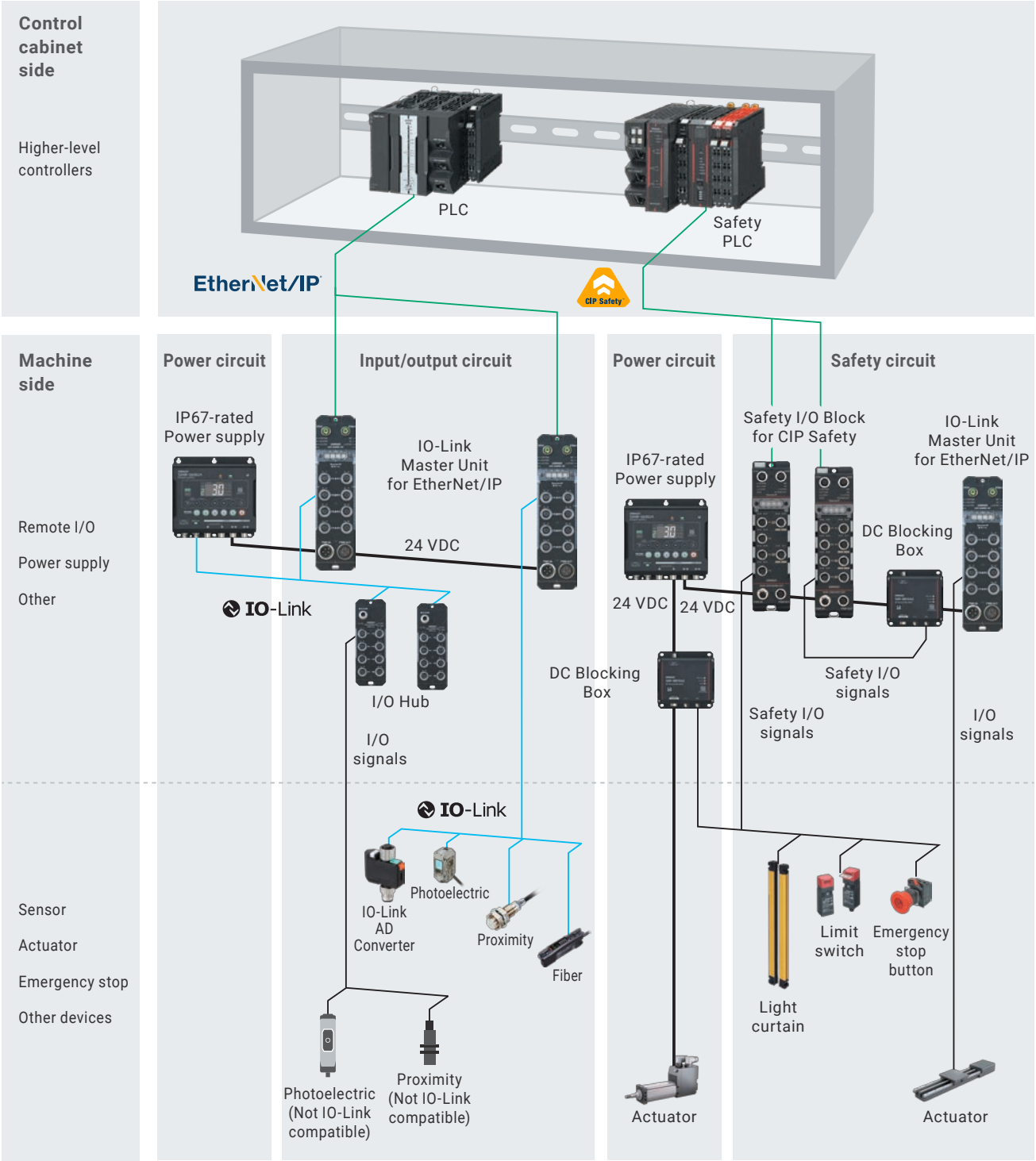
Design

Integrating control cabinet functions and relocating components outside the cabinet to significantly reduce engineering and wiring effort >P.6

System configuration enabled by OMRON products

Power supply, safety, and I/O functions are placed close to the equipment and connected through open networks such as CIP Safety, EtherNet/IP, and IO-Link. By combining OMRON products, manufacturers can implement a cabinet-free architecture with all necessary functions provided on the equipment side.

Open network support



Commissioning

Rapid commissioning and consistent installation quality through simplified wiring of out-of-cabinet devices >P.8

Maintenance

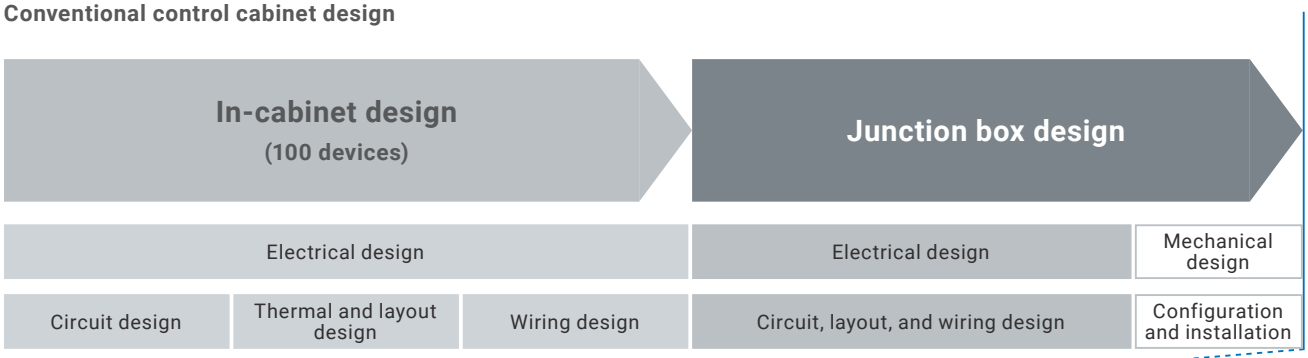
Reduced downtime through easy fault location identification enabled by device and wiring status visibility >P.10

Design

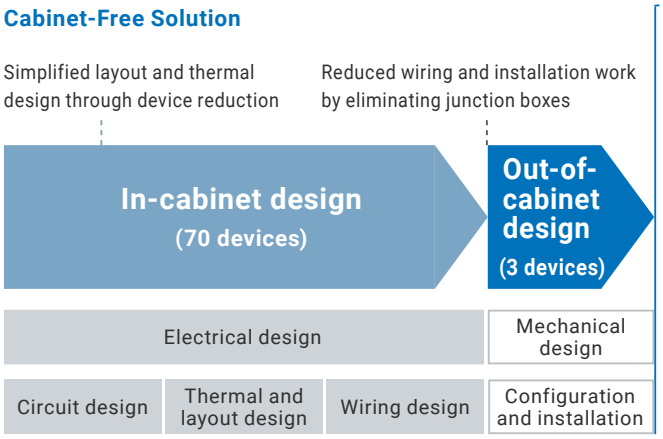
Integrating control cabinet functions and relocating components outside the cabinet to significantly reduce engineering and wiring effort

Reducing control cabinet design time to significantly shorten overall engineering lead time

Conventional control cabinet design



Cabinet-Free Solution



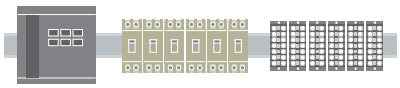
30–50% reduction in in-cabinet/box design effort*1

*1. Based on our control cabinet model (June 2026).

Cabinet-Free Solution reducing 30 in-cabinet devices to 3 out-of-cabinet devices

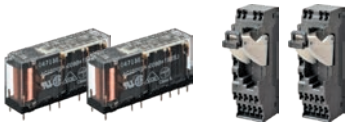
Before 30 devices inside the panel

Power supply + mechanical circuit protector + terminal block

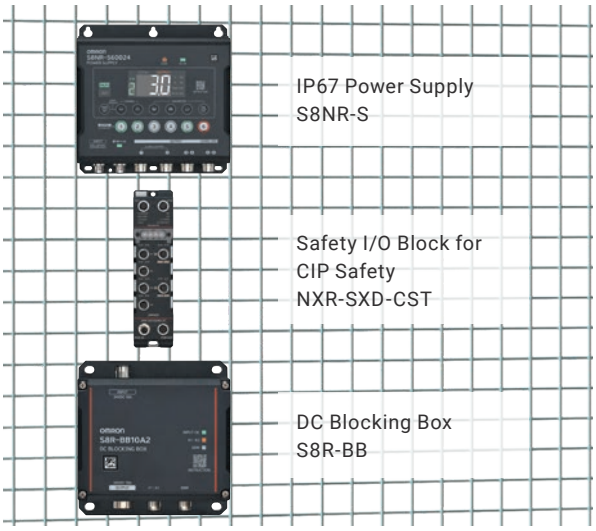


Safety I/O + Logic

Safety Relay + Socket



After 3 devices outside the panel

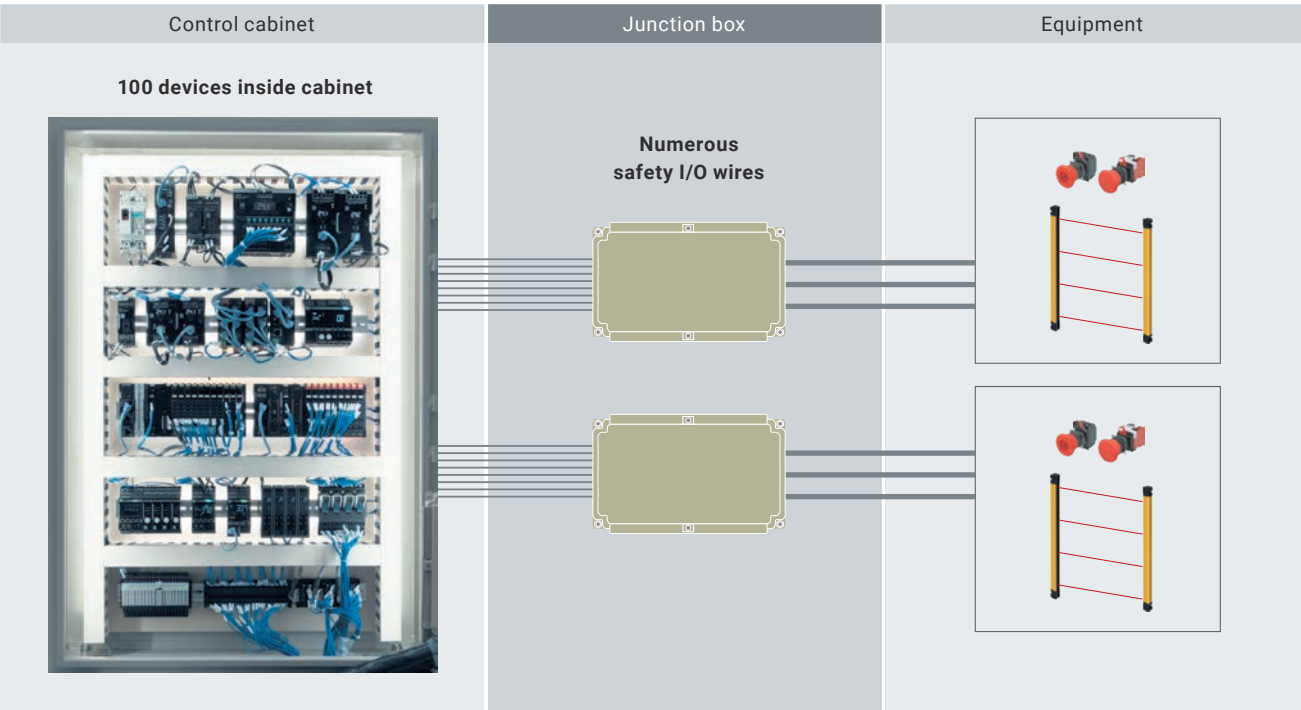


The Cabinet-Free Solution reduces the number of components and the amount of wiring inside control cabinets by moving power supply, safety, and I/O functions to the equipment side. This simplifies tasks such as cabinet layout, thermal design, and junction box design, helping reduce design workload and accelerate equipment commissioning.

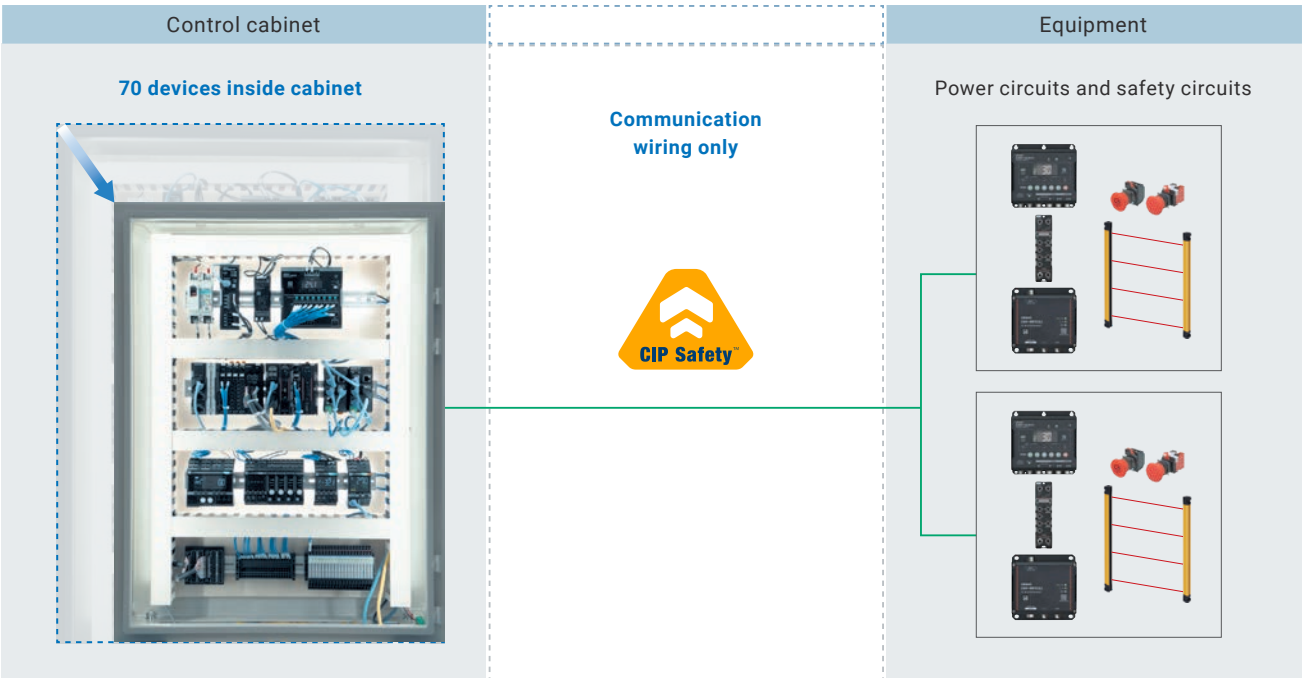
Integrated functions

Consolidating wiring between the control cabinet and equipment to reduce wiring and design workloads

Before **Numerous safety I/O wires between the control cabinet, junction box, and equipment, resulting in a complex wiring structure**



After **Reduced number of devices and wiring within the control cabinet, enabling a smaller control cabinet and requiring only communication wiring between the control cabinet and equipment**

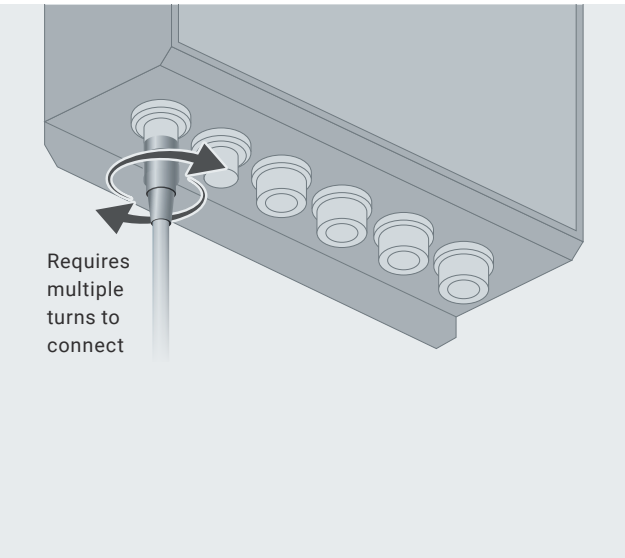


Commissioning

Rapid commissioning and consistent wiring quality through simplified installation of out-of-cabinet devices

Before **M12 screw-type connector**

Conventional screw-type connectors require time-consuming tightening and torque management.

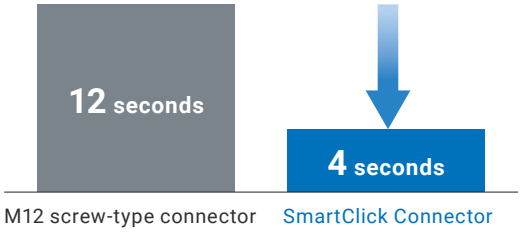


After **SmartClick Connector**

SmartClick enables secure connection with just a 1/8 turn.

OMRON's proprietary SmartClick Connector as standard

Compared with M12 threaded connectors, SmartClick reduces connection time to approximately 1/3*1 with no torque management require

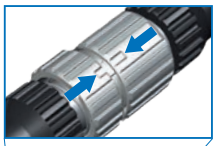


Approximately 1/3 the connection time*1

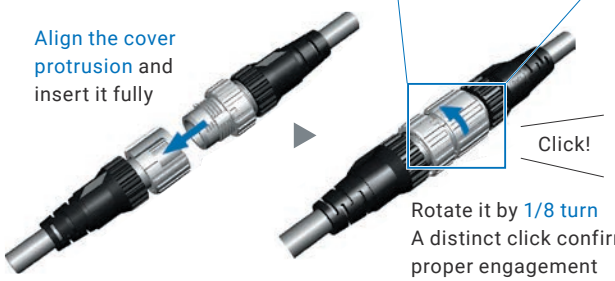
*1. Reference value based on comparison with M12 threaded connectors under our specified test conditions.

Consistent wiring quality

Visually confirm with mating marks



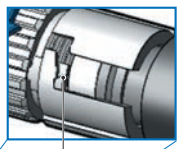
Align the cover protrusion and insert it fully

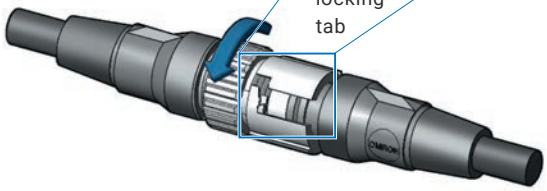


Rotate it by 1/8 turn
A distinct click confirms proper engagement

No torque control required

A bayonet-lock mechanism in the locking section prevents loosening after connection.

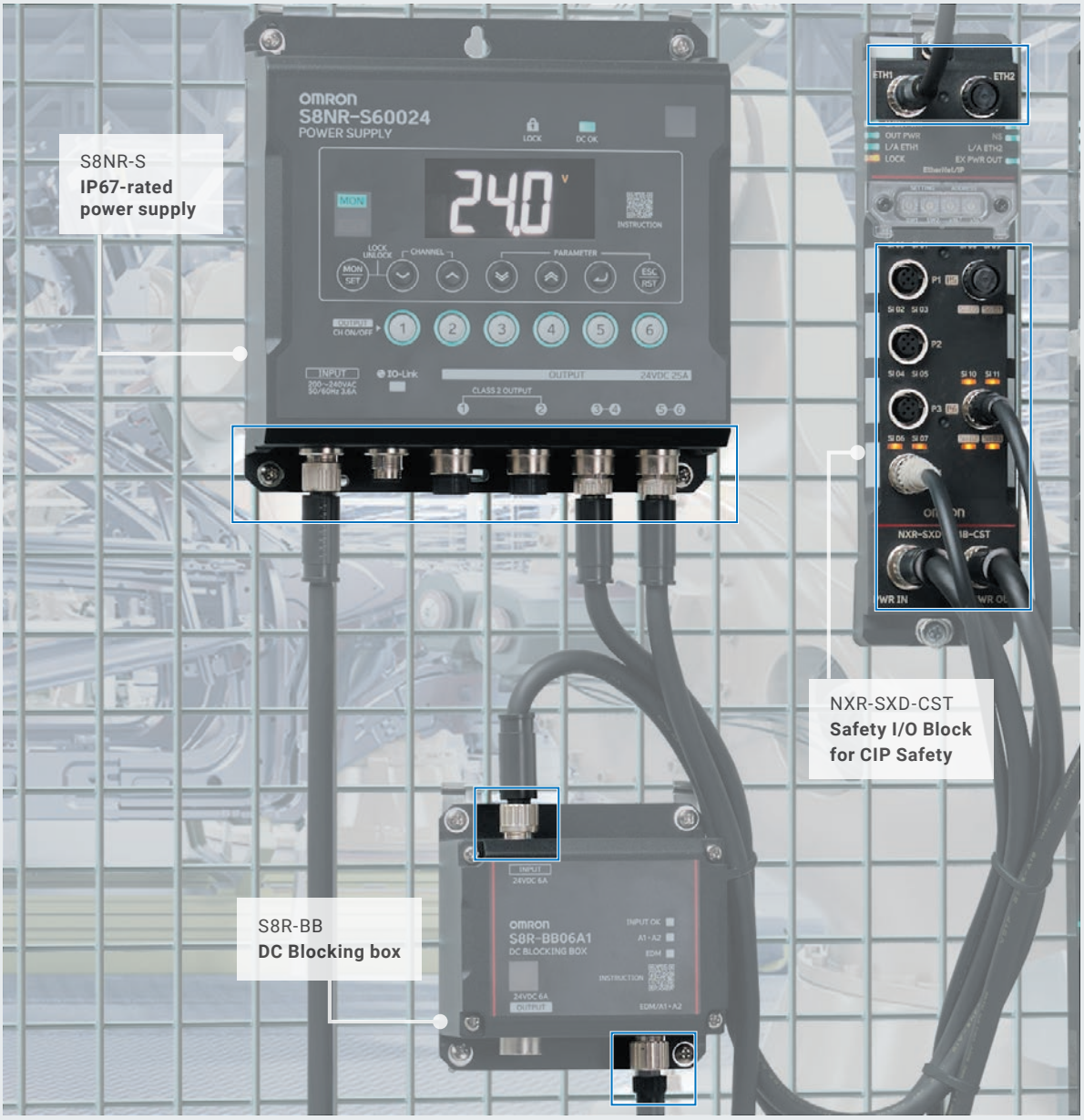




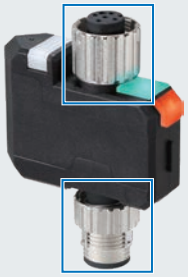
OMRON has incorporated its proprietary SmartClick mechanism into the M12 connectors required for connecting out-of-cabinet devices. The connectors can be secured without tools, helping reduce on-site wiring work, standardize connection quality, and accelerate equipment commissioning.

M12
SmartClick
connector

SmartClick Connectors across the entire new product line



S8NR-S
90W
IP67-rated power supply



K3CV
IO-Link AD converter

XS5□
Branch, cables, accessories

Maintenance

Reduced downtime through easy fault location identification enabled by device and wiring status visibility

Minimizing downtime through predictive maintenance and fault location identification

Visualizing power supply status makes predictive maintenance and fault identification easier, enabling fast maintenance and troubleshooting, whether on-site or remotely.

Multiple types of information displayed through the channel indicator and the central segment display

Replacement timing notification

Alerts users before the end of service life, helping prevent unexpected line stoppages.

Predictive maintenance enabled

5.0Yrs: 5.0 years until recommended replacement

Residual current display

Enables users to quickly determine whether additional devices can be connected to the power supply.

CH1 2.0A: Remaining Current

On-site or remote

PLC

IO-Link

IO-Link Master Unit

S8NR-S
IP67 Power Supply

LEDs for checking output shutdown and alarms for each channel (up to 6 channels)

Fault identification

Faults indicated in red

Lit green

Within rated output current

Lit red

Output shutdown / Alarm output

Easy identification of fault locations

Device and wiring status is visible across the network, enabling quick identification of fault locations when abnormalities occur. This helps reduce troubleshooting time, eliminate dependence on individual expertise, improve maintenance efficiency, and minimize equipment downtime.

Device and wiring status visibility

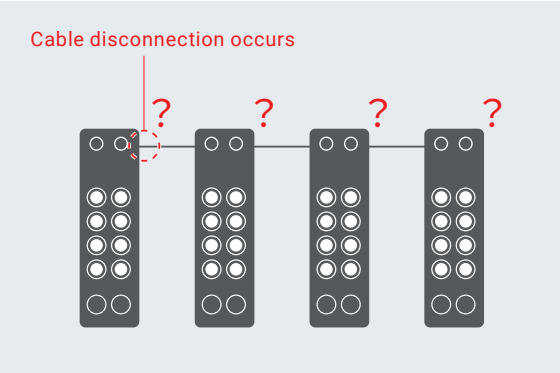
Enhanced usability of devices and configuration tools

Fault identification

Cable faults can be identified, enabling faster recovery and reducing the mean time to repair (MTTR).

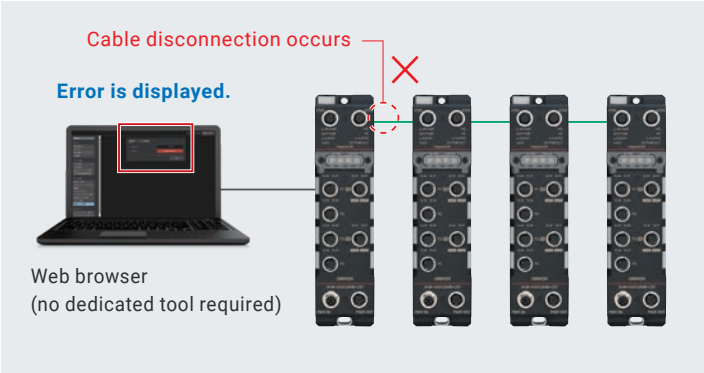
Before **General Safety I/O Block for CIP Safety**

Difficult to identify a faulty cable when multiple devices are connected.



After **NXR-SXD-CST Safety I/O Block for CIP Safety**

Quickly identify the faulty cable.

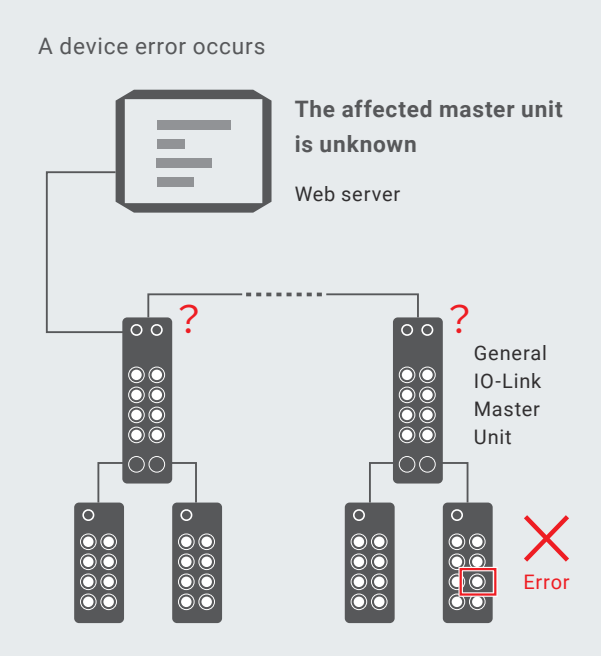


Troubleshooting

PC-based troubleshooting tools can minimize recovery time.

Before **General IO-Link Master Unit**

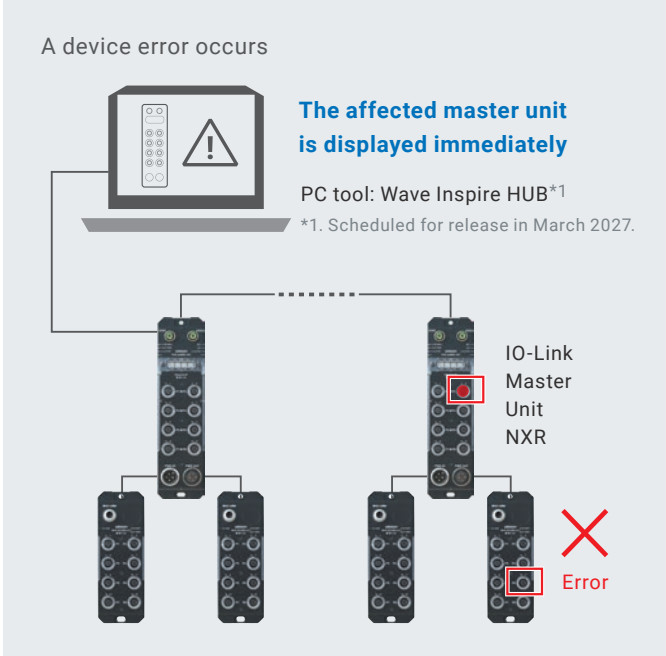
Users must access each master individually and check its status to determine which device has generated an error.



After **NXR-ILM08C-EIT**
IO-Link Master Unit for EtherNet/IP

When an error occurs, users can identify its location on the monitoring screen and take corrective action immediately.

Minimized recovery time



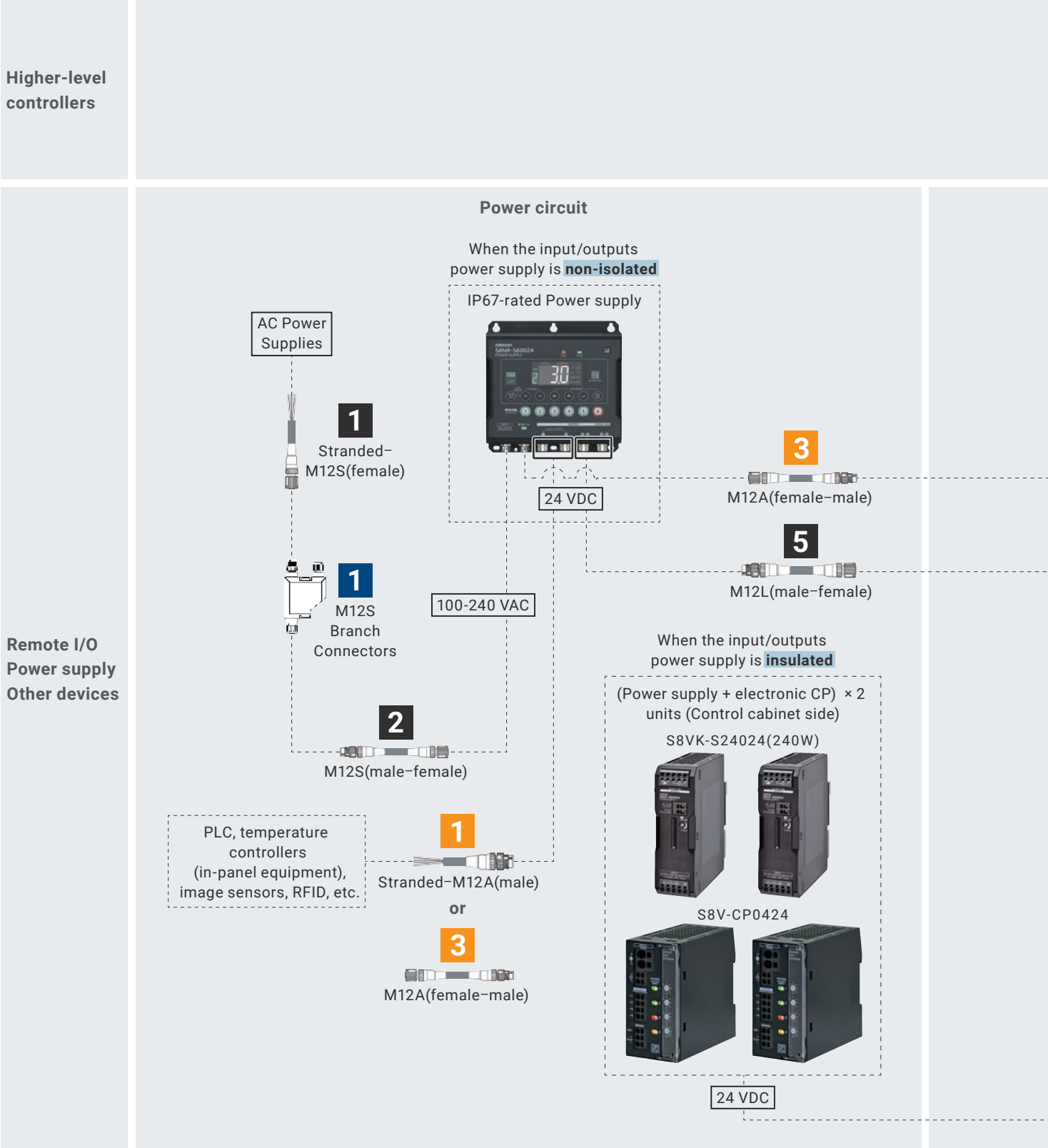
Cabinet-Free Solution Selector

Cable Selection Guide (1)

Easily identify the cable you want to find from the system configurations

- Check the types and numbers of connector cables and branch connectors between the Target products from the system configurations
- Select the Target Model from the cable list table based on its type and number

Example of PLC System configurations

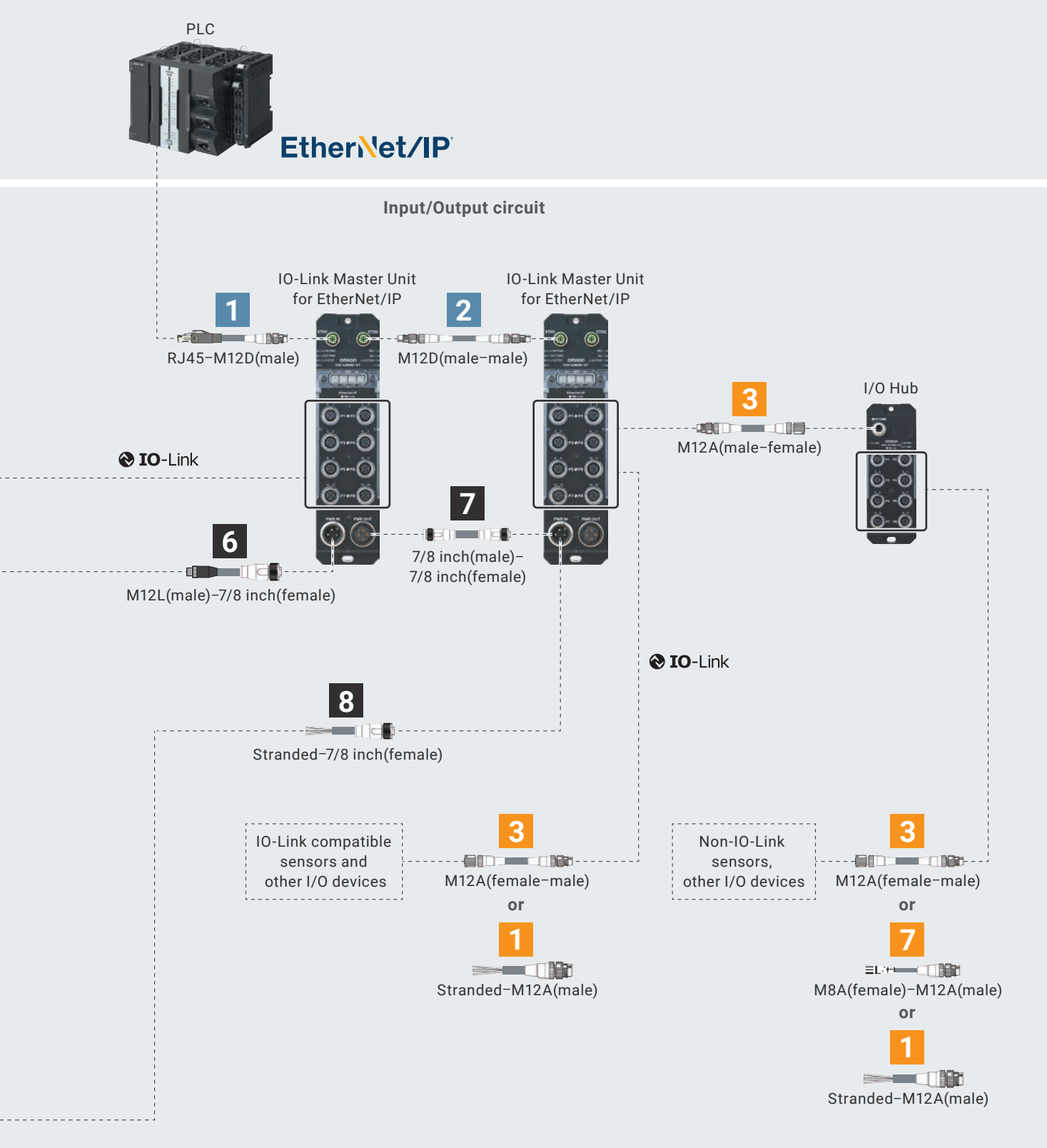


Cable for Power Supplies >P.16

Cable for communications >P.17

Branch Connectors >P.17

Cable for I/O >P.18



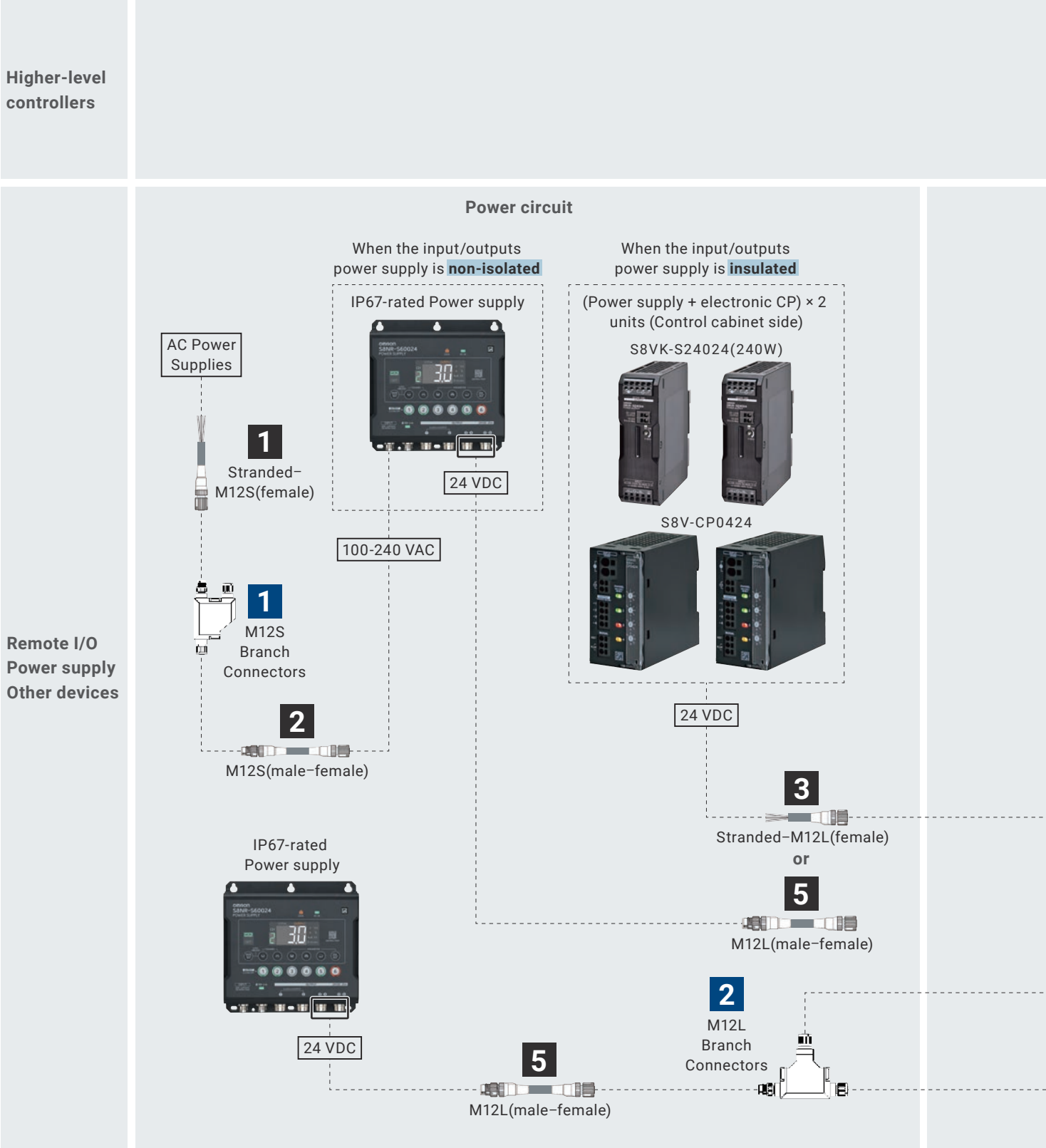
Cabinet-Free Solution Selector

Cable Selection Guide (1)

Easily identify the cable you want to find from the system configurations

- Check the types and numbers of connector cables and branch connectors between the Target products from the system configurations
- Select the Target Model from the cable list table based on its type and number

Example of Safety PLC System configurations

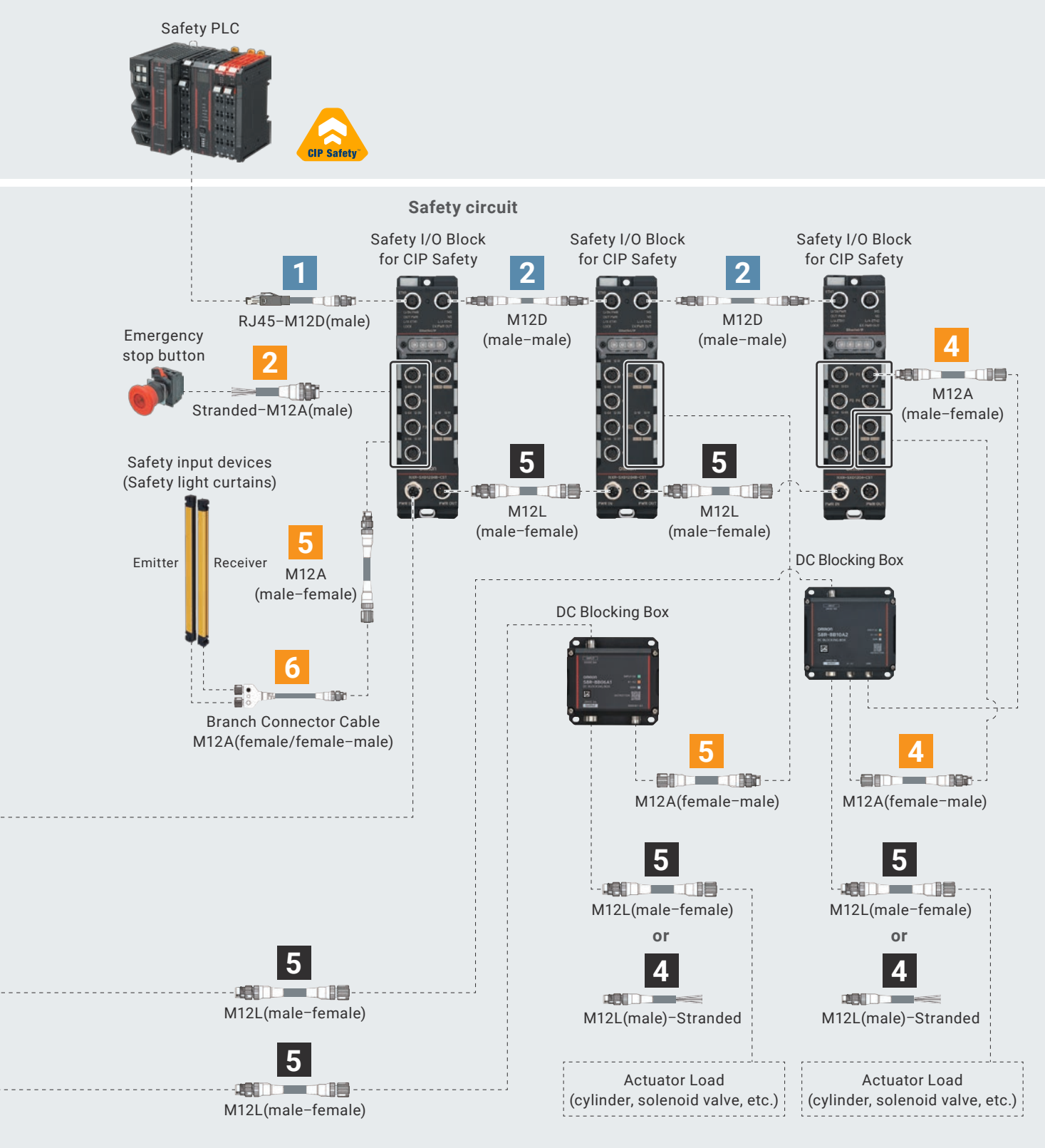


Cable for Power Supplies >P.16

Cable for communications >P.17

Branch Connectors >P.17

Cable for I/O >P.18



Cabinet-Free Solution Selector

List of Connector Cables

Cable for Power Supplies

Appearance	Protective structure	Specifications	Types of connectors	Direction of Lead	Number of Cable Cores	Cable length(m)	Model
1 Note: The photo shows the Smartclick connectors	IP65	M12 (S-coded, female)–Stranded	Smartclick connectors	Straight	3	0.5	XS5F-S321-B22-F *1
						1	XS5F-S321-C22-F *1
						2	XS5F-S321-D22-F *1
						3	XS5F-S321-E22-F *1
						5	XS5F-S321-G22-F *1
						10	XS5F-S321-J22-F *1
						15	XS5F-S321-K22-F *1
						20	XS5F-S321-L22-F *1
	IP67	M12 (S-coded, female)–Stranded	Screw type	Straight	3	2	XS2FP-S321-0200
						5	XS2FP-S321-0500
						10	XS2FP-S321-1000
						20	XS2FP-S321-2000
2 Note: The photo shows the Smartclick connectors	IP65	M12 (S-coded, female)–M12 (S-coded, male)	Smartclick connectors	Straight/ Straight	3	0.5	XS5W-S321-B22-F *1
						1	XS5W-S321-C22-F *1
						2	XS5W-S321-D22-F *1
						3	XS5W-S321-E22-F *1
						5	XS5W-S321-G22-F *1
						10	XS5W-S321-J22-F *1
						15	XS5W-S321-K22-F *1
						20	XS5W-S321-L22-F *1
	IP67	M12 (S-coded, female)–M12 (S-coded, male)	Screw type	Straight/ Straight	3	2	XS2WP-S321-0200
						5	XS2WP-S321-0500
						10	XS2WP-S321-1000
						20	XS2WP-S321-2000
3 Note: The photo shows the Smartclick connectors	IP65	M12 (L-coded, female)–Stranded	Smartclick connectors	Straight	5	0.5	XS5F-L521-B12-F
						1	XS5F-L521-C12-F
						2	XS5F-L521-D12-F
						3	XS5F-L521-E12-F
						5	XS5F-L521-G12-F
						10	XS5F-L521-J12-F
						15	XS5F-L521-K12-F
						20	XS5F-L521-L12-F
	IP67	M12 (L-coded, female)–Stranded	Screw type	Straight	5	1	XS2FP-L521-0100
						2	XS2FP-L521-0200
						5	XS2FP-L521-0500
						10	XS2FP-L521-1000
4 Note: The photo shows the Smartclick connectors	IP65	M12 (L-coded, male)–Stranded	Smartclick connectors	Straight	5	0.5	XS5H-L521-B12-F
						1	XS5H-L521-C12-F
						2	XS5H-L521-D12-F
						3	XS5H-L521-E12-F
						5	XS5H-L521-G12-F
						10	XS5H-L521-J12-F
						15	XS5H-L521-K12-F
						20	XS5H-L521-L12-F
	IP67	M12 (L-coded, male)–Stranded	Screw type	Straight	5	1	XS2HP-L521-0100
						2	XS2HP-L521-0200
						5	XS2HP-L521-0500
						10	XS2HP-L521-1000
5 Note: The photo shows the Smartclick connectors	IP65	M12 (L-coded, female)–M12 (L-coded, male)	Smartclick connectors	Straight/ Straight	5	0.5	XS5W-L521-B12-F
						1	XS5W-L521-C12-F
						2	XS5W-L521-D12-F
						3	XS5W-L521-E12-F
						5	XS5W-L521-G12-F
						10	XS5W-L521-J12-F
						15	XS5W-L521-K12-F
						20	XS5W-L521-L12-F
	IP67	M12 (L-coded, female)–M12 (L-coded, male)	Screw type	Straight/ Straight	5	1	XS2WP-L521-0100
						2	XS2WP-L521-0200
						5	XS2WP-L521-0500
						10	XS2WP-L521-1000

*1. UL Certification expected in December 2026. The certification schedule is subject to change based on the review process.

Cable for Power Supplies

Appearance	Protective structure	Specifications	Types of connectors	Direction of Lead	Number of Cable Cores	Cable length(m)	Model
6	IP65	M12 (L-coded, male)–7/8 inch (female)	Smartclick connectors –Screw type	Straight/ Straight	4	0.3	XS5W-L52B-A10-F
7	IP65/IP67	7/8 inch (male)– 7/8 inch (female)	Screw type	Straight/ Straight	4	1	XS4W-D421-101-A
						2	XS4W-D421-102-A
						5	XS4W-D421-105-A
						10	XS4W-D421-110-A
8	IP65/IP67	7/8 inch(female) –Stranded	Screw type	Straight	4	1	XS4F-D421-101-A
						2	XS4F-D421-102-A
						5	XS4F-D421-105-A
						10	XS4F-D421-110-A

Cable for communications

Appearance	Protective structure	Specifications	Types of connectors	Direction of Lead	Number of Cable Cores	Cable length(m)	Model
1	M12:IP67 RJ45:IP20 (IEC 60529)	M12 (D-coded, male)–RJ45 (for Ethernet) Conversion cable	Smartclick connectors	Straight/ Straight	4	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
2	IP67	M12 (D-coded, male)–M12 (D-coded, male)	Smartclick connectors	Straight/ Straight	4	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
						10	XS5W-T421-JM2-SS

Branch Connectors

Available in October 2026. **UL Certification Expected in December 2026** *2

Appearance	Protective structure	Types	Specifications	Number of poles	Model
1	IP65	T-shaped Joint Plug/ Socket	M12 (S-coded,female, male)–M12 (S-coded,female)	3	XS5R-S32T-1
	IP65	Y-shaped Joint Plug/ Socket			XS5R-S32Y-1
2	IP65	T-shaped Joint Plug/ Socket	M12 (L-coded,female, male)–M12 (L-coded,female)	5	XS5R-L52T-1
	IP65	Y-shaped Joint Plug/ Socket			XS5R-L52Y-1

*2. The certification schedule is subject to change based on the review process.

Cabinet-Free Solution Selector

List of Connector Cables

Cable for I/O

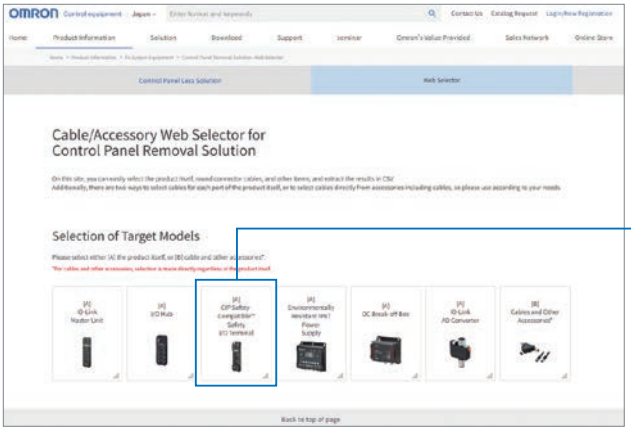
Appearance	Protective structure	Specifications	Types of connectors	Direction of Lead	Number of Cable Cores	Cable length(m)	Model
1	IP65/IP67	M12 (A-coded, male)–Stranded	Smartclick connectors	Straight	4	0.3	XS5H-D421-A80-F
						0.5	XS5H-D421-B80-F
						1	XS5H-D421-C80-F
						2	XS5H-D421-D80-F
						3	XS5H-D421-E80-F
						5	XS5H-D421-G80-F
2	IP65/IP67	M12 (A-coded, male)–Stranded	Smartclick connectors	Straight	5	0.5	XS5H-D521-BG0-F
						1	XS5H-D521-CG0-F
						2	XS5H-D521-DG0-F
						3	XS5H-D521-EG0-F
						5	XS5H-D521-GG0-F
3	IP65/IP67	M12 (A-coded, female)–M12 (A-coded, male)	Smartclick connectors	Straight/ Straight	4	0.5	XS5W-D421-B81-F
						1	XS5W-D421-C81-F
						2	XS5W-D421-D81-F
						3	XS5W-D421-E81-F
						4	XS5W-D421-F81-F
						5	XS5W-D421-G81-F
						10	XS5W-D421-J81-F
						15	XS5W-D421-K81-F
						20	XS5W-D421-L81-F
4	IP65/IP67	M12 (A-coded, female)–M12 (A-coded, male)	Smartclick connectors	Straight/ Straight	5	0.5	XS5W-D521-BG1-F
						1	XS5W-D521-CG1-F
						2	XS5W-D521-DG1-F
						3	XS5W-D521-EG1-F
						5	XS5W-D521-GG1-F
						10	XS5W-D521-JG1-F
						15	XS5W-D521-KG1-F
						20	XS5W-D521-LG1-F
5	IP65/IP67	M12 (A-coded, female)–M12 (A-coded, male)	Smartclick connectors	Straight/ Straight	8	0.5	XS5W-D821-BK1-F
						1	XS5W-D821-CK1-F
						2	XS5W-D821-DK1-F
						3	XS5W-D821-EK1-F
						5	XS5W-D821-GK1-F
						10	XS5W-D821-JK1-F
						15	XS5W-D821-KK1-F
						20	XS5W-D821-LK1-F
6	IP65/IP67	M12 (A-coded, male)–M12 (A-coded, female) /M12 (A-coded, female)	Smartclick connectors	Straight/ Straight/ Straight	5-5/8	0.5	F39-GCNY4
7	IP65/IP67	M8 (A-coded, female)–M12 (A-coded, male)	Screw type–Smartclick	Straight	4	0.3	XS3W-M42C-4C2-A

Cable Selection Guide (2) New Available in October 2026.

Select cables easily and accurately on the web, and export the selection results in CSV format.

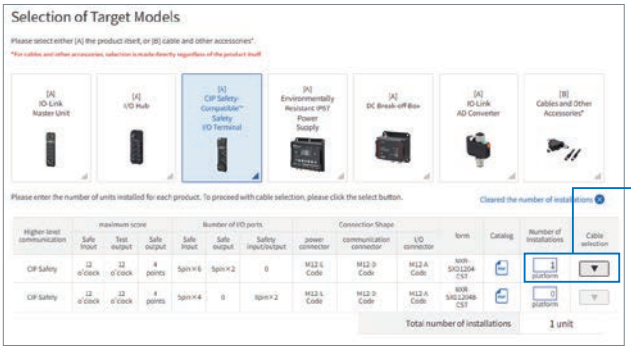
Try our Cabinet-Free Solution Web Selector. Scan the QR code or visit the web address on the right to get started.

https://www.fa.omron.co.jp/product/special/ban_less/selection/index.html



Web selector TOP page

Click the product you are interested in.



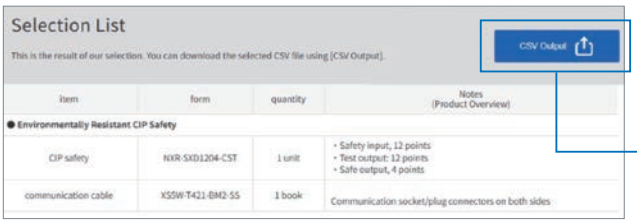
Product selection screen

Enter the number of units to be installed and click ▼.

Cable selection screen

Enter the required number of cables for each port on the product.

Click the list of Selected items.



Selection list screen

Selection results can be exported as a CSV file.

Related Catalogs

Environment-resistive Remote Terminal NXR Series IO-Link Master Unit for EtherNet/IP™or EtherCAT

Catalog No.R202-E1

NXR-S Series SIMPLE LOGIC SAFETY I/O Block for CIP Safety NXR-SXD1204□-CST

Catalog No.F141-E1

Environment-resistant IP67 Power Supply / DC Blocking Box S8NR-S/S8R-BB

Catalog No.T246-E1

K3CV series IO-Link AD Converter

Catalog No. H242-E1

Round Water-resistant Connectors (M12 Smartclick)

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

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