

Specification
for
Ethernet Cable Assemblies
for CC-Link IE TSN / CC-Link IE Field network

Type SC-E5EW-O□M-△▲-MV

mitsubishi electric system & service

Note

Revision				Drawn	Check	Design	Approved
A	8 Feb., 2021			<i>n. Ito</i>	<i>S. Kaiya</i>	<i>S. Karahara</i>	<i>D. Subushina</i>
B	12 Mar., 2021						
Send to				Date		Dwg	
				1 September, 2014		X903703D50060-H01B	
				Order			

1.SCOPE

This specification covers the requirements for the Ethernet cable assemblies type SC-E5EW-MV for CC-Link IE TSN / CC-Link IE Field network.

※ The Products covered in this specification don't include the toxic substances in RoHS.

※ UL's Wiring Harnesses Traceability program provides traceability for this cable.

2.USE ENVIRONMENT

The cable shall be used in following conditions.

- 1) Indoor movable
- 2) Rack
- 3) Control box
- 4) Indoor pipe
- 5) Duct
- 6) Free access

3.LENGTH OF CABLE

0.1m*¹, 0.2m, 0.3m, 0.5m, 1~45m (At 1m interval)

*1 Only "SC-E5EW-S□M-MV" is compatible with 0.1m.

4.CABLE TYPE

(1) Straight connectors on both ends

SC - E5E W - O □ M - MV

	Indoor movable
	Length of cable [m] 0.1m* ¹ , 0.2m, 0.3m, 0.5m 1~45m (At 1m interval) (cable only : From 1~200 [m] (At 1m interval)
	Applicable connector (All connectors are shielded) S : RJ45 connectors on both ends X : M12 connectors on both ends SX : RJ45 connector on one end (Serial No indication side) / M12 connector on one end blank : cable only
	Cable type Straight cable with Double shielded / STP
	Ethernet cable for CC-Link IE Field network

*1 Only "SC-E5EW-S□M-MV" is compatible with 0.1m.

(2) Straight connector on one end / Angle connector on one end

SC - E5E W - O □ M - △ - MV

Indoor movable
Cable lead out direction A1~A4 : Refer to clause 15.
Length of cable [m] 0.2m, 0.3m, 0.5m 1~45m (At 1m interval)
Applicable connector (All connectors are shielded) SA : RJ45 connector on one end (Serial No indication side) / Angle RJ45 connector on one end XA : M12connector on one end (Serial No indication side) / Angle RJ45 connector on one end
Cable type Straight cable with Double shielded/STP
Ethernet cable for CC-Link IE Field network

(3) Angle connectors on both ends

SC - E5E W - A □ M - △ ▲ - MV

Indoor movable
Cable lead out direction 1~4 : Refer to clause 15.
Cable lead out direction (Serial No indication side) A1~A4 : Refer to clause 15.
Length of cable [m] 0.2m, 0.3m, 0.5m 1~45m (At 1m interval)
Applicable connector (All connectors are shielded) A : Angle RJ45 connectors on both ends
Cable type Straight cable with Double shielded/STP
Ethernet cable for CC-Link IE Field network

5. COMFORMING STANDARDS

- 1) IEEE802.3 1000BASE-T
- 2) ANSI/TIA/EIA-568-B(Category 5e)
- 3) ISO/IEC 11801

6. UL STANDARDS (Cable Part)

- 1) UL 13 (CL2X)
- 2) UL AWM STYLE 20276
- 3) cUL AWM I AB(CSA C22.2 No.210.2)

7. CABLE CONSTRUCTION

Table 1. Cable construction

No.	Item	Construction			
	Type	Straight cable with Double shielded/STP			
	Number of wires in core	8 wires (4 twisted pairs)			
①	Conductor	Materials	Annealed Copper Twisted Wire for Power		
		Diameter	26AWG		
①	Insulator	Materials	FEP		
		Color	See Fig 2.		
②	Double shield	Aluminum / PE tape			
		Tin-plated copper wire braid			
③	Sheath	Materials	Heat Proof PVC		
		Color	Orange		
	Cable Diameter	6.5mm			
	Approximate Net Weight	55g/m			
		Min	Max	Unit	Conditions
	Operating Temperature	-10	60	°C	Being laid (No-load)
		0			By careless handling (short term)
	Maximum Tensile Load	—	80	N	By careless handling (short term)
	Minimum Radius Bend	26* ¹	—	mm	Fixed part (No-load)
		52* ¹	—		Movable part (No-load)
	Mechanical Operability	U bend	No wire disconnection one million times* ²		Stroke 500mm
		Reverse bend			Right and left 90°
		Twisting			Bend radius 50mm and No-load ±180°, Twisted length 300mm

*1 Do not apply force on the connector connection or on the connector under head.

*2 They are test results not guaranteed value.(The performance depends on the operating environment.)

8. CONNECTOR CONSTRUCTION

8.1 RJ45 connector with shield

Table 2. Connector construction

Item		Specification
Connection Method		Straight Connection
Boot	Materials	PVC (UL94 V-0)
	Color	Light grey
IP rating		IP20* ³

8.2 M12 connector with shield

Table 3. Connector construction

Item		Specification
Connection Method		Straight Connection
IP rating		IP67* ³

8.3 Angle RJ45 connector with shield

Table 4. Connector construction

Item		Specification
Connection Method		Straight Connection
IP rating		IP20* ³

*³ The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

9. CABLE CHARACTERISTICS (20°C)

Table 5. Cable characteristics [1]

Item	Specifications
Conductor Resistance	Under 123.5Ω/km
Resistance unbalance	Under 5.0%
Insulation Resistance	More than 100MΩkm
Voltage Proof	AC1000V/min
Capacitance	Under 5.6nF/45m (1kHz)
Capacitance unbalance pair to ground	Under 330pF/45m (1kHz)
Differential characteristic Impedance	85~115Ω (1~100MHz)

Table 6. Cable characteristics [2]

Item	Unit	Frequency (MHz)									
		1	4	8	10	16	20	25	31.25	62.5	100
Return Loss	More than dB	20.0	23.0	24.5	25.0	25.0	25.0	24.2	23.2	20.7	19.0
Insertion Loss	Under dB/100m	2.0	4.1	5.8	6.5	8.2	9.3	10.4	11.7	17.0	22.0
NEXT	More than dB	65.3	56.3	51.8	50.3	47.2	45.8	44.3	42.9	38.4	35.3
PSNEXT	More than dB	62.3	53.3	48.8	47.3	44.2	42.8	41.3	39.9	35.4	32.3
ELFEXT	More than dB/100m	63.8	51.7	45.7	43.8	39.7	37.8	35.8	33.9	27.9	23.8
PSELFEXT	More than dB/100m	60.8	48.7	42.7	40.8	36.7	34.8	32.8	30.9	24.9	20.8
Link delay	Under ns/100m	570	—	—	545	—	—	—	—	—	538
Link delay skew	Under ns/100m	45									

10. FIRE-RESISTANT AND OTHERS

Table 7. Fire-resistant and others

Item	Condition	Content
Fire-resistant	Pass the test of UL2556 VW-1.	Effect the test of UL2556 VW-1 by final product cable.
Oxygen index of Sheath	More than 26	Effect the test of JIS K 7201.

11. MARKING

The Ethernet cable shall be printed following marking format on the one side of sheath by regular interval.

- Marking content : CC-Link IE—— E302310 (UL) CL2X 105C 26AWG SHIELDED
—— AWM 20276 VW-1 c· AWM 80C 30V I A/B FT1 *****-LF-
- Marking pitch : 500mm
- Marking color : Black



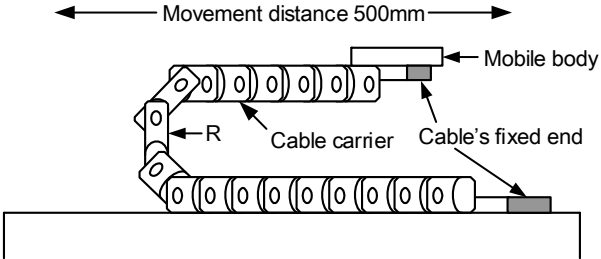
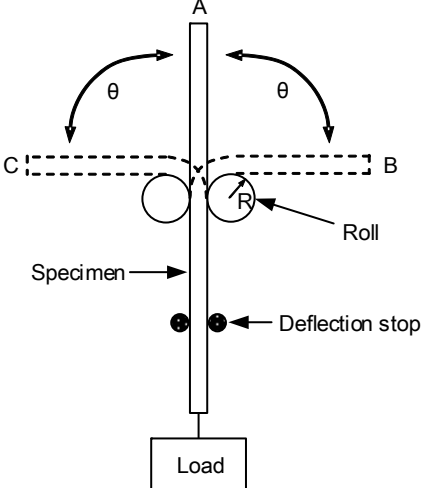
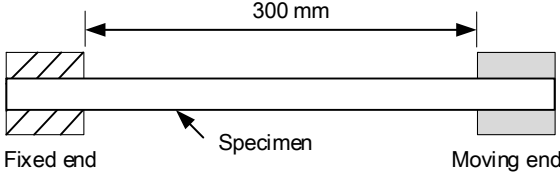
CC-Link IE — E302310 (UL) CL2X 105C 26AWG SHIELDED — AWM 20276 VW-1 c · AWM 80C 30V I A/B FT1 ***** -LF-

Serial Number

Fig.1 Marking of SC-E5EW-MV

- ※ Please acknowledge it though the print display might rub when transporting, and careless handling it and it disappear.

12. MECHANICAL CHARACTERISTIC

Item	Specifications
Cable Carrier Resistance Test	<p>Withstand one million reciprocating movements. [conditions] Specimen length : 5m Movement speed : Approx.50m/min Movement distance : 500mm Cable carrier radius : 50mm Fixing method : Fixed at both ends</p> 
±90° Bending Test	<p>Withstand one million flexion. [conditions] Bending angle θ : Right 90°/Left 90° (A—B—A—C—A) Bending speed : Approx.60 times/min Roll diameter R : 50mm</p> 
Twist Resistance Test	<p>Withstand one million twisting exercise. [conditions] Specimen length : 300mm Twisting angle : ±180° Fixing method : Fixed at both ends</p> 

※ The above data are actual measured values, not guaranteed values.

13. CONSTRUCTION FIGURE

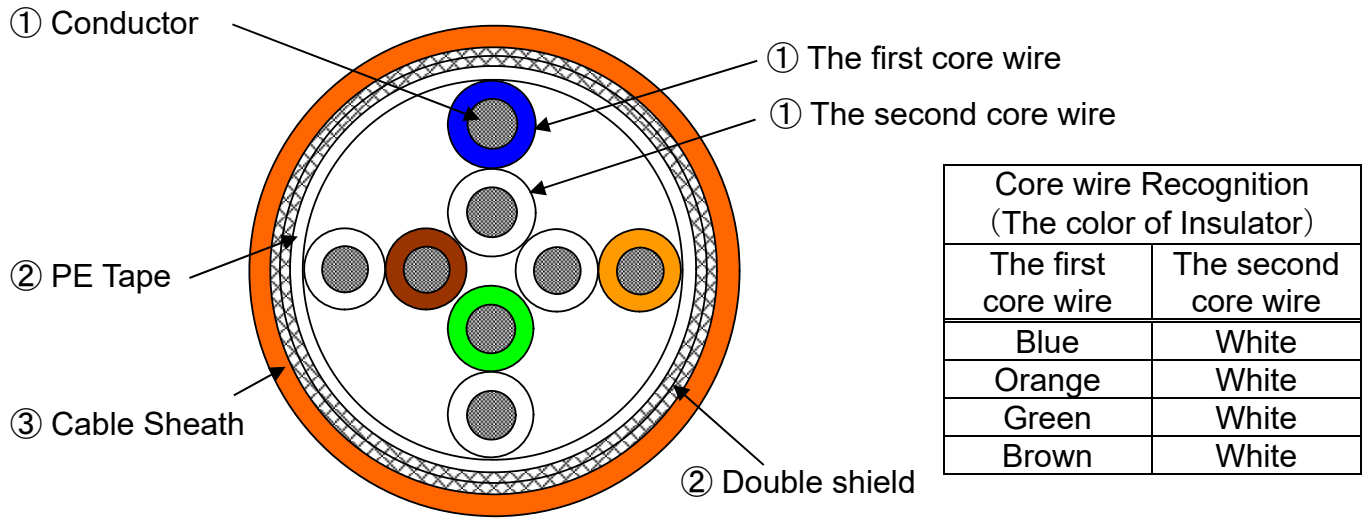


Fig.2 Construction of SC-E5EW-MV

14. OUTLINE DRAWING

(1) SC-E5EW-S□M-MV

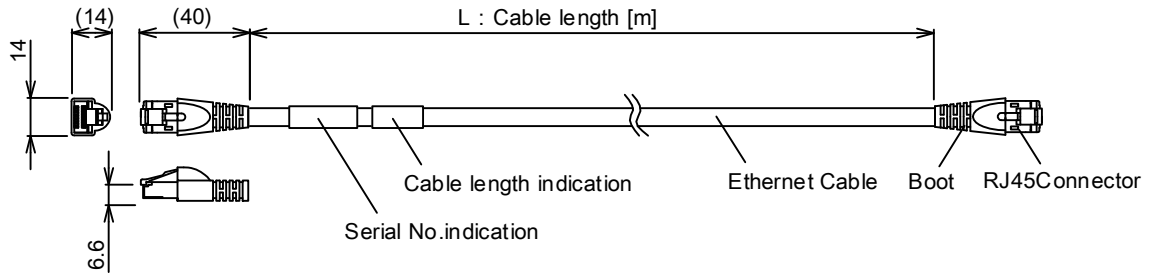


Fig. 3. Configuration of SC-E5EW-S□M-MV

[mm]

(2) SC-E5EW-X□M-MV

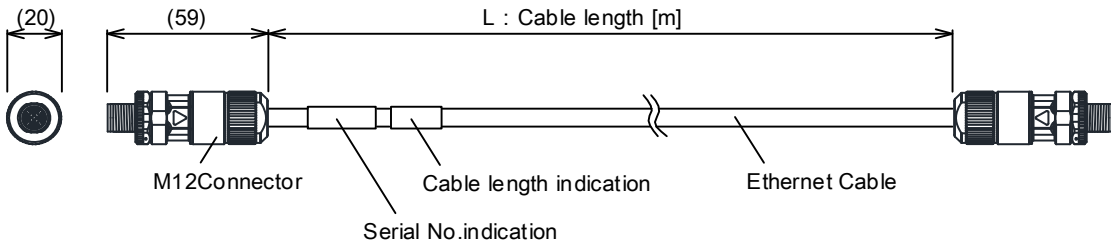


Fig. 4. Configuration of SC-E5EW-X□M-MV

[mm]

(3) SC-E5EW-SX□M-MV

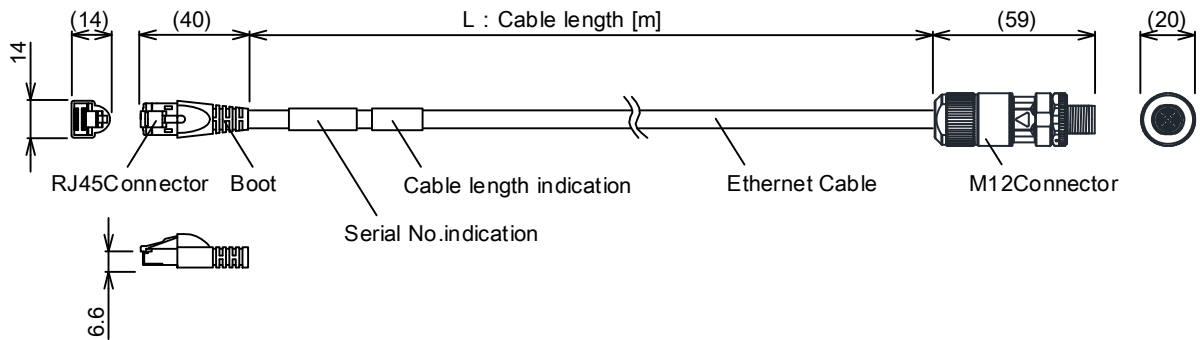


Fig. 5. Configuration of SC-E5EW-SX□M-MV

[mm]

(4) SC-E5EW-A□M-△▲-MV

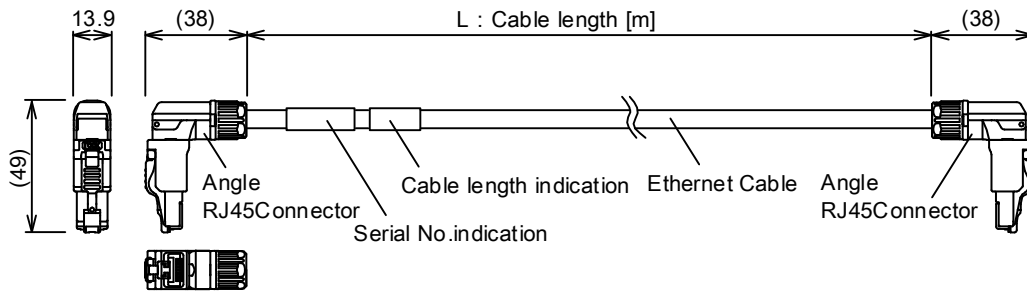


Fig. 6. Configuration of SC-E5EW-A□M-△▲-MV

[mm]

(5) SC-E5EW-SA□M-△-MV

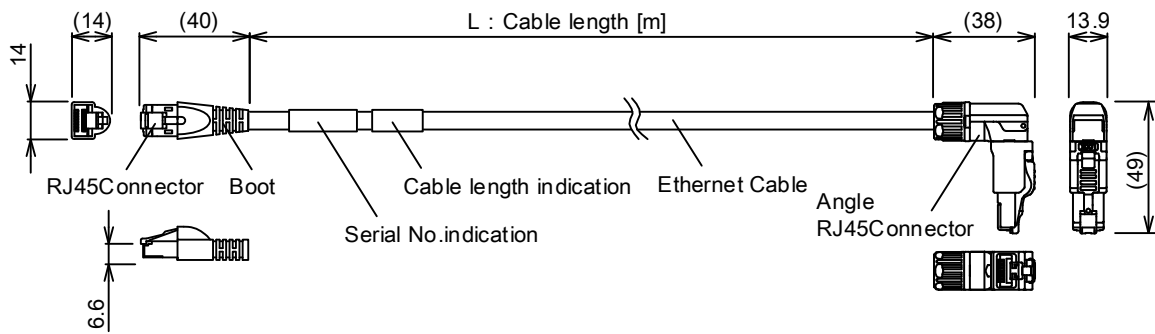


Fig. 7. Configuration of SC-E5EW-SA□M-△-MV

[mm]

(6) SC-E5EW-XA□M-△-MV

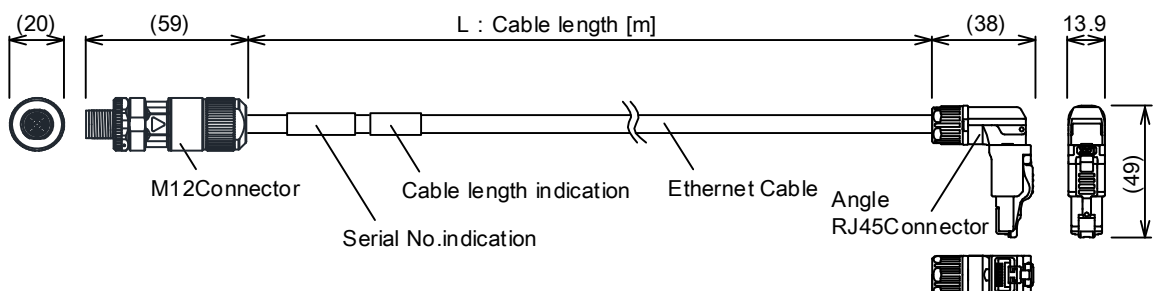
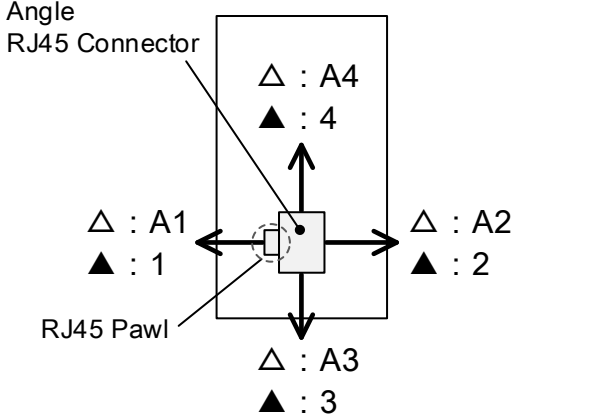
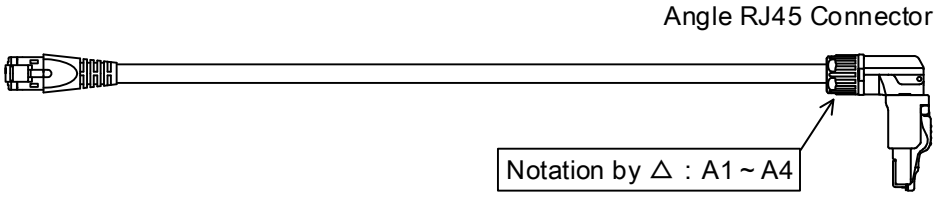
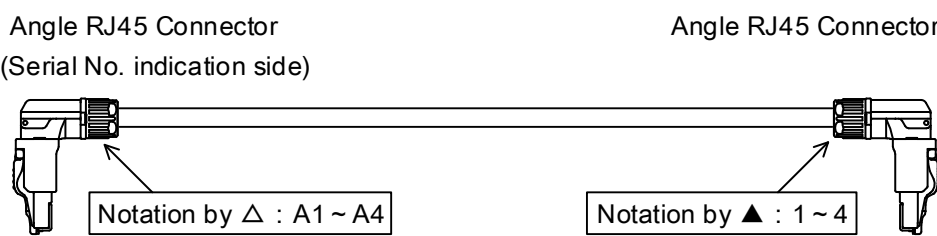


Fig. 8. Configuration of SC-E5EW-XA□M-△-MV

[mm]

15. CABLE LEAD OUT DIRECTION

For the angle RJ45 connector, the cable lead out direction can be specified as follows.

Cable lead out direction (View from cable insertion direction)	Sign △	Sign ▲	Cable lead out direction
	A1	1	RJ45 pawl side
	A2	2	Opposite of J45 pawl
	A3	3	Left side of J45 pawl
	A4	4	Right side of J45 pawl
<p>Straight connector on one end / Angle connector on one end</p> 			
<p>Angle connectors on both ends</p> 			

(Note) Depending on the situation such as installation environment or combination of cables and connectors, there is a chance not to complete installation.
 (Even though it's mentioned above)
 Please make sure the cable lead out direction before your purchase.