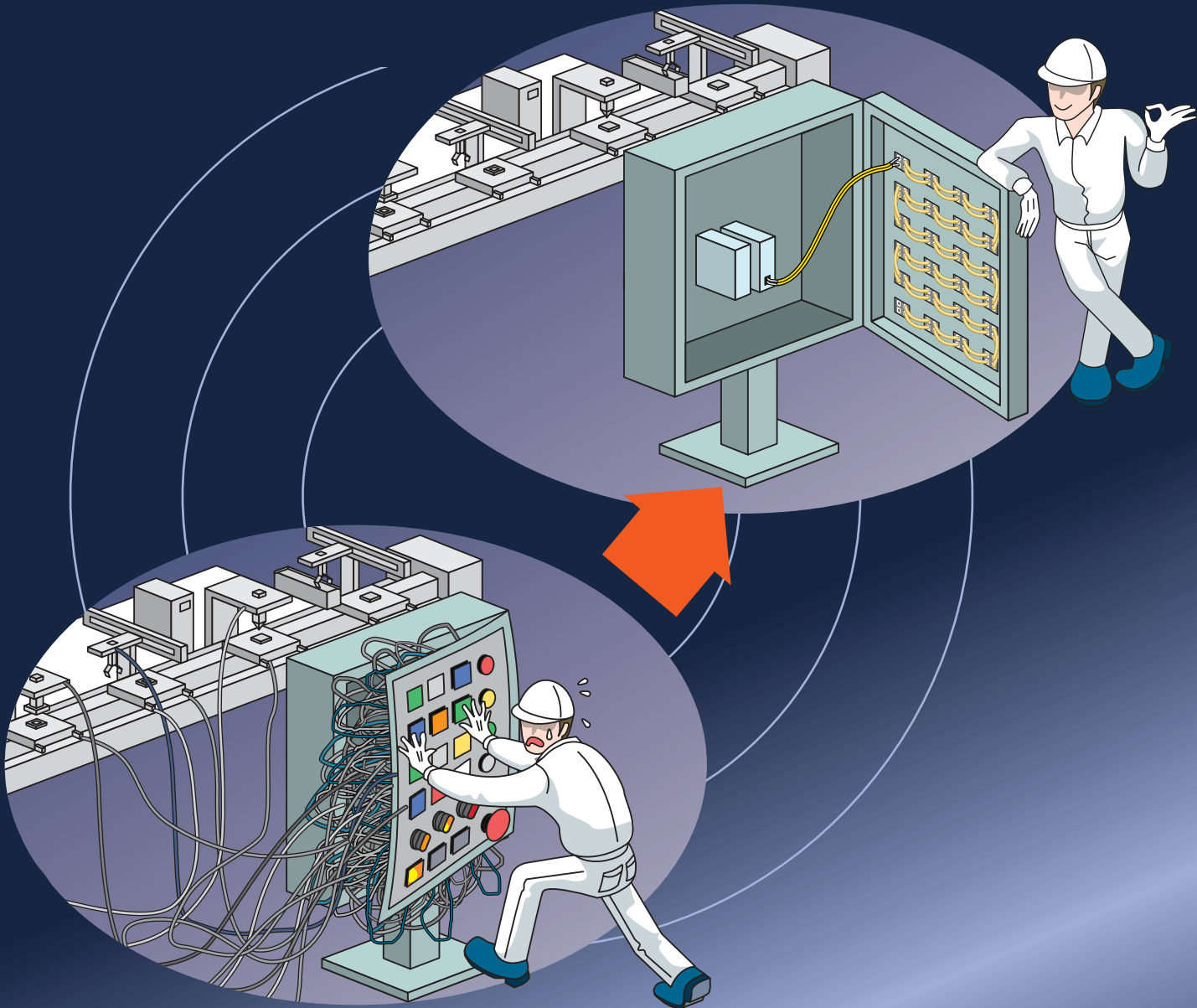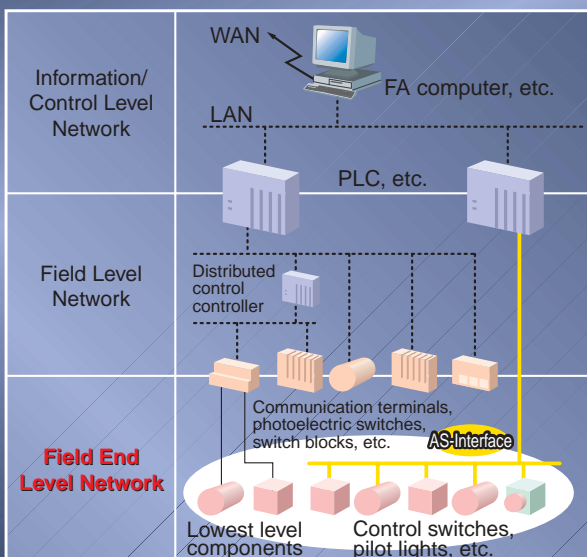# idec

# AS-Interface Devices

**MicroSmart AS-Interface Master Module**
**PS2R AS-Interface Power Supplies**
**SX5A AS-Interface/CC-Link Gateway**
**SX5A AS-Interface/DeviceNet Gateway**
**SX5A AS-Interface Communication Terminals**
**(Slave Modules)**

**SX5A AS-Interface Repeater**
**SwitchNet™ HW/L6 Series Control Units**



IDEC IZUMI CORPORATION

# No more spaghetti wiring!

The built-in communication IC for lowest-level components expands the possibility of next-generation production systems.
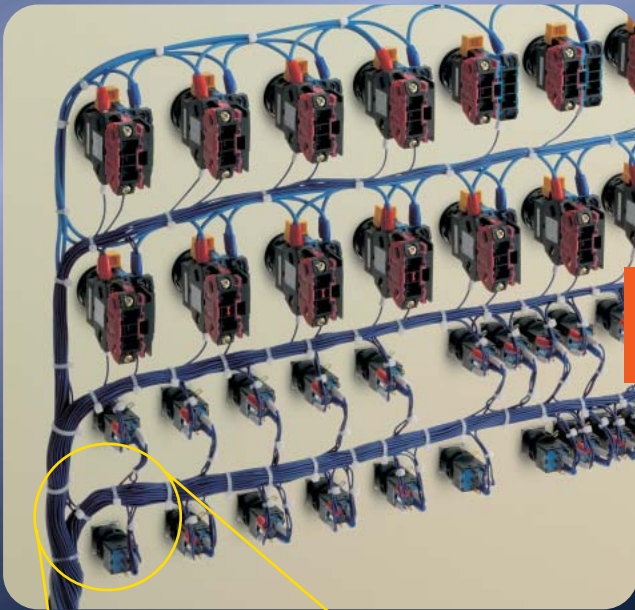
IDEC's dedication to "Saving" realizes simpler and more convenient systems.

Information/Control Level Network

WAN

FA computer, etc.

LAN

PLC, etc.

Field Level Network

Distributed control controller

Communication terminals, photoelectric switches, switch blocks, etc.

AS-Interface

Field End Level Network

Lowest level components

Control switches, pilot lights, etc.

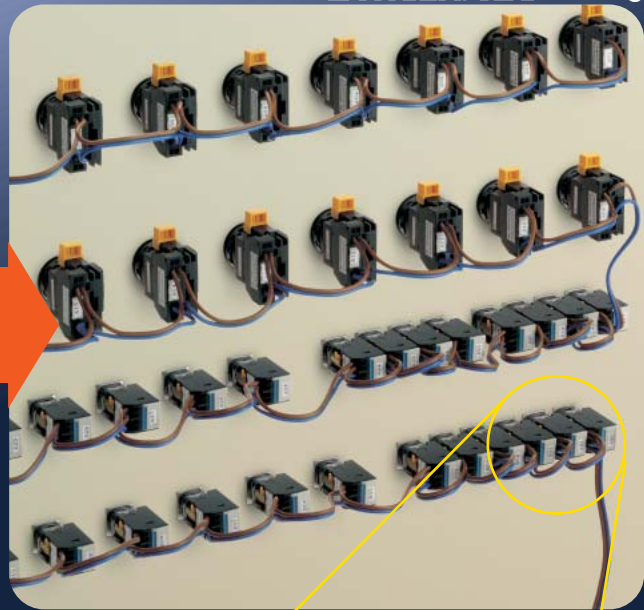# SwitchNet® Control Units directly connect to AS-Interface

What is **SwitchNet** ™:
SwitchNet is an IDEC's trade mark for pushbuttons, pilot lights, and other control units capable of direct connection to the AS-Interface. SwitchNet devices are completely compatible with AS-Interface Ver. 2.1.

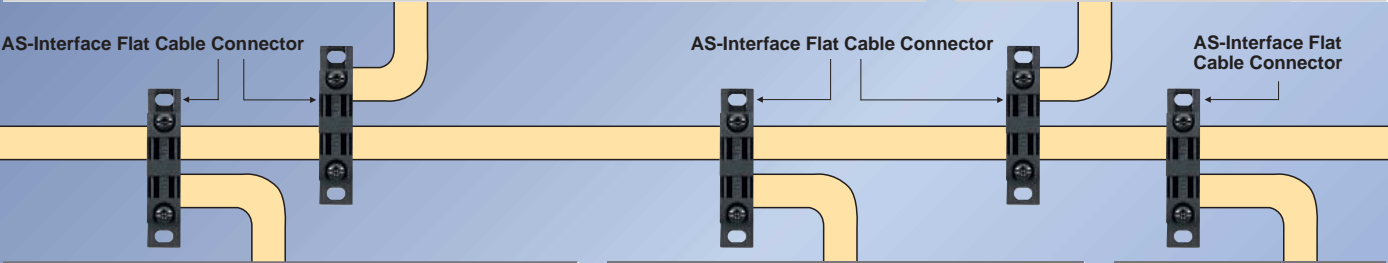Conventional bulky wiring

**SwitchNet**™ wiring

# AS-Interface
## (Actuator-Sensor-Interface)

# Link to

| MicroSmart CPU Module + AS-Interface Master Module + I/O Modules | AS-Interface / CC-Link Gateway | AS-Interface / DeviceNet Gateway | AS-Interface Power Supply |
|---|---|---|---|
| **1 model** ➡ Page 12 | **1 model** ➡ Page 16 | **1 model** ➡ Page 18 | 73W    145W<br>**2 model** ➡ Page 14 |

AS-Interface Flat Cable Connector

AS-Interface Flat Cable Connector

AS-Interface Flat Cable Connector

| AS-Interface Communication Terminal Outside-panel Type IP67 | AS-Interface Communication Terminal Inside-panel Type IP20 | FL1C IDEC SmartRelay |
|---|---|---|
| 4 inputs<br>2 inputs / 2 outputs<br>4 inputs / 3 outputs<br>**3 model** ➡ Page 22 | 4 inputs<br>4 inputs / 3 outputs<br>**2 model** ➡ Page 23 | |

## AS-Interface Master Module
Type No.: FC4A-AS62M
Applicable CPU modules: FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, FC4A-D40S3
Applicable slaves: Digital and analog slaves (62 maximum)

## AS-Interface Communication Terminal
Outside-panel type I/O modules
Type No.: SX5A-SWN40S02 (4 inputs)
SX5A-SWN40K02N (4 inputs)
SX5A-SWM22KS2N (2 inputs / 2 outputs)
SX5A-SWM43KS2N (4 inputs / 3 outputs)
Degree of protection: IP67
I/O spec: 4 NPN inputs (for 2- and 3-wire sensors)
4 PNP inputs (for 2- and 3-wire sensors)
2 PNP inputs (for 2- and 3-wire sensors), 2 PNP outputs
4 PNP inputs (for 2- and 3-wire sensors), 3 PNP outputs
Wiring style: M12 connector
Used with an optional base module.

## AS-Interface Power Supply
Type No.: PS2R-Q30ABL (73W)
PS2R-F30ABL (145W)
Rated input voltage: 100 to 240V AC
Rated output voltage: 30.5V DC (AS-Interface)
Rated output current: 2.4A (73W), 4.8A (145W)

## AS-Interface Communication Terminal
Inside-panel type I/O modules
Type No.: SX5A-SSN40S0N (4 inputs)
SX5A-SSN40K0N (4 inputs)
SX5A-SSM43KSN (4 inputs / 3 outputs)
Degree of protection: IP20
I/O spec: 4 NPN inputs (for 2- and 3-wire sensors)
4 PNP inputs (for 2- and 3-wire sensors)
4 PNP inputs (for 2- and 3-wire sensors), 3 PNP outputs
Wiring style: Screw terminal block

# the world with reduced wiring

## SwitchNet Control Units directly connect to AS-Interface

**Intelligent panels can be built with substantially reduced wiring at a lower total cost.**
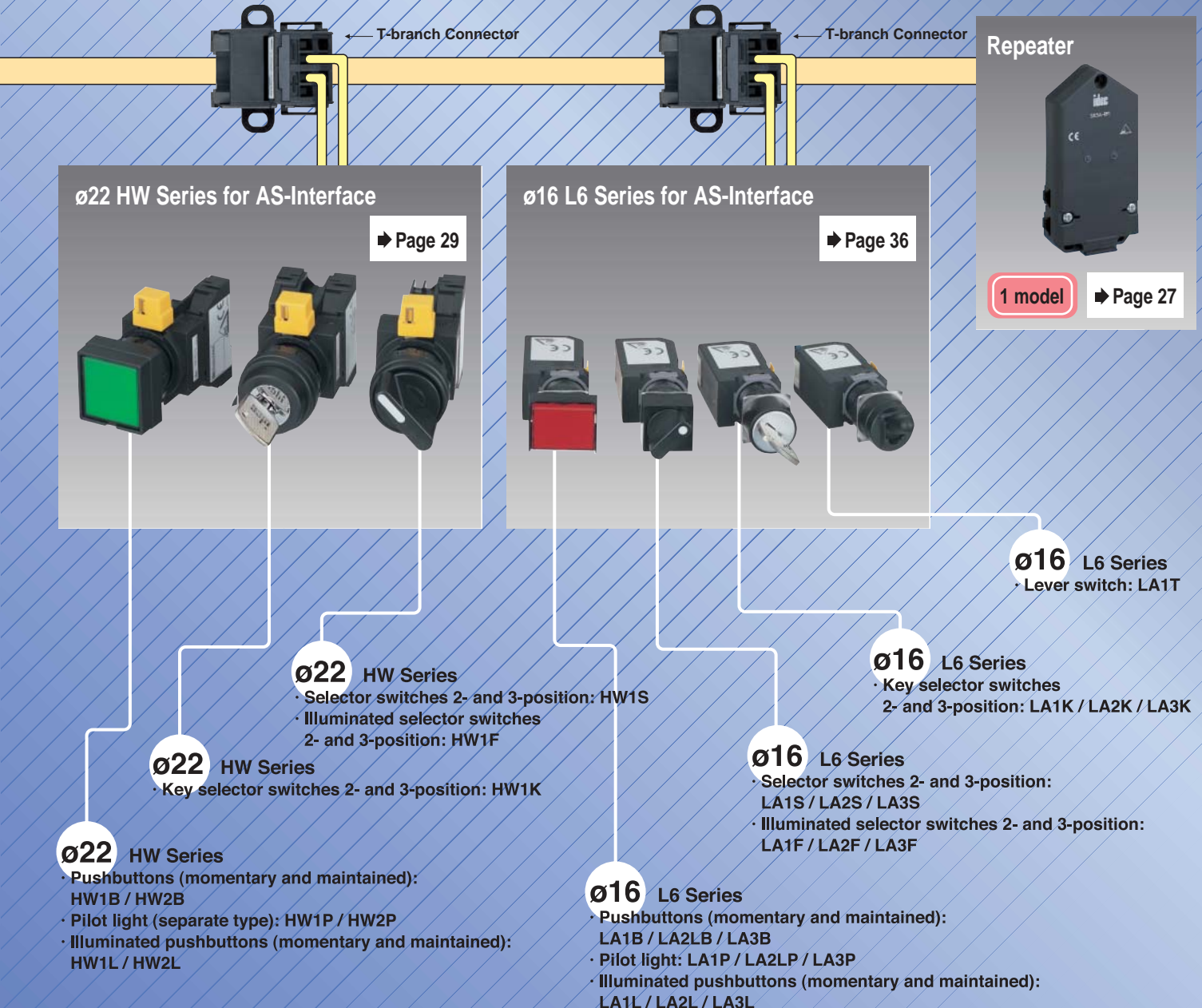- Signals and power are carried through two wires.
- A maximum of 62 switches and pilot lights can be connected. The wire length can be extended to 300m by using two repeaters.
- Spring clamp terminals save wiring time greatly.

**Intelligent pilot lights and illuminated pushbuttons enable brightness control.**
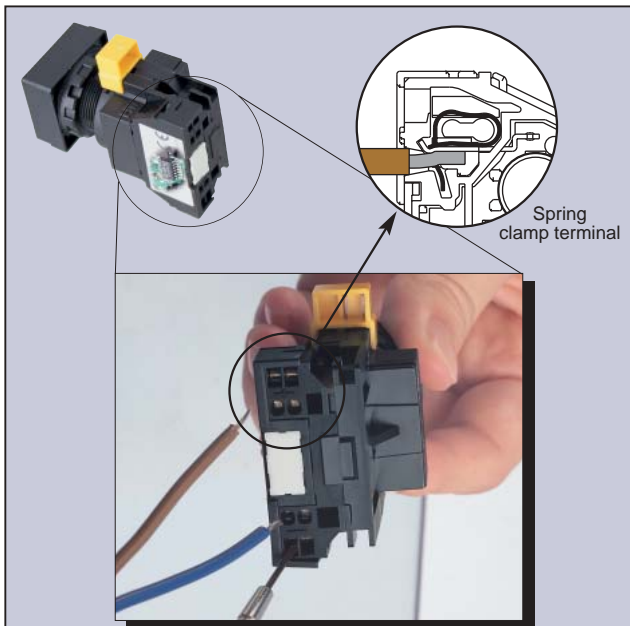
The brightness can be controlled in four levels according to the command from the AS-Interface master transmitted through the AS-Interface. More dynamic display and energy savings are made possible.

L6 Pilot Lights

12.5%   25%   50%   100%
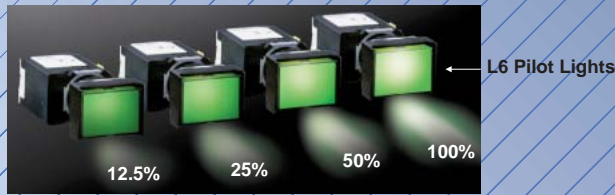
Each control switch or pilot light contains a communication IC (ASI-SW: AS-Interface Ver. 2.1).

← T-branch Connector

← T-branch Connector

**Repeater**

**1 model**  ➡ Page 27

### ø22 HW Series for AS-Interface
➡ Page 29

### ø16 L6 Series for AS-Interface
➡ Page 36

**ø16** L6 Series
· Lever switch: LA1T

**ø16** L6 Series
· Key selector switches
  2- and 3-position: LA1K / LA2K / LA3K

**ø22** HW Series
· Selector switches 2- and 3-position: HW1S
· Illuminated selector switches
  2- and 3-position: HW1F

**ø22** HW Series
· Key selector switches 2- and 3-position: HW1K

**ø16** L6 Series
· Selector switches 2- and 3-position:
  LA1S / LA2S / LA3S
· Illuminated selector switches 2- and 3-position:
  LA1F / LA2F / LA3F

**ø22** HW Series
· Pushbuttons (momentary and maintained):
  HW1B / HW2B
· Pilot light (separate type): HW1P / HW2P
· Illuminated pushbuttons (momentary and maintained):
  HW1L / HW2L

**ø16** L6 Series
· Pushbuttons (momentary and maintained):
  LA1B / LA2LB / LA3B
· Pilot light: LA1P / LA2LP / LA3P
· Illuminated pushbuttons (momentary and maintained):
  LA1L / LA2L / LA3L

# Easy and Flexible

## Quick and secure connection



Spring clamp terminal
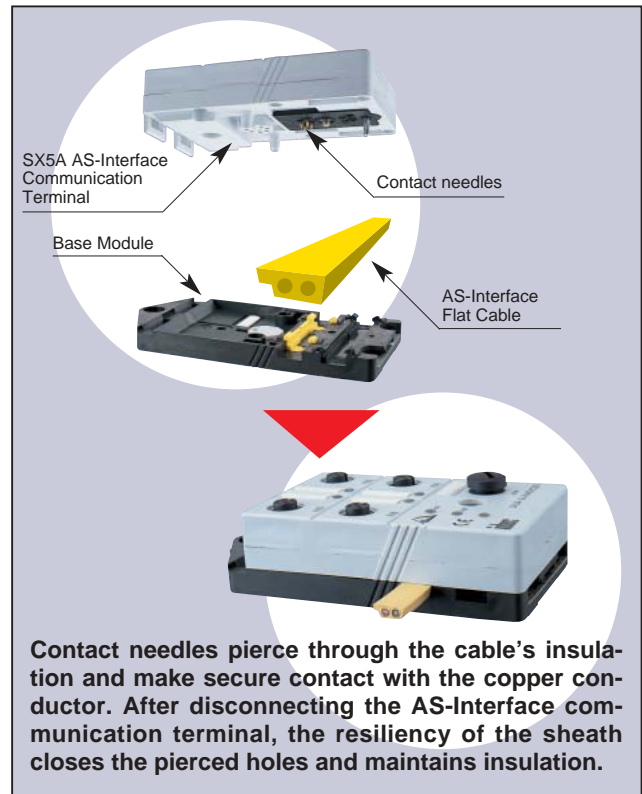
**Spring clamp reduces wiring time**
SwitchNet control units feature spring clamp terminals, eliminating the need for tightening screws. Wiring time is substantially reduced.

## Easy wiring



SX5A AS-Interface Communication Terminal

Contact needles

Base Module

AS-Interface Flat Cable

**Contact needles pierce through the cable's insulation and make secure contact with the copper conductor. After disconnecting the AS-Interface communication terminal, the resiliency of the sheath closes the pierced holes and maintains insulation.**

## Flexible Network Topology

The AS-Interface network structure can be selected from various types of topology to meet application requirements for slave locations and cable branching.
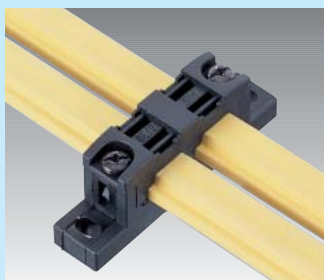


AS-Interface Master

**Tree structure**



AS-Interface Master

**Line structure**



AS-Interface Master
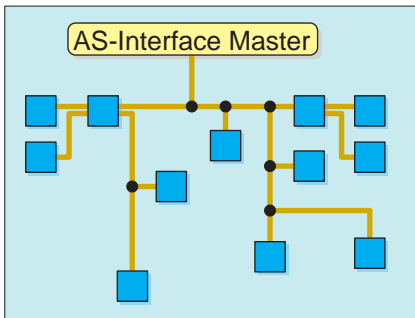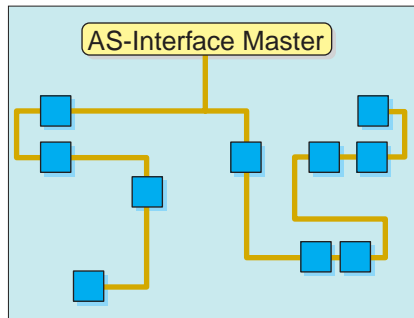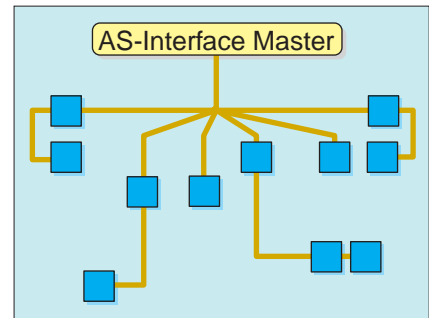
**Star structure**

■ : AS-Interface slave
AS-Interface power supply can be connected at any place. No terminator is needed.
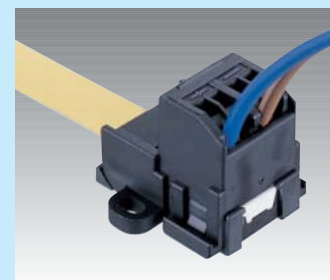
**Three types of connectors are available for easy designing of the inside- and outside-panel layout.**



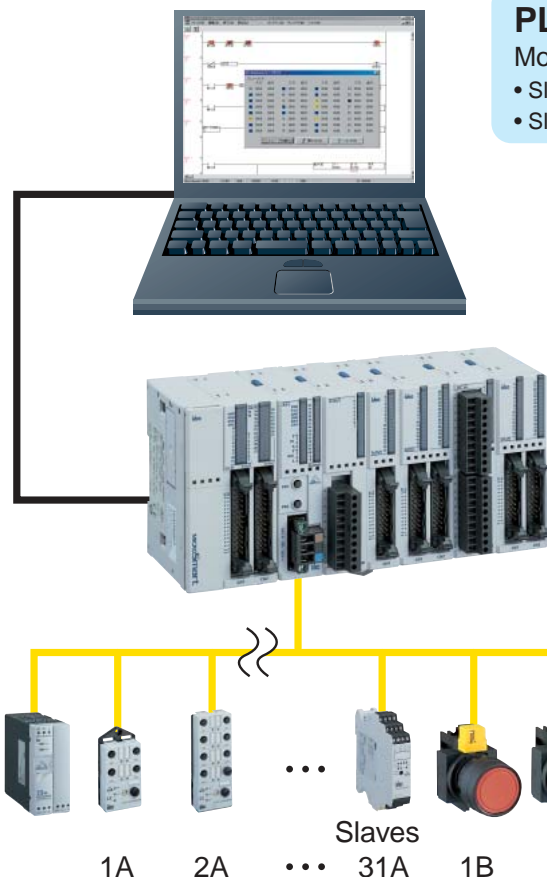AS-Interface Flat Cable Branch Connector (IP65)



M12 Branch Connector (IP65)



T-branch Connector (IP20)

## Compliant with AS-Interface Ver. 2.1

### PLC Programming Software: WindLDR Ver 4.21
Monitor function
• Slave configuration
• Slave I/O statuses

### MicroSmart AS-Interface Master Module
In addition to the control by the MicroSmart CPU module, the AS-Interface master module can also perform various configuration and monitoring functions using the pushbuttons and LED indicators on the front.
• SwitchNet™ illumination brightness can be controlled in four levels: 100%, 50%, 25%, 15%
• Monitoring slave I/O statuses
• Automatic slave address assignment when replacing slaves
• Changing slave addresses when adding slaves
• Configuring slaves
• Switching between protected mode (operation mode) and configuration mode

Slaves
1A  2A  • • •  31A  1B  2B  • • •  31B

**AS-Interface Ver. 2.1 Compliant**

## 62-slave mode compatible
434 I/O points maximum can be controlled.

### AS-Interface Ver. 2.1 and Ver. 2.0 Comparison

Master and slaves of either AS-Interface Ver. 2.1 or Ver. 2.0 can be connected to one AS-Interface network. Specifications are subject to the combination.

| Master Version | Ver. 2.1 | Ver. 2.0 |
|---|---|---|
| Maximum Slave Quantity | 62 (Note) | 31 |
| Ver. 2.1 slaves | Ver. 2.1 functionality available | Up to Ver. 2.0 functionality available |
| Ver. 2.0 slaves | Up to Ver. 2.0 functionality available | Up to Ver. 2.0 functionality available |

Note: When using a Ver. 2.1 master with Ver. 2.0 slaves, one slave occupies two slave addresses, and the maximum slave quantity is reduced to 31.

### AS-Interface Main Specifications

| Master Version | Ver. 2.1 | Ver. 2.0 |
|---|---|---|
| Control Method | Master/slave | |
| Topology | Line structure, tree structure, star structure | |
| Transmission Medium | AS-Interface flat cable (2-wire parallel cable is also applicable) | |
| Maximum Current within Network | 8A per network | |
| Maximum Slave Quantity | 62 | 31 |
| Maximum I/O Points | 434 points (A/B slaves) | 248 points (standard slaves) |
| Maximum Network Length | 100m (expandable to 200m using one repeater, or 300m using two repeaters) | |
| Bus Scan Cycle | 10 ms maximum (when connecting 62 A/B slaves) | 5 ms maximum (when connecting 31 standard slaves) |

### Self-diagnostic Functions of AS-Interface

• **Communication error**
• **Peripheral error detection notices errors on slaves**
• **Power supply failure**

The diagnostic functions help locate and solve errors. These communication errors are reported on the fault LED indicator.

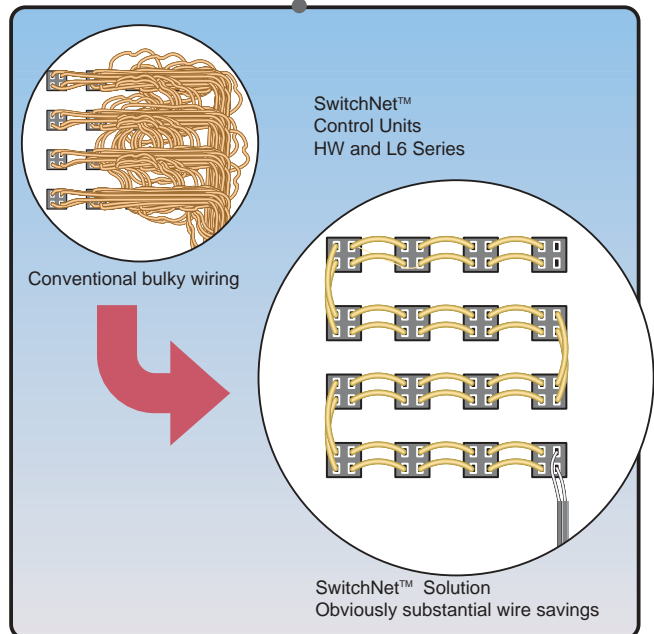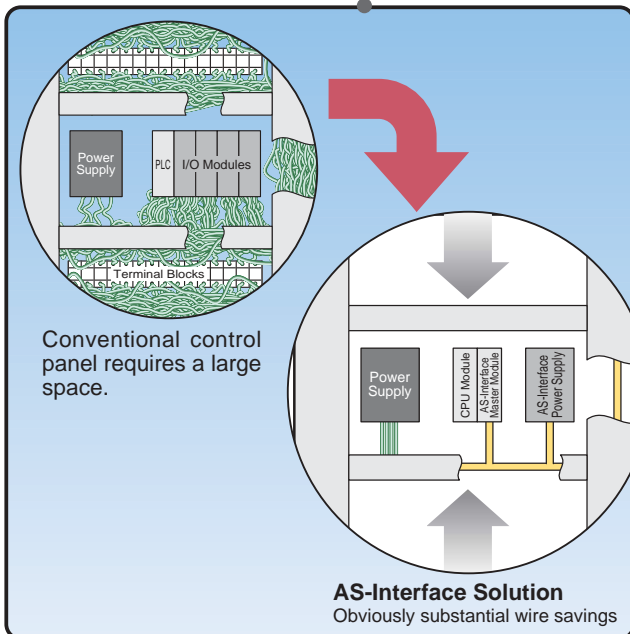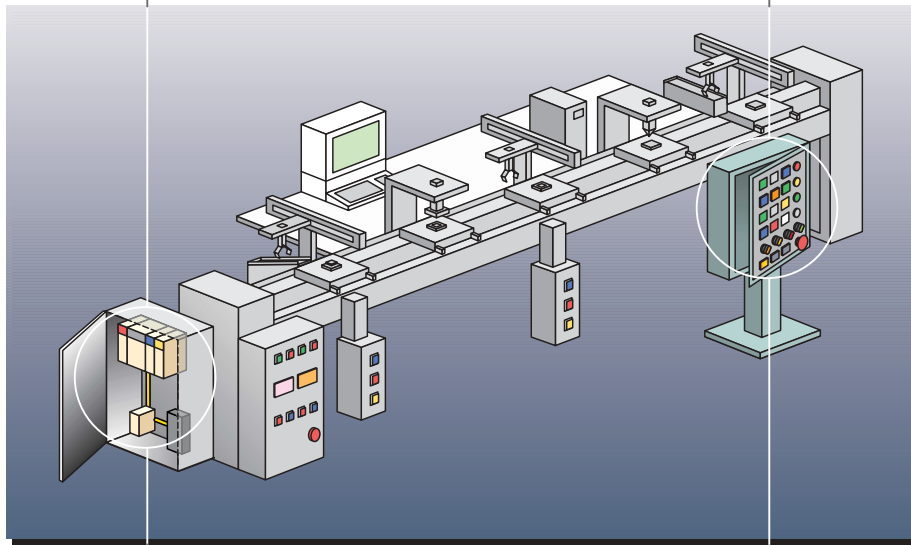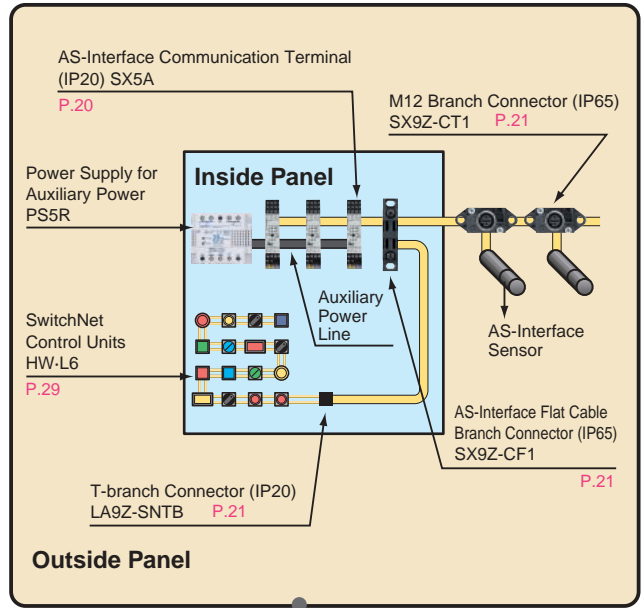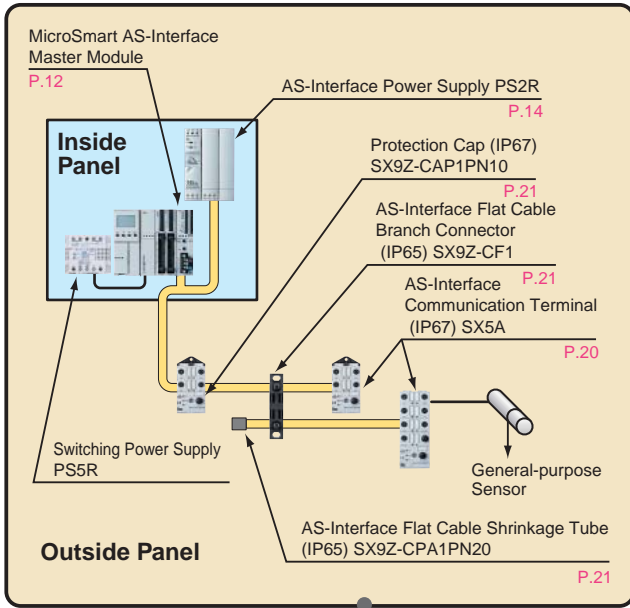### AS-Interface Maximum Communication Distances

Maximum communication distance (without repeater)  = 100m
Expandable distance by adding one repeater  = 100m
Expandable distance by adding one repeater  = 100m

Maximum communication distance (with 2 repeaters)  = 300m

### AS-Interface Communication Speed

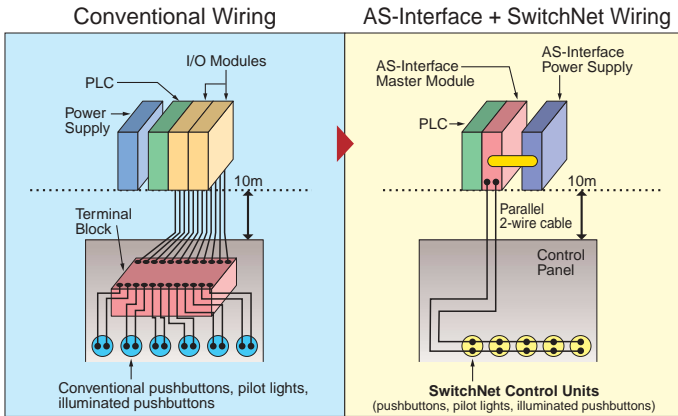**When 62 slaves are connected to the AS-Interface network, data refresh is completed in 10 ms.**

• When connecting 31 slaves, maximum scan time is 5 ms.
• When connecting 62 slaves, maximum scan time is 10 ms.

7

## Left Panel Diagram

MicroSmart AS-Interface Master Module
P.12

AS-Interface Power Supply PS2R
P.14

**Inside Panel**

Protection Cap (IP67) SX9Z-CAP1PN10
P.21

AS-Interface Flat Cable Branch Connector (IP65) SX9Z-CF1
P.21

AS-Interface Communication Terminal (IP67) SX5A
P.20

Switching Power Supply PS5R

General-purpose Sensor

AS-Interface Flat Cable Shrinkage Tube (IP65) SX9Z-CPA1PN20
P.21

**Outside Panel**

## Right Panel Diagram

AS-Interface Communication Terminal (IP20) SX5A
P.20

M12 Branch Connector (IP65) SX9Z-CT1    P.21

Power Supply for Auxiliary Power PS5R

**Inside Panel**

Auxiliary Power Line

SwitchNet Control Units HW-L6
P.29

AS-Interface Sensor

AS-Interface Flat Cable Branch Connector (IP65) SX9Z-CF1
P.21

T-branch Connector (IP20) LA9Z-SNTB    P.21

**Outside Panel**

## Bottom Left

Conventional control panel requires a large space.

Power Supply

PLC

I/O Modules

Terminal Blocks

Power Supply

CPU Module

AS-Interface Master Module

AS-Interface Power Supply

**AS-Interface Solution**
Obviously substantial wire savings

## Bottom Right

SwitchNet™ Control Units HW and L6 Series

Conventional bulky wiring

SwitchNet™ Solution
Obviously substantial wire savings

# Example of inside-panel wiring: Total cost savings by about 1/3

**Comparison of Wiring Method (IDEC's products)**

Conventional Wiring    AS-Interface + SwitchNet Wiring

PLC
I/O Modules
Power Supply
10m
Terminal Block
Conventional pushbuttons, pilot lights, illuminated pushbuttons

AS-Interface Master Module
AS-Interface Power Supply
PLC
10m
Parallel 2-wire cable
Control Panel
**SwitchNet Control Units**
(pushbuttons, pilot lights, illuminated pushbuttons)

## Conventional Wiring

When using the conventional wiring method involving a PLC and terminal blocks, inside the control panel is filled with wires for control switches, pilot lights, and other devices. Approximately a half of the total panel building cost is accountable to labor cost for wiring.

## AS-Interface + SwitchNet Wiring

All SwitchNet control units are connected to the AS-Interface master module using 2-wire cables. Wiring time drops to approximately 1/4 of the conventional method, and the total cost is reduced by approximately 40%. In addition, maintenance work is also simplified greatly.

**Comparison of Costs (IDEC's products)**
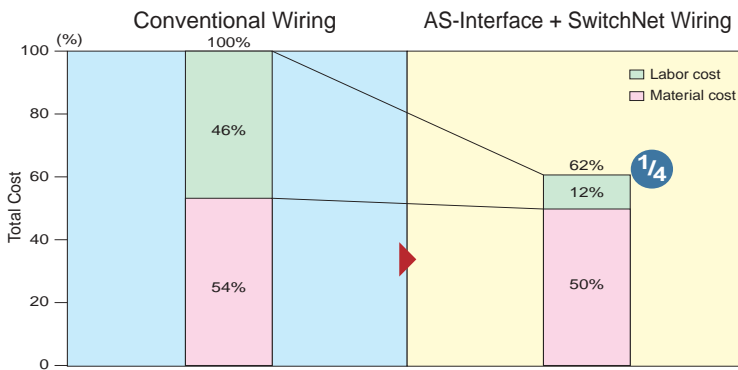
Conventional Wiring    AS-Interface + SwitchNet Wiring

(%)
Total Cost
100
80
60
40
20
0

Conventional Wiring: 100%, Labor 46%, Material 54%
AS-Interface + SwitchNet Wiring: 62%, Labor 12%, Material 50%
1/4

Labor cost
Material cost

The comparison is based on a simulated control panel configuration consisting of 60 control units.

# Example of inside- and outside-panel wiring: Total cost savings by about 1/4

**Comparison of Wiring Method (IDEC's products)**

Conventional Wiring      AS-Interface + SwitchNet Wiring

PLC
I/O Modules
Power Supply
Terminal Block
10m
10m
10m
Terminal Block
Terminal Box
Conventional cable
Conventional pushbuttons, pilot lights, illuminated pushbuttons
Terminal Box
Conventional Sensor

AS-Interface Master Module
AS-Interface Power Supply
PLC
10m
T-branch Connector
Control Panel
AS-Interface Communication Terminal (IP67)
10m
10m
Parallel 2-wire cable
**SwitchNet Control Units**
(pushbuttons, pilot lights, illuminated pushbuttons)
Conventional Sensor
M12 Sensor Connector

**Comparison of Costs (IDEC's products)**

Conventional Wiring    AS-Interface + SwitchNet Wiring

(%)
Total Cost
100
80
60
40
20
0

Conventional Wiring: 100%, 50%, 50%
AS-Interface + SwitchNet Wiring: 77%, 40%, 37%
3/4
Outside panel
Inside panel

Outside-panel labor cost
Outside-panel material cost
Inside-panel labor cost
Inside-panel material cost

## Conventional Wiring

A large amount of cost and space are required by the wiring to and inside the terminal boxes.

## AS-Interface + SwitchNet Wiring

SwitchNet wiring reduces the cost for inside-panel wiring, resulting in total cost reduction by approximately 1/4.

The comparison is based on a simulated control panel configuration consisting of 60 control units.

9

# Product Overview

## FC4A Series MICRO Smart
## AS-Interface Master Module: FC4A-AS62M

For details about the MicroSmart, see a separate brochure.

- AS-Interface Ver. 2.1 compliant
- Digital and analog slaves can be connected.
- Master profile: M1e
- 23.5-mm-wide compact housing
- Applicable CPU modules: 20-I/O relay output slim types and 40-I/O slim types
  Type No.: FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, FC4A-D40S3

## PS2R AS-Interface Power Supply

**73W**

PS2R-Q30ABL
Output capacity 73W
(30.5V, 2.4A)

**145W**

PS2R-F30ABL
Output capacity 145W
(30.5V, 4.8A)

- AS-International Association certified
- UL, CSA, TÜV Rheinland approved
- CE marked
- Universal AC input: 85 to 264V AC

## FL1C IDEC SmartRelay
## AS-Interface Communication Module FL1B-CAS2

### FL1B-CAS2
- AS-Interface Ver. 2.0 compliant
- A maximum of 31 slaves can be connected.
- I/O points: 4 input points, 4 output points.
- The space-saving, labor-saving, and cost-saving intelligent relay achieves decentralized control.

### FL1C IDEC SmartRelay
- Parameter values can be changed using buttons.
- I/O points expandable to 24 digital inputs, 16 digital outputs, and 8 analog inputs using expansion I/O modules (4 I/O modules + 4 analog modules maximum).
- AS-Interface and LONWORKS® communication modules achieve decentralized control.
- 10A output. No external relay required.
- A maximum of 130 function blocks and 24 internal relays can work at the same time.

**Cat. No. EP1049-0**
For details about the FL1C IDEC SmartRelay, see the catalog.

## SX5A AS-Interface Communication Devices

### Gateways
**AS-Interface / CC-Link Gateway**

SX5A-GM1N

- AS-Interface Ver. 2.1 compliant
- Degree of protection: IP65
- For connecting AS-Interface to CC-Link
- Power is supplied from AS-Interface.
- Status and error indication on LEDs and 2-digit display

**AS-Interface / DeviceNet Gateway**

SX5A-GD1N

- AS-Interface Ver. 2.1 compliant
- Degree of protection: IP20
- For connecting AS-Interface to DeviceNet
- Power is supplied from the AS-Interface.
- Status and error indication on LEDs and color graphical display

### Repeater

SX5A-RP1

- No address setting required
- AS-Interface network can be extended up to 300 m.
- IP65 protection
- Input statuses of AS-Interface 1 and 2 are displayed with the LED indicators.

### SX5A AS-Interface Communication Terminal (Outside-panel Type)

SX5A-SWN40S02∗
SX5A-SWN40K02N
(4 inputs)

SX5A-SWM22KS2N
(2 inputs / 2 outputs)

SX5A-SWM43KS2N
(4 inputs / 3 outputs)

- Degree of protection: IP67, connector type
- Expansion slave addresses up to 62 in the A/B slave mode
- Compatible with 2- and 3-wire sensors (∗ up to 31 slaves)
- With AS-Interface power and I/O status indicators
- Overload detection on the sensor power supply
- Output overload detection (2 in/2 out type, 4 in/3 out type)

### SX5A AS-Interface Communication Terminal (Inside-panel Type)

SX5A-SSN40S0N
SX5A-SSN40K0N
(4 inputs)

SX5A-SSM43KSN
(4 inputs / 3 outputs)

- Degree of protection: IP20, terminal block type
- Expansion slave addresses up to 62 in the A/B slave mode
- Detachable terminal block
- Communication monitor function
- Compatible with 2- and 3-wire sensors
- Input port power can be selected to supply from inside or outside
- With AS-Interface power, auxiliary power, and I/O status indicators

# SwitchNet™

- Control switches and pilot lights containing ASI-SW, a new AS-Interface communication IC, with IP65 degree of protection.

- The HW series for ø22mm mounting holes are available in 216 models, and the ø16 L6 series in 277 models — a total of 493 models to choose from.

- Spring clamp terminals substantially reduce wiring time.

- Illuminated units can change the brightness in four levels: 100%, 50%, 25%, and 12.5%.

- The same panel layout (mounting centers and behind-panel depth) can be used as the conventional HW and L6 series.

| Mounting Hole | Series | Minimum Mounting Centers (W × H) | Behind-panel Depth |
|---|---|---|---|
| ø22 | HW series | 30.0 × 50.0 mm (Note 1) | 49.3 mm |
| ø16 | L6 series | 24.0 × 18.0 mm (Note 2) | 43.8 mm |

Note 1: 30.0 × 50.0 mm for ø40 mushroom buttons
Note 2: Same mounting centers for round, square, and rectangular units.

## HW Series (ø22mm mounting hole)

| Non-illuminated Pushbuttons | | | | | |
|---|---|---|---|---|---|
| Round Flush | Round Extended | ø29 Mushroom | ø40 Mushroom | Square Flush | Square Extended |
|  |  |  |  |  |  |
| I/O: 1 in, momentary and maintained operation | | | | | |

| Illuminated Pushbuttons | | | | | |
|---|---|---|---|---|---|
| Round Flush | Round Extended | Round Extended with Full Shroud | ø29 Mushroom | ø40 Mushroom | Square Flush |
|  |  |  |  |  |  |
| I/O: 1 in/1 out, momentary and maintained operation | | | | | |

| Pilot Lights | | Selector Switch | Key Selector Switch | Illuminated Selector Switch | |
|---|---|---|---|---|---|
| Round Flush | Square Flush | Knob Operator | Key Operator | | |
|  |  |  |  |  | |
| I/O: 1 out | | I/O: 1 in (2-position) 1 in + 1 on 2 slaves (3-position) | | I/O: 1 in/1 out (2-position) 1 in/1 out + 1 in on 2 slaves (3-position) | |

## L6 Series (ø16mm mounting hole)

| Non-illuminated Pushbuttons | | | Illuminated Pushbuttons | | |
|---|---|---|---|---|---|
| Round | Square | Rectangular | Round | Square | Rectangular |
|  |  |  |  |  |  |
| I/O: 1 in, momentary and maintained operation | | | I/O: 1 in/1 out, momentary and maintained operation | | |

| Pilot Lights | | | Selector Switches | | |
|---|---|---|---|---|---|
| Round | Square | Rectangular | Round | Square | Rectangular |
|  |  |  |  |  |  |
| I/O: 1 out | | | I/O: 1 in (2-position), 2 in (3-position) | | |

| Key Selector Switches | | | Illuminated Selector Switches | | |
|---|---|---|---|---|---|
| Round | Square | Rectangular | Round | Square | Rectangular |
|  |  |  |  |  |  |
| I/O: 1 in (2-position), 2 in (3-position) | | | I/O: 1 in/1 out (2-position), 2 in/1 out (3-position) | | |

| Lever Switch | |
|---|---|
| |  |
| I/O: 1 in (2-position), 2 in (3-position) | |

# MicroSmart AS-Interface Master Module

## Capable of Connecting 62 Slaves using a Two-wire Cable

- Compliance with AS-Interface Ver. 2.1 specifications
- Digital and analog slaves can be connected.
- Configuration and slave monitoring can be done using the LED indicators and pushbuttons on the font panel as well as using WindLDR.
- The master profile is compliant with the entire specifications of M3.
- The AS-Interface master module can be used with 20-I/O relay output slim type CPU modules (FC4A-D20RK1 and FC4A-D20RS1) and 40-I/O slim type CPU modules (FC4A-D40K3 and FC4A-D40S3).
- The CPU module can control a maximum of 634 I/O points: digital I/O points 200 plus AS-Interface slave I/O points 434.
- When an AS-Interface master module is mounted, five more I/O modules can be added.
- The CPU module functionality can be expanded using optional clock cartridge and memory cartridge.
- The CPU module has an RS232C port as standard, and another RS232C or RS485 port can be added using an optional communication adapter or communication module.
- Analog signals can also be processed using the built-in analog voltage input terminal or optional analog I/O modules.
- IEC62026-2 compliant.
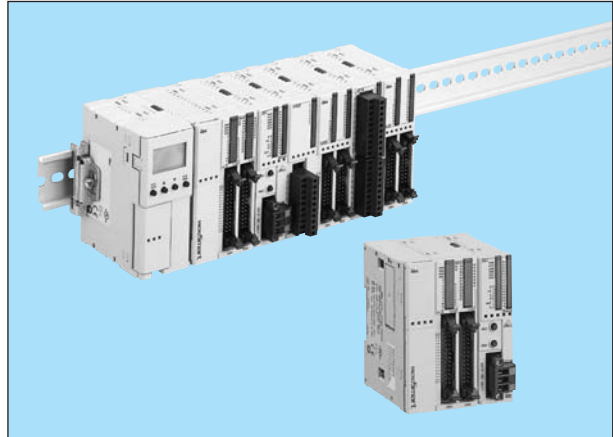
## Types

### • AS-Interface Master Module

| Name & Appearance | Type No. | Package Quantity |
|---|---|---|
| MicroSmart AS-Interface Master Module | FC4A-AS62M | 1 |

### • CPU Modules compatible with AS-Interface Master Module

| Name & Appearance | Power Voltage | Input Type | Output | High-speed Transistor Output | I/O Points | Type No. | Package Quantity |
|---|---|---|---|---|---|---|---|
| Slim Type | 24V DC | 24V DC Sink/source | Relay 2A 240V AC/2A 30V DC/2A | Sink 0.3A | 20 points (12 in / 8 out) * | FC4A-D20RK1 | 1 |
| Slim Type | | | | Source 0.3A | | FC4A-D20RS1 | |
| Slim Type | | | Transistor sink output 0.3A | | 40 points (24 in / 16 out) | FC4A-D40K3 | |
| Slim Type | | | Transistor source output 0.3A | | | FC4A-D40S3 | |
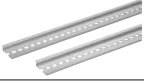
Note *: Two points are transistor outputs, and six points are relay outputs.

### • Programming and Monitoring Software

| Name & Appearance | Type No. | Package Quantity |
|---|---|---|
| WindLDR (Ver. 4.21 or higher) | FC9Y-LP2CDW | 1 |

# MicroSmart AS-Interface Master Module

## • Accessories

| Name & Appearance | Description | Type No. | Ordering Type No. | Package Quantity |
|---|---|---|---|---|
| Terminal Block for AS-Interface Master Module | 3-pole | FC4A-PMT3 | FC4A-PMT3PN02 | 2 |
| Direct Mounting Strip | For direct panel mounting | FC4A-PSP1 | FC4A-PSP1PN05 | 5 |
| 35-mm-wide DIN Rail | Aluminum (1m long) | BAA1000 | BAA1000PN10 | 10 |
| | Steel (1m long) | BAP1000 | BAP1000PN10 | 10 |
| Mounting Clip | | BNL5 | BNL5PN10 | 10 |
| AS-Interface Master Module User's Manual | | FC9Y-B644 | FC9Y-B644 | 1 |

Note: When ordering, specify the Ordering Type No.

## Specifications (AS-Interface Master Module)

### • General Specifications

| | |
|---|---|
| Operating Temperature | 0 to 55°C (no freezing) |
| Storage Temperature | −25 to +70°C (no freezing) |
| Relative Humidity | Level RH1, 30 to 90% (non-condensing) |
| Pollution Degree | 2 (IEC 60664) |
| Degree or Protection | IP20 |
| Corrosion Immunity | Atmosphere free from corrosive gases |
| Altitude | Operation: 0 to 2000m<br>Transport: 0 to 3000m |
| Vibration Resistance | • When mounted on a DIN rail:<br>10 to 57 Hz amplitude 0.075 mm, 57 to 150 Hz acceleration 9.8 m/s$^2$<br>2 hours per axis on each of three mutually perpendicular axes<br>• When mounted on a panel surface:<br>2 to 25 Hz amplitude 1.6 mm, 25 to 100 Hz acceleration 39.2 m/s$^2$<br>90 minutes per axis on each of three mutually perpendicular axes |
| Shock Resistance | 147 m/s$^2$, 11 ms duration, 3 shocks on each of three mutually perpendicular axes (IEC 61131) |

### • Function Specifications

| | |
|---|---|
| External Power Supply | AS-Interface power supply, 29.5 to 31.6V DC |
| AS-Interface Current Draw | 65 mA (normal operation)<br>110 mA maximum |
| Effect of Improper Input Connection | No damage |
| Connector on Mother Board | MSTB2.5/3-GF-5.08BK (Phoenix Contact)<br>Insertion/removal durability: 100 times minimum |
| Internal Current Draw | 80 mA (5V DC) |
| AS-Interface Master Module Power Consumption | 540 mW (24V DC) |
| Weight (approx.) | 85g |

### • Communication Specifications

| | |
|---|---|
| Maximum Bus Cycle | When 1 through 19 slaves are connected:   3 ms<br>When 20 through 62 slaves are connected:  $0.156 \times (1 + N)$ ms<br>where N is the number of active slaves<br>5 ms maximum when 31 slaves are connected<br>10 ms maximum when 62 slaves are connected |
| Maximum Slaves | Standard slaves: 31<br>A/B slaves:      62 |
| Maximum I/O Points | Standard slaves: 248 total (124 inputs + 124 outputs)<br>A/B slaves:      434 total (248 inputs + 186 outputs) |
| AS-Interface Cable Maximum Length | When using no repeater or extender:          100m<br>When using a total of 2 repeaters or extenders: 300m |
| Rated Bus Voltage | 30V DC |

## Dimensions

### • FC4A-AS62M
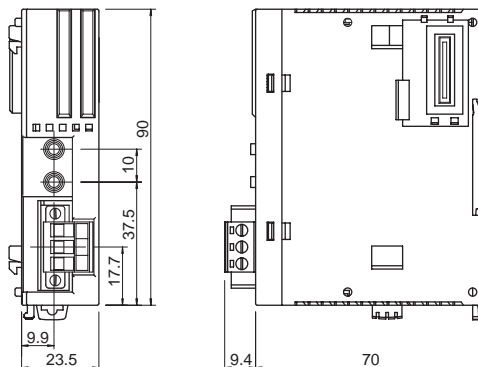


All dimensions in mm.

# PS2R AS-Interface Power Supply

## AS-Interface Power Supply with Universal AC Input Voltage

- Input voltage range: 100 to 240V AC
- Two output ratings: 73W and 145W
- Slim housing style mountable on DIN rails
- IP20 finger-safe terminals
- CE marked (LVD, EMCD)
- UL listed (UL 508), CSA (No. 950), TÜV (EN 60950, EN61010-1)
- Noise standards EN 55022, EN 61000-6-2 compliant
- I/O terminals are separated to top and bottom for easy wiring.
- With input indicator (orange) and output indicator (green)
- Mountable on 35-mm-wide and 75-mm-wide DIN rails
- IEC62026-2 compliant

## Types

### • AS-Interface Power Supply

| Name & Appearance | Output Capacity | Input Voltage | Output Voltage | Type No. | Package Quantity |
|---|---|---|---|---|---|
| AS-Interface Power Supply | 73W | 100 to 240V AC | 30.5V DC | PS2R-Q30ABL | 1 |
| AS-Interface Power Supply | 145W | | | PS2R-F30ABL | |

### • Accessories

| Name & Appearance | Description | Type No. | Ordering Type No. | Package Quantity |
|---|---|---|---|---|
| 35-mm-wide DIN Rail | Aluminum (1m long) | BAA1000 | BAA1000PN10 | 10 |
| | Steel (1m long) | BAP1000 | BAP1000PN10 | 10 |
| Mounting Clip | | BNL5 | BNL5PN10 | 10 |

Note: When ordering, specify the Ordering Type No.

## Specifications

### • AS-Interface Power Supply

| Type No. | | | PS2R-Q30ABL | PS2R-F30ABL |
|---|---|---|---|---|
| Input | Efficiency | | 83% (typical) at the rated input/output | |
| | Voltage | | 100 to 240V AC (85 to 264V AC) | |
| | Frequency | | 47 to 63 Hz | |
| | Current | 100V AC | 1.8A (typical) at the rated load | 3.0A (typical) at the rated load |
| | | 220V AC | 1.0A (typical) at the rated load | 2.0A (typical) at the rated load |
| | Leakage Current | | 3.5 mA maximum (UL, CSA, VDE) | |
| | Inrush Current | | 30A maximum (25°C at cold start) | |
| Output | Rated Voltage | | 30.5V DC | |
| | Rated Current | | 2.4A | 4.8A |
| | Adjustable Voltage Range | | Fixed | |
| | Ripple Noise Voltage | | 300 mV p-p maximum (0 to 10 kHz), 50 mV p-p maximum (10 to 500 kHz) according to AS-Interface standard | |
| | Input/Load Fluctuation | | 3% | |
| | Overall Fluctuation | | 29.5 to 31.6V DC including input fluctuation, output fluctuation, temperature fluctuation, and ripple voltage | |
| | Delay Time | | 2 sec maximum (delay in output voltage change from 5V to 26.5V) according to AS-Interface standard | |
| | Startup Time | | 1 sec maximum (output voltage change from 21.5V to 29.5V) according to AS-Interface standard | |
| | Output Holding Time | | 10 ms minimum at 85V AC, rated load | |

# PS2R AS-Interface Power Supply

| Type No. | | PS2R-Q30ABL | PS2R-F30ABL |
|---|---|---|---|
| Supplementary Functions | Overcurrent Protection | 110% (typical), automatic reset (Note 1) | |
| | Overvoltage Protection | 120% minimum (Note 2) | |
| | Undervoltage Protection | 95% maximum, automatic reset | |
| | Input Indicator | Orange | |
| | Output Indicator | Green | |
| Dielectric Strength | | Between inputs and outputs:  3.0 kV AC, 1 minute<br>Between inputs and ground:  3.0 kV AC, 1 minute<br>Between outputs and ground: 0.5 kV AC, 1 minute | |
| Insulation Resistance | | Between inputs and outputs:  100 MΩ minimum (500V DC megger)<br>Between inputs and ground:  100 MΩ minimum (500V DC megger) | |
| Operating Temperature | | 0 to 60°C (See the derating curve.) Vertical mounting only | |
| Storage Temperature | | –25 to +70°C (no freezing, non-condensation) | |
| Operating Humidity | | 95% RH (non-condensation) | |
| Vibration Resistance | | 10 to 57 Hz amplitude 0.075 mm, 57 to 150 Hz acceleration 10 m/s$^2$<br>10 cycles per axis on each of three mutually perpendicular axes | |
| Shock Resistance | | 147 m/s$^2$, 11 ms duration, 2 shocks per axis, on six mutually perpendicular axes | |
| Terminal | | IP20 | |
| Weight (approx.) | | 800g | 1300g |
| Dimensions | | 120H × 54W × 120D mm | 120H × 81W × 120D mm |
| Safety Standards | | UL 508 listed<br>CSA C22.2 No. 950<br>EN 60950, EN 61010 | |
| AS-Interface Standard | | EN 50295 | |
| EMC | (EMI)<br>Radiated Emission<br>Conducted Emission | IEC 61000-6-2<br>EN 55022 class B<br>EN 55022 class B | |

Note 1: The AS-Interface power supply is provided with an overvoltage protection circuit, but a long period of overload and short-circuit should be averted.
Note 2: After turning off the input voltage, allow more than 10 seconds before turning on again.

## Block Diagram

- **PS2R-Q30ABL**
- **PS2R-F30ABL**
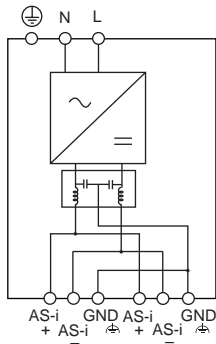


## Output Derating

(Operating temperature is the temperature around the power supply)



Mounting Direction: Vertical only
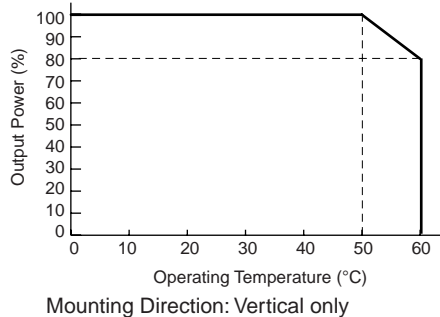
## Terminal Names

① (L) AC input terminal
② (N) AC input terminal (ground side)
③ (⏚) Ground terminal (protective ground)
④ (AS-i+) AS-Interface + output terminal
⑤ (AS-i–) AS-Interface – output terminal
⑥ (⏚) Ground terminal (output side)
⑦ (~) Input indicator (goes on when input is on)
⑧ (AS-i) Output indicator (goes on when output is on)
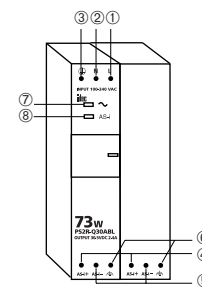
- **PS2R-Q30ABL**
- **PS2R-F30ABL**
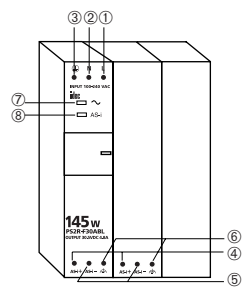


## Dimensions

- **PS2R-Q30ABL**
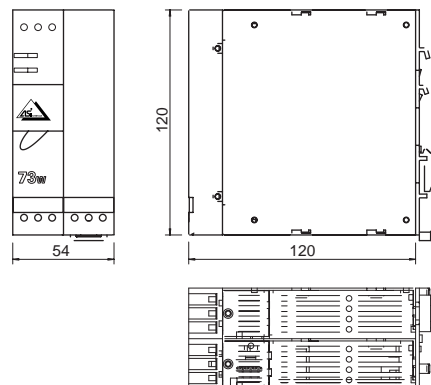


- **PS2R-F30ABL**
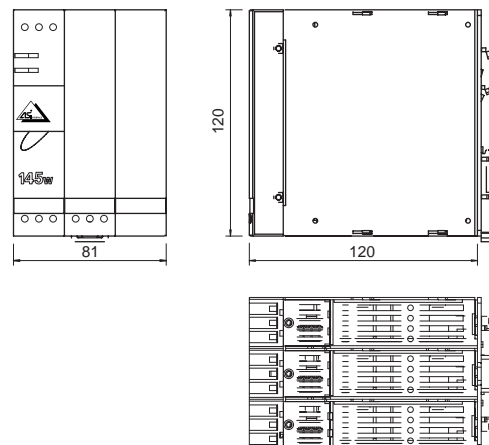


All dimensions in mm.

# SX5A AS-Interface Gateway

## AS-Interface/CC-Link Gateway

### SX5A-GM1N

- The SX5A-GM1N gateway converts the CC-Link and AS-Interface protocols. Serves as a slave of CC-Link and a master of AS-Interface.
- AS-Interface Ver. 2.1 compliant
- Degree of protection: IP65
- AS-Interface can be connected to CC-Link.
- Power is supplied from AS-Interface.
- Status and error indication on LEDs and 2-digit display
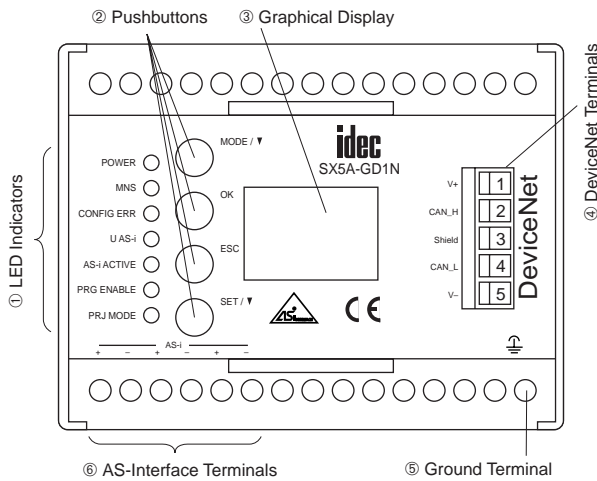- All AS-Interface functions can be operated via CC-Link.

## Specifications

| Type No. | | | SX5A-GM1N |
|---|---|---|---|
| General Specifications | Rated Input Voltage | | 26.5 to 31.6V DC |
| | Rated Current | | 200 mA |
| | Operating Temperature | | 0 to +55°C (no freezing) |
| | Storage Temperature | | −25 to +85°C (no freezing) |
| | Operating Humidity | | 30 to 95% RH (no condensation) |
| | Degree of Protection | | IP65 |
| | Insulation Resistance | | 5 MΩ minimum (500V DC megger) |
| | Dielectric Strength | | 1000V AC, 1 minute |
| | Applicable Wire | AS-Interface | AS-Interface flat cable |
| | | CC-Link | 3-wire twisted pair cable |
| | Weight | | Approx. 355 g |
| | Dimensions | | 95W × 102H × 71D mm |
| | Mounting | | 35-mm DIN rail or screw mounting |
| Communication Specifications | AS-Interface | Topology | Bus |
| | | Max. Number of Nodes per Network | 62 |
| | | Max. Number of I/Os per Network | 434 |
| | | Cycle Time | 10 msec (62 slaves) |
| | | Max. Network Length | 100 m (AS-Interface flat cable) |
| | | Max. Current inside Network | 8A per AS-Interface circuit |
| | | Applicable AS-Interface Version | Version 2.1 |
| | CC-Link | Topology | Bus |
| | | Max. Network Length | 100 m (10 Mbps), 150 m (5 Mbps), 200 m (2.5 Mbps), 600 m (625 kbps), 1200 m (156 kbps) |
| | | Transmission Speed | 10 Mbps, 5 Mbps, 2.5 Mbps, 625 kbps, 156 kbps |
| | | Applicable CC-Link Version | Version 1.0 |
| Standards | | | UL/c-UL, CE |

## Front Panel

### • Display

The front panel has 10 LED indicators and a 2-digit display.

#### LED Indicators

| LED | Color (ON) | Description |
|---|---|---|
| PW | Green | Sufficient power is supplied to the gateway. |
| L RUN | Green | Communication is active via the CC-Link interface. |
| L ERR | Green | The CC-Link has a communication error. |
| SD | Green | The CC-Link interface is transmitting data. |
| RD | Green | The CC-Link interface is receiving data. |
| CONF ERR | Red | The AS-Interface has a configuration error. |
| U AS-i | Green | Sufficient power is supplied to the AS-Interface circuit. |
| AS-i active | Green | Normal operation |
| PRG ENABLE | Green | Automatic addressing function is enabled. |
| PRG MODE | Orange | AS-Interface master is in configuration mode. |

LED Indicators

PW  L RUN  L ERR  SD  RD

CONF ERR  U AS-i  AS-i active  PRG ENABLE  PRG MODE

2-digit Display
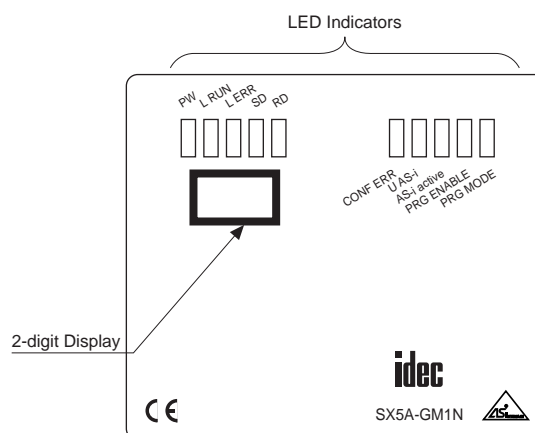
SX5A-GM1N

# SX5A AS-Interface Gateway

## Mounting and Removing (DIN Rail)

① Mounting

Removing ⑤

DIN Rail

②

③

④
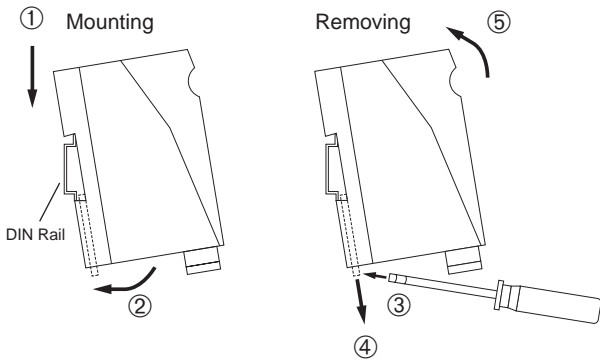
## Dimensions

• SX5A-GM1N

31

66

80

102

90

71

## Mounting Hole Layout

66

31
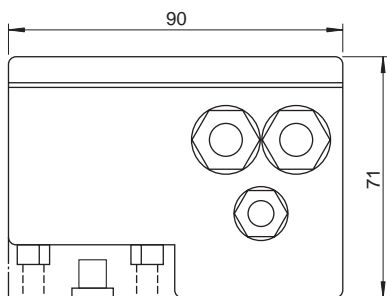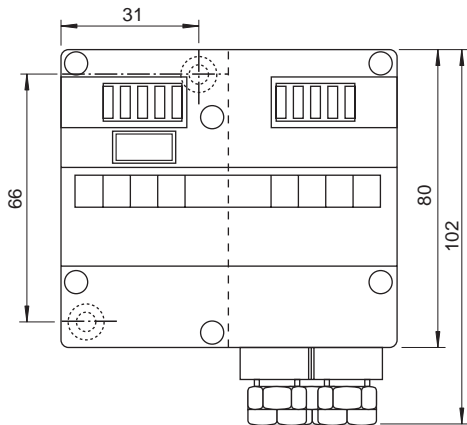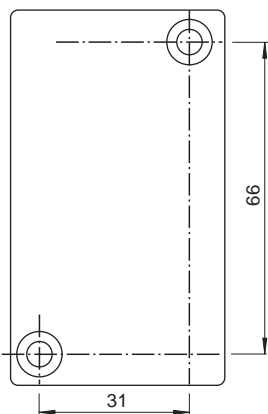
All dimensions in mm.

## Internal Connection

### ① CC-Link Terminals

To connect the SX5A-GM1N gateway to the CC-Link, remove the top cover and connect the CC-Link cable to the screw terminals. After connecting the cable, reinstall the top cover.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| FG | SLD | DG | DA | DB |
| 6 | 7 | 8 | 9 | 10 |
| FG | SLD | DG | DA | DB |

⚠ **Terminator**

When the SX5A-GM1N is not positioned at the end of the CC-Link line, remove the terminator.

Top Cover

① CC-Link Terminals

③ Pushbuttons

② AS-Inerface Connectors
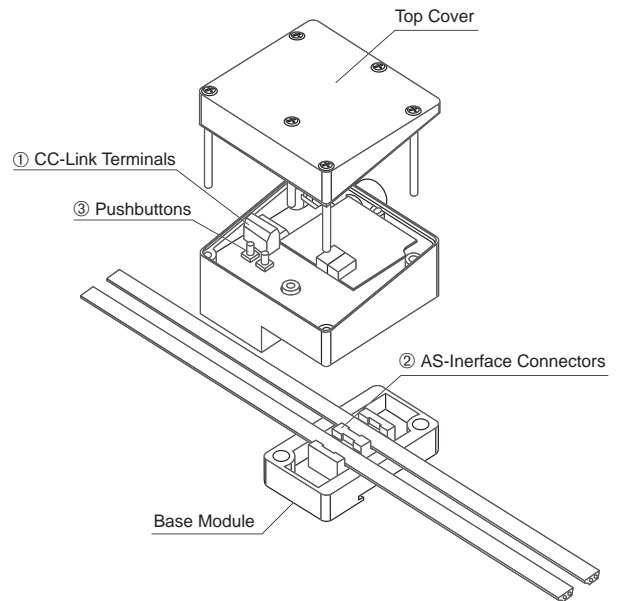
Base Module

### ② AS-Interface Connectors

Power is supplied to the SX5A-GM1N by connecting to the AS-Interface network via the base module.

⚠ **Warning**

When connecting only one AS-Interface flat cable, plug the unused cable connector using the attached gasket to ensure waterproof characteristics.

### ③ Pushbuttons

1. Sets the CC-Link slave number and baud rate.
2. Switches to AS-Interface configuration mode and protected mode.

# SX5A AS-Interface Gateway

## AS-Interface/DeviceNet Gateway

### SX5A-GD1N

- The SX5A-GD1N is a gateway to convert the DeviceNet and AS-Interface protocols. Serves as a slave of the DeviceNet and a master of the AS-Interface.
- AS-Interface Ver. 2.1 compliant
- Degree of protection: IP20
- AS-Interface can be connected to the DeviceNet.
- Power is supplied from the AS-Interface.
- Status and error indication on LEDs and color graphical display
- All AS-Interface functions can be operated via DeviceNet.



## Specifications

| Type No. | | | SX5A-GD1N |
|---|---|---|---|
| General Specifications | Rated Input Voltage | | 26.5 to 31.6V DC |
| | Rated Current | | 200 mA |
| | Operating Temperature | | 0 to +55°C (no freezing) |
| | Storage Temperature | | −15 to +70°C (no freezing) |
| | Operating Humidity | | 30 to 95% RH (no condensation) |
| | Degree of Protection | | IP20 |
| | Insulation Resistance | | 100 MΩ minimum (500V DC megger) |
| | Dielectric Strength | | 1000V AC, 1 minute |
| | Applicable Wire | AS-Interface | AS-Interface flat cable<br>Stranded wire: 0.5 to 0.75 mm$^2$ (ferrule)<br>Single wire: 0.5 to 1.5 mm$^2$<br>Shield wire outside diameter: 2.8 mm maximum |
| | | DeviceNet | 2-wire twisted pair cable |
| | Weight | | Approx. 420 g |
| | Dimensions | | 100W × 75H × 115D mm |
| | Mounting | | 35-mm DIN rail or screw mounting |
| Communication Specifications | AS-Interface | Topology | Bus |
| | | Max. Number of Nodes per Network | 62 |
| | | Max. Number of I/Os per Network | 434 |
| | | Cycle Time | 10 ms (62 slaves) (AS-Interface cable) |
| | | Max. Network Length | 100 m AS-Interface flat cable<br>(3V maximum voltage drop on the transmission line) |
| | | Max. Current inside Network | 8A per AS-Interface circuit |
| | | Applicable AS-Interface Version | Version 2.1 |
| | DeviceNet | Topology | Bus |
| | | Max. Network Length | 500 m (125 kbps), 250 m (250 kbps), and 100 m (500 kbps) |
| | | Data Size | Maximum input 64 bits, output 32 bits |
| | | Transmission Speed | 125, 250, and 500 kbps |
| | | Applicable DeviceNet Version | Version 2.0 Errate 4 |
| Standards | | | UL/c-UL, CE |

## Front Panel



② Pushbuttons  ③ Graphical Display
① LED Indicators
④ DeviceNet Terminals
⑥ AS-Interface Terminals
⑤ Ground Terminal

### ① LED Indicators

| LED | Color (ON) | Description |
|---|---|---|
| POWER | Green | Sufficient power is supplied to the gateway. |
| MNS | Red/Green | Red flash: No CAN communication in preoperational mode. Green flash: CAN communication node in preoperational mode. Green ON: CAN communication node in operational mode. |
| CONFIG ERR | Red | Configuration error |
| U AS-i | Green | Sufficient power is supplied to the AS-Interface circuit. |
| AS-i ACTIVE | Green | Normal operation |
| PRG ENABLE | Green | Automatic addressing function is enabled. |
| PRJ MODE | Orange | AS-Interface master is in configuration mode. |

### ② Pushbuttons

| MODE | Switches to configuration and protected modes. Saves the AS-Interface configuration data as default settings. |
|---|---|
| OK, ESC | Switches to graphical mode. |
| SET | Sets slave address. |

### ③ Graphical Display

Using the graphical display, the entire AS-Interface network can be operated without using the DeviceNet master. Connected equipment can be tested completely, ensuring easy and quick operation.

### ④ DeviceNet Terminals

| Terminal | Signal | Function | Color |
|---|---|---|---|
| 1 | V+ | DeviceNet Power + | Red |
| 2 | CAN_H | Communication Data High | White |
| 3 | Shield | Shield | — |
| 4 | CAN_L | Communication Data Low | Blue |
| 5 | V– | DeviceNet Power – | Black |

### ⑤ Ground Terminal
### ⑥ AS-Interface Terminals
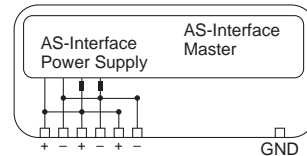


The power to the SX5A-GD1N is supplied from the AS-Interface line (200 mA). No additional 24V DC power is necessary.

The SX5A-GD1N starts when turning on the AS-Interface power.

| Terminal | Signal |
|---|---|
| + | AS-Interface positive terminal (3-pole) |
| – | AS-Interface negative terminal (3-pole) |
| GND | Ground |

## Mounting and Removing (DIN Rail)



① Mounting
Removing ⑤

DIN Rail
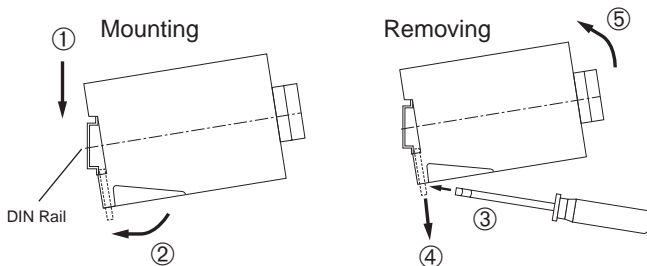
## Mounting Hole Layout



## Dimensions



100
75
110
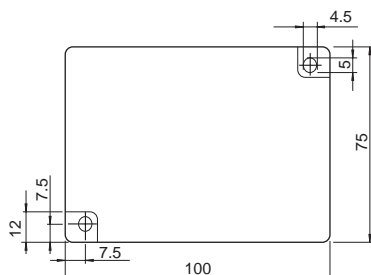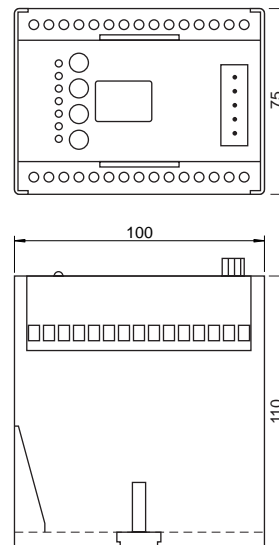
All dimensions in mm.

# SX5A AS-Interface (Communication Terminal and Repeater)

## Available in IP67 and IP20 Types

**AS-Interface Communication Terminals
(Slave Modules)**

**IP67 Type I/O Module**
• AS-Interface Ver. 2.1 compliant, capable of connecting 62 slaves
• Compatible with 2- and 3-wire sensors
• With AS-Interface power and input status indicators
• Overload detection function on the sensor power supply
• Output overload detection function (2 in/2 out type, 4 in/3 out type)

**IP20 Terminal Block Type**
• AS-Interface Ver. 2.1 compliant, capable of connecting 62 slaves
• Detachable terminal blocks
• Compatible with 2- and 3-wire sensors
• Input port power can be selected to supply from inside or outside.
• AS-Interface power and input status indicators
• IEC62026-2 compliant
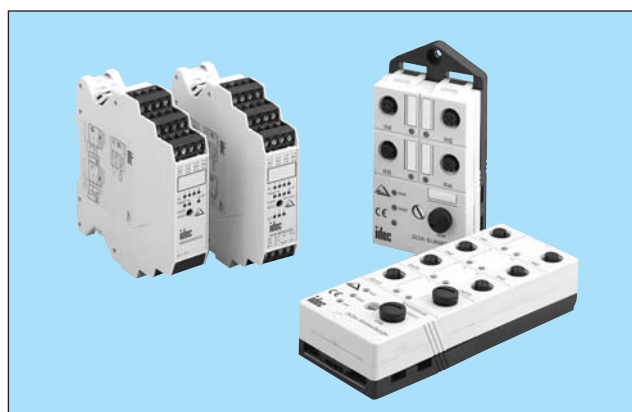
**Repeater**
• No address setting required. The AS-Interface network can be extended up to 300 m.
• IP65 protection
• The piercing technology allows easy connection to AS-Interface flat cables.

## Types

### • SX5A AS-Interface Communication Terminals

| Name & Appearance | Terminal | I/O Specifications | | | | Type No. | Package Quantity | Applicable Base Module |
|---|---|---|---|---|---|---|---|---|
| | | Input Points | Input Type | Output Points | Output Type | | | |
| IP67 Type I/O Module | Connector | 4 | NPN | — | — | SX5A-SWN40S02 | 1 | SX5A-B3FF |
| | | 4 | PNP | — | — | SX5A-SWN40K02N | 1 | SX5A-B3FF |
| | | 2 | PNP | 2 | PNP | SX5A-SWM22KS2N | 1 | SX5A-B3FF |
| | | 4 | PNP | 3 | PNP | SX5A-SWM43KS2N | 1 | SX5A-B2FF |
| IP20 Type I/O Module | Terminal Block | 4 | NPN | — | — | SX5A-SSN40S0N | 1 | — |
| | | 4 | PNP | — | — | SX5A-SSN40K0N | 1 | — |
| | | 4 | PNP | 3 | PNP | SX5A-SSM43KSN | 1 | — |

Note: The IP67 type I/O module is not supplied with a base module. Order an applicable base module separately.

### • Base Modules

| Name & Appearance | Applicable I/O Module | Description | Type No. | Package Quantity |
|---|---|---|---|---|
| Base Module for IP67 Type I/O Module | 4 in type 2 in/2 out type | Substructure module to connect two AS-Interface flat cables for AS-Interface bus and auxiliary power | SX5A-B3FF | 1 |
| | 4 in/3 out type | | SX5A-B2FF | 1 |

### • Repeater

| Name & Appearance | Description | Type No. | Package Quantity | Note |
|---|---|---|---|---|
| Repeater | A repeater can extend the AS-Interface network for up to 100 m. | SX5A-RP1 | 1 | See page 27 for details. |

• **Accessories**

| Name & Appearance | Description | Type No. | Ordering Type No. | Package Quantity | Note |
|---|---|---|---|---|---|
| Hand-held Programming Device | Assign slave addresses and monitor system configuration | SX9Z-ADR1N | SX9Z-ADR1N | 1 | Attachments:<br>• Programming device cable (SX9Z-CN1)<br>• Programming device AC adapter (SX9Z-ADPT)<br>• SwitchNet addressing port adapter (LA9Z-SNADP)<br>• Operation manual (English/Japanese) |
| Programming Device Cable | Connect the programming device to slave | SX9Z-CN1 | SX9Z-CN1 | 1 | |
| Programming Device AC Adapter | Charge the programming device | SX9Z-ADPT | SX9Z-ADPT | 1 | AC input voltage: 100 to 240V AC |
| SwitchNet Addressing Port Adapter | Connect the programing device cable to SwitchNet | LA9Z-SNADP | LA9Z-SNADP | 1 | |
| AS-Interface Flat Cable Branch Connector | Branch AS-Interface flat cable to AS-Interface flat cable | SX9Z-CF1 | SX9Z-CF1 | 1 | |
| T-branch Connector | Branch AS-Interface flat cable to 2-wire cable | LA9Z-SNTB | LA9Z-SNTB | 1 | |
| M12 Branch Connector | Branch AS-Interface flat cable to M12 connector | SX9Z-CT1 | SX9Z-CT1 | 1 | Pin Assignment<br>1: ASI+  3: AS–<br>2: NC    4: NC |
| AS-Interface Flat Cable Shrinkage Tube | Protect the end of AS-Interface cable | SX9Z-CPA1 | SX9Z-CPA1PN20 | 20 | Degree of protection: IP65 |
| Protection Cap | Ensure IP67 degree on unused M12 I/O plugs | SX9Z-CAP1 | SX9Z-CAP1PN10 | 10 | |
| 35-mm-wide DIN Rail | Aluminum (1m long) | BAA1000 | BAA1000PN10 | 10 | |
| | Steel (1m long) | BAP1000 | BAP1000PN10 | 10 | |
| Mounting Clip | | BNL5 | BNL5PN10 | 10 | |

Note: When ordering, specify the Ordering Type No.

# SX5A AS-Interface (Communication Terminal and Repeater)

## IP67 Type I/O Module

- AS-Interface Ver. 2.1 compliant. A maximum of 62 slaves can be connected.
- Only the SX5A-SWN40S02 is a Ver. 2.0 standard slave, which allows for connection of up to 31 slaves.
- Compatible with 2- and 3-wire sensors
- With AS-Interface power and input status indicators
- Overload detection function on the sensor power supply
- Output overload detection function (2 in/2 out type, 4 in/3 out type)
- IEC62026-2 compliant



## Specifications

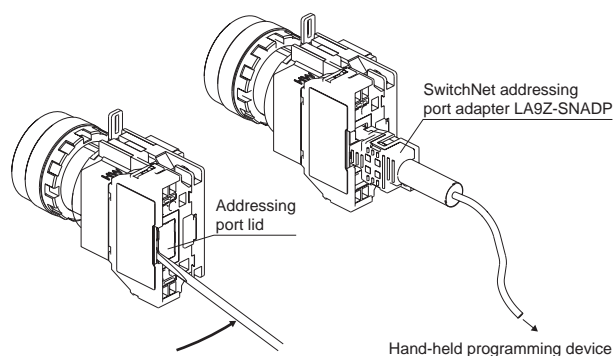| Type No. | | | SX5A-SWN40S02 | SX5A-SWN40K02N | SX5A-SWM22KS2N | SX5A-SWM43KS2N |
|---|---|---|---|---|---|---|
| General | Rated Operating Voltage Ue | | 26.5 to 31.6V DC supplied from AS-Interface line | | | |
| | Rated Operating Current Ie | | ≤ 40 mA (without sensor) 240 mA maximum | | ≤ 40 mA (without sensor) 140 mA maximum | ≤ 40 mA (without sensor) 240 mA maximum |
| | External Auxiliary Power Supply UAUX | | — | | 20 to 30V DC PELV (protective very-low voltage: protection class 3 VDE0106 / IEC 60364-4-41 compliant) | |
| | Operating Temperature | | –25 to +60°C (no freezing) | | | |
| | Storage Temperature | | –25 to +85°C (no freezing) | | | |
| | Degree of Protection | | IP67 (EN 60529); Attach the SX9Z-CAP1 protection caps on unused I/O connectors. | | | |
| | Connection Method | | Insulation penetration technology for flat cables (yellow/black) M12 connector for I/O | | | |
| | Weight | | 100 g | 100 g | 100 g | 150 g |
| | Mounting Method | | Screw mounting on base module | | | |
| Input | Input Points/Signals | | 4 DC inputs 2- and 3-wire sensors (NPN) | 4 DC inputs 2- and 3-wire sensors (PNP) | 2 DC inputs 2- and 3-wire sensors (PNP) | 4 DC inputs 2- and 3-wire sensors (PNP) |
| | Input Power | | 20 to 31V DC supplied from AS-Interface line | | | |
| | Load Current Capacity | | ≤ 200 mA (TB ≤ 40°C) ≤ 150 mA (TB ≤ 60°C) | | ≤ 100 mA (TB ≤ 40°C) ≤ 75 mA (TB ≤ 60°C) | ≤ 200 mA (TB ≤ 40°C) ≤ 150 mA (TB ≤ 60°C) |
| | | | Provided with overload and short-circuit protection | | | |
| | OFF Current | | OFF ≤ 1 mA | OFF ≤ 2 mA | | |
| | ON Current (sink) | | ON ≥ 4.5 mA | ON ≥ 4 mA | | |
| | Protection Circuit | | Input current limit ≤ 8 mA | | | |
| Output | Output Points/Signals | | — | | 2 PNP transistor outputs (with overload/short-circuit protection) | 3 PNP transistor outputs (with overload/short-circuit protection) |
| | Output Power | | — | | Supplied from external auxiliary power supply UAUX | |
| | Voltage | | — | | External auxiliary power voltage UAUX – 0.5V | |
| | Current | | — | | 1A per output point | 2A (OUT1, OUT2) 1.5A (OUT3) 4A total |
| | Communication Error | | — | | Output turns off | |
| Communication | Slave Type | | Standard slave | A/B slave | | |
| | Profile | IO | 0 | 0 | B | 7 |
| | | ID | 1 | A | A | A |
| | | ID2 | — | 2 | 2 | 2 |
| | Data Bits | | Input  Output | Input  Output | Input  Output | Input  Output |
| | D0 | | IN1    — | IN1    — | —    OUT1 | IN1    OUT1 |
| | D1 | | IN2    — | IN2    — | —    OUT2 | IN2    OUT2 |
| | D2 | | IN3    — | IN3    — | IN3    — | IN3    OUT3 |
| | D3 | | IN4    — | IN4    — | IN4    — | IN4    — |
| LED Indicators | PWR | | AS-Interface power: Green LED | | | |
| | AUX | | — | | External auxiliary power UAUX: Green LED | |
| | IN | | 4 yellow LEDs | | 2 yellow LEDs | 4 yellow LEDs |
| | OUT | | — | | 2 yellow LEDs | 3 yellow LEDs |
| | FAULT | | Error indication:  Red LED ON:                    Communication error or address 0 Flash:                 Sensor power supply or output is overloaded | | | |
| Address Assignment | Addressing Method | | Remove the protection cap from the addressing port on the I/O module. Connect the hand-held programming device (SX9Z-ADR1N) to the addressing port on the I/O module using the programming device cable (SX9Z-CN1), then the I/O module stops communication through the AS-Interface line. Change slave address using the programming device. | | | |
| Certification | | | AS-International Association | | | |
| Standards | | | UL/c-UL, CE | | | |

# SX5A AS-Interface (Communication Terminal and Repeater)

## IP20 Type I/O Module

- AS-Interface Ver. 2.1 compliant
- A maximum of 62 slaves can be connected.
- Detachable terminal blocks
- Communication monitor function
- Compatible with 2- and 3-wire sensors
- Input port power can be selected to supply from inside or outside.
- AS-Interface power and input status indicators
- IEC62026-2 compliant



## Specifications

| Type No. | | | SX5A-SSN40S0N | SX5A-SSN40K0N | SX5A-SSM43KSN |
|---|---|---|---|---|---|
| General | Rated Operating Voltage Ue | | 26.5 to 31.6V DC supplied from AS-Interface line | | |
| | Rated Operating Current Ie | | ≤ 30 mA (without sensor) | | ≤ 35 mA (without sensor) |
| | External Auxiliary Power Supply $U_{AUX}$ | | — | | 20 to 30V DC PELV (protective very-low voltage: protection class 3 VDE0106 / IEC 60364-4-41 compliant) |
| | Operating Temperature | | −25 to +60°C (no freezing) | | |
| | Storage Temperature | | −25 to +85°C (no freezing) | | |
| | Degree of Protection | | IP20 (EN 60529) | | |
| | Connection Method | | Detachable terminal block: Applicable wire size ≤ 2.5 mm$^2$ | | |
| | Weight | | 150 g | | |
| | Mounting Method | | DIN rail mounting | | |
| Input | Input Points/Signals | | 4 DC inputs, 2- and 3-wire sensors (NPN) | 4 DC inputs, 2- and 3-wire sensors (PNP) | |
| | Input Power | | Supplied from AS-Interface line (default: internal switch set to INT) Supplied from an external 12 to 24V DC PELV (internal switch set to EXT) | | |
| | Load Current Capacity | | ≤ 150 mA (provided with overload and short-circuit protection) | | |
| | OFF Current | | OFF ≤ 2 mA | | |
| | ON Current (sink) | | ON ≥ 4 mA | | |
| Output | Output Points/Signals | | — | | 3 PNP transistor outputs (with overload/short-circuit protection) |
| | Output Power | | — | | Supplied from external auxiliary power supply $U_{AUX}$ |
| | Voltage | | — | | External auxiliary power voltage $U_{AUX}$ − 0.5V |
| | Current | | — | | 3A max. (OUT1), 1.5A max. (OUT2, OUT3), 6A total ($T_B$ ≤ 40°C) 2A max. (OUT1), 1A max. (OUT2, OUT3), 4A total ($T_B$ ≤ 60°C) |
| | Communication Error | | — | | Output turns off |
| Communication | Slave Type | | A/B slaves | | |
| | Profile | IO | 0 | | 7 |
| | | ID | A | | A |
| | | ID2 | 0 | | 0 |
| | Data Bits D0 D1 D2 D3 | | Input  Output IN1  — IN2  — IN3  — IN4  — | | Input  Output IN1  OUT1 IN2  OUT2 IN3  OUT3 IN4  — |
| LED Indicators | PWR | | AS-Interface power: Green LED | | |
| | AUX | | — | | External auxiliary power $U_{AUX}$: Green LED |
| | IN | | 4 yellow LEDs | | |
| | OUT | | — | | 3 yellow LEDs |
| | FAULT | | Error indication:  Red LED ON:  Communication error or address 0 Flash:  Sensor power supply or output is overloaded | | |
| | INT | | Input power supplied from AS-Interface line: Green LED | | |
| Address Assignment | Addressing Method | | Connect the hand-held programming device (SX9Z-ADR1N) to the addressing port on the I/O module using the programming device cable (SX9Z-CN1), then the I/O module stops communication through the AS-Interface line. Change slave address using the programming device. | | |
| Certification | | | AS-International Association | | |
| Standards | | | UL/c-UL, CE | | |

# SX5A AS-Interface (Communication Terminal and Repeater)

## Internal Circuits

### • SX5A-SWN40S02
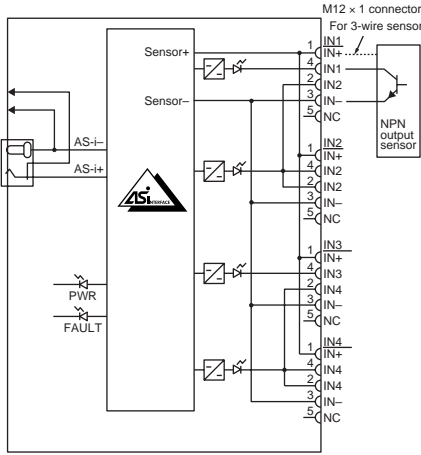


### • SX5A-SWN40K02N
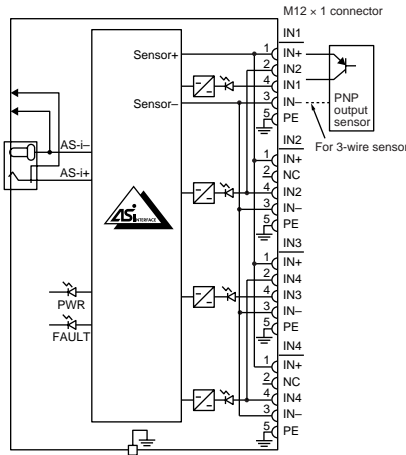


Connect to protective ground on control panel.

### • SX5A-SWM22KS2N
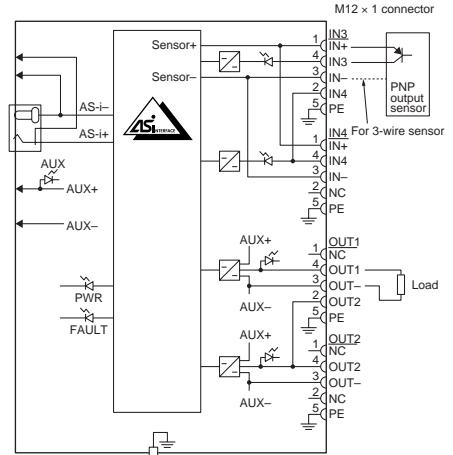


Connect to protective ground on control panel.

### • SX5A-SWM43KS2N
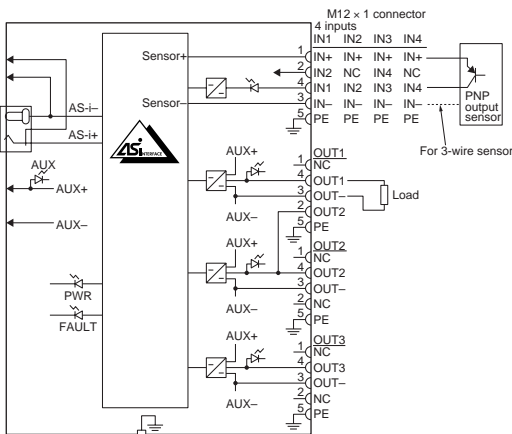


Connect to protective ground on control panel.

### • SX5A-SSN40S0N
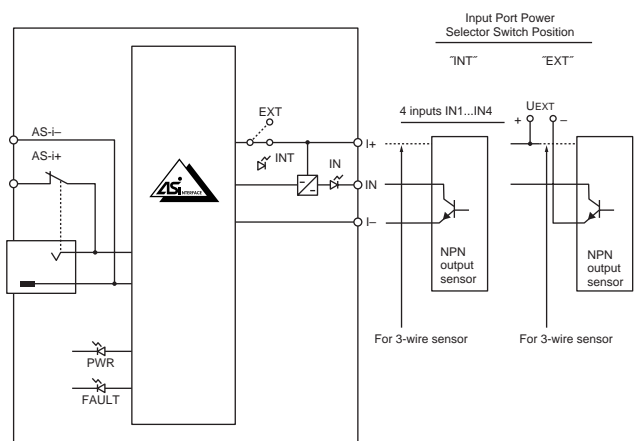


### • SX5A-SSN40K0N
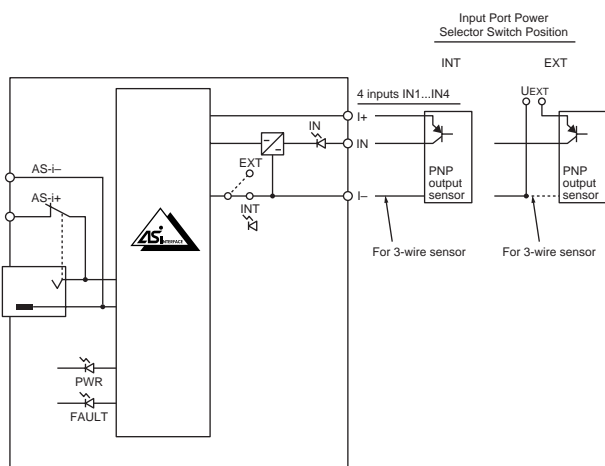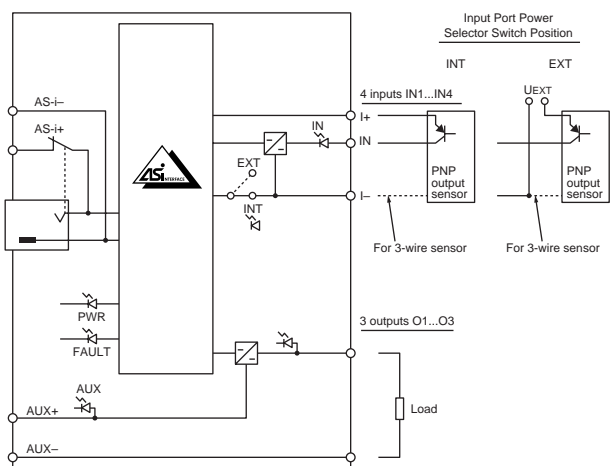


### • SX5A-SSM43KSN

# SX5A AS-Interface (Communication Terminal and Repeater)

## Connector Arrangement

**• SX5A-SWN40S02**
**• SX5A-SWN40K02N**



IN1  IN2
IN3  IN4
PWR
FAULT
ADDR

**• SX5A-SWM22KS2N**



OUT1  OUT2
IN3  IN4
PWR
FAULT
AUX
ADDR

**• SX5A-SWM43KS2N**



IN1  IN2
IN3  IN4
OUT1  OUT2
OUT3
PWR
FAULT
AUX
ADDR
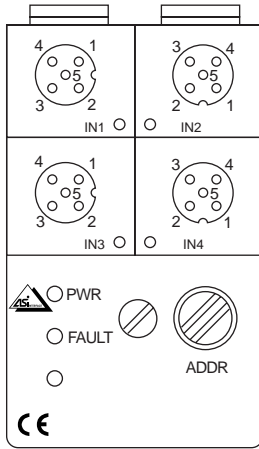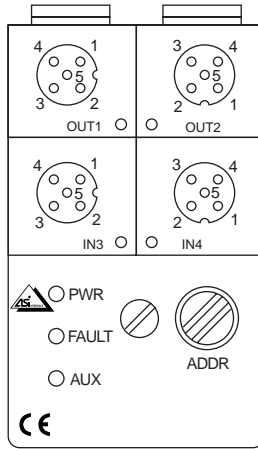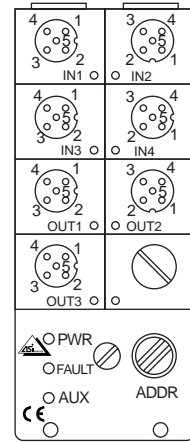
## Terminal Arrangement

**• SX5A-SSN40S0N, SX5A-SSN40K0N**



Input Terminal Assignment

Label Field (for user)

I-1  I-2  I-3  I-4
IN1  IN2  IN3  IN4
I+1  I+2  I+3  I+4

IN  1  2  3  4
FAULT  INT
PWR
ADDR

SX5A–SSN40K0N

AS-Interface Terminal Assignment

AS-i+  AS-i–

**• SX5A-SSM43KSN**



Input Terminal Assignment

Label Field (for user)

I-1  I-2  I-3  I-4
IN1  IN2  IN3  IN4
I+1  I+2  I+3  I+4

IN  1  2  3  4
FAULT  INT
PWR  AUX
ADDR
OUT  1  2  3

SX5A–SSM43KSN

Output Terminal Assignment

Auxiliary Voltage Terminal Assignment

01  0-1  02  0-2
03  0-3
AS-i+  AS-i–  AUX+  AUX–

AS-Interface Terminal Assignment

## Input Port Power Selection

Power for input ports and connected sensors can be supplied from either inside (AS-Interface) or outside (external power supply). The selection is done using the switch inside the I/O module.

While the input power is supplied from inside, the INT LED remains on. While the input power is supplied from outside, the INT LED remains off. I/O statuses are indicated on the front LED indicators.
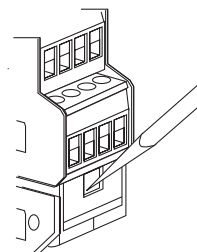


1. Unlock
   Press on BOTH sides.

2. Open
   Pull upper part until STOP.
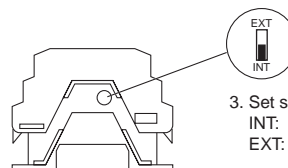
3. Set switch
   INT: sensor supply from AS-Interface
   EXT: external sensor supply

Switching the input power supply INT/EXT

# SX5A AS-Interface (Communication Terminal and Repeater)

## Dimensions

• **SX5A-SWN40S02**
• **SX5A-SWN40K02N**
• **SX5A-SWM22KS2N**

Base module is
separately ordered.
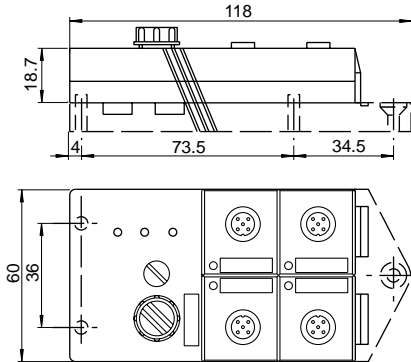


• **SX5A-SWM43KS2N**

Base module is
separately ordered.
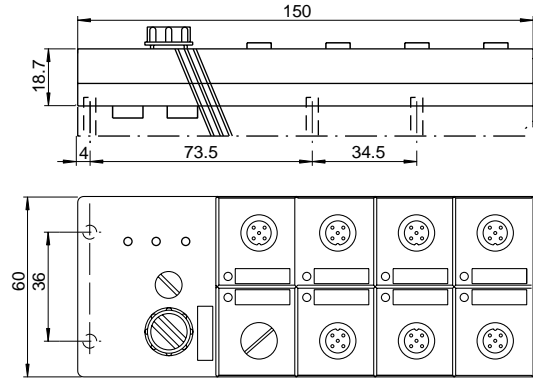


• **SX5A-B3FF**
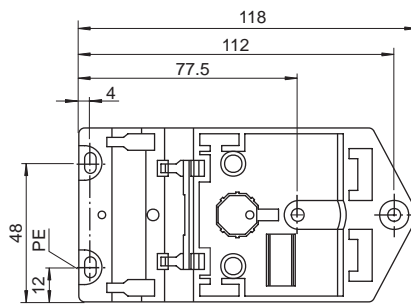


• **SX5A-B2FF**
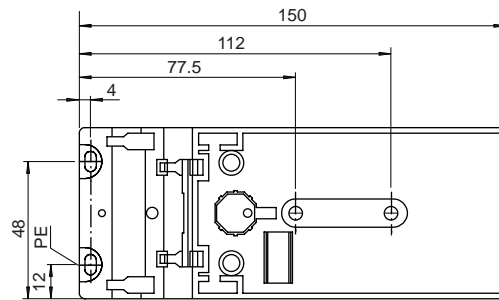


• **SX5A-SSN40S0N**
• **SX5A-SSN40K0N**
• **SX5A-SSM43KSN**
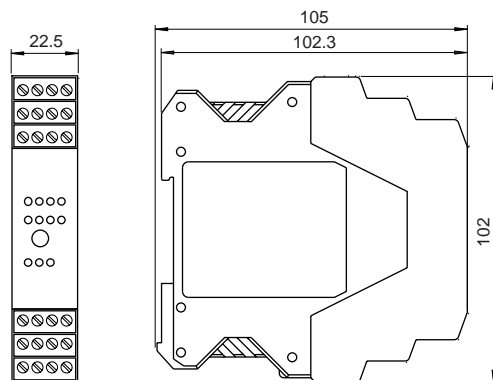


All dimensions in mm.

# SX5A AS-Interface (Communication Terminal and Repeater)

## Repeater

### SX5A-RP1

- No address setting required
- An AS-Interface network can be extended up to 300 m.
- IP65 protection
- The insulation penetration technology allows easy connection to AS-Interface flat cables.
- Input statuses of AS-Interface 1 and 2 are displayed with the LED indicators.
- The SX5A-RP1 repeater is used to extend the AS-Interface cable. One repeater extends the length of network for up to 100 m. A maximum of two repeaters can be used in a network, enabling the construction of a network of up to 300 m.
- The repeater does not require address setting.

## Specifications

| Type No. | | SX5A-RP1 |
|---|---|---|
| General | Rated Input Voltage | 26.5 to 31.6V DC |
| | Rated Current | 60 mA (per segment), 120 mA (total) |
| | Operating Temperature | 0 to +55°C (no freezing) |
| | Storage Temperature | −25 to +75°C (no freezing) |
| | Operating Humidity | 30 to 95% RH (no condensation) |
| | Degree of Protection | IP65 |
| | Insulation Resistance | 5 MΩ minimum (500V DC megger) |
| | Dielectric Strength | 1000V AC, 1 minute |
| | Applicable Wire | AS-Interface flat cable |
| | Weight | Approx. 170 g |
| | Dimensions | 60W × 118.5H × 22.5D mm |
| | Mounting | Screw mounting |
| Standard | | CE |

### • LED Indicators (see Dimensions)

| Indicators | Color (when ON) | Description |
|---|---|---|
| AS-Interface 1 | Green | Power is supplied to line 1. |
| AS-Interface 2 | Green | Power is supplied to line 2. |

## Dimensions

• SX5A-RP1
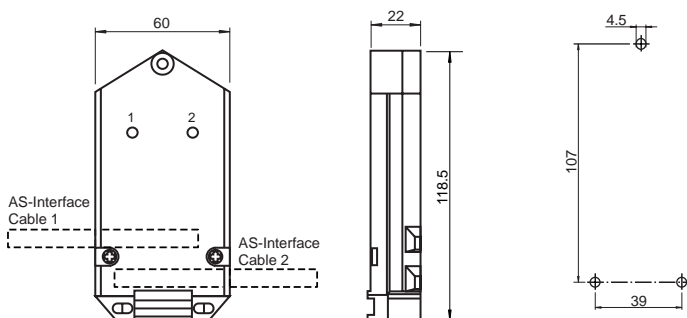
## Mounting Hole Layout

## System Setup

All dimensions in mm.
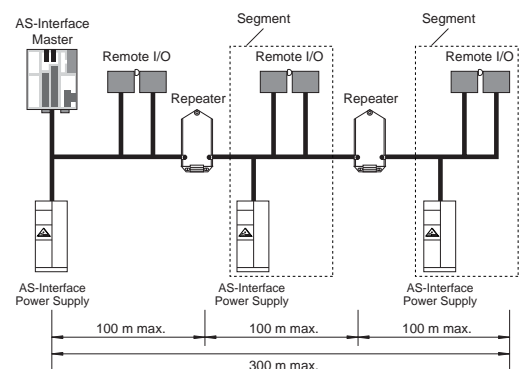
# SX5A AS-Interface (Communication Terminal and Repeater)

**,• Hand-held Programming Device**

| Type No. | SX9Z-ADR1N |
|---|---|
| Standards | CE |
| Power Supply | Powered by built-in battery (recharged using the attached AC adapter) |
| Operation Time | 8 hours or 250 read/write operations after full charge |
| Charging Time | Approx. 14 hours |
| Operating Temperature | 0 to +55°C |
| Storage Temperature | −25 to +85°C (no freezing) |
| Degree of Protection | IP20 |
| Weight | Approx. 275g |
| Communication Specifications | AS-Interface Version 2.1 |
| Operation | Slave address assignment and data read/write (compatible with the 62-slave mode) |
| Connection | Connects to a slave using the attached programming device cable |

**• Address Assignment for Communication Terminals**

Remove the protection cap from the addressing port on the I/O module.

Connect the hand-held programming device (SX9Z-ADR1N) to the addressing port on the I/O module using the programming device cable (SX9Z-CN1), then the I/O module stops communication through the AS-Interface line. Change slave addresses using the programming device.

For addressing procedures, see the user's manual for the hand-held programming device.



Hand-held programming device SX9Z-ADR1N

Programming device cable SX9Z-CN1

Addressing port

Addressing port

SX5A I/O Terminal (IP67 Type)
• SX5A-SWN40S02
• SX5A-SWN40K02N
• SX5A-SWM22KS2N
• SX5A-SWM43KS2N

SX5A I/O Terminal (IP20 Type)
• SX5A-SSN40S0N
• SX5A-SSN40K0N
• SX5A-SSM43KSN

**• Address Assignment for SwitchNet**

Turn off the power to the SwitchNet control unit, and open the lid of the addressing port. Connect the programming device cable (SX9Z-CN1) to the hand-held programming device (SX9Z-ADR1N), and attach the SwitchNet addressing port adapter (LA9Z-SNADP) to the programming device cable (SX9Z-CN1). Insert the addressing port adapter into the addressing port on the SwitchNet control unit. Change slave address using the programming device.

For addressing procedures, see the user's manual for the hand-held programming device. After completing address assignment, attach the lid to the addressing port.



Hand-held programming device SX9Z-ADR1N

Programming device cable SX9Z-CN1

SwitchNet addressing port adapter LA9Z-SNADP

SwitchNet HW communication block

SwitchNet L6 communication block

**• Using SwitchNet Addressing Port Adapter on HW**

To open the addressing port lid, insert a screwdriver into the side slot as shown. Do not lose the lid since it falls apart the communication block.



SwitchNet addressing port adapter LA9Z-SNADP

Addressing port lid

Hand-held programming device

Attach the addressing port adapter to the programming device cable, and insert the addressing port adapter into the addressing port on the communication block.

**• Using SwitchNet Addressing Port Adapter on L6**

To open the addressing port lid, insert a screwdriver into the right-side hole as shown. The addressing port lid can be removed from the communication block by pulling it out strongly.
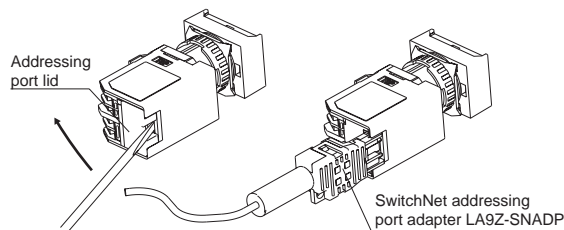


Addressing port lid

SwitchNet addressing port adapter LA9Z-SNADP

Attach the addressing port adapter to the programming device cable, and insert the addressing port adapter into the addressing port on the communication block.

# SwitchNet™ HW Series Control Units

## 216 Models of ø22dia Control Units Contain AS-Interface (ASI-SW)

- AS-Interface Ver. 2.1 compliant, capable of connecting 62 slaves
- Signals and power are carried through two wires.
- The wire length can be extended to 300m by using two repeaters.
- Spring clamp terminals save wiring time greatly.
- Available models include pushbuttons, pilot lights, illuminated pushbuttons, selector switches, key selector switches, and illuminated selector switches.
- Illuminated units can change the brightness in four levels: 100%, 50%, 25%, and 12.5%.
- The operator shapes and mounting hole dimensions are identical with the conventional HW series control units.
- Degree of protection: IP65 (from front of the panel)
- IEC 62026-2 compliant
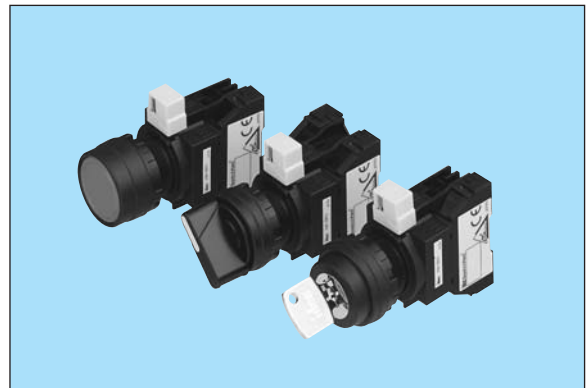
## Types

### • HW Series

| Non-illuminated Pushbuttons | Style | Operation | Type No. | Button Color Code | Package Quantity | Note |
|---|---|---|---|---|---|---|
| | Round Flush | Momentary | HW1B-M1A110S① | B (black)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow)<br>In place of ①, specify a button color code. | 1 | For dimensions, see page 35. |
| | | Maintained | HW1B-A1A110S① | | | |
| | Round Extended | Momentary | HW1B-M2A110S① | | | |
| | | Maintained | HW1B-A2A110S① | | | |
| | Mushroom ø29mm | Momentary | HW1B-M3A110S① | | | |
| | | Maintained | HW1B-A3A110S① | | | |
| | Mushroom ø40mm | Momentary | HW1B-M4A110S① | | | |
| | | Maintained | HW1B-A4A110S① | | | |
| | Square Flush | Momentary | HW2B-M1A110S① | | | |
| | | Maintained | HW2B-A1A110S① | | | |
| | Square Extended | Momentary | HW2B-M2A110S① | | | |
| | | Maintained | HW2B-A2A110S① | | | |

| Pilot Lights | Style | Type No. | Lens Color Code | Package Quantity | Note |
|---|---|---|---|---|---|
| | Round Flush | HW1P-1A101S4②-T | A (amber)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow)<br>In place of ②, specify a lens color code. | 1 | One LED lamp is included: LSTD-2②.<br>For dimensions, see page 35. |
| | Square Flush | HW2P-1A101S4②-T | | | |

# SwitchNet™ HW Series Control Units

## • HW Series

| Illuminated Pushbuttons | Style | Operation | Type No. | Lens Color Code | Package Quantity | Note |
|---|---|---|---|---|---|---|
| | Round Flush | Momentary | HW1L-M1A111S4② | A (amber)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow)<br>In place of ②, specify a lens color code. | 1 | One LED lamp is included: LSTD-2②.<br>For dimensions, see page 35. |
| | | Maintained | HW1L-A1A111S4② | | | |
| | Round Extended | Momentary | HW1L-M2A111S4② | | | |
| | | Maintained | HW1L-A2A111S4② | | | |
| | Round Extended with Full Shroud | Momentary | HW1L-MF2A111S4② | | | |
| | | Maintained | HW1L-AF2A111S4② | | | |
| | Mushroom ø29mm | Momentary | HW1L-M3A111S4② | | | |
| | | Maintained | HW1L-A3A111S4② | | | |
| | Mushroom ø40mm | Momentary | HW1L-M4A111S4② | | | |
| | | Maintained | HW1L-A4A111S4② | | | |
| | Square Flush | Momentary | HW2L-M1A111S4② | | | |
| | | Maintained | HW2L-A1A111S4② | | | |

| Selector Switches | Style | Operation | | Type No. | Package Quantity | Note |
|---|---|---|---|---|---|---|
| | Knob | 90° 2-position | Maintained | HW1S-2A110S | 1 | For dimensions, see page 35. 3-position selector switches use two communication blocks. |
| | | | Spring Return from Right | HW1S-21A110S | | |
| | | 45° 3-position | Maintained | HW1S-3A220XS | | |
| | | | Spring Return from Right | HW1S-31A220XS | | |
| | | | Spring Return from Left | HW1S-32A220XS | | |
| | | | Spring Return Two-way | HW1S-33A220XS | | |

| Key Selector Switches | Style | Operation | | Type No. | Key Retained Position Code | Package Quantity |
|---|---|---|---|---|---|---|
| | Key | 90° 2-position | Maintained | HW1K-2③A110S | A, B, C | 1 |
| | | | Spring Return from Right | HW1K-21③A110S | B | |
| | | 45° 3-position | Maintained | HW1K-3③A220XS | A, B, C, D, E, G, H | |
| | | | Spring Return from Right | HW1K-31③A220XS | B, D, G | |
| | | | Spring Return from Left | HW1K-32③A220XS | C, D, H | |
| | | | Spring Return Two-way | HW1K-33③A220XS | D | |

Note 1: In place of ③ in the Type No., specify a key retained position code from the table below.
Note 2: 3-position selector switches use two communication blocks.
Note 3: For dimensions, see page 35.

### [Key Retained Position Code]

| 90° 2-position | | | 45° 3-position | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | A | B | C | D | E | G | H |
| No retained | Right retained | Left retained | No retained | Right retained | Left retained | R/L retained | Center retained | C/R retained | C/L retained |

| Illuminated Selector Switches | Style | Operation | | Type No. | Lens Color Code | Package Quantity |
|---|---|---|---|---|---|---|
| | Knob | 90° 2-position | Maintained | HW1F-2A111S4② | A (amber)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow) | 1 |
| | | | Spring Return from Right | HW1F-21A111S4② | | |
| | | 45° 3-position | Maintained | HW1F-3A221XS4② | | |
| | | | Spring Return from Right | HW1F-31A221XS4② | | |
| | | | Spring Return from Left | HW1F-32A221XS4② | | |
| | | | Spring Return Two-way | HW1F-33A221XS4② | | |

Note 1: In place of ② in the Type No., specify a lens color code.
Note 2: 3-position selector switches use two communication blocks.
Note 3: One LED lamp is included: LSTD-2②.
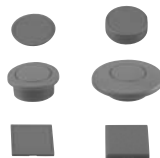Note 4: For dimensions, see page 35.
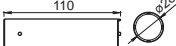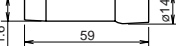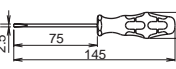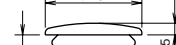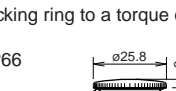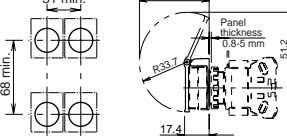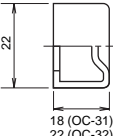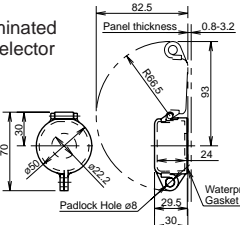
## • Accessories

| Name & Appearance | | Application/ Specification | Type No. | Ordering Type No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|
| T-branch Connector | | Branches AS-Interface flat cable to 2-wire cable | LA9Z-SNTB | LA9Z-SNTB | 1 | Current capacity 3A<br>For wiring instructions, see page 35. |
| Hand-held Programming Device | | Assigns slave addresses and monitor system configuration | SX9Z-ADR1N | SX9Z-ADR1N | 1 | Attachments:<br>• Programming device cable (SX9Z-CN1)<br>• Programming device AC adapter (SX9Z-ADPT)<br>• SwitchNet addressing port adapter (LA9Z-SNADP)<br>• Operating manual (English/Japanese) |
| Programming Device Cable | | Connects the programming device to slave | SX9Z-CN1 | SX9Z-CN1 | 1 | Included with hand-held programming device SX9Z-ADR1N |
| Programming Device AC Adapter | | Charges the programming device | SX9Z-ADPT | SX9Z-ADPT | 1 | AC input voltage: 100-240V AC<br>Included with hand-held programming device SX9Z-ADR1N |
| SwitchNet Addressing Port Adapter | | Connects the programing device cable to SwitchNet | LA9Z-SNADP | LA9Z-SNADP | 1 | Included with hand-held programming device SX9Z-ADR1N |
| Tools | Locking Ring Wrench | Made of metal Weight: Approx. 150g | MW9Z-T1 | MW9Z-T1 | 1 | Used to tighten the plastic locking ring. |
| | Lamp Holder Tool | Made of rubber | OR-55 | OR-55 | 1 | Used to remove and install LED lamps. |
| | Wiring Screwdriver | Weight: Approx. 20g | BC1S-SD0 | BC1S-SD0 | 1 | Used to wire spring clamp terminals. |
| Anti-rotation Ring | | Made of plastic | HW9Z-RL | HW9Z-RLPN10 | 10 | Prevents rotation of control unit in mounting hole. |
| Rubber Mounting Hole Plug | | Black rubber | OB-31 | OB-31PN05 | 5 | For plugging unused ø22 mounting holes in panel. |
| Metallic Mounting Hole Plug | | Diecast metal (Locking ring: plastic) | LW9Z-BM | LW9Z-BM | 1 | • For plugging unused ø22 mounting holes in panel.<br>• Tighten the attached locking ring to a torque of 1.2 N·m.<br>• Degree of protection: IP66 |
| Switch Guard | Spring return | Made of plastic | HW9Z-K1 | HW9Z-K1 | 1 | • For preventing inadvertent operation on flush pushbuttons and illuminated pushbuttons.<br>• Degree of protection: IP65<br>• Maintained cover stops at 90° and 180°. |
| | Maintained cover | | HW9Z-K11 | HW9Z-K11 | 1 | |
| Pushbutton Clear Boot | For flush buttons | Made of rubber (EPDM) | OC-31 | OC-31 | 1 | Used to cover and protect pushbuttons. Not used outdoors and not oil resistant. |
| | For extended buttons | | OC-32 | OC-32 | 1 | |
| Padlock Cover | | Body: Polyarylate Gasket: Nitrile rubber | HW9Z-KL1 | HW9Z-KL1 | 1 | Used to protect pushbuttons, illuminated pushbuttons, or selector switches. |

Note: When ordering, specify the Ordering Type No. and quantity.

# SwitchNet™ HW Series Control Units

## • HW Series Replacement Parts

| Name & Appearance | | Application/Specification | Type No, | Ordering Type No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|
| Button | Round Flush | Polyacetal | HW1A-B1① | HW1A-B1①PN05 | 5 | In place of ①, specify a button color code.<br>B (black)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow) |
| | Round Extended | Polyacetal | HW1A-B2① | HW1A-B2①PN05 | 5 | |
| | ø29 Mushroom | Polyacetal | HW1A-B3① | HW1A-B3①PN02 | 2 | |
| | ø40 Mushroom | Polyacetal | HW1A-B4① | HW1A-B4①PN02 | 2 | |
| | Square Flush | Polyacetal | HW2A-B1① | HW2A-B1①PN05 | 5 | |
| | Square Extended | Polyacetal | HW2A-B2① | HW2A-B2①PN05 | 5 | |
| Lens | Round Flush Illuminated PB | Polyarylate | HW9Z-L11② | HW9Z-L11②PN05 | 5 | In place of ②, specify a lens color code.<br>A (amber)<br>C (clear)<br>G (green)<br>R (red)<br>S (blue)<br>Y (yellow)<br>Note: For white illumination W, use a C (clear) lens. |
| | Round Extended Pilot Light Illuminated PB | Polyarylate | HW9Z-L12② | HW9Z-L12②PN05 | 5 | |
| | Square Flush Pilot Light Illuminated PB | Polyarylate | HW9Z-L21② | HW9Z-L21②PN05 | 5 | |
| Lens | ø29 Illuminated PB | AS resin Marking type | ALW31L-② | ALW31L-②PN02 | 2 | ②: C (clear), G (green), R (red), S (blue) |
| | | | ALW31LD-② | ALW31LD-②PN02 | 2 | ②: A (amber), Y (yellow) |
| | ø40 Illuminated PB | AS resin Marking type | ALW41L-② | ALW41L-② | 1 | ②: C (clear), G (green), R (red), S (blue) |
| | | | ALW41LD-② | ALW41LD-② | 1 | ②: A (amber), Y (yellow) |
| Marking Plate | Round Flush | Acrylic resin | HW9Z-P11 | HW9Z-P11PN05 | 5 | Color: white |
| | Round Extended | Acrylic resin | HW9Z-P12 | HW9Z-P12PN05 | 5 | |
| | Square Flush | Acrylic resin | HW9Z-P21 | HW9Z-P21PN05 | 5 | |
| | ø29/ø40 Mushroom | Acrylic resin | ALW3B | ALW3BPN05 | 5 | |
| Illuminated Selector Knob | | Polyarylate | HW9Z-FDY② | HW9Z-FDY② | 1 | In place of ②, specify a lens color code.<br>A (amber)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow) |
| Replacement Key | For key selector switch | Metallic | HW9Z-SK-231 | HW9Z-SK-231PN02 | 2 | |
| Locking Ring | | Plastic | HW9Z-LN | HW9Z-LNPN05 | 5 | Black |
| Safety Lever Lock | | Plastic | HW9Z-LS | HW9Z-LSPN10 | 10 | Yellow |
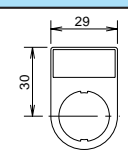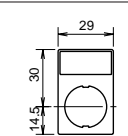
Note: When ordering, specify the Ordering Type No. and quantity.

## • LED Lamp

| Rated Voltage | Current Draw | Type No. | Ordering Type No. | Lens Color Code | Package Quantity | Lamp Base |
|---|---|---|---|---|---|---|
| 24V AC/DC ±10% | 10mA AC<br>11mA DC | LSTD-2② | LSTD-2② | A (amber), G (green), R (red), S (blue), W (white), Y (yellow)<br>In place of ②, specify a lens color code. | 1 | BA9S |
| | | | LSTD-2②PN10 | | 10 | |

Note: When ordering, specify the Ordering Type No.

## • HW Nameplates

| Name | Specifications | Type No. | Ordering Type No. | Package Quantity | Note/Dimensions |
|---|---|---|---|---|---|
| HWAM Nameplate | Without legend plate<br>Made of black plastic<br>1.5 mm thick | HWAM | HWAM | 1 | Order a legend plate HWNP-④ separately. |
| | | | HWAMPN10 | 10 | |
| HWAQ Nameplate | Without legend plate<br>Made of black plastic<br>1.5 mm thick | HWAQ | HWAQ | 1 | Order a legend plate HWNP-④ separately. |
| | | | HWAQPN10 | 10 | |

Note: When ordering, specify the Ordering Type No.

# SwitchNet™ HW Series Control Units

## • Legend Plate

| Name | Specifications | Type No. | Ordering Type No. | Package Quantity | Note/Dimensions |
|---|---|---|---|---|---|
| HWNP Legend Plate | Black aluminum plate 1.0 mm thick | HWNP-④ | HWNP-④ | 1 | White letter on black background. In place of ④, specify a legend code from the table below. |
| | | | HWNP-④PN10 | 10 | |

When ordering, specify the Ordering Type No.

### [Legend Codes ④ for Legend Plate]

| Legend Code ④ | Legend |
|---|---|
| 0 | (blank) |
| 1 | ON |
| 2 | OFF |
| 3 | START |
| 4 | STOP |
| 31 | OFF-ON |
| 35 | HAND-AUTO |
| 53 | HAND-OFF-AUTO |

- Fig. 1 shows the procedure to install the legend plate into the nameplate.
- Fig. 2 shows how to remove the legend plate from the nameplate. Insert a thin screwdriver into the top of the legend plate to remove the legend plate.
- When using the nameplate, the applicable panel thickness reduces by 1.5 mm, the thickness of the nameplate.
- When anti-rotation is not necessary and the recess is not provided in the mounting hole, break the anti-rotation tab off the nameplate as shown in Fig. 2.



Fig. 1          Fig. 2

## Specifications

### • General Specifications

| | |
|---|---|
| Operating Voltage | 26.5 to 31.6V DC |
| Maximum Input Current | Pushbutton, selector 2-position, key selector 2-position:   16 mA<br>Pilot light, illuminated PB, illuminated selector 2-position: 25 mA<br>Selector 3-position, key selector 3-position:          32 mA (2 slaves: 1-in slave 16 mA)<br>Illuminated selector 3-position:          41 mA (2 slaves: 1-in slave 16 mA, 1-in/1-out slave 25 mA) |
| Dielectric Strength | Between AS-Interface terminal and dead parts:500V AC, 1 minute |
| Insulation Resistance | Between AS-Interface terminal and dead parts: 100 MΩ minimum (500V DC megger) |
| Operating Temperature | –25 to +55°C (no freezing) |
| Storage Temperature | –40 to +80°C (no freezing) |
| Operating Humidity | 95% RH maximum (non-condensing) |
| Altitude | Operate: 2000m maximum, Transport: 3000m maximum |
| Pollution Degree | 3 (IEC 60664) |
| Degree of Protection | IP65 (outside of panel) |
| Corrosion Immunity | Atmosphere free from corrosive gases |
| Vibration Resistance | 5 to 55 Hz amplitude 0.5 mm, 50 m/s$^2$ (5G)<br>1 hour per axis on each of three mutually perpendicular axes |
| Shock Resistance | 1000 m/s$^2$ (100G), 5 shocks on each of three mutually perpendicular axes |
| Weight | Approx. 40g (3-position selector switches: approx. 44g) |

### • Communication Specifications

| | |
|---|---|
| Applicable Standard | AS-Interface Ver. 2.1 |
| Slave Profile | I/O code/ID code/ID2 code: B/A/E |
| Occupied Slave Addresses | Pushbutton, pilot light, illuminated PB, selector 2-position (knob, key, illuminated): 1 slave address<br>Selector 3-position (knob, key, illuminated):          2 slave addresses |
| Digital I/O Data Allocation | See page 34. |
| Illumination Control | LED illumination brightness of SwitchNet units can be controlled using the Write_Parameter command.<br>For Write_Parameter command and settings, see page 29. |
| AS-Interface Communication Specifications | Control system:          Master/slave system<br>Topology:          Free topology<br>Transmission medium:     2-wire cable<br>Maximum slaves:          62 (A/B slaves), 31 (standard slaves)<br>Maximum I/O points:     434 (A/B slaves), 248 (standard slaves)<br>Maximum network length: 100m (without repeater)<br>Maximum bus scan time:  10 ms (62 A/B slaves), 5 ms (31 standard slaves) |

# SwitchNet™ HW Series Control Units

## • Mechanical/Electrical Specifications

| Terminal Style | Spring clamp |
|---|---|
| Applicable Wire | Parallel 2-wire cable (twisted cable not applicable)<br>Single wires can also be used for connection over short distances.<br>Stranded wire: 0.5 to 0.75 mm$^2$ (AWG20 to 18)<br>Solid wire:     0.5 to 1.5 mm$^2$ (AWG20 to 16)<br>When using a ferrule on a stranded wire, use the ferrule shown far below on this page. Do not twist single wires together. |
| Mounting Hole Size | ø22.3 mm, +0.4 or –0 mm |
| Applicable LED Lamp | LSTD-2② (rated current 10 mA DC) |
| Mechanical Life | Momentary:                                5,000,000 operations minimum<br>Maintained, selector:                    500,000 operations minimum<br>Addressing port adapter durability:  100 insertions/removals minimum |

## • Certification

| Certification | AS-International Association |
|---|---|
| Standards | UL listed, c-UL listed, CE marked |

## • Digital I/O Data Allocation

| Slave Unit | Used I/O | Communication Block Mounting Position | Input Data (slave send data) | | | | Output Data (slave receive data) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | DI3 | DI2 | DI1 | DI0 | DO3 | DO2 | DO1 | DO0 |
| Pushbutton | 1 in | ② | 0 | X1 | 1 | 1 | ∗ | — | — | — |
| Pilot light | 1 out | ② | 0 | 0 | 1 | 1 | ∗ | — | — | X1 |
| Illuminated pushbutton | 1 in/1 out | ② | 0 | X1 | 1 | 1 | ∗ | — | — | X1 |
| Selector, Key selector 2-position | 1 in | ② | 0 | X2 | 1 | 1 | ∗ | — | — | — |
| Selector, Key selector 3-position | 1 in | ① | 0 | X3 | 1 | 1 | ∗ | — | — | — |
| | 1 in | ② | 0 | X3 | 1 | 1 | ∗ | — | — | — |
| Illuminated selector 2-position | 1 in/1 out | ② | 0 | X2 | 1 | 1 | ∗ | — | — | X1 |
| Illuminated selector 3-position | 1 in | ① | 0 | X3 | 1 | 1 | ∗ | — | — | — |
| | 1 in/1 out | ② | 0 | X3 | 1 | 1 | ∗ | — | — | X1 |

Notes:

1. In the above table, bits marked with X1, X2, and X3 are used.
2. X1: When pushbutton is pressed, input data is 1 (on). When not pressed, input data is 0 (off). When output data is 1 (on), LED is on. When output data is 0 (off), LED is off.
3. X2: The input data of 2-position selector switches depend on the operator position as shown below.

| 2-position Operator |  | |
|---|---|---|
| Operator Position | 1 | 2 |
| DI2 | 0 | 1 |

4. X3: The input data of 3-position selector switches depend on the operator position as shown below.

| 3-position Operator | |  | | |
|---|---|---|---|---|
| Operator Position | | 1 | 0 | 2 |
| Communication Block Mounting Position | Input Data Bit | | | |
| ① | DI2 | 1 | 0 | 0 |
| ② | DI2 | 0 | 0 | 1 |

5. Unused input bits DI3 and DI2 are 0 (off), and unused input bits DI1 and DI0 are 1 (on). Slaves ignore unused output data sent from the master.
6. ∗: The master uses bit DO3 for addressing A/B slaves.
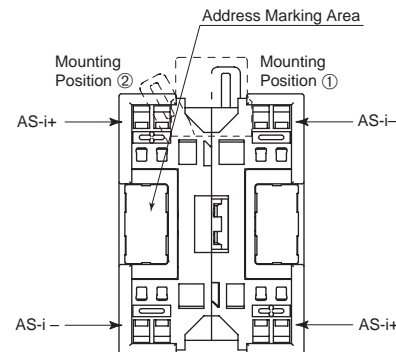


On 3-position selector switches and illuminated selector switches, communication blocks ① and ② are mounted in positions as shown above.

## • Write_Parameter Command

| 0 | 0 | A4 | A3 | A2 | A1 | A0 | 1 | Sel P3 | P2 | P1 | P0 | PB | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

### [Write_Parameter Settings]

| LED Brightness | Settings | | | Remarks |
|---|---|---|---|---|
| | Output Selection | Control Data | | |
| | P2 | P1 | P0 | |
| 100% | | 1 | 1 | Default |
| 50% | 1: DO0<br>0: DO1 | 0 | 1 | |
| 25% | | 1 | 0 | |
| 12.5% | | 0 | 0 | |

## • Ferrules (Phoenix Contact)

| Cable Size (Stranded) | Phoenix Type | Order No. | Pcs./Pkt. |
|---|---|---|---|
| 0.5 mm$^2$ (AWG20) | AI 0,5-8 WH | 32 00 01 4 | 100 |
| 0.75 mm$^2$ (AWG18) | AI 0,75-8 GY | 32 00 51 9 | 100 |

## Dimensions

All dimensions in mm.

### • Top and Side Views

Communication Block
Operator
Gasket
Panel thickness 0.8 to 6
HW
0.5

Locking Ring
23.6
49.3    13.0

### • Pushbuttons

Panel thickness 0.8 to 6
Gasket
Locking Ring
LOCK ø29
25
41.4
□29.6
29.4
13

Round Flush
Round Extended    Square Flush
Square Extended

LOCK
ø29
25
41.4
29.4
13
23.2

ø29 Mushroom

LOCK
ø40
25
41.4
29.4
13
23.2

ø40 Mushroom

### • Pilot Lights
### • Illuminated Pushbuttons

Gasket
Locking Ring
Panel thickness 0.8 to 6
ø29
25
41.4
29.4
13
□29.6

Round Flush
Round Extended    Square Flush

ø23.5
13
18.5

Round Extended

ø29.5
18.5

With Full Shroud

ø29
25
41.4
29.4
13
23.2

ø29 Mushroom

LOCK
ø40
25
41.4
29.4
13
23.2

ø40 Mushroom

### • Selector Switch

Gasket
Locking Ring
Panel thickness 0.8 to 6
LOCK ø29
ø28.8
25
41.4
7    29.4
21

### • Key Selector Switch

LOCK ø29.4
25
41.4
17
13
30.5    29.4

### • Illuminated Selector Switch

LOCK ø29
25
41.4
7    29.4
21

### Panel Cut-out

$*3.2 {}^{+0.2}_{0}$    R0.8 max.
$ø22.3 {}^{+0.4}_{0}$
$24.1 {}^{+0.4}_{0}$

The 3.2 recess marked with * is for anti-rotation. When nameplates and anti-rotation rings are not used, this recess is not necessary.
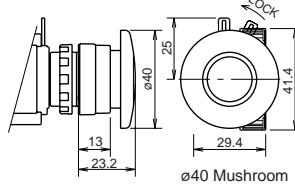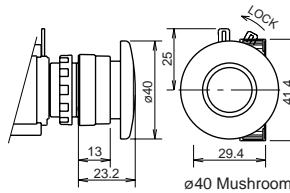
## T-branch Connector: LZ9Z-SNTB

1.7    11.2
20    26    32.8

AS-i+    AS-i–
AS-i+    AS-i–

32.8

30
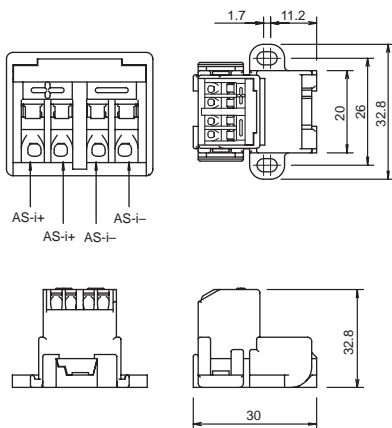
Mounting
Hole Layout
26.0
$2-ø3.5$
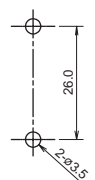
### • Wiring Instructions

1. Locate the wire hole on top of the T-branch connector. To open the spring clamp in the wire hole, insert an optional screwdriver (BC1S-SD0) diagonally into the adjoining screwdriver hole until it hits the bottom. Slightly jerk the screwdriver to insert easily.

Approx. 50°
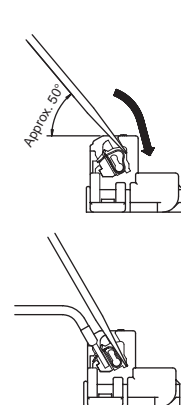
Screwdriver Tip
According to DIN5264
0.4
7 to 13°
ø2.5
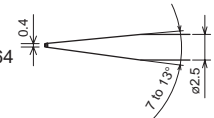
2. With the screwdriver held in the hole, insert a wire or ferrule to the bottom of the wire hole, then pull out the screwdriver.
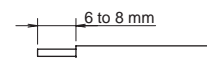
6 to 8 mm

3. Strip the cable insulation 6 to 8 mm from the end. When wiring with 0.75 mm$^2$ or AWG18 stranded wires, use of the ferrule shown on page 34 is recommended to ensure a sufficient tensile strength. If a stranded wire of this thickness is connected without using a ferrule, the wire tensile strength reduces.

# SwitchNet™ L6 Series Control Units

## 277 Models of ø16dia Control Units Contain AS-Interface (ASI-SW)

- AS-Interface Ver. 2.1 compliant, capable of connecting 62 slaves
- Signals and power are carried through two wires.
- The wire length can be extended to 300m by using two repeaters.
- Spring clamp terminals save wiring time greatly.
- Available models include pushbuttons, pilot lights, illuminated push-buttons, selector switches, key selector switches, illuminated selector switches, and lever switches.
- Illuminated units can change the brightness in four levels: 100%, 50%, 25%, and 12.5%.
- The operator shapes and mounting hole dimensions are identical with the conventional L6 series control units.
- Degree of protection: IP65 (from front of the panel)
- IEC 62026-2 compliant
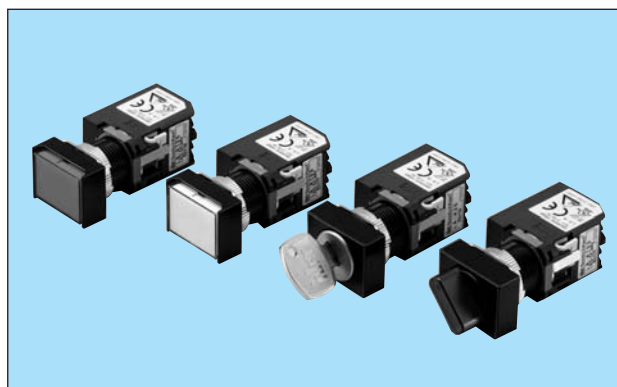


## Types

### • L6 Series

| Non-illuminated Pushbuttons | Style | Operation | Type No. | Button Color Code | Package Quantity | Note |
|---|---|---|---|---|---|---|
| | Round | Momentary | LA1B-M1A1S① | B (black)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow)<br>In place of ①, specify a button color code. | 1 | For dimensions, see page 42. |
| | Round | Maintained | LA1B-A1A1S① | | | |
| | Square | Momentary | LA2B-M1A1S① | | | |
| | Square | Maintained | LA2B-A1A1S① | | | |
| | Rectangular | Momentary | LA3B-M1A1S① | | | |
| | Rectangular | Maintained | LA3B-A1A1S① | | | |

| Pilot Lights | Style | Type No. | Button Color Code | Package Quantity | Note |
|---|---|---|---|---|---|
| | Round | LA1P-1A04S② | A (amber)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow)<br>In place of ②, specify a lens color code. | 1 | One LED lamp is included: LFTD-2②.<br>For dimensions, see page 42. |
| | Square | LA2P-1A04S② | | | |
| | Rectangular | LA3P-1A04S② | | | |

| Illuminated Pushbuttons | Style | Operation | Type No. | Button Color Code | Package Quantity | Note |
|---|---|---|---|---|---|---|
| | Round | Momentary | LA1L-M1A14S② | A (amber)<br>G (green)<br>R (red)<br>S (blue)<br>W (white)<br>Y (yellow)<br>In place of ②, specify a lens color code. | 1 | One LED lamp is included: LFTD-2②.<br>For dimensions, see page 42. |
| | Round | Maintained | LA1L-A1A14S② | | | |
| | Square | Momentary | LA2L-M1A14S② | | | |
| | Square | Maintained | LA2L-A1A14S② | | | |
| | Rectangular | Momentary | LA3L-M1A14S② | | | |
| | Rectangular | Maintained | LA3L-A1A14S② | | | |

| Selector Switches | Style | Operation | | | Type No. | Package Quantity | Note |
|---|---|---|---|---|---|---|---|
| | Round | 90° 2-position | Maintained | | LA1S-2A1S | 1 | For dimensions, see page 42. |
| | | | Spring Return from Right | | LA1S-21A1S | | |
| | | 45° 3-position | Maintained | | LA1S-3A2S | | |
| | | | Spring Return from Right | | LA1S-31A2S | | |
| | | | Spring Return from Left | | LA1S-32A2S | | |
| | | | Spring Return Two-way | | LA1S-33A2S | | |
| | Square | 90° 2-position | Maintained | | LA2S-2A1S | | |
| | | | Spring Return from Right | | LA2S-21A1S | | |
| | | 45° 3-position | Maintained | | LA2S-3A2S | | |
| | | | Spring Return from Right | | LA2S-31A2S | | |
| | | | Spring Return from Left | | LA2S-32A2S | | |
| | | | Spring Return Two-way | | LA2S-33A2S | | |
| | Rectangular | 90° 2-position | Maintained | | LA3S-2A1S | | |
| | | | Spring Return from Right | | LA3S-21A1S | | |
| | | 45° 3-position | Maintained | | LA3S-3A2S | | |
| | | | Spring Return from Right | | LA3S-31A2S | | |
| | | | Spring Return from Left | | LA3S-32A2S | | |
| | | | Spring Return Two-way | | LA3S-33A2S | | |

| Key Selector Switches | Style | Operation | | | Type No. | Key Retained Position Code ③ | Package Quantity |
|---|---|---|---|---|---|---|---|
| | Round | 90° 2-position | Maintained | | LA1K-2A1S③ | A, B, C | 1 |
| | | | Spring Return from Right | | LA1K-21A1S③ | B | |
| | | 45° 3-position | Maintained | | LA1K-3A2S③ | A, B, C, D, E, G, H | |
| | | | Spring Return from Right | | LA1K-31A2S③ | B, D, G | |
| | | | Spring Return from Left | | LA1K-32A2S③ | C, D, H | |
| | | | Spring Return Two-way | | LA1K-33A2S③ | D | |
| | Square | 90° 2-position | Maintained | | LA2K-2A1S③ | A, B, C | |
| | | | Spring Return from Right | | LA2K-21A1S③ | B | |
| | | 45° 3-position | Maintained | | LA2K-3A2S③ | A, B, C, D, E, G, H | |
| | | | Spring Return from Right | | LA2K-31A2S③ | B, D, G | |
| | | | Spring Return from Left | | LA2K-32A2S③ | C, D, H | |
| | | | Spring Return Two-way | | LA2K-33A2S③ | D | |
| | Rectangular | 90° 2-position | Maintained | | LA3K-2A1S③ | A, B, C | |
| | | | Spring Return from Right | | LA3K-21A1S③ | B | |
| | | 45° 3-position | Maintained | | LA3K-3A2S③ | A, B, C, D, E, G, H | |
| | | | Spring Return from Right | | LA3K-31A2S③ | B, D, G | |
| | | | Spring Return from Left | | LA3K-32A2S③ | C, D, H | |
| | | | Spring Return Two-way | | LA3K-33A2S③ | D | |

Note 1: In place of ③ in the Type No., specify a key retained position code from the table below.
Note 2: For dimensions, see page 42.

**[Key Retained Position Code]**

| 90° 2-position | | | 45° 3-position | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | A | B | C | D | E | G | H |
| No retained | Right retained | Left retained | No retained | Right retained | Left retained | R/L retained | Center retained | C/R retained | C/L retained |

# SwitchNet™ L6 Series Control Units

| Illuminated Selector Switches | Style | Operation | | | Type No. | Lens Color Code | Package Quantity |
|---|---|---|---|---|---|---|---|
| | Round | 90° 2-position | Maintained | | LA1F-2A14S② | A (amber) G (green) R (red) S (blue) W (white) Y (yellow) In place of ② in the Type No., specify a lens color code. | 1 |
| | | | Spring Return from Right | | LA1F-21A14S② | | |
| | | 45° 3-position | Maintained | | LA1F-3A24S② | | |
| | | | Spring Return from Right | | LA1F-31A24S② | | |
| | | | Spring Return from Left | | LA1F-32A24S② | | |
| | | | Spring Return Two-way | | LA1F-33A24S② | | |
| | Square | 90° 2-position | Maintained | | LA2F-2A14S② | | |
| | | | Spring Return from Right | | LA2F-21A14S② | | |
| | | 45° 3-position | Maintained | | LA2F-3A24S② | | |
| | | | Spring Return from Right | | LA2F-31A24S② | | |
| | | | Spring Return from Left | | LA2F-32A24S② | | |
| | | | Spring Return Two-way | | LA2F-33A24S② | | |
| | Rectangular | 90° 2-position | Maintained | | LA3F-2A14S② | | |
| | | | Spring Return from Right | | LA3F-21A14S② | | |
| | | 45° 3-position | Maintained | | LA3F-3A24S② | | |
| | | | Spring Return from Right | | LA3F-31A24S② | | |
| | | | Spring Return from Left | | LA3F-32A24S② | | |
| | | | Spring Return Two-way | | LA3F-33A24S② | | |
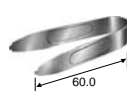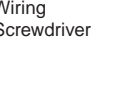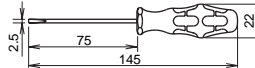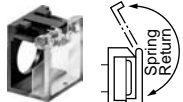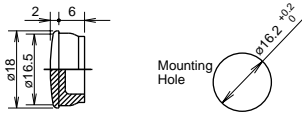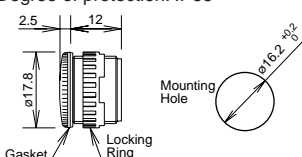
Note 1: One LED lamp is included: LFTD-2②.
Note 2: For dimensions, see page 42.

| Lever Switches | Style | Operation | | Type No. | Package Quantity | Note |
|---|---|---|---|---|---|---|
| | Round | 2-position | Maintained | LA1T-2A1S | 1 | For dimensions, see page 42. |
| | | | Spring Return from Up | LA1T-21A1S | | |
| | | | Spring Return from Down | LA1T-22A1S | | |
| | | 3-position | Maintained | LA1T-3A2S | | |
| | | | Spring Return from Up | LA1T-31A2S | | |
| | | | Spring Return from Down | LA1T-32A2S | | |
| | | | Spring Return Two-way | LA1T-33A2S | | |

• **L6 Accessories**

| Name & Appearance | | Application/ Specification | Type No. | Ordering Type No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|
| T-branch Connector | | Branches AS-Interface flat cable to 2-wire cable | LA9Z-SNTB | LA9Z-SNTB | 1 | Current capacity 3A. For wiring instructions, see page 35. |
| Hand-held Programming Device | | Assigns slave addresses and monitor system configuration | SX9Z-ADR1N | SX9Z-ADR1N | 1 | Attachments: • Programming device cable (SX9Z-CN1) • Programming device AC adapter (SX9Z-ADPT) • SwitchNet addressing port adapter (LA9Z-SNADP) • Operation manual (English/Japanese) |
| Programming Device Cable | | Connects the programming device to slave | SX9Z-CN1 | SX9Z-CN1 | 1 | Included with hand-held programming device SX9Z-ADR1N |
| Programming Device AC Adapter | | Charges the programming device | SX9Z-ADPT | SX9Z-ADPT | 1 | AC input voltage: 100-240V AC. Included with hand-held programming device SX9Z-ADR1N |
| SwitchNet Addressing Port Adapter | | Connects the programing device cable to SwitchNet | LA9Z-SNADP | LA9Z-SNADP | 1 | Included with hand-held programming device SX9Z-ADR1N |
| Tools | Ring Wrench | Made of nickel-plated brass | MT-001 | MT-001 | 1 | • Used to tighten the plastic locking ring when installing the L6 unit on a panel. • Tightening torque: 0.88 N·m maximum |
| | Lamp Holder Tool | Made of rubber | OR-44 | OR-44 | 1 | Used to remove and install LED lamps. |
| | Lens Removal Tool | Made of stainless steel | MT-101 | MT-101 | 1 | Used to remove the lens or button from the operator. |
| | Wiring Screwdriver | Weight: Approx. 20g | BC1S-SD0 | BC1S-SD0 | 1 | Used to wire spring clamp terminals. |
| Switch Guard 180° opening Spring Return | For round/square units | Material: Polyarylate (lens and base) | AL-K6SP | AL-K6SP | 1 | • For preventing inadvertent operation. • Degree of protection: IP65 • For dimensions, see page 43. |
| | For rectangular units | | AL-KH6SP | AL-KH6SP | 1 | |
| Dustproof Cover | For round units | Clear part: Elastomer Black part: Polypropylene | AL-D6 | AL-D6 | 1 | • For minimum mounting centers when using dust proof covers, see page 43. • Operating temperature: –10 to +55°C |
| | For square units | | AL-DQ6 | AL-DQ6 | 1 | |
| | For rectangular units | | AL-DH6 | AL-DH6 | 1 | |
| Mounting Hole Plug | Rubber Mounting Hole Plug | Nitrile rubber (black) | AL-B6 | AL-B6PN05 | 5 | Degree of protection: IP65 |
| | Metallic Mounting Hole Plug | Metal (Locking ring: plastic) | AL-BM6 | AL-BM6 | 1 | Degree of protection: IP65 |

Note: When ordering, specify the Ordering Type No. and quantity.

# SwitchNet™ L6 Series Control Units

## • L6 Series Replacement Parts

| Name & Appearance | | Material | Type No. | Ordering Type No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|
| Button | For round units | Polyarylate | AL6M-B① | AL6M-B①PN05 | 5 | In place of ①, specify a button color code. |
| | For square units | Polyarylate | AL6Q-B① | AL6Q-B①PN05 | 5 | B (black), G (green), R (red), S (blue), W (white), Y (yellow) |
| | For rectangular units | Polyarylate | AB6H-B① | AB6H-B①PN05 | 5 | |
| Lens | For round units | Polyarylate | AL6M-L② | AL6M-L②PN05 | 5 | In place of ②, specify a lens color code. |
| | For square units | Polyarylate | AL6Q-L② | AL6Q-L②PN05 | 5 | A (amber), C (clear), G (green), R (red), S (blue), Y (yellow) |
| | For rectangular units | Polyarylate | AL6H-L② | AL6H-L②PN05 | 5 | Note: For white illumination W, use a C (clear) lens. |
| Marking Plate | For round units | Acrylic resin | AL6M-W | AL6M-WPN05 | 5 | White |
| | For square units | Acrylic resin | AL6Q-W | AL6Q-WPN05 | 5 | |
| | For rectangular units | Acrylic resin | AL6H-W | AL6H-WPN05 | 5 | |
| Replacement Key | For key selector switch | Nickel-plated brass | AS6-SK-132 | AS6-SK-132PN02 | 2 | Thickness: 2 mm |
| Illuminated Selector Knob | For illuminated selector switch | Plastic | LA1A-F② | LA1A-F②PN02 | 2 | In place of ②, specify a lens color code. A (amber), G (green), R (red), S (blue), W (white), Y (yellow) |

Note: When ordering, specify the Ordering Type No. and quantity.

## • LED Lamp

| Rated Voltage | Current Draw | Type No. | Ordering Type No. | Lens Color Code | Package Quantity | Lamp Base |
|---|---|---|---|---|---|---|
| 24V AC/DC ±10% | 8 mA AC/DC | LFTD-2② | LFTD-2② | A (amber), G (green), R (red), S (blue), W (white), Y (yellow) In place of ②, specify a lens color code. | 1 | T 1-3/4 Miniature flange base |
| | | | LFTD-2②PN10 | | 10 | |

Note: When ordering, specify the Ordering Type No.

# Specifications

## • General Specifications

| | |
|---|---|
| Operating Voltage | 26.5 to 31.6V DC |
| Maximum Input Current | Pushbutton, selector, key selector, lever: 16 mA<br>Pilot light, illuminated pushbutton, illuminated selector: 22 mA |
| Dielectric Strength | Between AS-Interface terminal and dead parts:500V AC, 1 minute |
| Insulation Resistance | Between AS-Interface terminal and dead parts:100 MΩ minimum (500V DC megger) |
| Operating Temperature | −25 to +55°C (no freezing) |
| Storage Temperature | −40 to +80°C (no freezing) |
| Operating Humidity | 95% RH maximum (non-condensing) |
| Altitude | Operate: 2000m maximum<br>Transport: 3000m maximum |
| Pollution Degree | 3 (IEC 60664) |
| Degree of Protection | IP65 (outside of panel: operator), IP20 (inside of panel: terminal) |
| Corrosion Immunity | Atmosphere free from corrosive gases |
| Vibration Resistance | 5 to 55 Hz amplitude 0.5 mm, 50 m/s$^2$ (5G)<br>1 hour per axis on each of three mutually perpendicular axes |
| Shock Resistance | 1000 m/s$^2$ (100G), 5 shocks on each of three mutually perpendicular axes |
| Weight | Approx. 20g |

## • Communication Specifications

| | |
|---|---|
| Applicable Standard | AS-Interface Ver. 2.1 |
| Slave Profile | I/O code/ID code/ID2 code: B/A/E |
| Occupied Slave Address | 1 slave address |
| Digital I/O Data Allocation | See page 38. |
| Illumination Control | LED illumination brightness of SwitchNet units can be controlled using the Write_Parameter command.<br>For Write_Parameter command and settings, see page 41. |
| AS-Interface Communication Specifications | Control system: Master/slave system<br>Topology: Free topology<br>Transmission medium: 2-wire cable<br>Maximum slaves: 62 (A/B slaves), 31(standard slaves)<br>Maximum I/O points: 434 (A/B slaves), 248 (standard slaves)<br>Maximum network length: 100m (without repeater)<br>Maximum bus scan time: 10 ms (62 A/B slaves), 5 ms (31 standard slaves) |

## • Mechanical/Electrical Specifications

| | |
|---|---|
| Terminal Style | Spring clamp |
| Applicable Wire | Parallel 2-wire cable (twisted cable not applicable)<br>Single wires can also be used for connection over short distances.<br>Stranded wire: 0.5 to 0.75 mm² (AWG20 to 18)<br>Solid wire:　0.5 to 1.5 mm² (AWG20 to 16)<br>When using a ferrule on a stranded wire, use the ferrule shown far below on this page. Do not twist single wires together. |
| Mounting Centers | Vertical: 18 mm, Horizontal: 24 mm |
| Mounting Hole Size | ø16.2 mm, +0.2 or –0 mm |
| Applicable LED Lamp | LFTD-2② (rated current 8 mA AC/DC) |
| Mechanical Life | Momentary:　2,000,000 operations minimum<br>Maintained, selector, lever:　250,000 operations minimum<br>Addressing port adapter durability: 100 insertions/removals minimum |

## • Certification

| | |
|---|---|
| Certification | AS-International Association |
| Standards | UL listed, c-UL listed, CE marked |

## • Digital I/O Data Allocation

| Slave Unit | Used I/O | Input Data (slave send data) | | | | Output Data (slave receive data) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | DI3 | DI2 | DI1 | DI0 | DO3 | DO2 | DO1 | DO0 |
| Pushbutton | 1 in | 0 | X1 | 1 | 1 | ∗ | — | — | — |
| Pilot light | 1 out | 0 | 0 | 1 | 1 | ∗ | — | — | X1 |
| Illuminated pushbutton | 1 in/1 out | 0 | X1 | 1 | 1 | ∗ | — | — | X1 |
| Selector, Key selector, Lever 2-position | 1 in | 0 | X2 | 1 | 1 | ∗ | — | — | — |
| Selector, Key selector, Lever 3-position | 2 in | X3 | X3 | 1 | 1 | ∗ | — | — | — |
| Illuminated selector 2-position | 1 in/1 out | 0 | X2 | 1 | 1 | ∗ | — | — | X1 |
| Illuminated selector 3-position | 2 in/1 out | X3 | X3 | 1 | 1 | ∗ | — | — | X1 |

Notes:

1. In the above table, bits marked with X1, X2, and X3 are used.

2. X1: When pushbutton is pressed, input data is 1 (on). When not pressed, input data is 0 (off). When output data is 1 (on), LED is on. When output data is 0 (off), LED is off.

3. X2: The input data of 2-position selector switches and 2-position lever switches depend on the operator position as shown below.

| 2-position Operator |  | |
|---|---|---|
| Operator Position | 1 | 2 |
| DI2 | 0 | 1 |

4. X3: The input data of 3-position selector switches and 3-position lever switches depend on the operator position as shown below.

| 3-position Operator |  | | |
|---|---|---|---|
| Operator Position | 1 | 0 | 2 |
| DI3 | 0 | 0 | 1 |
| DI2 | 1 | 0 | 0 |

5. Unused input bits DI3 and DI2 are 0 (off), and unused input bits DI1 and DI0 are 1 (on). Slaves ignore unused output data sent from the master.

6. ∗: The master uses bit DO3 for addressing A/B slaves.

## • Write_Parameter Command

| 0 | 0 | A4 | A3 | A2 | A1 | A0 | 1 | Sel P3 | P2 | P1 | P0 | PB | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

### [Write_Parameter Settings]

| LED Brightness | Settings | | | | Remarks |
|---|---|---|---|---|---|
| | Output Selection | Control Data | | | |
| | P2 | P1 | P0 | | |
| 100% | | 1 | 1 | | Default |
| 50% | 1: DO0<br>0: DO1 | 0 | 1 | | |
| 25% | | 1 | 0 | | |
| 12.5% | | 0 | 0 | | |

## • Ferrules (Phoenix Contact)

| Cable Size (Stranded) | Phoenix Type | Order No. | Pcs./Pkt. |
|---|---|---|---|
| 0.5 mm² (AWG20) | AI 0,5-8 WH | 32 00 01 4 | 100 |
| 0.75 mm² (AWG18) | AI 0,75-8 GY | 32 00 51 9 | 100 |

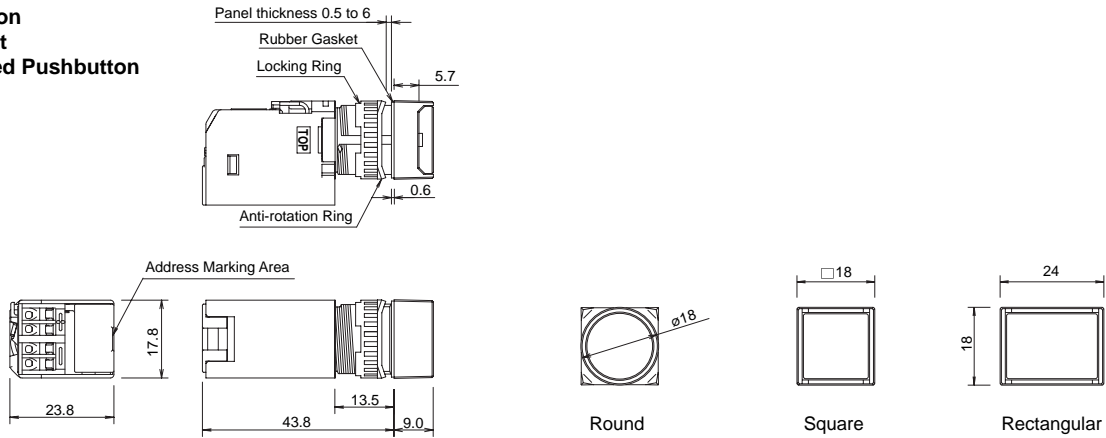## • Marking Plate Size and Engraving Area for Illuminated Units

| Style | Marking Plate Size | Marking Area |
|---|---|---|
| Round | ø13.8 mm | ø12 mm |
| Square | 13.8 ×13.8 mm | 12 × 12 mm |
| Rectangular | 13.8 ×19.8 mm | 12 × 18 mm |

Note: Engraving depth 0.5 mm maximum

# SwitchNet™ L6 Series Control Units

## Dimensions

- **Pushbutton**
- **Pilot Light**
- **Illuminated Pushbutton**

Panel thickness 0.5 to 6
Rubber Gasket
Locking Ring
5.7
TOP
0.6
Anti-rotation Ring

Address Marking Area
17.8
23.8
43.8   13.5   9.0

ø18   Round   □18   Square   24   18   Rectangular

- **Selector Switch**
- **Illuminated Selector Switch**

TOP

17
9
Address Marking Area
17.8
23.8
43.8   13.5   9.0

ø18   Round   □18   Square   24   18   Rectangular

- **Key Selector Switch**

TOP

25.1
9
Address Marking Area
17.8
23.8
43.8   9.0

ø18   Round   □18   Square   24   18   Rectangular

- **Lever Switch**

TOP

Address Marking Area
17.8
23.8
43.8   10.8   24

ø18

All dimensions in mm.

## Dimensions of Accessories

### • Switch Guard

For Round/Square Units (AL-K6SP)    For Rectangular Units (AL-KH6SP)



Panel thickness 0.5 to 5

With Switch Guard Installed

### • Dustproof Cover

For Round Units (AL-D6)        For Square Units (AL-DQ6)        For Rectangular Units (AL-DH6)



ø24        □24        30

Waterproof Gasket        Waterproof Gasket        Waterproof Gasket

Panel thickness 0.5 to 5

With Dustproof Cover Installed

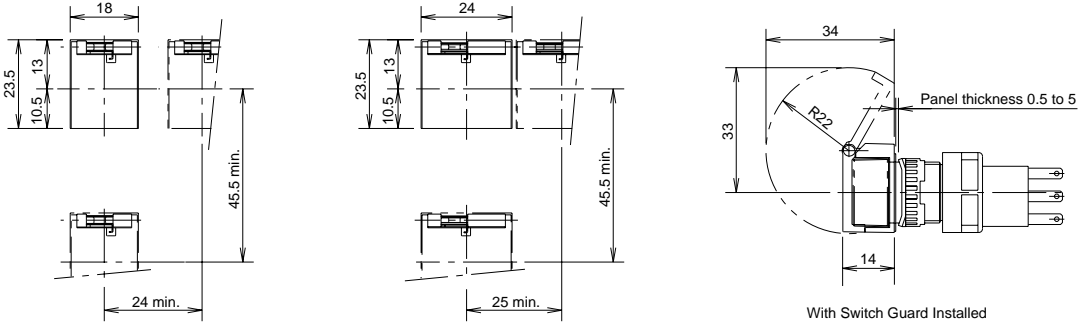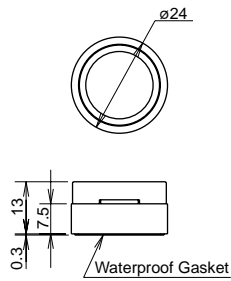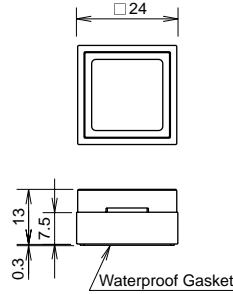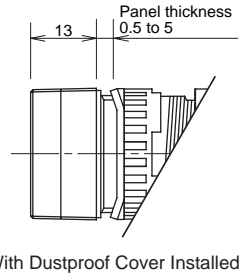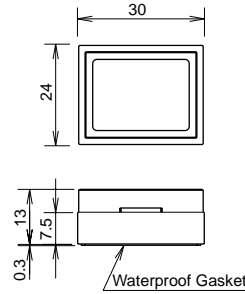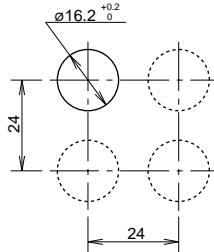## Minimum Mounting Centers

### • Round/Square Units

$ø16.2 {}^{+0.2}_{0}$



### • Rectangular Units

$ø16.2 {}^{+0.2}_{0}$
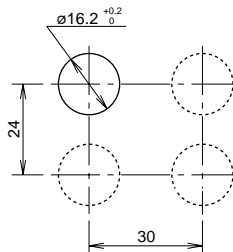


Determine the mounting centers in consideration of easy operation.

All dimensions in mm.

## Wiring
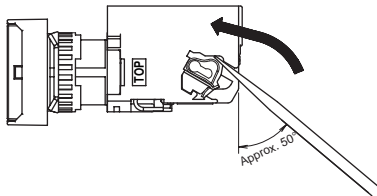


Approx. 50°

Locate the wire hole in the back of the communication contact block. To open the spring clamp in the wire hole, insert an optional screwdriver (BC1S-SD0) diagonally into the adjoining screwdriver hole until it hits the bottom. Slightly jerk the screwdriver to insert easily.
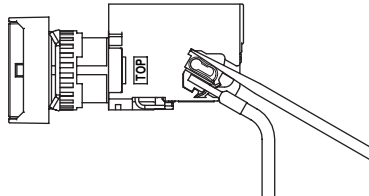


With the screwdriver held in the hole, insert a wire or ferrule to the bottom of the wire hole, then pull out the screwdriver. If an excessive force (normal operating force: 20 to 30N) is applied to the contact block while the L6 control unit is mounted on a panel, the communication block may be damaged. If the spring clamp does not open easily, remove the communication block from the operator and try again.

### • Applicable Screwdriver Tip

Screwdriver Tip According to DIN5264



### • Terminal Arrangement

TOP

AS-i+
AS-i+
AS-i−
AS-i−

Screwdriver Holes
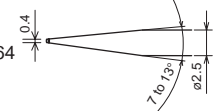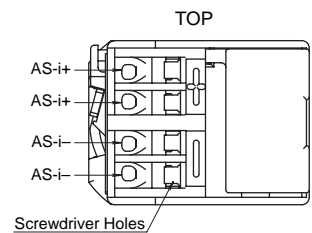
# Operating Instructions

## MicroSmart AS-Interface Master Module

### Installation Location

- The MicroSmart modules must be installed correctly for optimum performance.
- The MicroSmart is designed for installation in a cabinet. Do not install the MicroSmart outside a cabinet.
- The environment for using the MicroSmart is "Pollution degree 2." Use the MicroSmart in environments of pollution degree 2 (according to IEC 60664-1).
- Make sure that the operating temperature does not drop below 0°C or exceed 55°C. If the temperature does exceed 55°C, use a fan or cooler.
- Mount the MicroSmart on a vertical plane.
- To eliminate excessive temperature build-up, provide ample ventilation. Do not install the MicroSmart near, and especially above, any device which generates considerable heat, such as a heater, transformer, or large-capacity resistor. The relative humidity should be above 30% and below 95%.
- The MicroSmart should not be exposed to excessive dust, dirt, salt, direct sunlight, vibrations, or shocks. Do not use the MicroSmart in an area where corrosive chemicals or flammable gases are present. The modules should not be exposed to chemical, oil, or water splashes.

### Cable Connection

⚠ **Caution**
- Make sure that the operating conditions are within the specification values.
- Connect the ground terminal of the CPU module to a proper ground, otherwise electric shock may occur.
- Do not touch live terminals, otherwise electric shock may occur.
- Applicable ferrules, crimping tool, and screwdriver are listed below.
- When using ferrules, insert a wire to the bottom of the ferrule and crimp the ferrule.
- When connecting a stranded wire or multiple wires to a screw terminal block, use a ferrule, otherwise the wire may slip off the terminal block.

- **Ferrules for Terminal Block**
  Cross-section 0.5 mm$^2$
    For 1-cable connection: AI 0,5-8 WH
    For 2-cable connection: AI-TWIN 2×0,5-8 WH
  Cross-section 0.75 mm$^2$
    For 1-cable connection: AI 0,75-8 GY
    For 2-cable connection: AI-TWIN 2×0,75-8 GY
  Cross-section 1.5 mm$^2$
    For 1-cable connection: AI 1,5-8 BK
- **Crimping Tool**
  CRIMPFOX ZA 3 (Phoenix Contact)
- **Screwdriver**
  SZS 0.6×3.5 (Phoenix Contact)
- **Screw Tightening Torque**
  AS-Interface connector terminal screws: 0.5 to 0.6 N·m
  AS-Interface connector mounting screws: 0.3 to 0.5 N·m
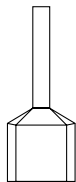
Recommended ferrules shown above are made by Phoenix Contact.

### AS-Interface Cable Wiring

- Before wiring the AS-Interface cable, remove the AS-Interface cable terminal block from the AS-Interface cable connector on the AS-Interface master module.
- AS-Interface specifies use of brown cables for the AS-i+ line, and blue cables for the AS-i– line. Connect the cables according to the colors indicated on the terminal block. Tighten the terminal screws to a torque of 0.5 to 0.6 N·m. (Replacement terminal block: FC4A-PMT3PN02, package quantity: 2)
- Insert the terminal block to the connector on the AS-Interface master module, and tighten the mounting screws to a torque of 0.3 to 0.5 N·m.



Brown AS-i+  Use a ferrule.
Brown Label
Blue Label
Blue AS-i–  Use a ferrule.
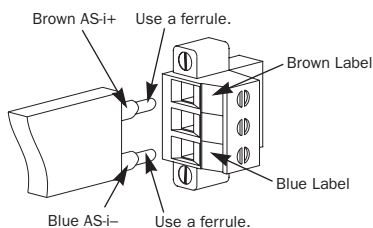
## PS2R AS-Interface Power Supply
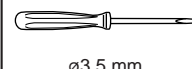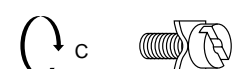
### Precautions for Installation

#### 1. Heat Dissipation by Convection
Keep minimum spacings of 50 mm above and below, and 15 mm on both sides to ensure proper ventilation.

#### 2. Applicable Wires, Ferrules, and Tightening Torque

 Ferrule    Stranded wire
 Solid wire

| Ferrule/ Wire | Single | Double | Single | Single | Double |
|---|---|---|---|---|---|
| mm$^2$ | 0.14 to 1.5 | 0.14 to 0.75 | 0.14 to 2.5 | 0.14 to 4 | 0.14 to 1.5 |
| AWG | 26 to 16 | 26 to 18 | 26 to 14 | 26 to 12 | 26 to 16 |

| ø3.5 mm | C | | 0.6 N·m |
|---|---|---|---|
| | | | 5.4 in·lbs |

#### 3. Mounting on 35- and 75-mm-wide DIN Rails
**[Mounting]**
To mount the power supply on a DIN rail, place the input terminal side up and put the groove of the power supply on the DIN rail as shown. Press the power supply towards the DIN rail.

**[Removing]**
Insert a flat screwdriver into the slot in the clamp. While pulling out the clamp, turn the power supply bottom out.



Mounting on DIN Rail            Removing from DIN Rail
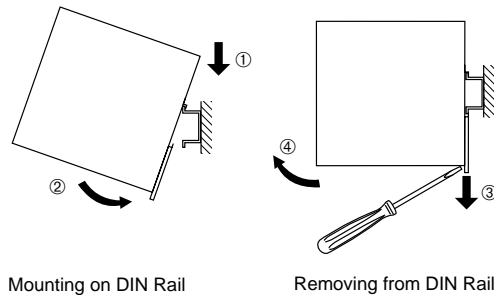
#### • Mounting Direction
The AS-Interface power supply can be mounted on a vertical plane only. Other mounting directions are not allowed because of heat dissipation.

#### • Overvoltage Protection
When an overcurrent of 110% the rated output current flows due to an overload, the output voltage drops automatically and intermittent operation starts.

When the load returns to normal conditions, the normal output voltage is automatically restored. Prevent overload or short-circuitry for a long period of time, otherwise the internal elements will deteriorate and be damaged.

#### • Overvoltage Protection
When the output voltage exceeds 120% the rated output voltage, the output is turned off. When the output voltage is turned off due to an overvoltage, turn the input off, and after more than 10 seconds, turn the input on again.

#### • Undervoltage Protection
When the output voltage drops below 95% the rated output voltage, the output is turned off. When the cause of the error is removed, the normal output voltage is automatically restored.

#### • Insulation/Dielectric Tests
When performing insulation and dielectric strength tests, connect the AC input terminals together and output + and – terminals together. Do not apply or interrupt the voltage suddenly, otherwise a surge voltage may damage the power supply.

# Operating Instructions

## SwitchNet™ HW Series Control Units

### Panel Mounting

Remove the communication block from the operator. Insert the operator into the panel cut-out from the front, then install the communication block to the operator.

#### • Removing/Installing the Communication Block

Turn the locking lever on the communication block in the direction opposite to the arrow on the housing. Then the communication block can be removed.

To install the communication block, align the TOP markings on the communication block and the operator, and insert the communication block. Then, turn the locking lever in the direction of the arrow.
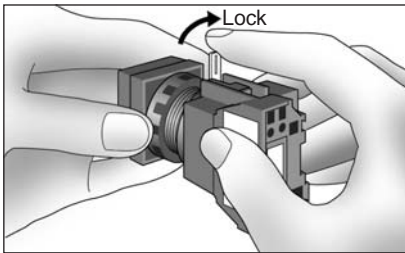


#### • Notes for Panel Mounting

When mounting the operator onto a panel, use the optional locking ring wrench (MW9Z-T1) to tighten the locking ring. Recommended tightening torque is 2.0 N·m. Do not use pliers. Excessive tightening will damage the locking ring.

On pilot lights and illuminated pushbuttons, do not apply an excessive force to the LED lamp installed in the unit. Otherwise the lamp base may be damaged.

#### • Notes for Illuminated Pushbuttons with Full Shroud

The full shroud cannot be removed from the full shroud type operator.

### Using the Safety Lever Lock

To make sure that the lock lever is in the locked position, use of the attached safety lever lock (HW9Z-LS, yellow) is recommended.

Use the safety lever lock according to the instructions described below.

1. The minimum vertical mounting centers of HW control units are 50 mm. Determine the mounting centers in consideration of convenience for installing the safety lever lock. (100 mm is recommended.)

2. After mounting the HW units on a panel, turn the locking lever to the locked position and put on the safety lever lock.

3. When the HW units are mounted on mounting centers smaller than the recommended distance, first put on the safety lever lock with the locking lever unlocked, and install the communication block onto the operator. Turn the lock lever into the locked position, and push down the safety lever lock into place.

4. To remove the safety lever lock, insert a screwdriver into the hole in the safety lever lock, and pull up the safety lever lock.

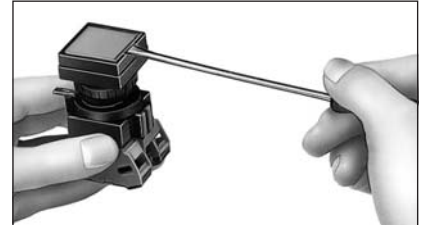#### • Installing/Removing the Safety Lever Lock
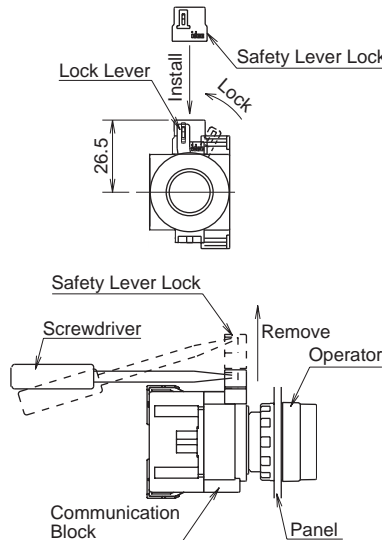


### Replacement of the Lens and Marking Plate

#### • Removing

1. To remove the lens unit (lens, marking plate, and lens holder), insert a screwdriver into the recess of the lens. Recesses are on the TOP mark side and the opposite side.

**[Removing the Lens Unit]**



2. To remove the lens, insert a screwdriver between the lens and lens holder to disengage the latches. Then, the marking plate can be removed.

**[Removing the Lens]**
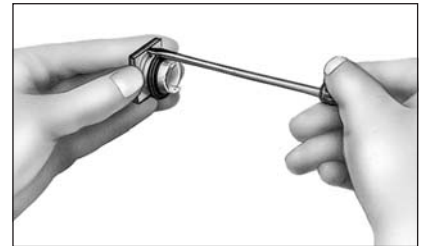


Note: The filter on the lens holder is for waterproof and oiltight purposes and cannot be removed.

#### • Installing

For round lens types, place the marking plate on the lens holder with the anti-rotation projection engaged and press the lens onto the lens holder to engage the latches. For square lens types, insert the marking plate into the lens, and press the lens onto the lens holder to engage the latches.
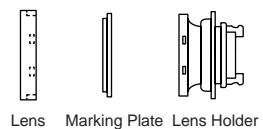
Pay attention to the orientation of the marking plate.

**Round Lens Type**



Lens    Marking Plate    Lens Holder
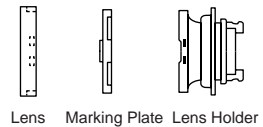
**Square Lens Type**

Note the orientation.



Lens    Marking Plate    Lens Holder

# Operating Instructions

## SwitchNet™ HW Series Control Units

### Legend Marking

For HW series pilot lights and illuminated pushbuttons, legends and symbols can be engraved on marking plates, or printed Mylar can be inserted under the lens for labelling purposes.

#### • Marking Plate and Marking Film Size

| Lens Style | Round Lens Type (Flush) | Square Lens Type |
|---|---|---|
| Built-in Marking Plate | Engraving Area ø19.6 | Engraving Area □ 19.9 |

- Engraving must be made on the engraving area within 0.5 mm deep.
- The marking plate is made of white acrylic resin.

| Lens Style | Round Lens Type (Flush) | Square Lens Type |
|---|---|---|
| Applicable Marking Film | ø21.5 / 19.4 | □ 22.7 |

- Mylar for printing labels is not included and must be provided and printed by user.
- Two 0.1-mm-thick films or one 0.2-mm-thick film can be installed in the lens.
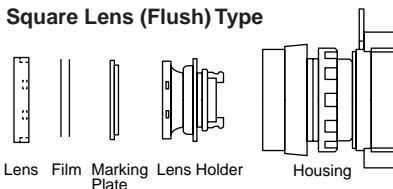- Recommended marking film: Mylar

#### • Insertion Order of Marking Plate and Film

**Round Lens (Flush) Type**

Lens  Film  Marking Plate  Lens Holder  Housing
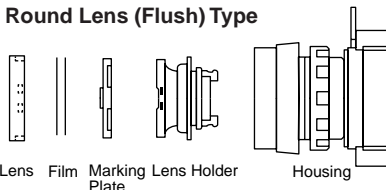
Note: Mylar is not included.

**Square Lens (Flush) Type**

Lens  Film  Marking Plate  Lens Holder  Housing

Note: Mylar is not included with the control unit. When using Mylar, place the marking plate in the reverse direction.
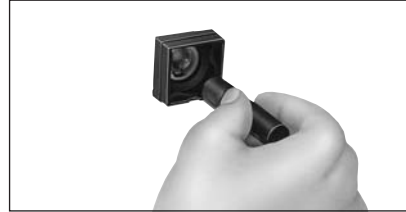
### Replacement of LED Lamps

LED lamps can be replaced using the lamp holder tool (OR-55) from the front of the panel. The lamp can also be replaced by removing the communication block from the operator unit.

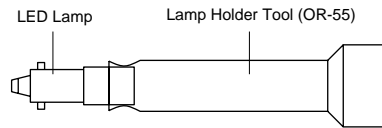#### • Replacement of Lamps from Panel Front

**[How to Remove]**

Push in and turn the LED lamp counter-clockwise using the lamp holder tool, then the LED lamp can be removed.

**[How to Install]**

1. Insert the LED lamp into the lamp holder tool and hold the lamp as shown below.

LED Lamp          Lamp Holder Tool (OR-55)

2. Align the contact pins of the lamp base with the grooves in the lamp receptacle in the operator unit, then push in the LED lamp lightly and turn it clockwise into place.

Lamp Receptacle
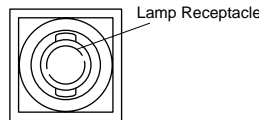
### Wiring

1. Locate the wire hole in the back of the communication contact block. To open the spring clamp in the wire hole, insert an optional screwdriver (BC1S-SD0) into the adjoining screwdriver hole until it hits the bottom. Slightly jerk the screwdriver to insert easily.

AS-i+
AS-i–
Screwdriver Holes 4 places

Screwdriver Tip According to DIN5264
0.4
7 to 13°
ø2.5
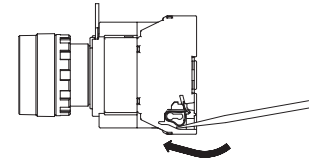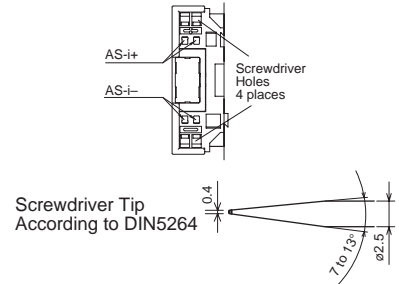
2. With the screwdriver held in the hole, insert a wire or ferrule to the bottom of the wire hole, then pull out the screwdriver.
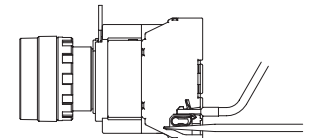
Strip the cable insulation 6 to 8 mm from the end.
6 to 8 mm

### Anti-rotation Ring

When using the anti-rotation ring, align the TOP marking on the operator and the ▲ mark on the anti-rotation ring with the recess in the mounting hole.

Panel thickness 1.2 to 4.5 mm
Projection (▲mark)
HW Operator          Anti-rotation Ring          Locking Ring
Panel
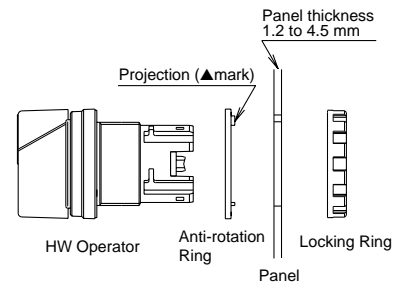
### Panel Cut-out (IEC 947-5-1)

$3.2^{+0.2}_{0}$
R0.5 max.
$24.1^{+0.4}_{0}$
$ø22.3^{+0.4}_{0}$
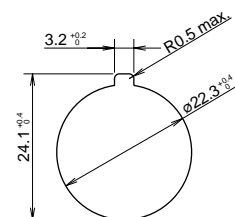
# Operating Instructions

## SwitchNet™ L6 Series Control Units

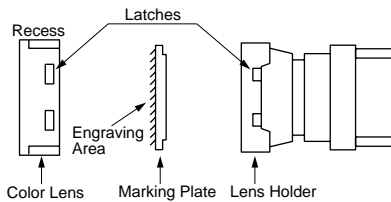### Replacement of the Lens and Marking Plate

#### • Removal

To remove the operator (color lens, marking plate, and lens holder), hold the color lens recesses with the lens removal tool (MT-101) and pull it out. Remove the marking plate by disengaging the latches between the color lens and lens holder. Engrave a legend on the correct side of the marking plate, if required.



#### • Installation

Place the marking plate on the lens holder in the correct direction, and press the color lens onto the lens holder to engage the latches. Insert the lens holder into the housing in the correct direction.
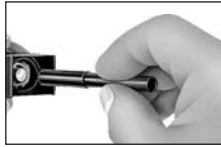
### Replacement of LED Lamps

Lamps can be replaced using the lamp holder tool (OR-44) from the front of the panel. The lamp can also be replaced by removing the communication block from the operator unit.

### • Replacement from Panel Front

#### [Removal]

1. Push and turn the LED lamp counter-clockwise using the lamp holder tool, then the LED lamp and the lamp holder can be removed.
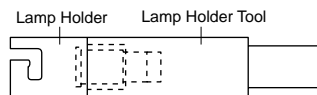


2. Push in the lamp head into the lamp holder, and pull out the LED lamp from the rear of the lamp holder.



#### [Installation]

1. First, insert the LED lamp into the lamp holder from the rear. The lamp can be pushed in easily using the thinner end of the lamp holder tool.
2. Hold the LED lamp in the lamp holder tool as shown below.



3. Insert the LED lamp into the communication block. With the slit in the lamp holder aligned with the contact pin inside, push in and turn clockwise until the lamp holder is retained.
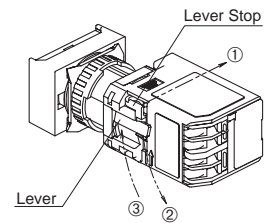
### Panel Mounting

Remove the communication block from the operator. Insert the operator into the panel cut-out from the front, then install the communication block to the operator.

#### • Removing/Installing the Communication Block

With the yellow lever stop depressed in the direction of ①, turn the lock lever in the direction of ② (opposite to the arrow on the communication block), and pull out the communication block.

To install, align the TOP markings on the operator and the communication block together, insert the operator into the communication block, and turn the lock lever in the direction of ③ (the arrow on the communication block).



#### • Notes for Panel Mounting

Use the optional ring wrench (MT-001) to mount the operator onto a panel. Tighten the locking ring to a recommended torque of 0.88 N·m. Use of pliers or excessive tightening will damage the locking ring.

For addressing procedures, see page 28.

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# Precautions for AS-Interface Wiring (Common Notices)

1. Do not run the AS-Interface network cables in parallel with or near power lines. Keep the cables away from noise sources.

2. Turn power off before starting wiring. After wiring, confirm that wiring is connect before turning power on.

3. For wiring, use cables appropriate for each slave as listed in the table below.

- Cables applicable to slaves can also be used for the AS-Interface master module and AS-Interface power supply.

- For SwitchNet slaves (HW and L6 units), single wires can also be used for connection over short distances: stranded wires 0.5 to 0.75 mm$^2$ (AWG20 to 18) or solid wires 0.5 to 1.5 mm$^2$ (AWG20 to 16).

| Slave | Applicable Cable | | Cable Type No. | Manufacturer | Remarks |
|---|---|---|---|---|---|
| SwitchNet HW/L6 all models<br>SX5A AS-Interface I/O Module IP20 type | 2-core parallel cable | | | | |
| SX5A AS-Interface I/O Module all models | AS-Interface Flat Cable | Yellow (data and power) | 2170 228 | LAPP | Sheath material: EPDM |
| | | Black (auxiliary power) | 2170 229 | | |

Note: Do not use twisted cables and do not twist single cables together.

4. When using a ferrule on a stranded wire for wiring SwitchNet slaves (HW and L6 units) or T-branch connectors, use the ferrule shown in the table below. If a stranded wire of 0.75 mm$^2$ or AWG18 is connected without using a ferrule, the wire tensile strength reduces.

| Cable Size (Stranded Wire) | Ferrule Type (Phoenix) | Order No. | Pcs./Pkt. |
|---|---|---|---|
| 0.5 mm$^2$ (AWG20) | AI 0,5-8 WH | 32 00 01 4 | 100 |
| 0.75 mm$^2$ (AWG18) | AI 0,75-8 GY | 32 00 51 9 | 100 |

5. The maximum total cable length is 100m, including all network cables. The maximum cable length can be extended to 200m using one repeater, or to 300m using two repeaters.

6. AS-Interface does not require a terminator.

7. Slave module address is set to 00 before shipment from factory.

8. Network error causes include:
   - Disconnected or shorted network cable
   - Strong external noise
   - Dropped power voltage for the master and slaves below the minimum power voltage.
   - Use of an improper network cable

# MICROSmart Micro Programmable Logic Controller

All-in-one and slim type CPU modules
Powerful communication functions and flexible system expansion

WindLDR Ver. 4.21
Programming and Monitoring

### • CPU Modules

| Type | Type No. | I/O Points |
|---|---|---|
| All-in-One | FC4A-C10R2 | 6 in / 4 out |
| | FC4A-C16R2 | 9 in / 7 out |
| | FC4A-C24R2 | 14 in / 10 out |
| Slim | FC4A-D20K3 | 12 in / 8 out |
| | FC4A-D20S3 | 12 in / 8 out |
| | FC4A-D20RK1 | 12 in / 8 out |
| | FC4A-D20RS1 | 12 in / 8 out |
| | FC4A-D40K3 | 24 in / 16 out |
| | FC4A-D40S3 | 24 in / 16 out |

### • I/O Modules

| Module | I/O Points | Models |
|---|---|---|
| Input | 8 inputs | 1 |
| | 16 inputs | 2 |
| | 32 inputs | 1 |
| Output | 8 outputs | 3 |
| | 16 outputs | 3 |
| | 32 outputs | 2 |
| I/O | 4 in / 4 out | 1 |
| | 16 in / 8 out | 1 |
| Analog | 2 in / 1 out | 2 |
| | 2 inputs | 1 |
| | 1 output | 1 |

### • AS-Interface Master Module

| Type No. | AS-i Version |
|---|---|
| FC4A-AS62M | Ver. 2.1 |

For details about the MicroSmart, see the catalog.

### • Option

| Type No. | Models |
|---|---|
| HMI Module | 1 |
| HMI Base Module | 1 |
| Communication Adapter | 3 |
| Communication Module | 3 |
| Memory Cartridge | 1 |
| Clock Cartridge | 1 |

# PS5R Switching Power Supply

IP20 finger-safe spring-up terminals
DIN rail mounting, AC universal input voltage

| Output | Type No. | Input Voltage | Output Voltage | Remarks |
|---|---|---|---|---|
| 7.5W | PS5R-A① | 100 to 240V AC (85-264V AC/105-370V DC compatible) | 12 or 24V DC | |
| 15W | PS5R-B① | | | |
| 30W | PS5R-C① | | | |
| 50W | PS5R-D24 | | 24V DC | |
| 100W | PS5R-E24 | 100 to 200V AC (85 to 132V AC) 200 to 240V AC (170-264A AC/240-370VDC) | | |
| 75W | PS5R-Q24 | 100 to 240V AC (85-264V AC/110-350V DC compatible) | | Limit for Harmonic Current Emissions (EN 61000-3-2) compliant |
| 120W | PS5R-F24 | | | |
| 240W | PS5R-G24 | | | |

Specify an output voltage code in place of ①.

| Output Voltage | Code |
|---|---|
| 12V DC | 12 |
| 24V DC | 24 |

# ⚠ Safety Precautions

- **All IDEC AS-Interface devices are manufactured under IDEC's rigorous quality control system, but users must add a backup or failsafe provision to the control system using the device in applications where heavy damage or personal injury may be caused in case the device should fail.**

- **Turn off the power to the device before starting installation, removal, wiring, maintenance, and inspection of the device. Failure to turn power off may cause electric shocks or fire hazard.**

- **Use a power supply and I/O devices of the rated value, otherwise fire hazard may occur.**

- **Special expertise is required to install, wire, program, and operate the AS-Interface devices. People without such expertise must not use the AS-Interface devices.**

- **Read the user's manual or operating instruction sheet attached to the product to make sure of correct operation.**

Specifications and other descriptions in this catalog are subject to change without notice.