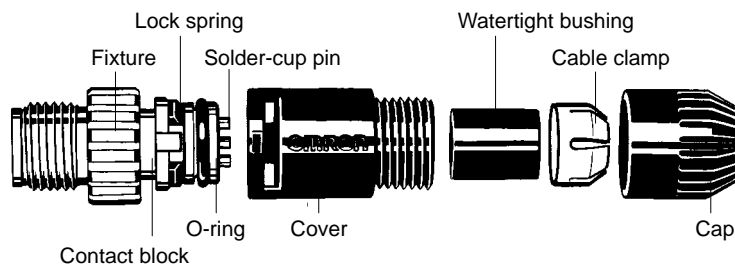# Sensor I/O Connectors | XS2

Water- and Environment-resistive FA Connector Saves Wiring and Maintenance Effort

- Compact FA connector meets IP67 requirements and ensures a 94V-0 fire retardant rating.
- A wide array of connectors makes a wiring system more modular, simplifies maintenance, and reduces downtime.
- Cables with connectors and connector assemblies are available.
- Solderless and soldering models are available.

■ Construction

Lock spring
Fixture   Solder-cup pin
Watertight bushing
Cable clamp
O-ring   Cover
Cap
Contact block

■ Specifications

Rated current	3 A
Rated voltage	125 VDC, 250 VAC
Contact resistance	40 mΩ max. (20 mV max., 100 mA max.) (See note 1)
Insulation resistance	1,000 MΩ min. (at 500 VDC)
Withstand voltage	1,500 VAC for 1 min (leakage current: 1 mA max.) (See note 2)
Enclosure rating	IP67 (IEC529)
Electrical protection	Class 0
Insertion tolerance	200 times min.
Vibration resistance	At 10 to 500 Hz, 1.5 mm (0.059 in.) amplitude (or 10 G), no current shut-off for more than 1 μs.
Assembled fixture strength	Tensile: 98 N (10 kgf)/15 sec. Torsion: 0.98 N • m (10 kgf • cm)/15 sec.
Cable hold strength	Cable diameter: 6 mm 98 N (10 kgf) for 15 sec. 4 to 5 mm 49 N (5 kgf) for 15 sec. 3 mm 29 N (3 kgf) for 15 sec.
Ambient temperature	Operating: –25°C to 70°C

Note: 1.   The value indicates the contact resistance of the connector.
2.   The value indicates the dielectric strength of the connector.
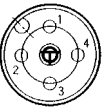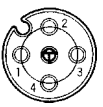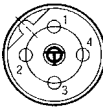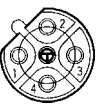
■ Materials/Finish

Contact block	PBT resin (UL94V-0); for DC: light grey; for AC: dark grey (see note 1)
Contact	Brass/nickel base, 0.4-μm gold plating (See note 2)
Fixtures	Brass with nickel plating (See note 3)
Cap	Black PBT resin (UL94V-0)
Cable clamp	Polyamide resin (UL94-0); 6-mm: white; 4-/3-mm: black
Pin clamp	White polyamide resin (UL94V-0)
Lock spring	LCP resin
Watertight bushing	Rubber
Cover	Assembled: PBT resin (UL94V-0)/black Molded: Polyvinyl chloride (UL94V-0)/black
Ring	Steel
O-ring	Rubber

Note: 1.   The pin blocks of the XS2R, XS2M, and XS2P are made of polyamide resin (UL94V-0).
2.   The contact of the XS2F, XS2H, and XS2W is made of phosphorus bronze.
3.   The thread bracket of the XS2R is made of white aluminum.

■ Recommended Cables

Cable outer diameter		Conductor sizes	
		Solderless models	Soldering models
6 mm	5 to 6 mm	Two types of pins are available.	0.5 mm^2 max.
4 mm	4 to 5 mm		
3 mm	3 to 4 mm		

■ Socket Appearance

DC type		AC type	
Male contact	Female contact	Male contact	Female contact

Note: The AC and DC connectors are different as shown here and therefore cannot be connected together.

■ **Configuration**
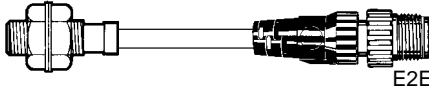
← → : connections,   ◆ ➔ : wiring

Sensors	Cables

Sensors

Used with Sensors and Limit Switches Incorporating Connectors

Proximity Switch
(with connector)
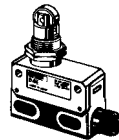
E2E

Terminal connector

E2E

Compact Limit Switch
(with connector)

D4CC

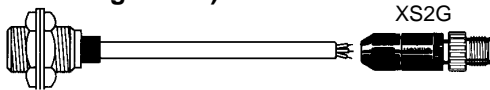**Compact Enclosure Switch**
(with connector)

D4E-□N

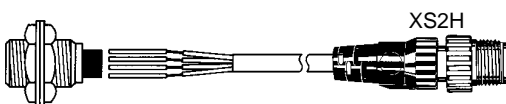Used as Connectors for Sensors Incorporating Lead Wires

Connector Assembly (Solderless or Soldering Model)

XS2G

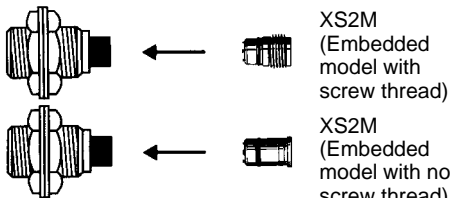Use the XS2G as a connector for a sensor that has lead wires.

Used as Sensor Components (by Sensor Manufacturers)

Connector with Cable

XS2H

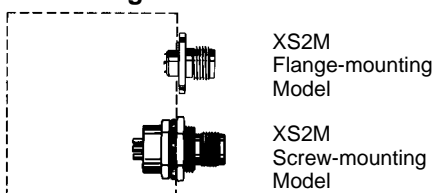Use the XS2H as the built-in connector of a sensor.

Built-in Sensor Connector

XS2M
(Embedded model with screw thread)

XS2M
(Embedded model with no screw thread)

Use the XS2M as the built-in connector of a sensor.

Used as Panel-mounting Connectors
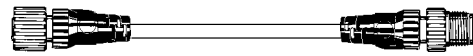
Panel-mounting Connector

XS2M
Flange-mounting Model

XS2M
Screw-mounting Model

Cables

Cable with Connector
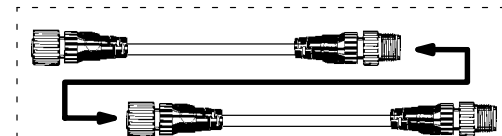
XS2W

More than one XS2W can be used for connection.
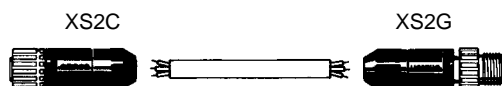
Connector Assembly (Solderless or Soldering Model) and Cables with Connectors

XS2C   XS2H
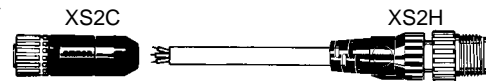
Cable with Connector and Connector Assembly (Solderless or Soldering Model)
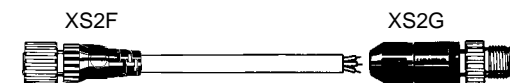
XS2F   XS2G

Connector Assembly (Solderless or Soldering Model)

XS2C   XS2G

Connector Assembly (Solderless or Soldering Model)

XS2C

Cable with Connector

XS2F

Personal Computer
PT (Programmable Terminal)

Terminal Box (Panel-mounting)

Connector Terminal Box

XW3A

Connector for Terminal Box

XS2P

Use the XS2P for the connector
of a terminal box.

Host Link Cable

XW2Z

PC

Wiring with crimp-style terminals

**Connector–Terminal
Conversion Unit**

XW2C (with power-supply common
terminal and operation indicator)

XW2B (with no power supply common
terminal or operation indicator)

Cable

XW2Z

Terminal Block (Optional)
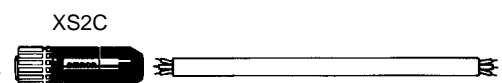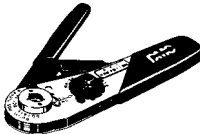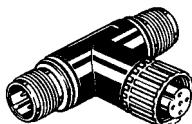
■ Classification

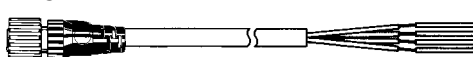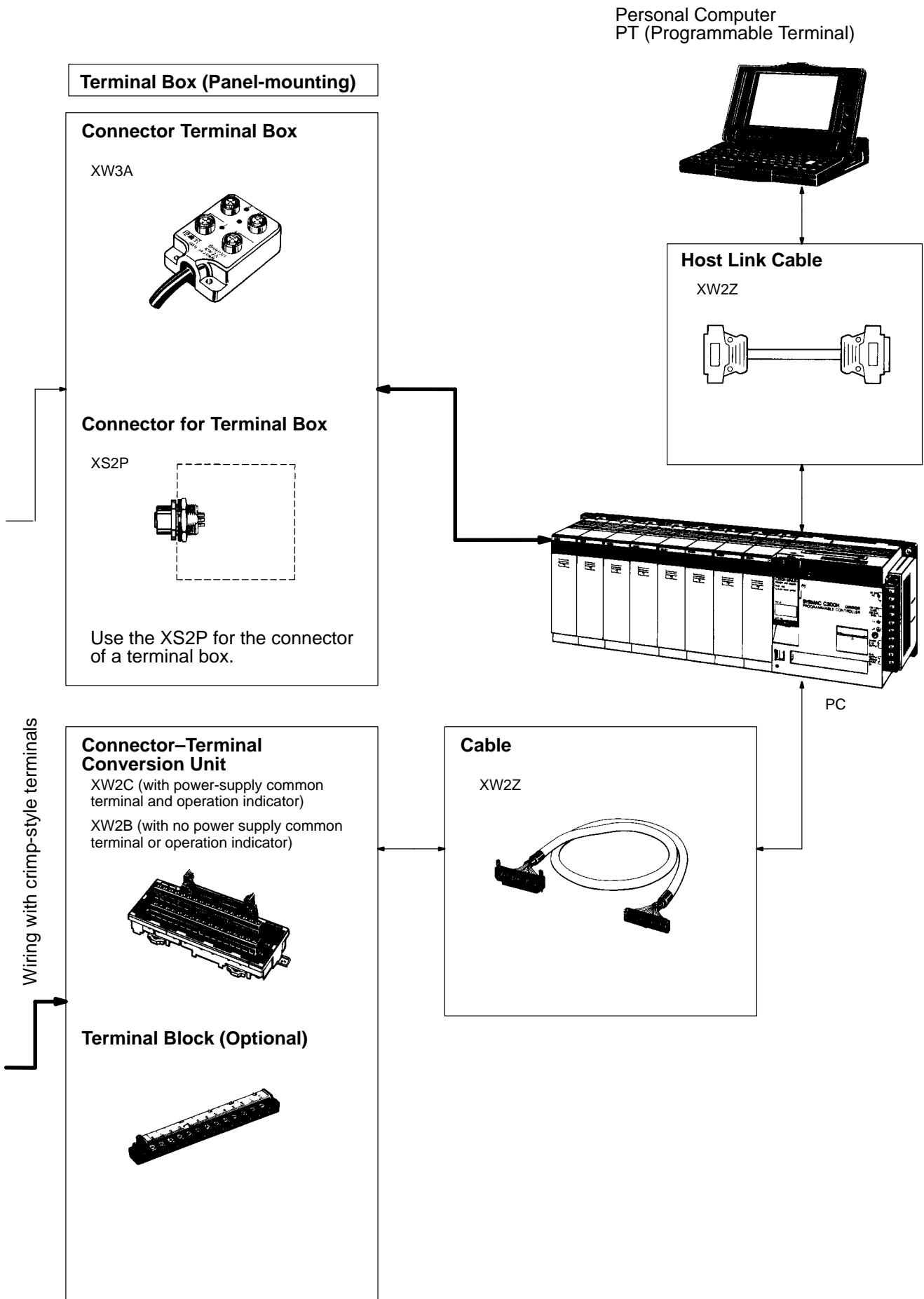| Item	Model	Appearance
Cable with Connector	XS2W with socket and plug for both cable ends	
	XS2F with socket for single cable end	
	XS2H with plug for single cable end	
Connector Assembly: (Solderless or soldering model) Used as sensor cable or connection cable connectors.	XS2G Plug	
	XS2C Socket	
	XY2F Crimp Tool	
Terminal Box Connector: Used as the connectors of terminal boxes.	XS2P Socket	
T Joint: Used for bifurcated wiring or daisy-chain connection.	XS2R Plug/Socket	
Built-in Sensor Connector: Used as built-in sensor connectors.	XS2M Plug	
Panel-mounting Connector: Used as the panel-mounting connectors of I/O boxes.	XS2M Plug	

XS2W Sensor I/O Connector with Socket and Plug Used for Both Cable Ends

■ Ordering Information

Orders are accepted in multiples of the minimum order.

Item	Cable pulling direction	No. of cable conductors	Cable length (m)	DC	
				Model	Minimum order
Standard cable	Straight/Straight	4	1	XS2W-D421-C81-A	10
			2	XS2W-D421-D81-A	
			5	XS2W-D421-G81-A	5
			10	XS2W-D421-J81-A	
	L-shaped/L-shaped		2	XS2W-D422-D81-A	10
			5	XS2W-D422-G81-A	5
	Straight/L-shaped		2	XS2W-D423-D81-A	10
			5	XS2W-D423-G81-A	5
	L-shaped/Straight		2	XS2W-D424-D81-A	10
			5	XS2W-D424-G81-A	5
Vibration-proof robot cable	Straight/Straight		1	XS2W-D421-C81-R	10
			2	XS2W-D421-D81-R	
			5	XS2W-D421-G81-R	5
			10	XS2W-D421-J81-R	

■ Model Number Legend

XS2W-D42□-□81-□
  1 2 3 4 5 6 7 8 9

1. Type
  W: Connector with socket and plug for both cable ends

2. AC/DC (Shape of Engaged Portion)
  D: DC

3. No. of Connector Poles
  4: 4 poles

4. Pin plating
  2: 0.4-μm gold plating

5. Cable Pulling Direction
  1: Straight/Straight

  2: L-shaped/L-shaped

  3: Straight (XS2F)/L-shaped (XS2H)

  4: L-shaped (XS2F)/Straight (XS2H)

6. Cable Length
  C: 1 m (for only cables pulled straight)

  D: 2 m

  G: 5 m

  J: 10 m (for only cables pulled straight)

7. Wiring
For pins 1, 2, 3, and 4

  8: Brown, white, blue, and black (for DC)

8. Connector for Single Cable End/Both Cable Ends
  1: Connector for both cable ends

9. Cable Specification
  A: Standard

  R: Vibration-proof cable (for only cables pulled straight)

XS2W Sensor I/O Connector with Sockets and Plugs Used for Both Cable Ends

- **XS2W-D42☐-☐81-A Standard Cable**
- **XS2W-D421-☐81-R Vibration-proof Robot Cable (Only for Cables Pulled Straight)**
- ■ **Dimensions**

Straight/Straight Connectors

6 dia.   M12
14.9 dia.   14.9 dia.
40.7   44.7
L

L-shaped/L-shaped Connectors

M12
28.3   6 dia.   32.3
25.3   25.3
L

Wiring Diagram (4-conductor Model)

Contact No.

① ① Brown
② ② White
③ ③ Blue
④ ④ Black (DC)

Cable conductor color
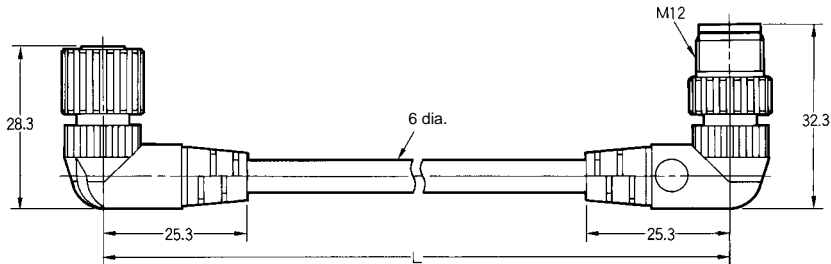
Straight/L-shaped Connectors

14.9 dia.
M12
6 dia.   32.3
14.9 dia.
40.7   25.3
L
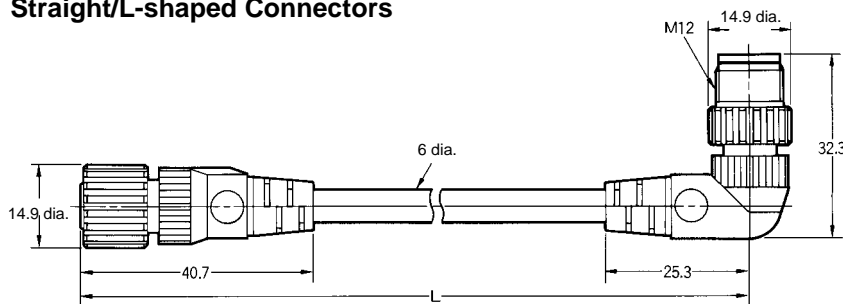
L-shaped/Straight Connectors

28.3   6 dia.   M12
25.3   44.7
L
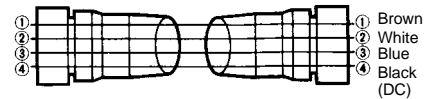
XS2F Sensor I/O Connector with Socket Used for Single Cable End

■ Model Number Legend

XS2F-☐☐2☐-☐☐0-☐
      1 2 3 4 5 6 7 8 9

1. Type

   F: Sensor I/O Connector (with Socket Used for Single Cable End)

2. AC/DC (Shape of Engaged Portion)

   A: AC

   D: DC

3. No. of Connector Poles

   4:   4 poles

   5:   5 poles

4. Pin plating

   2:   0.4-μm gold plating

5. Cable Pulling Direction

   1:   Straight

   2:   L-shaped

6. Cable Length

   C: 1 m

   D: 2 m

   G: 5 m

   J: 10 m (2- and 5-m-long cables are available for models with five connector poles.)

7. Wiring

For pins 1, 2, 3, and 4   For pins 1, 2, 3, 4, and 5

   A: Brown, ---, ---, and blue (for DC)   G: Brown, white, blue, black, and gray

   B: ---, ---, brown, and blue (for AC)

   C: Brown, ---, blue, and black

   8:   Brown, white, blue, and black (for DC)

   9:   Brown, white, blue, and black (for AC)

8. Connector for Single Cable End/Both Cable Ends

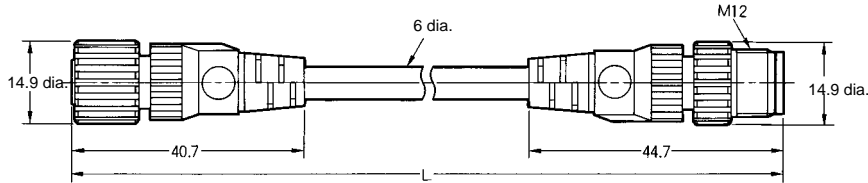   0:   Connector for single cable end

9. Cable Specification/E2E Connection Only

   A: Standard

   R: Vibration-proof cable (for only cables pulled straight)

   TR: E2E connection only (See note)

Note: Refer to page 17 for wiring, which is different from the wiring specifications shown as suffix item 7 on this page.

Non-polar DC (for Sensors and Limit Switches)
6. Cable Length

  3:    2 m

  4:    5 m

7. Wiring

For pins 1, 2, 3, and 4

  1:    ---, ---, black, and white

8. Connector for Single Cable End/Both Cable Ends

  0:    Connector for single cable end

9. Cable Specification

Note: Items 6, 7, and 9 apply only to models for non-polar DC.

XS2F Sensor I/O Connector with Socket Used for Single Cable End

- **XS2F-□42□-□□0-A Standard Cable**
- **XS2F-□42□-□□0-R Vibration-proof Robot Cable**
 (Only for Cables Pulled Straight)
- **XS2F-□42□-□□0 Standard Cable**
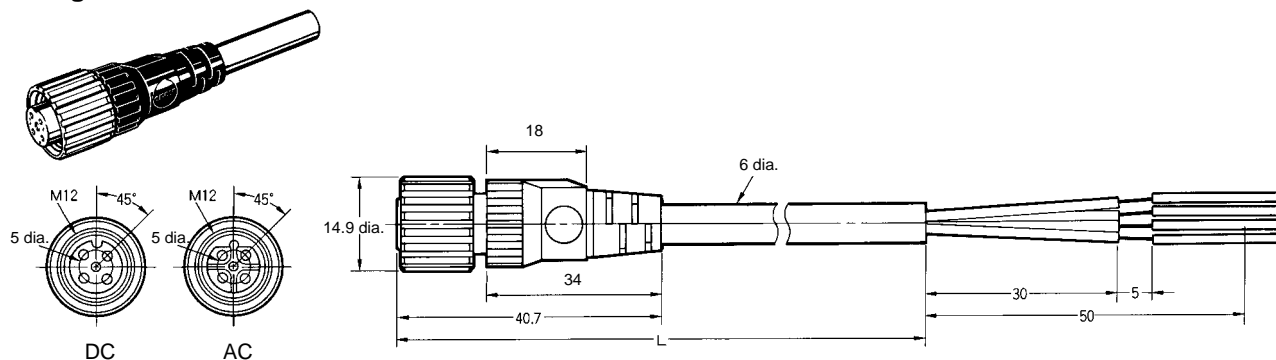 **(Only for Non-polar DC)**

■ Ordering Information
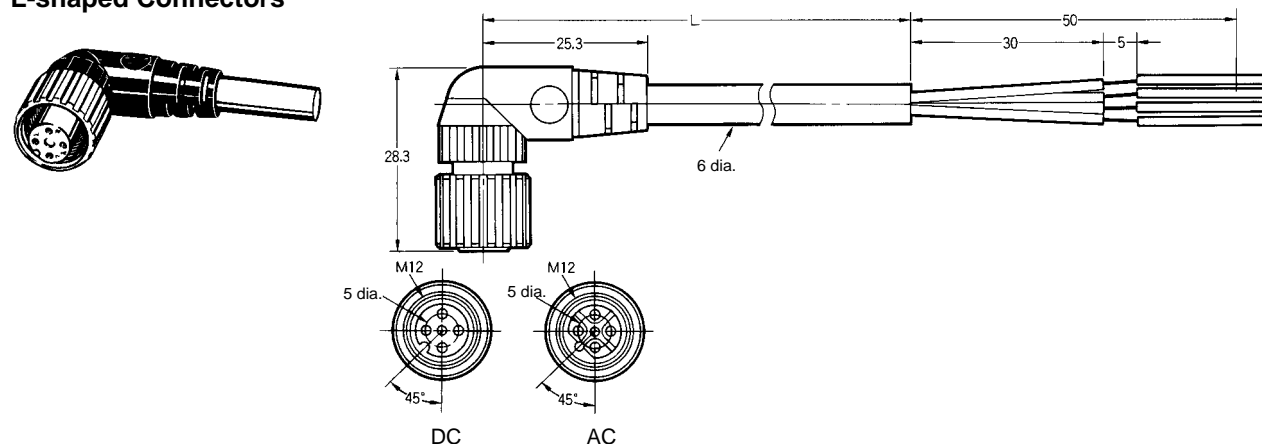
Orders are accepted in multiples of the minimum order.

Item	Cable pulling direction	No. of cable conductors	Cable length (m)	Model		Minimum order
				DC	AC	
Standard cable	Straight	2	1	XS2F-D421-CA0-A	XS2F-A421-CB0-A	10
		3		XS2F-D421-CC0-A	---	
		4		XS2F-D421-C80-A	XS2F-A421-C90-A	
		2	2	XS2F-D421-DA0-A	XS2F-A421-DB0-A	10
		3		XS2F-D421-DC0-AZ	---	
		4		XS2F-D421-D80-AZZ	XS2F-A421-D90-A	
		2	5	XS2F-D421-GA0-A	XS2F-A421-GB0-A	5
		3		XS2F-D421-GC0-AZ	---	
		4		XS2F-D421-G80-AZZ	XS2F-A421-G90-A	
		2	10	XS2F-D421-JA0-A	XS2F-A421-JB0-A	5
		3		XS2F-D421-JC0-A	---	
		4		XS2F-D421-J80-A	XS2F-A421-J90-A	
	L-shaped	2	1	XS2F-D422-CA0-A	XS2F-A422-CB0-A	10
		3		XS2F-D422-CC0-A	---	
		4		XS2F-D422-C80-A	---	
		2	2	XS2F-D422-DA0-A	XS2F-A422-DB0-A	10
		3		XS2F-D422-DC0-AZ	---	
		4		XS2F-D422-D80-AZ	---	
		2	5	XS2F-D422-GA0-A	XS2F-A422-GB0-A	5
		3		XS2F-D422-GC0-AZ	---	
		4		XS2F-D422-G80-AZ	---	
		2	10	XS2F-D422-JA0-A	XS2F-A422-JB0-A	5
		3		XS2F-D422-JC0-A	---	
		4		XS2F-D422-J80-A	---	
Vibration-proof robot cable	Straight	2	1	XS2F-D421-CA0-R	XS2F-A421-CB0-R	10
		4		XS2F-D421-C80-R	XS2F-A421-C90-R	
		2	2	XS2F-D421-DA0-R	XS2F-A421-DB0-R	10
		4		XS2F-D421-D80-R	XS2F-A421-D90-R	
		2	5	XS2F-D421-GA0-R	XS2F-A421-GB0-R	5
		4		XS2F-D421-G80-R	XS2F-A421-G90-R	
		2	10	XS2F-D421-JA0-R	XS2F-A421-JB0-R	5
		4		XS2F-D421-J80-R	XS2F-A421-J90-R	
	L-shaped	2	1	XS2F-D422-CA0-R	XS2F-A422-CB0-R	10
		4		XS2F-D422-C80-R	---	
		2	2	XS2F-D422-DA0-R	XS2F-A422-DB0-R	10
		4		XS2F-D422-D80-R	---	
		2	5	XS2F-D422-GA0-R	XS2F-A422-GB0-R	5
		4		XS2F-D422-G80-R	---	
		2	10	XS2F-D422-JA0-R	XS2F-A422-JB0-R	5
		4		XS2F-D422-J80-R	---	
Standard cable (non-polar)	Straight	2	2	XS2F-D421-310	XS2F-A421-310	10
		2	5	XS2F-D421-410	XS2F-A421-410	5
	L-shaped	2	2	XS2F-D422-310	XS2F-A422-310	10
		2	5	XS2F-D422-410	XS2F-A422-410	5

■ Dimensions

Straight Connectors

18

6 dia.

14.9 dia.

M12 — 45°   M12 — 45°

5 dia.   5 dia.

DC   AC

34

40.7

L

30

50

5

L-shaped Connectors

L

50

25.3

30

5

28.3

6 dia.

M12   M12

5 dia.   5 dia.

45°   45°

DC   AC

■ Wiring Diagram

Item	Standard cable Vibration-proof robot cable	Standard cable (non-polar DC)
	XS2F-□42□-□□0-A XS2F-□42□-□□0-R	XS2F-□42□-□□0
Two-conductor model	Contact No. ①②③④ — Brown / Blue (DC) Cable conductor color Contact No. ①②③④ — Brown / Blue (AC) Cable conductor color	Contact No. ①②③④ — Black / White Cable conductor color
Three-conductor model	Contact No. ①②③④ — Brown / Blue / Black (DC) Cable conductor color	---
Four-conductor model	Contact No. ①②③④ — Brown / White / Blue / Black (DC/AC) Cable conductor color	---

● **XS2F-☐42☐-☐☐0-TR E2E Connection Cable**

The XS2F-☐42☐-☐☐0-TR is a dedicated connection cable for the E2E. The Cable has pin numbers and color lead wires that are the same as the corresponding terminal numbers and the colors of the E2E lead wires.
The Cable is dark gray and marked with a lot number ☐☐☐☐-TR to discriminate the Cable from the standard XS2F.
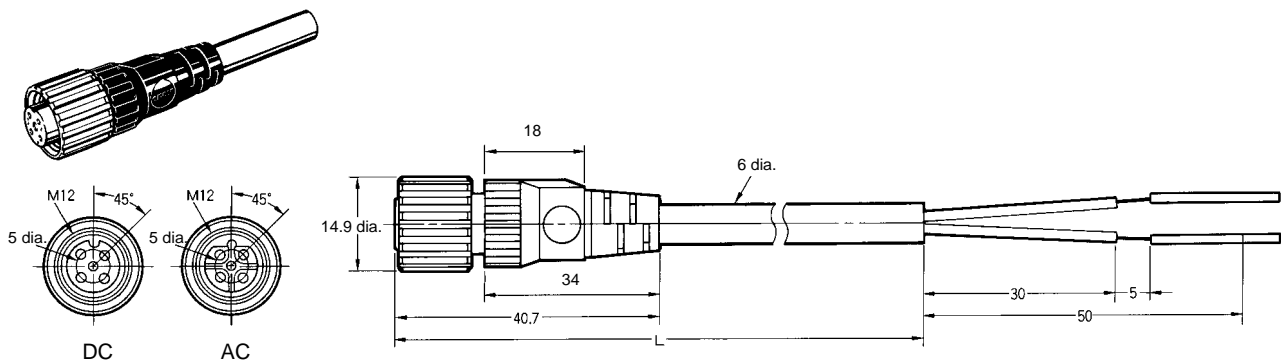
■ **Ordering Information**

Orders are accepted in multiples of the minimum order.

Cable pulling direction	No. of cable conductors	Cable length (m)	Model		Minimum order
			DC	AC	
Straight/Straight	2	2	XS2F-D421-DD0-TR	XS2F-A421-DB0-TR	10
		5	XS2F-D421-GD0-TR	XS2F-A421-GB0-TR	5
L-shaped/L-shaped		2	XS2F-D422-DD0-TR	XS2F-A422-DB0-TR	10
		5	XS2F-D422-GD0-TR	XS2F-A422-DB0-TR	5
Straight/Straight	3	2	XS2F-D421-DC0-TR	---	10
		5	XS2F-D421-GC0-TR	---	5
L-shaped/L-shaped		2	XS2F-D422-DC0-TR	---	10
		5	XS2F-D422-GC0-TR	---	5

■ **Dimensions**

Straight Connectors

DC   AC

L-shaped Connectors

DC   AC