Open Network

DigitalLinkSensor

AnyWireASLINK

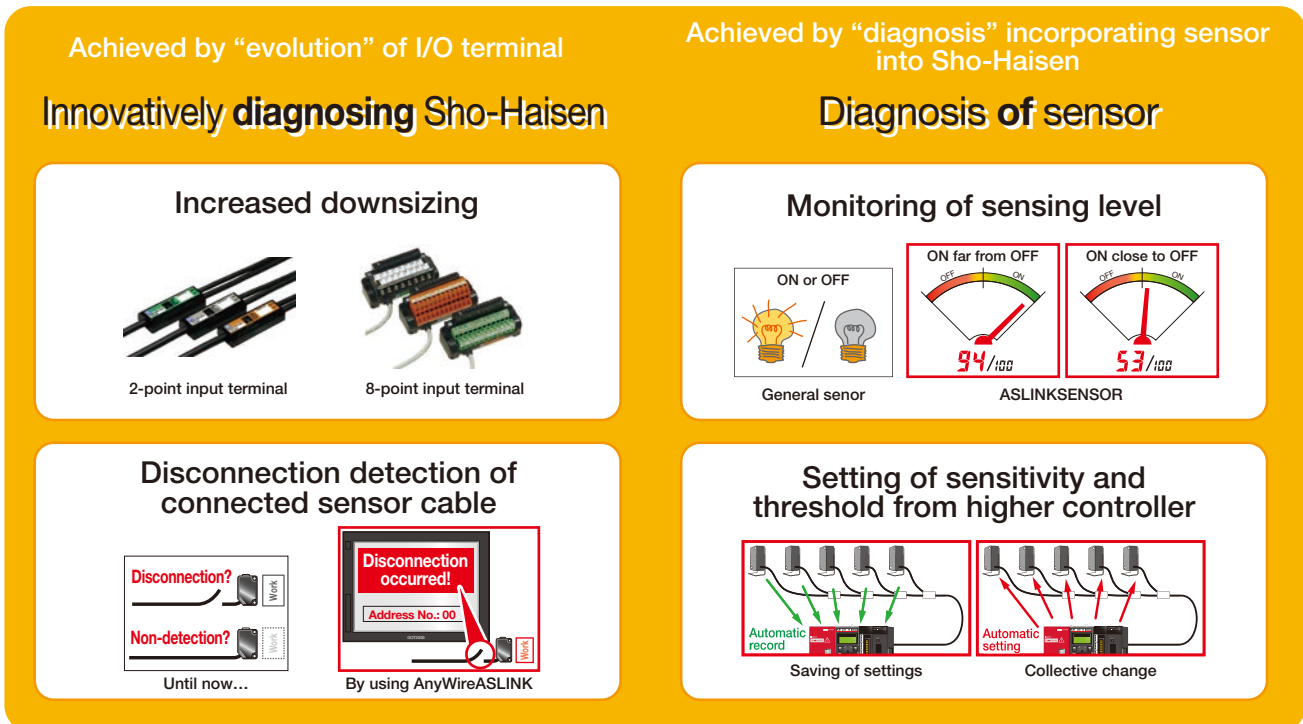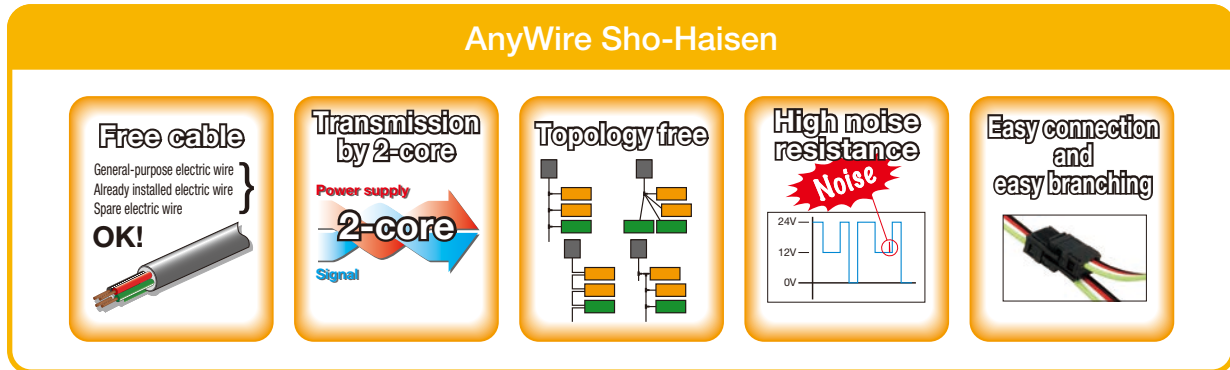**Robot Sho-Haisen**

PC Interface
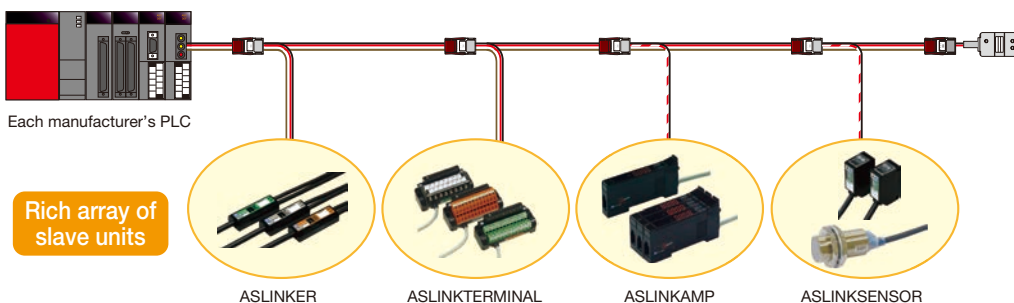
I/O Interface

Ethernet

RS-232C

PLC

What is AnyWireASLINK?

AnyWireASLINK is a breakthrough Sho-Haisen system that offers additional value on top of all of the advantages and features inherited from the conventional AnyWire Sho-Haisen system.
∗ "Sho-Haisen" means wire saving in Japanese.

AnyWire Sho-Haisen

Free cable
General-purpose electric wire
Already installed electric wire
Spare electric wire
OK!

Transmission by 2-core
Power supply
2-core
Signal

Topology free

High noise resistance
Noise
24V
12V
0V

Easy connection and easy branching

Achieved by "evolution" of I/O terminal

Innovatively **diagnosing** Sho-Haisen

Increased downsizing

2-point input terminal   8-point input terminal

Disconnection detection of connected sensor cable

Disconnection?
Non-detection?
Work

Disconnection occurred!
Address No.: 00
Work

Until now…   By using AnyWireASLINK

Achieved by "diagnosis" incorporating sensor into Sho-Haisen

Diagnosis **of** sensor

Monitoring of sensing level

ON or OFF

ON far from OFF
OFF   ON
94/100

ON close to OFF
OFF   ON
53/100

General senor   ASLINKSENSOR

Setting of sensitivity and threshold from higher controller

Automatic record   Automatic setting

Saving of settings   Collective change

◆ **System configuration overview**

Each manufacturer's PLC

Rich array of slave units

ASLINKER   ASLINKTERMINAL   ASLINKAMP   ASLINKSENSOR

For details on masters, slaves, and other information, refer to the AnyWireASLINK Product Catalog.   →

DigitalLinkSensor
AnyWireASLINK
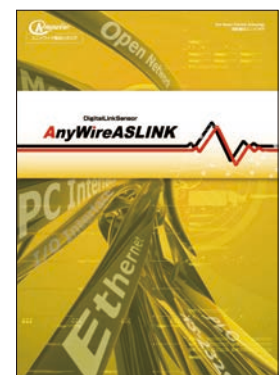
Various needs for robots

In the present robot control, various challenges have surfaced along with increasingly more intelligent and complex robot hands. AnyWireASLINK is the most advanced sensor Sho-Haisen system, as well as the most suitable robot Sho-Haisen system for resolving various challenges with more intelligent and complex robot hands.

Multipoint operation based on intelligent hand functionality

◇ Increasing risk of wiring breakage
◇ Turning range restricted by multi-core cables
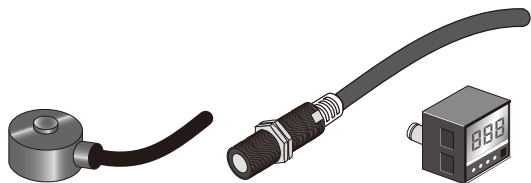◇ Occurrence of impurities resulting from wires rubbed against each other
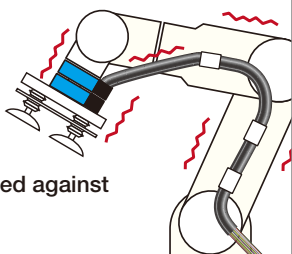
AnyWireASLINK

◇ Wire saving
→ Only four wires can provide 256 input points and 256 output points
◇ Strong noise resistance

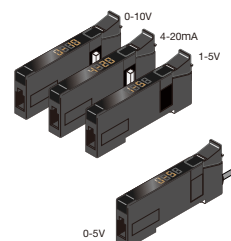ASLINKAMP
ASLINKTERMINAL
ASLINKSENSOR
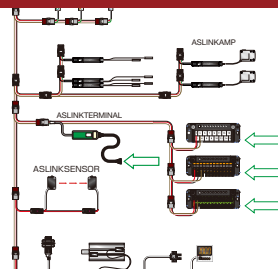
Increasing variations of sensors mounted

◇ Installation of analog devices such as intelligent sensors

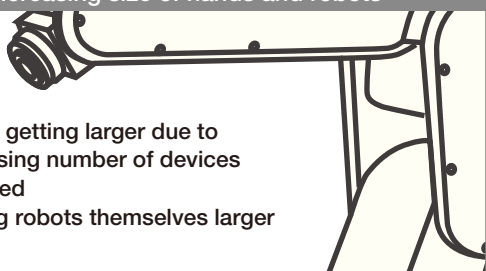### AnyWireASLINK

◇ Import of analog values by compact analog units
◇ Safe and reliable transmission of analog data via transmission system with strong noise resistance

0-10V
4-20mA
1-5V
0-5V

Increasing size of hands and robots

◇ Hands getting larger due to increasing number of devices mounted
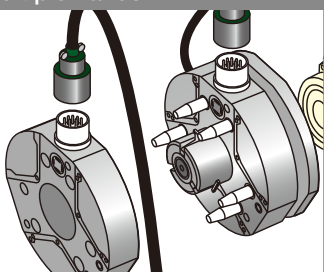→ Making robots themselves larger

AnyWireASLINK

◇ Making hands compact and lightweight through the use of wire saving and ultra-compact I/O modules
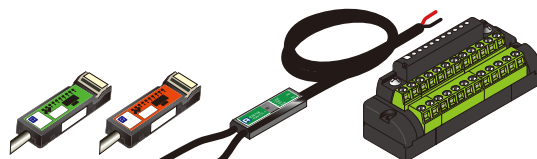
Use of multiple hands

◇ Accommodating tool changers

AnyWireASLINK

◇ Automatic recovery of transmission after tool change
◇ Use of tool answer unit can:
→ Suppress communication errors during tool change
→ Automatically identify the mounted tool

Tool answer unit
B281SB-ID08-C20

Diversified range of robot control

◇ Mixture of robots from multiple manufacturers
◇ Accommodating various types of controllers

AnyWireASLINK

◇ Master units for various types of PLCs
◇ Open field network
◇ PC control (PCI Express)

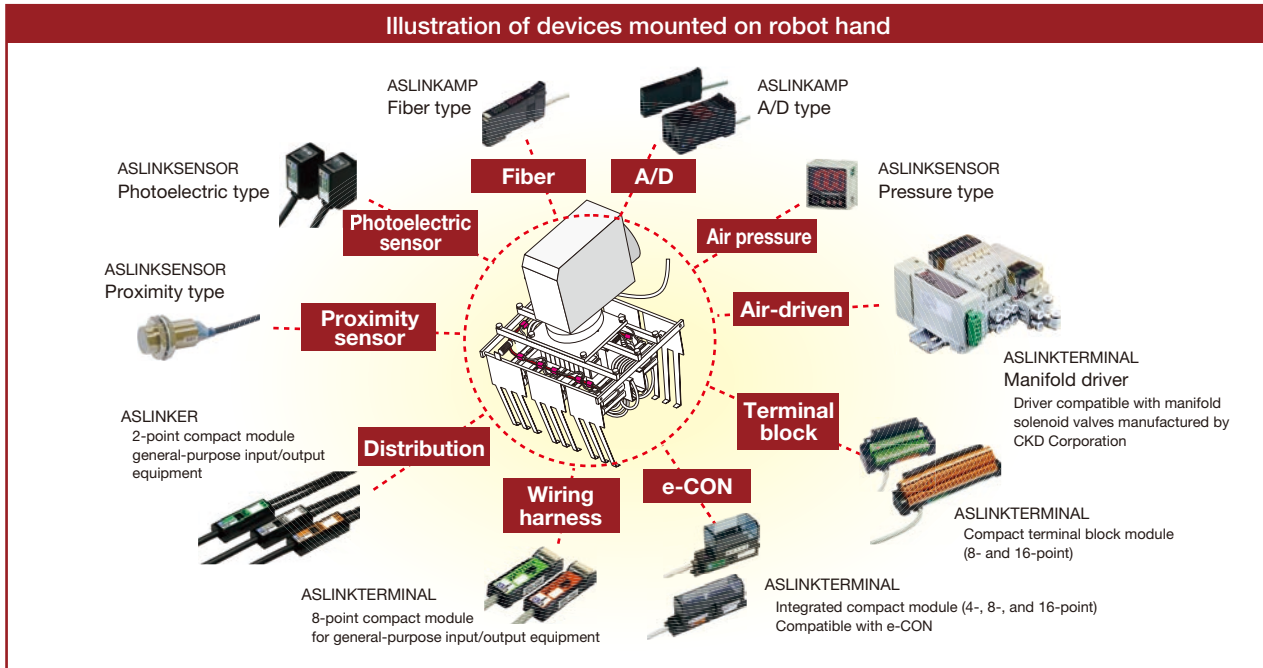◇ I/O parallel connection to each manufacturer's robot controllers

Resend unit

System configuration diagram

I/O terminals on robot hands can be connected with 4-core cables to control them.
For connection with controllers, any of the following four methods can be selected:
1. PLCs (MELSEC iQ-R, iQ-F, Q, L, or F Series)
2. Open field network (CC-Link, CC-Link IE Field, DeviceNet, PROFIBUS, or Ethernet)
3. PCI Express
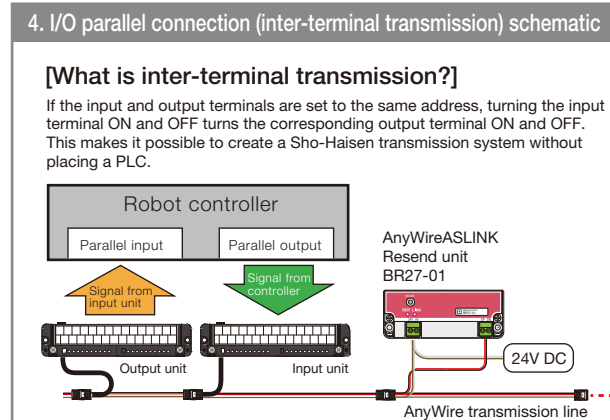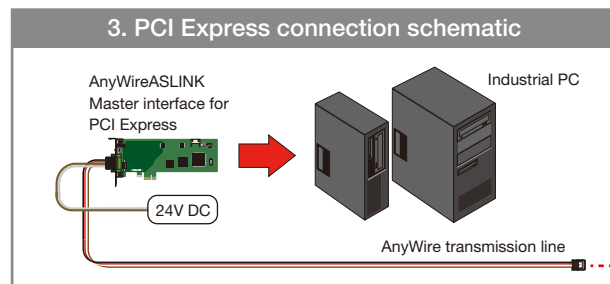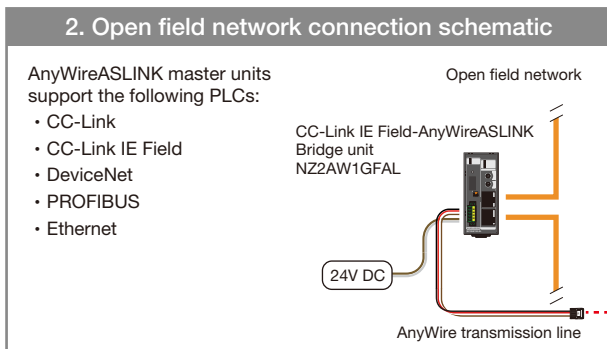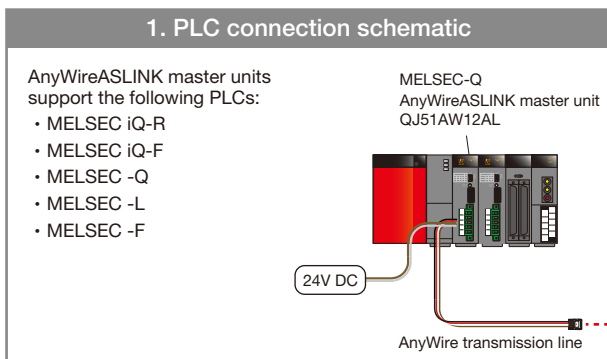4. Parallel I/O connection (robot controller D type)

Illustration of devices mounted on robot hand

ASLINKAMP
Fiber type

ASLINKAMP
A/D type

ASLINKSENSOR
Photoelectric type

Fiber

A/D

ASLINKSENSOR
Pressure type

Photoelectric sensor

Air pressure

ASLINKSENSOR
Proximity type

Proximity sensor

Air-driven

ASLINKTERMINAL
Manifold driver
Driver compatible with manifold solenoid valves manufactured by CKD Corporation

ASLINKER
2-point compact module general-purpose input/output equipment

Distribution

Terminal block

Wiring harness

e-CON

ASLINKTERMINAL
Compact terminal block module (8- and 16-point)

ASLINKTERMINAL
8-point compact module for general-purpose input/output equipment

ASLINKTERMINAL
Integrated compact module (4-, 8-, and 16-point)
Compatible with e-CON

To robot wiring

Each manufacturer's robot

To robot wiring

AnyWire transmission line

1. PLC connection schematic

AnyWireASLINK master units support the following PLCs:
- MELSEC iQ-R
- MELSEC iQ-F
- MELSEC -Q
- MELSEC -L
- MELSEC -F

MELSEC-Q
AnyWireASLINK master unit
QJ51AW12AL

24V DC

AnyWire transmission line

2. Open field network connection schematic

AnyWireASLINK master units support the following PLCs:
- CC-Link
- CC-Link IE Field
- DeviceNet
- PROFIBUS
- Ethernet

Open field network

CC-Link IE Field-AnyWireASLINK
Bridge unit
NZ2AW1GFAL

24V DC

AnyWire transmission line

3. PCI Express connection schematic

AnyWireASLINK
Master interface for
PCI Express

Industrial PC

24V DC

AnyWire transmission line

4. I/O parallel connection (inter-terminal transmission) schematic

[What is inter-terminal transmission?]
If the input and output terminals are set to the same address, turning the input terminal ON and OFF turns the corresponding output terminal ON and OFF. This makes it possible to create a Sho-Haisen transmission system without placing a PLC.

Robot controller

Parallel input

Parallel output

Signal from input unit

Signal from controller

AnyWireASLINK
Resend unit
BR27-01

Output unit

Input unit

24V DC

AnyWire transmission line

Making tool change simpler (Tool answer unit)

This is a unique unit that makes it simpler to perform tool change for multiple hands (tools)!

In recent years attention has been paid to a method that improves production efficiency by enabling a single robot to replace multiple hands (tools) to handle multiple types of workpieces. However, such hands (tools) have a structure that accommodates the handling of each workpiece, so the number of I/O points and device configurations differ depending on hands (tools).
In the current situation, therefore, it is difficult to recognize mounted hands (tools) and perform control switching and other operations.
This unit can resolve such "difficulties in usage".
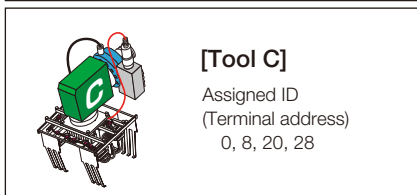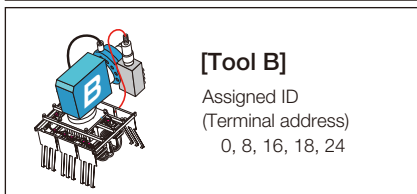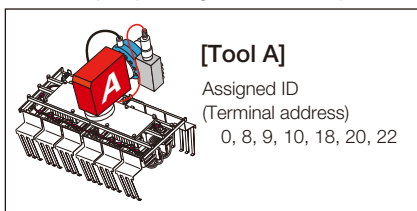
Tool answer unit
B281SB-ID08-C20

Use of tool answer unit

The tool answer unit is used for multiple hands (tools) with different I/O configurations.
This unit can have hand identification information and so perform selective control for each hand.
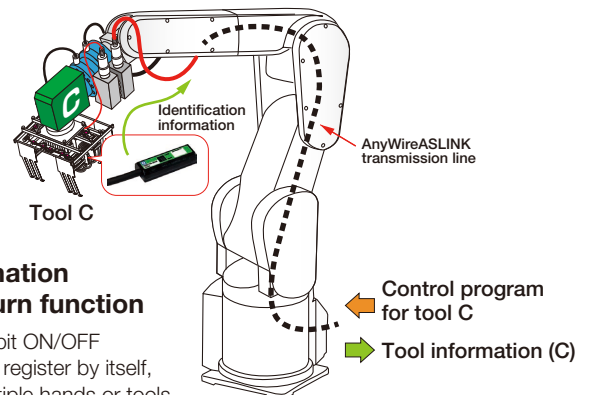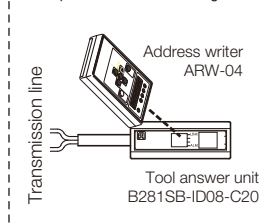Moreover, there is no need to repeat automatic address recognition each time the hand is changed, and normal transmission can be restored just by resetting disconnection errors.

■ Hand (tool) configuration example

[Tool A]
Assigned ID
(Terminal address)
0, 8, 9, 10, 18, 20, 22

[Tool B]
Assigned ID
(Terminal address)
0, 8, 16, 18, 24

[Tool C]
Assigned ID
(Terminal address)
0, 8, 20, 28

■ Tool answer unit setup

• Identification information registration
• Response ID information registration

Transmission line

Address writer
ARW-04

Tool answer unit
B281SB-ID08-C20

Identification information

Tool C

AnyWireASLINK transmission line

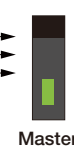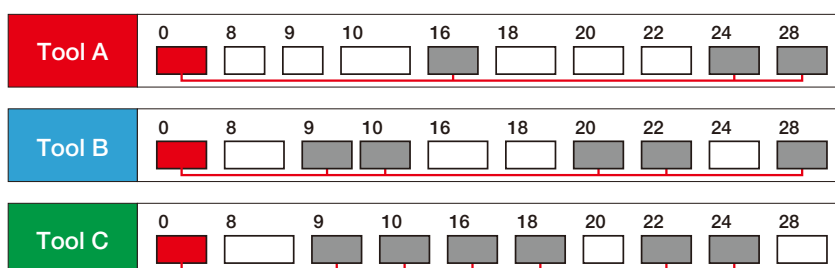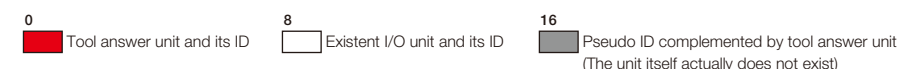Control program for tool C

Tool information (C)

◇ **Identification information registration and return function**

The tool answer unit has 8-bit ON/OFF information that it can freely register by itself, so installing this unit on multiple hands or tools enables the unit to return their respective identification information.

◇ **Nonexistent ID registration and response complement functions**

Changing multiple hands or tools having different I/O configurations causes various problems due to ID inconsistency.
(Disconnection error continued even after resetting, failure to detect I/O disconnection, failure to perform appropriate control, etc.)
This response complement function spuriously returns IDs on behalf of nonexistent I/Os to avoid problems due to ID inconsistency.

■ All IDs, existent IDs, and pseudo IDs stored and monitored by AnyWireASLINK master that controls hands (tools)

0 — Tool answer unit and its ID
8 — Existent I/O unit and its ID
16 — Pseudo ID complemented by tool answer unit (The unit itself actually does not exist)

Tool A	0	8	9	10	16	18	20	22	24	28

Tool B	0	8	9	10	16	18	20	22	24	28

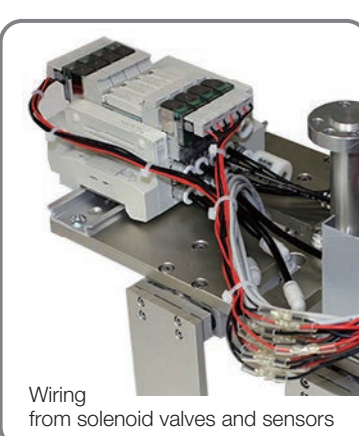| Tool C	0	8	9	10	16	18	20	22	24	28

Master

All IDs are stored in the master unit. Although ID configurations differ from one hand (or tool) to another, the functions of the tool answer unit enable any tools to send all IDs. Therefore, when a tool is changed, normal transmission can be instantly restored just by resetting the disconnection flag.
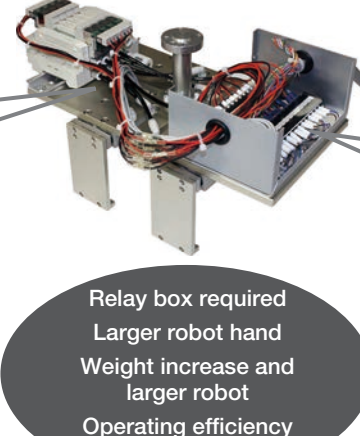
Robot hand implementation examples

◆ **Many constraints on high functionality of robot hands**

Unimplemented | **Improving functionality** (increasing the number of I/O points) ➡ **Increasing the number of wires**

Multi-core cable
For tool changers, the number of poles will increase, resulting in higher cost.
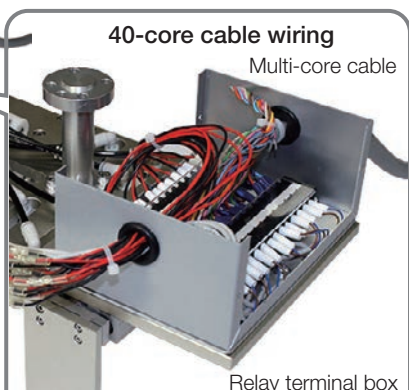
40-core cable wiring
Multi-core cable

Wiring
from solenoid valves and sensors

Relay box required
Larger robot hand
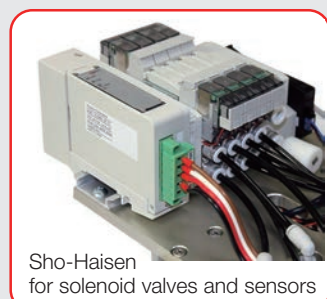Weight increase and larger robot
Operating efficiency declined
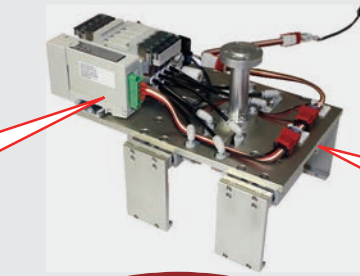
Relay terminal box
Input: 8 points; Output: 8 points

Implemented | **Improving functionality** (increasing the number of I/O points) ➡ **Keeping the number of wires unchanged**

4-core cable
For tool changers, the number of poles will decrease, resulting in lower cost.
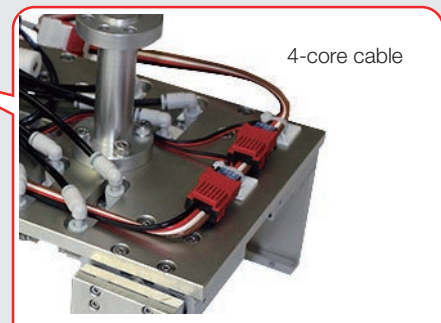
4-core cable

Sho-Haisen
for solenoid valves and sensors

No relay box required
Smaller robot hand
Weight reduction and smaller robot
Operating efficiency improved

No relay terminal box
Input: Up to 256 points; Output: Up to 256 points

For robot hand (tool) management

Tool answer unit
B281SB-ID08-☐☐20

Unique "identification unit" with 8-bit binary information transmission and nonexistent-ID proxy response functions

Even if multiple types of robot hands are controlled on a single robot by using tool changers, any robot hand that is mounted can be recognized, and there is also no need to perform automatic address recognition each time the hand is changed.

Robot collaboration partners

Mitsubishi Electric Corporation

Anywire Corporation is a MELFA robot partner of Mitsubishi Electric Corporation.

Vertical articulated robot MELFA FR series
(RV-13FR SH01, 02, 04, 05) (RV-FR series)
Payload: 4 to 20kg (RV-4FR to RV-20F)

Horizontal articulated robot MELFA FR series
(RH-FR series)
Payload: 3kg, 6kg (RH-3FRH, RH-6FRH)

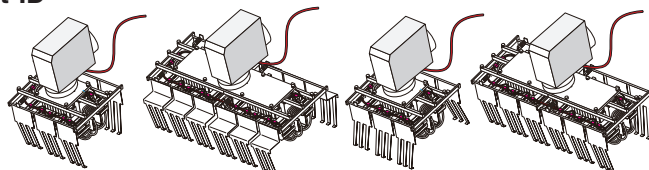**!** It is difficult to use any robots other than these series, depending on the presence or absence of wires inside arms or variations of wire diameters.

Also conforming to internal cable specifications!

Transmission line components (to be purchased separately) enable transmission lines to be created with internal cables.

① External wiring set (forearm part or base part external wiring set) ・・・ Mitsubishi Electric Corporation
② AnyWireASLINK conversion adapter cable (for forearm part or base part) ・・・ Anywire Corporation

＊ Select either ① or ② according to the robot model and the internal piping specifications used.

Yaskawa Electric Corporation

＊ Anywire Corporation is a unit manufacturer (SI partner) of Yaskawa Electric Corporation.

Vertical articulated robot MOTOMAN-GP8
Payload: 8kg

Vertical articulated robot MOTOMAN-GP7
Payload: 7kg

Denso Wave Incorporated

Vertical articulated robot VS series VS-060
Payload: 4kg

Nitta Corporation

Automatic tool changer
OMEGA type S-OY
Payload: 24kg

AnyWireASLINK lineup

✎ : Not applicable —: Not determined

◆ASLINKER
Smart LINKER
(disconnection detection linker)

B2N87SB-02D☐-CC20 BL2LN87SB-02D☐-CC20

Dimension A: 17×60×9.2

Number of I/O points		Input/output specifications	Method	Consumption current (mA)		Connection	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output			Transmission side	I/O side					
2	✎	DC input	NPN	3.4		2-wire type (non-insulation)	A	20	B2N87SB-02D-CC20	Open
2	✎	DC input	PNP	3.4					B2N87SB-02DS-CC20	Open
2	✎	DC input	NPN	1.5	10.0	4-wire type (insulation)			BL2LN87SB-02D-CC20	Open
2	✎	DC input	PNP	1.5	9.2				BL2LN87SB-02DS-CC20	Open

◆ASLINKTERMINAL
Integrated compact 8-point module

∗16-point type is also available

Dimension A: 21×100×37.1

Number of I/O points		Input/output specifications	Method	Consumption current (mA)		Connection	I/O side connection connector	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output			Transmission side	I/O side						
8	✎	DC input	NPN	6	40	4-wire type (insulation)	e-CON	A	40	BL296SB-08F-4-20	Open
8	✎	DC input	PNP	6	40					BL296SB-08FS-4-20	Open
4	4	DC input / Tr output	NPN	6	26					BL296XB-08F-4-20	Open
4	4	DC input / Tr output	PNP	6	26					BL296XB-08FS-4-20	Open
✎	8	Tr output	NPN	6	10					BL296PB-08F-4-20	Open
✎	8	Tr output	PNP	6	10					BL296PB-08FS-4-20	Open

◆ASLINKTERMINAL
Compact terminal block module
(3-wire cable type sensor compatible)

∗16-point type is also available

Dimension A: 28.9×81×39.4

Number of I/O points		Input/output specifications	Method	Consumption current (mA)		Connection	Terminal block type	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output			Transmission side	I/O side						
8	✎	DC input	NPN	6	40	4-wire type (insulation)	Standard terminal block	A	90	BL296SB-08F-V50	Open
8	✎	DC input	PNP	6	40					BL296SB-08FS-V50	Open
4	4	DC input / Tr output	NPN	6	26					BL296XB-08F-V50	Open
4	4	DC input / Tr output	PNP	6	26					BL296XB-08FS-V50	Open
✎	8	Tr output	NPN	6	10					BL296PB-08F-V50	Open
✎	8	Tr output	PNP	6	10					BL296PB-08FS-V50	Open

◆ASLINKAMP
Analog input unit
(With 7 segment display, non-insulation/insulation type between channels)

State that extension unit is additionally connected to base unit.

Dimension A: 10×72×36.7

Number of I/O points		Input/output specifications	Method	Type	Consumption current (mA)		Connection	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output				Transmission side	I/O side					
16	✎	Multi input (switched by setting)	0-10V, 0-5V, 1-5V, 0-20mA, 4-20mA	Base	10		2-wire type (non-insulation)	A	22	LA-A12W	Open
16	✎			Extension	10				17	LB-A12W	Open
16	✎	Multi input (switched by setting)	0-10V, 0-5V, 1-5V, 0-20mA, 4-20mA	Base	20		2-wire type (non-insulation)	A	22	LA-A1AW	Open
16	✎			Extension	20				17	LB-A1AW	Open

Analog input of 1 channel for one unit is possible. (16 points are occupied.)

◆ASLINKMASTER
Resend unit

Transmission is performed between input and output terminals that are set to the same address.
Example: If an input is generated from the input terminal with address 50, an output signal is mechanically sent out to the output terminal with address 50.

Dimension A: 40×100×48

Power supply	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Transmission line driver: Voltage: 24V DC +15% to -10% (21.6 to 27.6V DC) (Power supply to Ripple: 0.5Vp-p max. connector terminal) Current: 0.1A (when 128 slave units are connected, not including load current)	A	200	BR27-01	Open

◆ASLINKSENSOR
Proximity type (Shield type) (IP67)

Dimension A: M8×51.8
Dimension B: M12×50.9
Dimension C: M18×50.5
Dimension D: M30×60.6

Number of I/O points		Input/output specifications	Type	Detection distance (mm)	Consumption current (mA)		Connection	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output				Transmission side	I/O side					
1	✎	Electromagnetic induction	M8	0 to 1	13.8		2-wire type (non-insulation)	A	28	BS-K1117-M08-1K	Open
1	✎		M12	0 to 2	8.4			B	41	BS-K1117-M12-1K	Open
1	✎		M18	0 to 5	8			C	54	BS-K1117-M18-1K	Open
1	✎		M30	0 to 10	8.2			D	117	BS-K1117-M30-1K	Open

◆ASLINKSENSOR
Proximity type (Amplifier relay type) (IP67)

Amplifier Dimension A, B, C
Common: 14×38×7.5
Head Dimension A: φ4×16
Dimension B: φ5.4×16
Dimension C: M5×16

Number of I/O points		Input/output specifications	Type	Detection distance (mm)	Consumption current (mA)		Connection	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output				Transmission side	I/O side					
1	✎	Electromagnetic induction	φ4	0 to 0.8	6.3		2-wire type (non-insulation)	A	30	BM-K1117G-S04-1K	Open
1	✎		φ5.4	0 to 1	6.5			B	31	BM-K1117G-S05-1K	Open
1	✎		M5	0 to 1	6.4			C	31	BM-K1117G-M05-1K	Open

◆ASLINKSENSOR
Cylinder type

B285SB-01-1K1 BM-C27-DM9-50-5050

Dimension A: 10.4×22×11.3
Dimension B:
Amplifier: 14×38×7.5
Head: 20×4.5×4

Number of I/O points		Input/output specifications	Type	Consumption current (mA)		Connection	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output			Transmission side	I/O side					
1	✎	Magnetic	Cylinder	13		2-wire type (non-insulation)	A	13	B285SB-01-1K1	Open
2	✎		Cylinder (Amplifier relay type)	8			B	40	BM-C27-DM9-50-5050	Open

Compatible with cylinder round groove manufactured by SMC

◆ASLINKSENSOR
Pressure type

Dimension A: 30×30×26.8

Number of I/O points		Input/output specifications	Type	Gauge pressure (kPa)	Consumption current (mA)		Connection	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output				Transmission side	I/O side					
1	✎	Pressure sensitive	Pressure	Compound pressure -100 to 100	20		2-wire type (non-insulation)	A	25	B284SB-01-1KLP30	Open
2	✎				20					B284SB-02-1KLP30	Open
16	✎				20					B284SB-J1-1KLP30	Open

"B284SB-J1-1K☐☐P30" are types that occupy 16 points of input and output analog values in 10 bit binary.

◆ASLINKTERMINAL
Manifold driver

Dimension A: 72×20×48.8

Number of I/O points		Input/output specifications	Method	Consumption current (mA)		Connection	Dimension (mm)	Mass (g)	Model	Standard price (¥)
Input	Output			Transmission side	I/O side					
✎	16	Tr output	NPN	7	38	4-wire type (insulation)	A	55	BL264PB-16F-T5	Open
✎	16	Tr output	PNP	7	38				BL264PB-16FS-T5	Open

Compatible with the MN4G-T70-FL series manifold manufactured by CKD Corporation

◆Tool answer unit

A unit that adds identification information to robot hands (tools) and complements AnyWireASLINK disconnection detection operation.
This unit can register and return any information based on ON/OFF, making it possible to identify a robot hand (tool) that is mounted. With the ID proxy response function, automatic address recognition is no longer required even when a robot hand (tool) with a different terminal configuration is mounted.

Dimension A: 14×38×7.5

Outline	Dimension (mm)	Model	Standard price (¥)
8-bit registration information transmission, ID complement response, transmission function unit	A	B281SB-ID08-C20	Open
8-bit registration information transmission, ID complement response, transmission function unit (IP67) With M12 Smartclick connector	A	B281SB-ID08-G220	Open

Smartclick is a registered trademark of Omron Corporation.

Anywire

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Comments/suggestions about AnyWire products: