

Round Water-resistant Connectors (M12)

XS5

Water-resistant Smartclick Connectors That Reduce Installation Work

- A newly developed lock structure that maintains compatibility with conventional, screw-type M12 connectors.
- Simply insert the Connectors, then turn them approximately 1/8 of a turn to lock.
- A positive click indicates locking.
- Features the same degree of protection (IP67) as conventional, screw-type M12 connectors.
- Connector with cable are UL approved



Specifications

Rated current	4 A
Rated voltage	250 VDC
Contact resistance (connector)	40 mΩ max. (20 mV max., 100 mA max.)
Insulation resistance	1,000 MΩ min. (at 500 VDC)
Dielectric strength (connector)	1,500 VAC for 1 min. (leakage current: 1 mA max.)
Degree of protection	IP67 (IEC60529)
Insertion tolerance	50 times min.
Lock strength	Pulling: 100 N/15 s, Twisting: 1 N·m/15 s
Cable holding strength	100 N/15 s (for cable diameter of 6 mm)
Lock operating force	0.1 N·m to 0.25 N·m
Ambient operating temperature range	-25°C to 70°C

Recommended Cables

Cable outer diameter (mm)		Core sizes		
		Crimping models	Soldering models	Screw-on models
8 mm	7 to 8 mm	Two types of connectors are available. 0.18 to 0.3mm ² 0.5 to 0.75mm ²	0.5 mm ² max.	0.18 to 0.75mm ²
7 mm	6 to 8 mm			
6 mm	5 to 6 mm			
4 mm	4 to 5 mm			
3 mm	3 to 4 mm			

Connection Combinations

OMRON model No.		Smartclick Plug Connectors	M12 Plug Connectors
		XS5H, XS5G, XS5M XS5W (plug side) XS5R (plug side)	XS2H, XS2G, XS2M XS2W (plug side) XS2R (plug side)
Smartclick Socket Connectors	XS5F, XS5C, XS5P XS5W (socket side) XS5R, (socket side)	⊗	○
M12 Socket Connectors	XS2F, XS2C, XS2P XS2W (socket side) XS2R (socket side)	○	○

Note: Smartclick™ is a registered trademark of the OMRON Corporation.

⊗: Connected by Smartclick™ twisting. ○: Connected by screwing.

Materials and Finish

Item	Model	XS5F/H/W/R	XS5M/P	XS5C/G
Contacts	Materials	Phosphor bronze		Brass
	Finish	Nickel base, 0.4-μm gold-plating		
Fixtures		Nickel-plated zinc alloy		
Pin Block		PBT resin (UL94V-0)		
O-ring		Rubber		
Overmolding/Cover		Polyester elastomer	—	PBT resin (UL94V-0)
Cable	Standard cable	UL AWM2464, 6-mm dia. 4 cores × AWG20 (0.12/49)	—	—
	Vibration-proof robot cable	UL CL3, 6-mm dia. 4 cores × AWG20 (0.08/110)	—	—
	Oil-resistant polyurethane cable	6 dia. 4 cores × 0.5 mm ² (0.12/45)	—	—
Seal Resin		—	Epoxy Resin (UL94V-0)	—
Power supply wires		—	UL 1007 AWG20	—

- Note: 1. See "XS5/XS2 - Assembly Tooling and Accessories" datasheet for information regarding assembly, tooling and accessories that are common to the XS5 and XS2 connectors
2. See "XS2" datasheet for specifics regarding those connectors

4-Pin Connectors with Cable Attached

■ XS5F - Socket on One Cable End

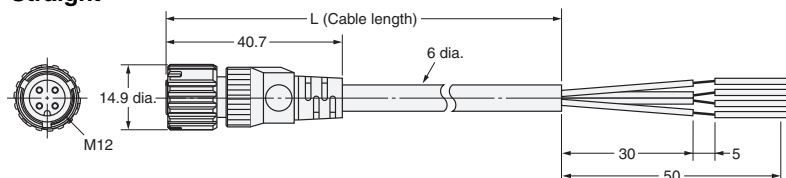
XS5F-D42□-□80-A Standard Cable
 XS5F-D42□-□80-F Vibration-proof Robot Cable
 XS5F-D42□-□80-P Oil-resistant Polyurethane Cable



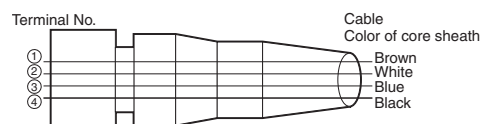
Dimensions

(Unit: mm)

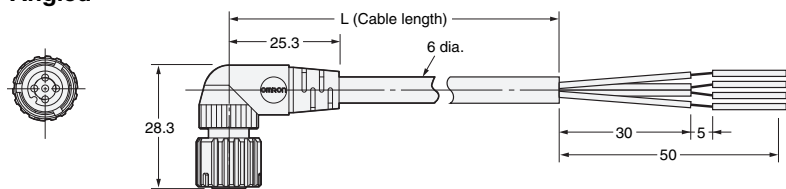
Straight



Wiring Diagram for 4 Cores



Angled



Note: The overmolding on the Standard Cable (XS5F-D42□-□80-A) and the Oil-resistant Polyurethane Cable (XS5F-D42□-□80-P) is black, and the overmolding on the Vibration-proof Robot Cable (XS5F-D42□-□80-F) is gray.

Ordering Information

Cable type	Cable length L (m)	Model		Standard pack quantity
		Straight	Angled	
Standard cable	1	XS5F-D421-C80-A	XS5F-D422-C80-A	10
	2	XS5F-D421-D80-A	XS5F-D422-D80-A	
	3	XS5F-D421-E80-A	XS5F-D422-E80-A	
	5	XS5F-D421-G80-A	XS5F-D422-G80-A	
	10	XS5F-D421-J80-A	XS5F-D422-J80-A	5
Vibration-proof robot cable	1	XS5F-D421-C80-F	XS5F-D422-C80-F	10
	2	XS5F-D421-D80-F	XS5F-D422-D80-F	
	3	XS5F-D421-E80-F	XS5F-D422-E80-F	
	5	XS5F-D421-G80-F	XS5F-D422-G80-F	
	10	XS5F-D421-J80-F	XS5F-D422-J80-F	5
Oil-resistant polyurethane cable	2	XS5F-D421-D80-P	XS5F-D422-D80-P	
	5	XS5F-D421-G80-P	XS5F-D422-G80-P	
	10	XS5F-D421-J80-P	XS5F-D422-J80-P	1

Note: Ask your OMRON representative about other specifications.

Model Number Legend

Use this model number legend to identify products from their model number.
When ordering, use a model number from the table in *Ordering Information*.

XS5F - D42 - **80** -

1 2 3 4 5 6 7 8 9

1. Type

F: Connector connected to cable, socket on one cable end

2. AC/DC (Mating Section Form)

D: DC

3. Connector Poles

4: 4 poles

4. Contact Plating

2: 0.4-μm gold plating

5. Cable Connection Direction

1: Straight

2: Angled

6. Cable Length

A: 0.3 m G: 5 m

B: 0.5 m H: 7 m

C: 1 m J: 10 m

D: 2 m K: 15 m

E: 3 m L: 20 m

F: 4 m

7. Connections

8: ① Brown, ② White, ③ Blue, ④ Black
(Numbers inside circles are terminal numbers.)

8. Connectors on One End/Both Ends

0: One end

9. Cable Specification

A: Standard cable

F: Vibration-proof robot cable

P: Oil-resistant polyurethane cable

■ XS5H - Plug on One Cable End

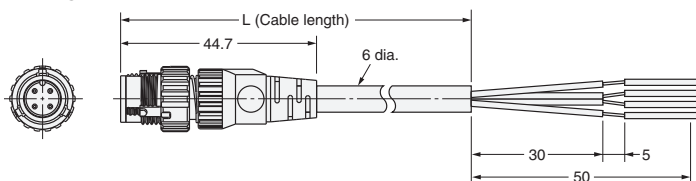
XS5H-D42□-□80-A Standard Cable
 XS5H-D42□-□80-F Vibration-proof Robot Cable
 XS5H-D42□-□80-P Oil-resistant Polyurethane Cable



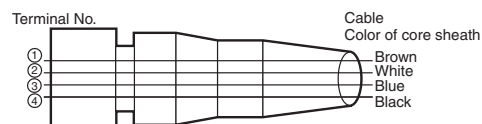
Dimensions

(Unit: mm)

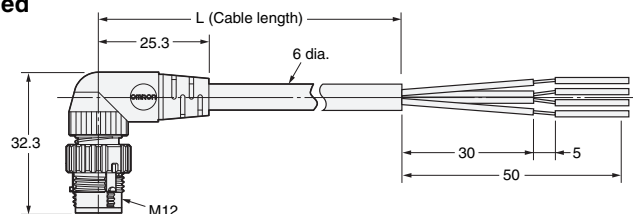
Straight



Wiring Diagram for 4 Cores



Angled



Note: The overmolding on the Standard Cable (XS5H-D42□-□80-A) and the Oil-resistant Polyurethane Cable (XS5H-D42□-□80-P) is black, and the overmolding of the Vibration-proof Robot Cable (XS5H-D42□-□80-F) is gray

Ordering Information

Cable type	Cable length L (m)	Model		Standard pack quantity
		Straight	Angled	
Standard cable	0.3	XS5H-D421-A80-A	XS5H-D422-A80-A	5
	1	XS5H-D421-C80-A	XS5H-D422-C80-A	
	2	XS5H-D421-D80-A	XS5H-D422-D80-A	
	5	XS5H-D421-G80-A	XS5H-D422-G80-A	
Vibration-proof robot cable	0.3	XS5H-D421-A80-F	XS5H-D422-A80-F	5
	1	XS5H-D421-C80-F	XS5H-D422-C80-F	
	2	XS5H-D421-D80-F	XS5H-D422-D80-F	
	5	XS5H-D421-G80-F	XS5H-D422-G80-F	
Oil-resistant polyurethane cable	0.3	XS5H-D421-A80-P	XS5H-D422-A80-P	10
	2	XS5H-D421-D80-P	XS5H-D422-D80-P	5
	5	XS5H-D421-G80-P	XS5H-D422-G80-P	

Note: Ask your OMRON representative about other specifications.

Model Number Legend

Use this model number legend to identify products from their model number.
When ordering, use a model number from the table in *Ordering Information*.

XS5H - D42 ☐ - ☐ **80** - ☐

1 2 3 4 5 6 7 8 9

1. Type

H: Connector connected to cable, plug on one cable end

2. AC/DC (Mating Section Form)

D: DC

3. Connector Poles

4: 4 poles

4. Contact Plating

2: 0.4-μm gold plating

5. Cable Connection Direction

1: Straight

2: Angled

6. Cable Length

A: 0.3 m G: 5 m

B: 0.5 m H: 7 m

C: 1 m J: 10 m

D: 2 m K: 15 m

E: 3 m L: 20 m

F: 4 m

7. Connections

8: ① Brown, ② White, ③ Blue, ④ Black
(Numbers inside circles are terminal numbers)

8. Connectors on One End/Both Ends

0: One end

9. Cable Specifications

A: Standard cable

F: Vibration-proof robot cable

P: Oil-resistant polyurethane cable

■ XS5W - Socket and Plug on Cable Ends

XS5W-D42□-□81-A Standard Cable

XS5W-D42□-□81-F Vibration-proof Robot Cable

XS5W-D42□-□81-P Oil-resistant Polyurethane Cable

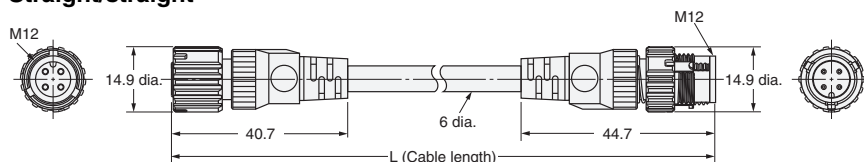
C[®] AI[®] US
(PENDING)

Smartclick™

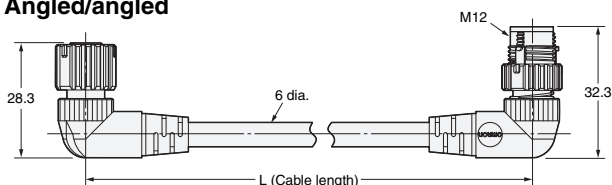
Dimensions

(Unit: mm)

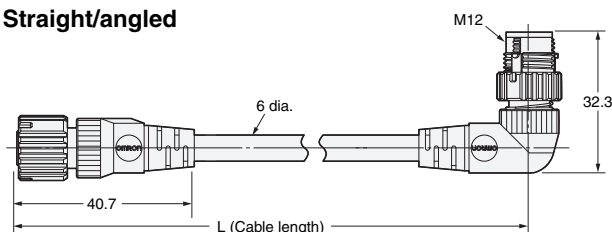
Straight/straight



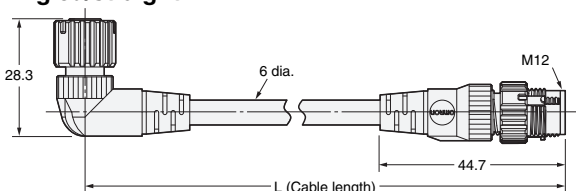
Angled/angled



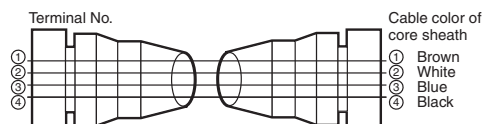
Straight/angled



Angled/straight



Wiring Diagram for 4 Cores



Note: The overmolding on the Standard Cable (XS5W-D42□-□81-A) and the Oil-resistant Polyurethane Cable (XS5W-D42□-□81-P) is black, and the overmolding of the Vibration-proof Robot Cable (XS5W-D42□-□81-F) is gray.

Ordering Information

Cable type	Cable length L (m)	Model		Standard pack quantity
		Straight/straight	Angled/angled	
Standard cable	1	XS5W-D421-C81-A	—	10
	2	XS5W-D421-D81-A	XS5W-D422-D81-A	
	3	XS5W-D421-E81-A	—	
	5	XS5W-D421-G81-A	XS5W-D422-G81-A	
	10	XS5W-D421-J81-A	—	5
Vibration-proof robot cable	1	XS5W-D421-C81-F	—	10
	2	XS5W-D421-D81-F	—	
	3	XS5W-D421-E81-F	—	
	5	XS5W-D421-G81-F	—	
	10	XS5W-D421-J81-F	—	5
Oil-resistant polyurethane cable	2	XS5W-D421-D81-P	—	5
	5	XS5W-D421-G81-P	—	
	10	XS5W-D421-J81-P	—	1

Cable type	Cable length L (m)	Model		Standard pack quantity
		Straight/angled	Angled/straight	
Standard cable	2	XS5W-D423-D81-A	XS5W-D424-D81-A	5
	5	XS5W-D423-G81-A	XS5W-D424-G81-A	

Note: Ask your OMRON representative about other specifications.

Model Number Legend

Use this model number legend to identify products from their model number.
When ordering, use a model number from the table in *Ordering Information*.

XS5W - D42 - **81** -

1 2 3 4 5 6 7 8 9

1. Type

W: Connectors connected to cable, socket and plug on cable ends

2. AC/DC (Mating Section Form)

D: DC

3. Connector Poles

4: 4 poles

4. Contact Plating

2: 0.4-μm gold plating

5. Cable Connection Directions

- 1: Straight/straight
- 2: Angled/angled
- 3: Straight (XS5F)/angled (XS5H)
- 4: Angled (XS5F)/straight (XS5H)

6. Cable Length

- A: 0.3 m G: 5 m
- B: 0.5 m H: 7 m
- C: 1 m J: 10 m
- D: 2 m K: 15 m
- E: 3 m L: 20 m
- F: 4 m

7. Connections

- 8: ① Brown, ② White, ③ Blue, ④ Black
(Numbers inside circles are terminal numbers.)

8. Connectors on One End/Both Ends

- 1: Both ends

9. Cable Specifications

- A: Standard cable
- F: Vibration-proof robot cable
- P: Oil-resistant polyurethane cable

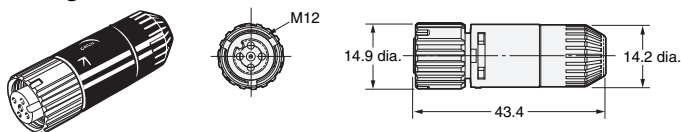
4-Pin and 5-Pin Assembly Connector

■ XS5C Sockets

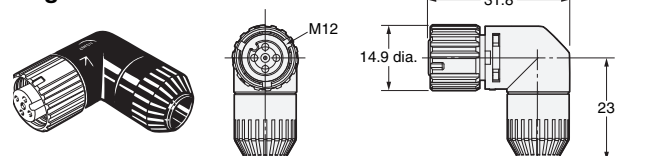


Dimensions

XS5C-D4C□ (Crimping Model)
XS5C-D42□ (Soldering Model)
Straight Connectors

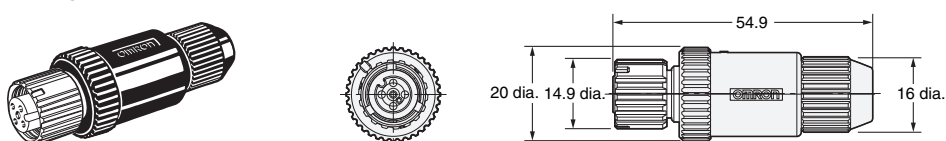


XS5C-D4C□ (Soldering Model)
XS5C-D42□ (Soldering Model)
Angled Connectors

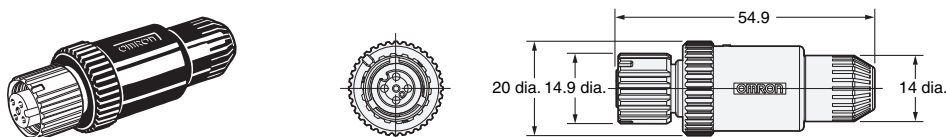


(Unit: mm)

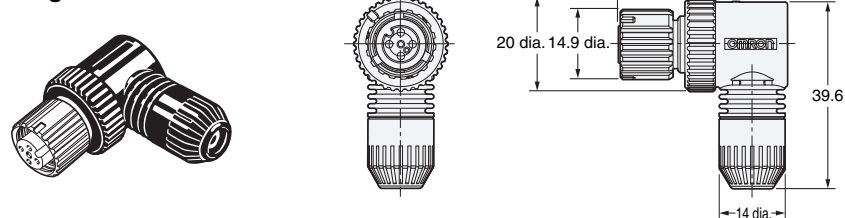
XS5C-D□S□ (Screw-on Connectors, Applicable Cable Outer Diameter: 7 or 8mm)
Straight Connectors



XS5C-D□S□ (Screw-on Connectors, Applicable Cable Outer Diameter: 3, 4, or 6mm)
Straight Connectors



XS5C-D□S□ (Screw-on Connectors)
Angled Connectors



Ordering Information

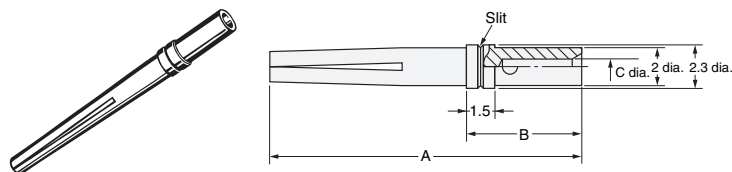
No. of Poles	Connection Method	Suitable cable dia. (mm)	Model		Standard pack quantity
			Straight	Angled	
4	Crimping	6 mm (5 to 6)	XS5C-D4C1	XS5C-D4C2	10
		4 mm (4 to 5)	XS5C-D4C3	XS5C-D4C4	
		3 mm (3 to 4)	XS5C-D4C5	XS5C-D4C6	
	Soldering	6 mm (5 to 6)	XS5C-D421	XS5C-D422	
		4 mm (4 to 5)	XS5C-D423	XS5C-D424	
		3 mm (3 to 4)	XS5C-D425	XS5C-D426	
	Screw-on	6 mm (5 to 6)	XS5C-D4S1	XS5C-D4S2	
		4 mm (4 to 5)	XS5C-D4S3	XS5C-D4S4	
		3 mm (3 to 4)	XS5C-D4S5	XS5C-D4S6	
		8 mm (7 to 8)	XS5C-D4S7	—	
5	Screw-on	7 mm (6 to 7)	XS5C-D4S9	—	
		6 mm (5 to 6)	XS5C-D5S1	—	
		4 mm (4 to 5)	XS5C-D5S3	—	
		3 mm (3 to 4)	XS5C-D5S5	—	
		8 mm (7 to 8)	XS5C-D5S7	—	
		7 mm (6 to 7)	XS5C-D5S9	—	

■ XS5U (Crimping pin for XS5C)

Dimensions

(Unit: mm)

XS5U-222□
Socket Pin



Dimensions

Model	Suitable core size (mm ²)	Dimension (mm)			No. of slits
		A	B	C	
XS5U-2221	0.18 to 0.3 (22 to 24 AWG)	16.7	6.1	0.8	1
XS5U-2222	0.5 to 0.7 (18 to 20 AWG)	16.8	6.2	1.3	0

Note: 1. A special tool must be used for crimping. For details, refer to the "XS5/XS2 - Assembly Tooling and Accessories" datasheet.
2. AWG size is based on UL1007 wire.

Ordering Information

Suitable core size (mm ²)	Model	Standard Pack Quantity
0.18 to 0.3	XS5U-2221	100
0.5 to 0.75	XS5U-2222	

■ XS5G - Plugs

CALUS
(PENDING)

Smartclick™

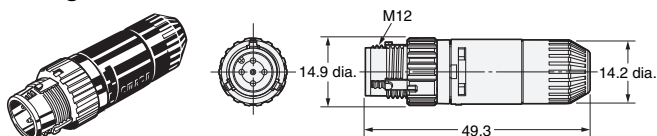
Dimensions

(Unit: mm)

XS5G-D4C□ (Crimping Model)

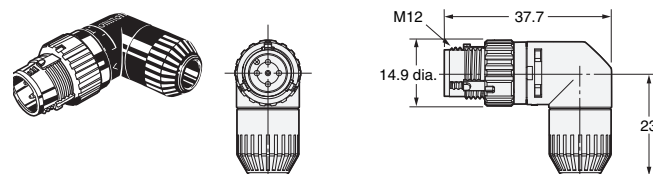
XS5G-D42□ (Soldering Model)

Straight Connectors



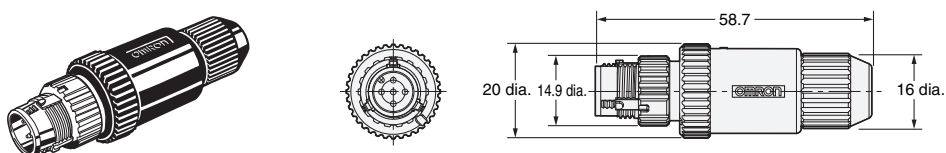
XS5G-D42□ (Soldering Model)

Angled Connectors



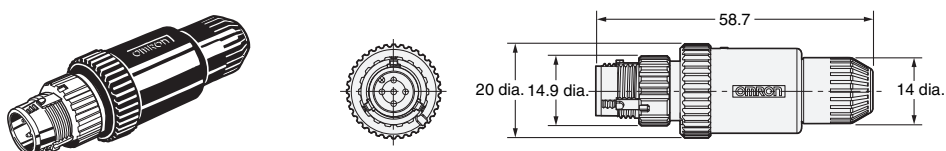
XS5G-D□S□ (Screw-on Connectors, Applicable Cable Outer Diameter: 7 or 8mm)

Straight Connectors



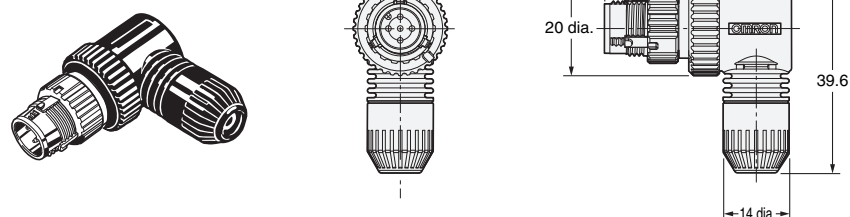
XS5G-D□S□ (Screw-on Connectors, Applicable Cable Outer Diameter: 3, 4, or 6mm)

Straight Connectors



XS5G-D□S□ (Screw-on Connectors)

Angled Connectors



Ordering Information

No. of Poles	Connection Method	Suitable cable dia. (mm)	Model		Standard pack quantity
			Straight	Angled	
4	Crimping	6 mm (5 to 6)	XS5G-D4C1	—	10
		4 mm (4 to 5)	XS5G-D4C3	—	
		3 mm (3 to 4)	XS5G-D4C5	—	
	Soldering	6 mm (5 to 6)	XS5G-D421	XS5G-D422	
		4 mm (4 to 5)	XS5G-D423	XS5G-D424	
		3 mm (3 to 4)	XS5G-D425	XS5G-D426	
	Screw-on	6 mm (5 to 6)	XS5G-D4S1	XS5G-D4S2	
		4 mm (4 to 5)	XS5G-D4S3	XS5G-D4S4	
		3 mm (3 to 4)	XS5G-D4S5	XS5G-D4S6	
		8 mm (7 to 8)	XS5G-D4S7	—	
5	Screw-on	7 mm (6 to 7)	XS5G-D4S9	—	
		6 mm (5 to 6)	XS5G-D5S1	—	
		4 mm (4 to 5)	XS5G-D5S3	—	
		3 mm (3 to 4)	XS5G-D5S5	—	
		8 mm (7 to 8)	XS5G-D5S7	—	
		7 mm (6 to 7)	XS5G-D5S9	—	

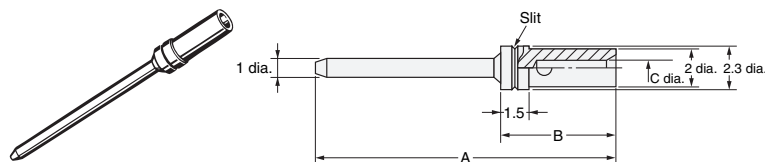
Note: XS5G Screw-on Plugs cannot be connected side-by-side to the CN1 and CN2 connectors of XS2R or XS5R Y-Joint Sockets / Plugs

■ XS5U (Crimping pin for XS5G)

Dimensions

(Unit: mm)

XS5U-312□
Plug Pin



Dimensions

Model	Suitable core size (mm ²)	Dimension (mm)			No. of slits
		A	B	C	
XS5U-3121	0.18 to 0.3 (22 to 24 AWG)	22.6	6.1	0.8	1
XS5U-3122	0.5 to 0.7 (18 to 20 AWG)	22.7	6.2	1.3	0

- Note:** 1. A special tool must be used for crimping. For details, refer to the "XS5/XS2 - Assembly Tooling and Accessories" datasheet.
2. AWG size is based on UL1007 wire.

Ordering Information

Suitable core size (mm ²)	Model	Standard Pack Quantity
0.18 to 0.3	XS5U-3121	100
0.5 to 0.75	XS5U-3122	

4-Pin Y-Joint Plug/Socket Connectors

■ XS5R

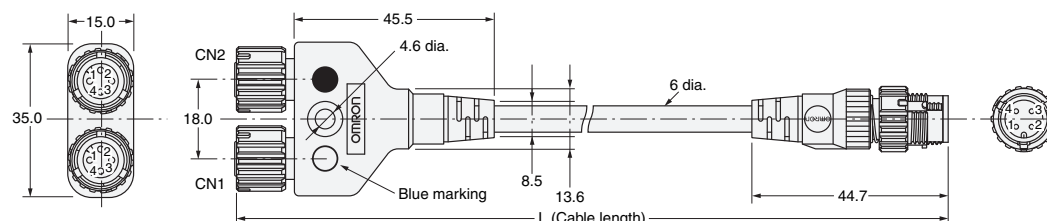


Dimensions

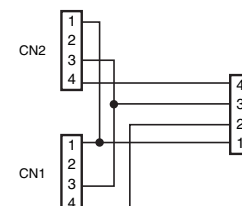
(Unit: mm)

XS5R-D426-□11-F

Connectors on Both Ends (Y-Joint Plug/Socket)

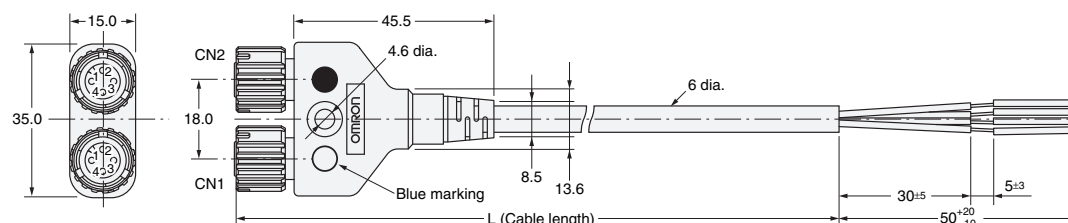


Wiring Diagram

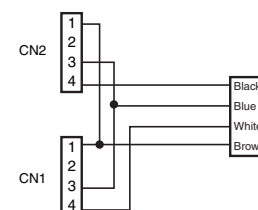


XS5R-D426-□10-F

Connectors on One Cable End (Y-Joint Socket)

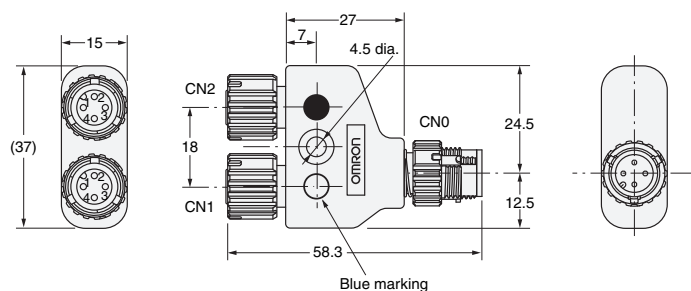


Wiring Diagram



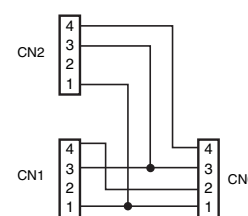
XS5R-D426-□

Y-Joint Plug/Socket without Cable

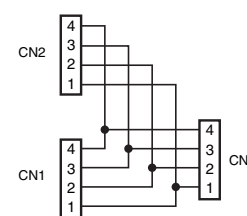


Wiring Diagram

XS5R-D426-1



XS5R-D426-5



Ordering Information

Cable	Connector	Cable length (m)	Model	Standard pack quantity
With cable	Connectors on both cable ends	0.5	XS5R-D426-B11-F	5
		1	XS5R-D426-C11-F	
		2	XS5R-D426-D11-F	
		3	XS5R-D426-E11-F	
	Connector on one cable end	2	XS5R-D426-D10-F	
		5	XS5R-D426-G10-F	
With no cable	Y-Joint Plug/Socket	---	XS5R-D426-1	10
			XS5R-D426-5	

Note: XS2G and XS5G Assembled Connectors with screw connections cannot be connected to both CN1 and CN2 at the same time.

4-Pin Panel-mount Connectors

■ XS5P - Sockets

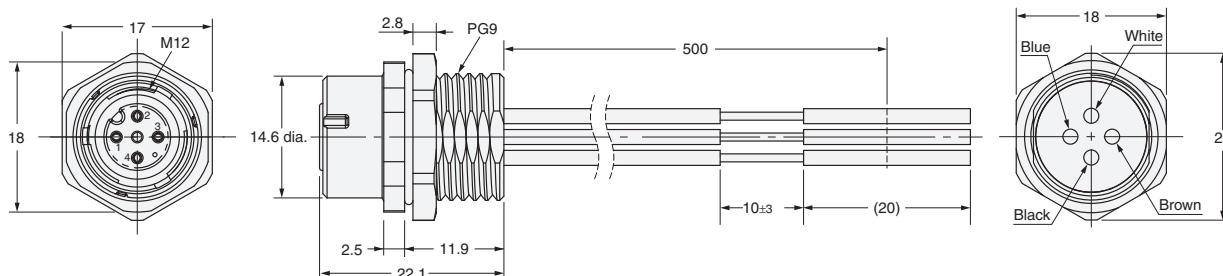


Dimensions

(Unit: mm)

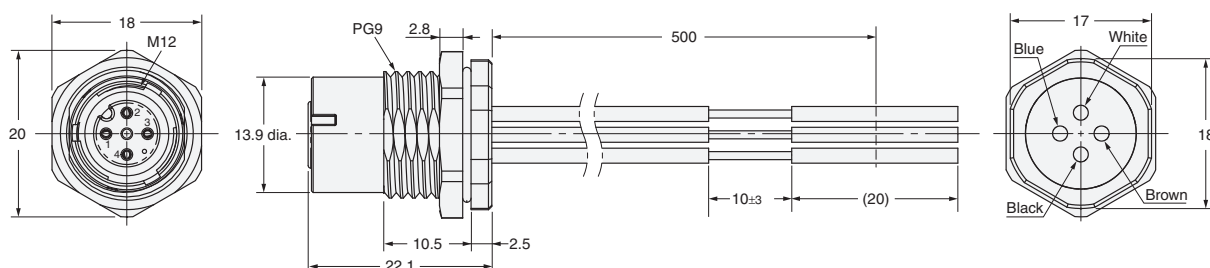
XS5P-D426-5

Front Panel-mounting Sockets for Rear Lock Nuts

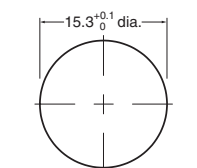


XS5P-D427-5

Rear Panel-mounting Sockets for Front Lock Nuts



Panel Cutout



Panel Cutout Dimension
Panel thickness = 1 to 4 mm

Note: 1. The panel cutout dimension is the same for Front-locking and Rear-locking Sockets.

2. Rotational positioning is not possible for connector rotation.

Wiring and Wire Specifications

Wiring

Pin number	Color
1	Brown
2	White
3	Blue
4	Black

Wire Specifications

Item		Specification
Specification		UL1007
Nominal size		AWG20
Configuration	Number of wires	21
	Wire diameter	0.18
	Standard outer diameter	1.8

Ordering Information

Type	Lock	Cable length (m)	Model	Standard pack, quantity
With cable	Rear lock	0.5	XS5P-D426-5	10
	Front lock		XS5P-D427-5	

■ XS5M - Plugs

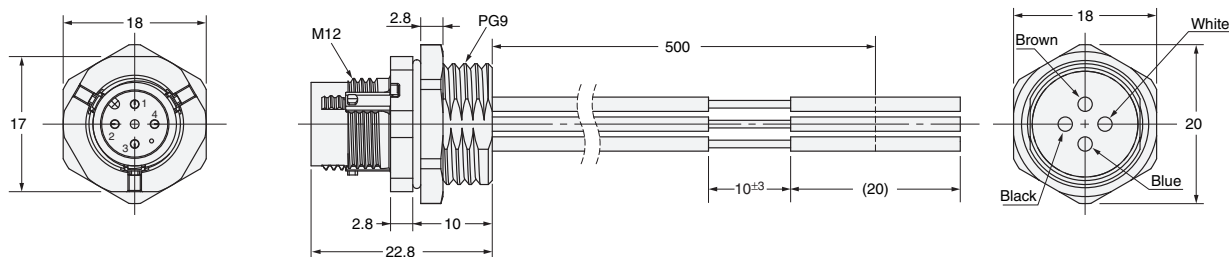


Dimensions

(Unit: mm)

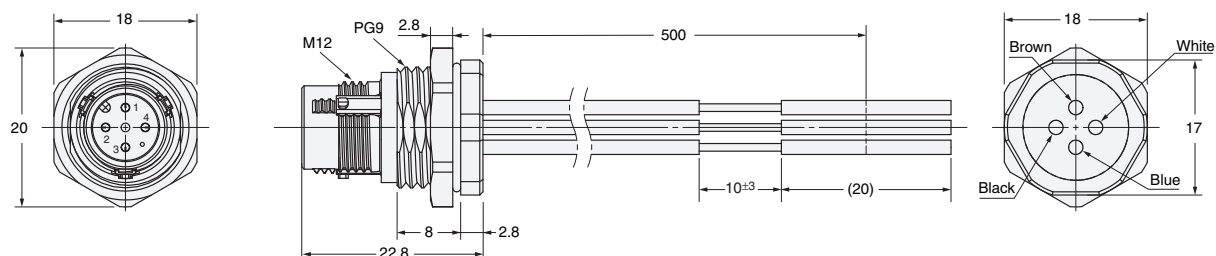
XS5M-D426-5

Front Panel-mounting Plugs for Rear Lock Nuts

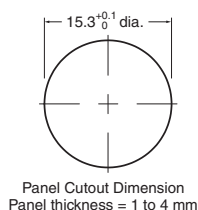


XS5M-D427-5

Rear Panel-mounting Plugs for Front Lock Nuts



Panel Cutout



- Note:** 1. The panel cutout dimension is the same for Front-locking and Rear-locking Sockets.
2. Rotational positioning is not possible for connector rotation.

Wiring and Wire Specifications

Wiring

Pin number	Color
1	Brown
2	White
3	Blue
4	Black

Wire Specifications

Item		Specification
Specification		UL1007
Nominal size		AWG20
Configuration	Number of wires	21
	Wire diameter	0.18
	Standard outer diameter	1.8

Ordering Information

Type	Lock	Cable length (m)	Model	Standard pack, quantity
With cable	Rear lock	0.5	XS5M-D426-5	10
	Front lock		XS5M-D427-5	

Precautions

- Note:** 1. See "XS5/XS2 - Assembly Tooling and Accessories" datasheet for information and precautions regarding assembly, tooling and accessories that are common to the XS5 and XS2 connectors
2. See "XS2" datasheet for specifics regarding those connectors

■ Correct Use

Do not use the Connectors in an atmosphere or environment that exceeds the specifications.

Connector Connection and Disconnection

- When connecting or disconnecting Connectors, be sure to hold the Connectors by hand.
- Do not hold the cable when disconnecting Connectors.
- When mating Connectors, be sure to insert the plug all the way to the back of the socket before attempting to lock the Connectors.
- Do not use tools of any sort to mate the Connectors. Always use your hands. Pliers or other tools may damage the Connectors.
- When mating the Connectors to XS2 or other M12 Connectors, tighten the lock by hand to a torque of 0.39 to 0.49 N·m.

Wiring

- Always confirm wiring diagrams before wiring sensors, limit switches, or other devices.
- Lay the cables so that external force is not applied to the Connectors. Otherwise, the degree of protection (IP67) may not be achieved.

Degree of Protection

- The degree of protection of Connectors (IP67) is not for a fully watertight structure. Do not use the Connectors underwater.
- Do not step on or place any objects on the Connectors. Doing so may damage the Connectors.

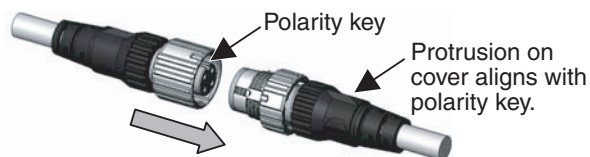
■ General Precautions

- Do not pull excessively on the Connectors or cables. Do not install the Connectors or cables in any way that would place a load directly on the mating section or cable connections. Doing so can damage the Connectors or break the wires inside the cables.
- Install the Connectors and cables where they will not be stepped on to prevent the wires inside the cables from being broken and to prevent the Connectors from being damaged. If the Connectors or cables must be installed where they might be stepped on, protect them with covers.
- Refer to the specifications for your cables before bending the cables and do not bend them past their minimum bending radius.
- If sensors or switches are not attached during installation, protect the mating surface of the Connector with a XS2Z-22 Waterproof Cover or XS2Z-14/15 Dust Cover.

■ Connecting the XS5

1. Connecting the XS5 Plug and Socket

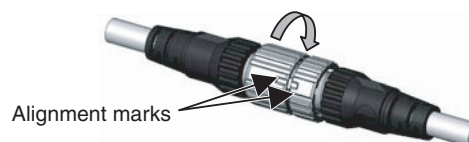
- Align the projection on the plug cover with the polarity key on the socket, then insert the plug all the way in.



- Hold the knurled socket grip, then insert the projection on the plug into the groove of the socket.



- Turn the knurled grips of the socket clockwise approximately 45 degrees in respect to the plug. A click will indicate that the Connectors are locked. The locking condition can also be confirmed by the alignment marks on the plug and socket.



2. Connecting the XS5 and XS2

- Align the projection on the plug cover with the polarity key on the socket, then insert the plug all the way in.
- In the same way as when connecting two XS2 Connectors, screw the knurled grip in the clockwise direction.
- Use your fingers to tighten the Connectors sufficiently.

A large grid of 100 small squares, each containing a unique combination of symbols (plus, minus, multiplication, division, and equals signs) and numbers (1 through 9). The symbols and numbers are arranged in a way that suggests a mathematical or logical pattern, possibly related to the 'Mathematical Symbols' mentioned in the text. The grid is composed of 10 rows and 10 columns of squares. Each square contains a unique combination of symbols and numbers. The symbols used are plus (+), minus (-), multiplication (x), division (/), and equals (=). The numbers used are 1 through 9. The arrangement of symbols and numbers in each square is unique, suggesting a complex pattern or a key to a puzzle. The grid is a visual representation of the 'Mathematical Symbols' mentioned in the text.

Omron Electronic Components, LLC

Terms and Conditions of Sales

I. GENERAL

- Definitions:** The words used herein are defined as follows.
 - Terms:** These terms and conditions
 - Seller:** Omron Electronic Components LLC and its subsidiaries
 - Buyer:** The buyer of Products, including any end user in section III through VI
 - Products:** Products and/or services of Seller
 - Including:** Including without limitation
- Offer/Acceptance:** These Terms are deemed part of all quotations, acknowledgments, invoices, purchase orders and other documents, whether electronic or in writing, relating to the sale of Products by Seller. Seller hereby objects to any Terms proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
- Distributor:** Any distributor shall inform its customer of the contents after and including section III of these Terms.

II. SALES

- Prices; Payment:** All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at the time the purchase order is accepted by Seller. Payments for Products received are due net 30 days unless otherwise stated in the invoice. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice.
- Discounts:** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (a) the invoice is paid according to Seller's payment terms and (b) Buyer has no past due amounts owing to Seller.
- Interest:** Seller, at its option, may charge Buyer 1.5% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- Orders:** Seller will accept no order less than 200 U.S. dollars net billing.
- Currencies:** If the prices quoted herein are in a currency other than U.S. dollars, Buyer shall make remittance to Seller at the then current exchange rate most favorable to Seller; provided that if remittance is not made when due, Buyer will convert the amount to U.S. dollars at the then current exchange rate most favorable to Seller available during the period between the due date and the date remittance is actually made.
- Governmental Approvals:** Buyer shall be responsible for all costs involved in obtaining any government approvals regarding the importation or sale of the Products.
- Taxes:** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.
- Financial:** If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
- Cancellation; Etc:** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
- Force Majeure:** Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
- Shipping; Delivery:** Unless otherwise expressly agreed in writing by Seller:
 - All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Products shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Products until the full purchase price is paid by Buyer;
 - Delivery and shipping dates are estimates only; and
 - Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- Claims:** Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier or any claim related to pricing or other charges must be presented in detail in writing to Seller within 30 days of receipt of shipment.

III. PRECAUTIONS

- Suitability:** IT IS THE BUYER'S SOLE RESPONSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS, (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM, (F) MATERIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in all cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
- Use with Attention:** The followings are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible use of any Product, nor to imply that any use listed may be suitable for any Product:
 - Outdoor use, use involving potential chemical contamination or electrical interference.

- Use in consumer Products or any use in significant quantities.
 - Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
 - Systems, machines, and equipment that could present a risk to life or property.
- Prohibited Use:** NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
 - Motorized Vehicle Application:** USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY SELLER.
 - Programmable Products:** Seller shall not be responsible for the Buyer's programming of a programmable Product.

IV. WARRANTY AND LIMITATION

- Warranty:** Seller's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT ALL OTHER WARRANTIES, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS.
- Buyer Remedy:** Seller's sole obligation hereunder shall be to replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product or, at Seller's election, to repay or credit Buyer an amount equal to the purchase price of the Product; provided that there shall be no liability for Seller or its affiliates unless Seller's analysis confirms that the Products were correctly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Seller before shipment.
- Limitation on Liability:** SELLER AND ITS AFFILIATES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. FURTHER, IN NO EVENT SHALL LIABILITY OF SELLER OR ITS AFFILIATES EXCEED THE INDIVIDUAL PRICE OF THE PRODUCT ON WHICH LIABILITY IS ASSERTED.
- Indemnities:** Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products.

V. INFORMATION; ETC.

- Intellectual Property:** The intellectual property embodied in the Products is the exclusive property of Seller and its affiliates and Buyer shall not attempt to duplicate it in any way without the written permission of Seller. Buyer (at its own expense) shall indemnify and hold harmless Seller and defend or settle any action brought against Seller to the extent that it is based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
- Property; Confidentiality:** Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Seller. All information and materials supplied by Seller to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
- Performance Data:** Performance data is provided as a guide in determining suitability and does not constitute a warranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements.
- Change In Specifications:** Product specifications and descriptions may be changed at any time based on improvements or other reasons. It is Seller's practice to change part numbers when published ratings or features are changed, or when significant engineering changes are made. However, some specifications of the Product may be changed without any notice.
- Errors And Omissions:** The information on Seller's website or in other documentation has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.
- Export Controls:** Buyer shall comply with all applicable laws, regulations and licenses regarding (a) export of the Products or information provided by Seller; (b) sale of Products to forbidden or other proscribed persons or organizations; (c) disclosure to non-citizens of regulated technology or information.

VI. MISCELLANEOUS

- Waiver:** No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller.
- Assignment:** Buyer may not assign its rights hereunder without Seller's written consent.
- Law:** These Terms are governed by Illinois law (without regard to conflict of laws). Federal and state courts in Cook County, Illinois have exclusive jurisdiction for any dispute hereunder.
- Amendment:** These Terms constitute the entire agreement between Buyer and Seller relating to the Products, and no provision may be changed or waived unless in writing signed by the parties.
- Severability:** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision.

Certain Precautions on Specifications and Use

1. **Suitability for Use.** Seller shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in Buyer's application or use of the Product. At Buyer's request, Seller will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
 - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
 - (ii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
 - (iii) Use in consumer products or any use in significant quantities.
 - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. **Programmable Products.** Seller shall not be responsible for the user's programming of a programmable product, or any consequence thereof.
3. **Performance Data.** Performance data given in this publication is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to Seller's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Seller representative at any time to confirm actual specifications of purchased Product.
5. **Errors and Omissions.** The information in this publication has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors, or omissions.
6. **RoHS Compliance.** Where indicated, our products currently comply, to the best of our knowledge as of the date of this publication, with the requirements of the European Union's Directive on the Restriction of certain Hazardous Substances ("RoHS"), although the requirements of RoHS do not take effect until July 2006. These requirements may be subject to change. Please consult our website for current information.

Complete "Terms and Conditions of Sale" for product purchase and use are on Omron's website at <http://www.components.omron.com> – under the "About Us" tab, in the Legal Matters section.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

OMRON[®]

**OMRON ELECTRONIC
COMPONENTS LLC**

55 E. Commerce Drive, Suite B
Schaumburg, IL 60173

847-882-2288

OMRON ON-LINE

Global - <http://www.omron.com>

USA - <http://www.components.omron.com>