

# Waterproof Circular Connectors (MIL-DTL-5015 Compatible)

## D/MS (D190) Series

DDK Ltd.

### ◆ OUTLINE

D/MS(D190) series is a waterproof circular plug connector which is intermateable with D/MS series and CE02-2A series.

This connector is suitable for the outer connection between the industrial equipment such as a servo motor which needs to be moistureproof or waterproof.



Conforming Standard  
MIL-DTL-5015

Waterproof  
IP67

Lock Type  
Threaded Coupling

### ◆ FEATURES

- Compatible with MIL-DTL-5015 and intermateable with D/MS series
- The insert assembly is common to D/MS A/B series and 73 sorts of insert arrangements are available.
- Mating with the box receptacle connector D/MS3102A, it will be waterproof rating IP67.
- The combination with CE02-2A can be waterproof. (Refer to insert arrangement availability in CE02-2A series catalog.)

### ◆ SPECIFICATIONS

#### Rated Voltage

Service Rating	Rated Voltage(V)		Minimum Length between Each Contacts	Minimum Creepage Distance
	DC	AC(r.m.s.)		
INST	250	200	-	1.6mm
A	700	500	1.6mm	3.2mm
D	1250	900	3.2mm	4.8mm
E	1750	1250	4.8mm	6.4mm

#### Rated Current

Contact Size	Pin Contact Diameter	Current Capacity per Contact
#16	φ 1.6mm	13A
#12	φ 2.4mm	23A
#8	φ 3.6mm	46A
#4	φ 5.7mm	80A
#0	φ 9.1mm	150A

#### Applicable Cable Size

Contact Size	Minimum Bore of Solder Cup	Applicable Cable Size		
		AWG	Nominal Section Area	Maximum Conductor Dia.
#16	1.76 (mm)	#16 - #22	1.25mm <sup>2</sup>	1.6mm
#12	2.85 (mm)	#12 - #14	3.50mm <sup>2</sup>	2.5mm
#8	5.21 (mm)	# 8 - #10	8.00mm <sup>2</sup>	4.5mm
#4	8.33 (mm)	# 4 - # 6	22.00mm <sup>2</sup>	7.0mm
#0	11.7 (mm)	# 0 - # 2	50.00mm <sup>2</sup>	11.0mm

### ◆ MATERIAL / FINISH



Parts	Material / Finish
Contact	Copper Alloy/Silver Plating (Option Gold Plating)
Retaining Ring	Copper Alloy/Nickel Plating
Insert	Diallyl Phthalate Resin(Blue)
Gasket	Synthetic Rubber(Nitrile)
Shell	Aluminum Alloy/Zinc Plating, Trivalent Chromium Finish

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## ▶ Insert Arrangement

Insert No.	Number of Contact	Service Rating	Contact Size				
			#0	#4	#8	#12	#16
10SL-3	3	A					3
10SL-4	2	A					2
12S-3	2	A					2
14S-1	3	A					3
14S-2	4	INST					4
14S-5	5	INST					5
14S-6	6	INST					6
14S-7	3	A					3
14S-9	2	A					2
16S-1	7	A					7
16S-5	3	A					3
16S-8	5	A					5
16-10	3	A				3	
18-1	10	A					4
		INST					6
18-4	4	D					4
18-5	3	D				2	1
18-8	8	A				1	7
18-10	4	A				4	
18-11	5	A				5	
18-12	6	A					6
18-19	10	A					10
18-20	5	A					5
18-21	3	A				3	
18-22	3	D					3
20-2	1	D	1				
20-4	4	D				4	
20-7	8	D					4
		A					4
20-15	7	A				7	
20-16	9	A				2	7
20-17	6	A				5	1
20-18	9	A				3	6
20-22	6	A			3		3
20-23	2	A			2		
20-27	14	A					14
20-29	17	A					17
22-2	3	D			3		
22-10	4	E					4
22-14	19	A					19
22-19	14	A					14
22-22	4	A			4		
22-23	8	D				1	
		A				7	
22-28	7	A				7	

Insert No.	Number of Contact	Service Rating	Contact Size				
			#0	#4	#8	#12	#16
24-2	7	D				7	
24-5	16	A					16
24-7	16	A				2	14
24-10	7	A			7		
24-11	9	A			3	6	
24-20	11	D				2	9
24-22	4	D			4		
24-28	24	INST					24
28-6	3	D		3			
28-10	7	D				1	
		A		2	2	2	
28-11	22	A				4	18
28-12	26	A					26
28-15	35	A					35
28-16	20	A					20
28-20	14	A				10	4
28-21	37	A					37
32-1	5	E				1	
		D	2			2	
32-2	5	E		3			2
32-5	2	D	2				
32-7	35	A				7	24
		INST					4
32-8	30	A				6	24
32-9	14	D		2			12
32A-10	54	A					54
32-17	4	D		4			
32-414	52	A					52
36-3	6	D	3			3	
36-4	3	D	1				
		A	2				
36-5	4	A	4				
36-9	31	A		1	2	14	14
36-10	48	A					48
36-73	73	A					73

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▶ Insert Arrangement List

Front View of Pin Contact

Number of Contact	2					
Insert Arrangement						
Insert Number	20-2	10SL-4	12S-3	14S-9	20-23	32-5
Contact Size	1-#0	2-#16	2-#16	2-#16	2-#8	2-#0
Service Rating	D	A	A	A	A	D
Rated Current	150A	13A	13A	13A	46A	150A

Number of Contact	3							
Insert Arrangement								
Insert Number	10SL-3	14S-1	14S-7	16S-5	16-10	18-5	18-21	
Contact Size	3-#16	3-#16	3-#16	3-#16	3-#12	2-#12, 1-#16	3-#12	
Service Rating	A	A	A	A	A	D	A	
Rated Current	13A	13A	13A	13A	23A	#12 : 23A #16 : 13A	23A	

Number of Contact	3			
Insert Arrangement				
Insert Number	18-22	22-2	28-6	36-4
Contact Size	3-#16	3-#8	3-#4	3-#0
Service Rating	D	D	D	D(A), A(BC)
Rated Current	13A	46A	80A	150A

Contact Size Symbol	●	⊕	⊗	⊙	⊕	⊙
	#16	#12	#8	#4	#0	
Service Rating	INST	A	D	E		
Rated Voltage AC(r.m.s.)	200	500	900	1,250		
Rated Voltage DC	250	700	1,200	1,750		
Contact Size	#16	#12	#8	#4	#0	
MAX Current /Contact	13	23	46	80	150	

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▶ Insert Arrangement List

Number of Contact	4					
Insert Arrangement						
Insert Number	14S-2	18-4	18-10	20-4	22-10	22-22
Contact Size	4-#16	4-#16	4-#12	4-#12	4-#16	4-#8
Service Rating	INST	D	A	D	E	A
Rated Current	13A	13A	23A	23A	13A	46A

Number of Contact	4		
Insert Arrangement			
Insert Number	24-22	32-17	36-5
Contact Size	4-#8	4-#4	4-#0
Service Rating	D	D	A
Rated Current	46A	80A	150A

Number of Contact	5					
Insert Arrangement						
Insert Number	14S-5	16S-8	18-11	18-20	32-1	32-2
Contact Size	5-#16	5-#16	5-#12	5-#16	2-#0, 3-#12	3-#4, 2-#16
Service Rating	INST	A	A	A	E(A), D	E
Rated Current	13A	13A	23A	13A	# 0 : 150 ,#12 : 23A	#4 : 80A, #16 : 13A

Number of Contact	6				
Insert Arrangement					
Insert Number	14S-6	18-12	20-17	20-22	36-3
Contact Size	6-#16	6-#16	5-#12, 1-#16	3-#8, 3-#16	3-#0, 3-#12
Service Rating	INST	A	A	A	D
Rated Current	13A	13A	#12 : 23A #16 : 13A	# 8 : 46A #16 : 13A	# 0 : 150A, #16 : 23A

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▶ Insert Arrangement List

Number of Contact	7					
Insert Arrangement						
Insert Number	16S-1	20-15	22-28	24-2	24-10	28-10
Contact Size	7-#16	7-#12	7-#12	7-#12	7-#8	2-#4, 2-#8, 3-#12
Service Rating	A	A	A	D	A	D(G), A
Rated Current	13A	23A	23A	23A	46A	#4 : 80A, #8 : 46A #12 : 23A

Number of Contact	8			9		
Insert Arrangement						
Insert Number	18-8	20-7	22-23	20-16	20-18	24-11
Contact Size	1-#12, 7-#16	8-#16	8-#12	2-#12, 7-#16	3-#12, 6-#16	3-#8, 6-#12
Service Rating	A	D(ABHG) , A(CDEF)	D(H) , A	A	A	A
Rated Current	#12 : 23A, #16 : 13A	13A	23A	#12 : 23A, #16 : 13A	#12 : 23A, #16 : 13A	#8 : 46A, #12 : 23A

Number of Contact	10		11	14	
Insert Arrangement					
Insert Number	18-1	18-19	24-20	20-27	22-19
Contact Size	10-#16	10-#16	2-#12, 9-#16	14-#16	14-#16
Service Rating	A(BCFG, INST)	A	D	A	A
Rated Current	13A	13A	#12 : 23A, #16 : 13A	13A	13A

Number of Contact	14	
Insert Arrangement		
Insert Number	28-20	32-9
Contact Size	10-#12, 4-#16	2-#4, 12-#16
Service Rating	A	D
Rated Current	#12 : 23A, #16 : 13A	#4 : 80A, #16 : 13A

Contact Size Symbol					
	#16	#12	#8	#4	#0
Service Rating	INST	A	D	E	
Rated Voltage AC(r.m.s.)	200	500	900	1,250	
Rated Voltage DC	250	700	1,200	1,750	
Contact Size	#16	#12	#8	#4	#0
MAX Current /Contact	13	23	46	80	150

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▶ Insert Arrangement List

Number of Contact	16		17	19	20
Insert Arrangement					
Insert Number	24-5	24-7	20-29	22-14	28-16
Contact Size	16-#16	2-#12, 14-#16	17-#16	19-#16	20-#16
Service Rating	A	A	A	A	A
Rated Current	13A	#12 : 23A, #16 : 13A	13A	13A	13A
Number of Contact	22	24	26	30	
Insert Arrangement					
Insert Number	28-11	24-28	28-12	32-8	
Contact Size	4-#12, 18-#16	24-#16	26-#16	6-#12, 24-#16	
Service Rating	A	INST	A	A	
Rated Current	#12 : 23A, #16 : 13A	13A	13A	#12 : 23A, #16 : 13A	
Number of Contact	31	35		37	
Insert Arrangement					
Insert Number	36-9	28-15	32-7	28-21	
Contact Size	1-#4, 2-#8, 14-#12, 14-#16	35-#16	7-#12, 28-#16	37-#16	
Service Rating	A	A	INST(ABHJ), A	A	
Rated Current	#4 : 80A #8 : 46A #12 : 23A #16 : 13A	13A	#12 : 23A #16 : 13A	13A	
Number of Contact	48	52	54	73	
Insert Arrangement					
Insert Number	36-10	32-414	32A-10	36-73	
Contact Size	48-#16	52-#16	54-#16	73-#16	
Service Rating	A	A	A	A	
Rated Current	13A	13A	13A	13A	

Contact Size Symbol



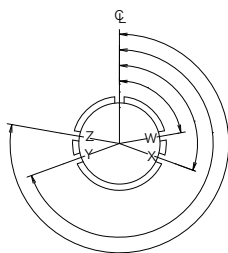
Service Rating	· · · · · INST	A	D	E				
Rated Voltage AC(r.m.s.)	200	500	900	1,250				
Rated Voltage DC	· · · · 250	700	1,200	1,750				
Contact Size	· · · · · #16	#12	#8	#4	#0			
MAX Current /Contact	· · · · · 13	23	46	80	150			

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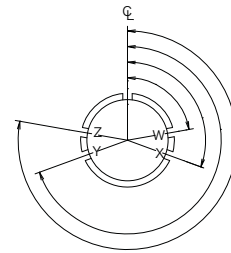
▶ Alternate Insert Position

Number of Contact	Insert Number	Alternate Insert Key			
		W	X	Y	Z
1	20-2	—	—	—	—
2	10SL-4	—	—	—	—
	12S-3	70°	145°	215°	290
	14S-9	70°	145°	215°	290
	20-23	35°	110°	250°	325
	32-5	35°	110°	250°	325
3	10SL-3	—	—	—	—
	14S-1	—	—	—	—
	14S-7	90°	180°	270°	—
	16S-5	70°	145°	215°	290
	16-10	90°	180°	270°	—
	18-5	80°	110°	250°	280
	18-21	—	—	—	—
	18-22	70°	145°	215°	290
	22-2	70°	145°	215°	290
	28-6	70°	145°	215°	290
	36-4	70°	148°	215°	290
4	14S-2	—	120°	240°	—
	18-4	35°	110°	250°	325
	18-10	—	120°	240°	—
	20-4	45°	110°	250°	—
	22-10	35°	110°	250°	325
	22-22	—	110°	250°	—
	24-22	45°	110°	250°	—
	32-17	45°	110°	250°	—
	36-5	—	120°	240°	—
5	14S-5	—	110°	—	—
	16S-8	—	170°	265°	—
	18-11	—	170°	165°	—
	18-20	90°	180°	270°	—
	32-1	80°	110°	250°	280
	32-2	70°	145°	215°	290
6	14S-6	—	—	—	—
	18-12	80°	—	—	280
	20-17	90°	180°	270°	—
	20-22	80°	—	—	280
	36-3	70°	145°	215°	290

Number of Contact	Insert Number	Alternate Insert Key			
		W	X	Y	Z
7	16S-1	80°	—	—	280°
	20-15	80°	—	—	280°
	22-28	80°	—	—	280°
	24-2	80°	—	—	280°
	24-10	80°	—	—	280°
	28-10	80°	110°	250°	280°
8	18-8	70°	—	—	290°
	20-7	80°	110°	250°	280°
	22-23	35°	—	—	—
9	20-16	80°	110°	250°	280°
	20-18	35°	110°	250°	325°
	24-11	35°	110°	250°	325°
10	18-1	70°	145°	215°	290°
	18-19	—	120°	240°	—
11	24-20	80°	110°	250°	280°
14	20-27	35°	110°	250°	325°
	22-19	80°	110°	250°	280°
	28-20	80°	110°	250°	280°
16	32-9	80°	110°	250°	280°
	24-5	80°	110°	250°	280°
16	24-7	80°	110°	250°	280°
	24-7	80°	110°	250°	280°
17	20-29	80°	—	—	280°
19	22-14	80°	110°	250°	280°
20	28-16	80°	110°	250°	280°
22	28-11	80°	110°	250°	280°
24	24-28	80°	110°	250°	280°
26	28-12	90°	180°	270°	—
30	32-8	80°	125°	235°	280°
31	36-9	80°	125°	235°	280°
35	28-15	80°	110°	250°	280°
	32-7	80°	125°	235°	280°
37	28-21	80°	110°	250°	280°
48	36-10	80°	125°	235°	280°
52	32-414	80°	110°	250°	280°
54	32A-10	—	—	—	—
73	36-73	80°	110°	250°	280°



Front View of Pin Insert

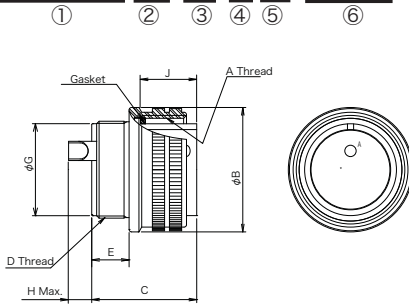


Front View of Socket Insert

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▶ Straight Plug

**D/MS3106A20-29SW (D190)**

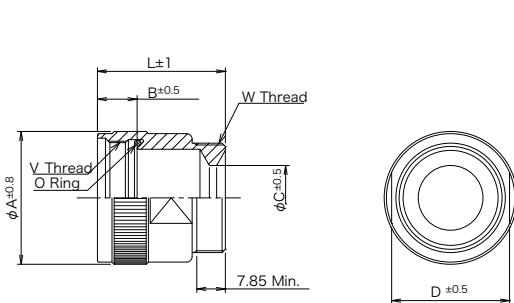


① Connector Style	3106A : Straight Plug
② Shell Size	10SL, 12S, 14S, 16S, 16, 18, 20, 22, 24, 28, 32 and 36
③ Insert Number	Refer to page 3 to 6.
④ Contact Style	P : Plug Contact S : Socket Contact.
⑤ Alternate Insert Key Position	Omit : Standard Position, W, X, Y, Z : Refer to page 7.
⑥ Deviation	(D190) Waterproof, without backshell.

Shell Size	A	B	C±0.5	D	E±0.3	G <sup>+0.35</sup> <sub>-0.25</sub>	J±0.12
10SL	5/8-24UNEF-2B	22.00	23.30	9/16-24UNEF-2A	7.50	12.50	13.49
12S	3/4-20UNEF-2B	25.40	24.43	11/16-24UNEF-2A	8.43	15.60	13.49
14S	7/8-20UNEF-2B	28.57	24.34	3/4-20UNEF-2A	8.46	17.00	13.49
16S	1-20UNEF-2B	31.75	24.38	7/8-20UNEF-2A	8.38	20.05	13.49
16	1-20UNEF-2B	31.75	33.72	7/8-20UNEF-2A	11.76	20.26	18.26
18	1 1/8-18UNEF-2B	34.13	33.72	1-20UNEF-2A	11.74	23.50	18.26
20	1 1/4-18UNEF-2B	37.28	34.11	1 1/8-18UNEF-2A	12.16	26.80	18.26
22	1 3/8-18UNEF-2B	40.48	34.11	1 1/4-18UNEF-2A	12.15	29.90	18.26
24	1 1/2-18UNEF-2B	43.63	36.58	1 3/8-18UNEF-2A	13.42	32.90	18.26
28	1 3/4-18UNS-2B	50.00	37.03	1 5/8-18UNEF-2A	13.07	38.98	18.26
32	2-18UNS-2B	56.33	36.95	1 7/8-16UN-2A	13.14	45.30	18.26
36	2 1/4-16UN-2B	62.68	37.44	2 1/8-16UN-2A	13.60	51.60	18.26

▶ Waterproof Straight Backshell

**CE02-18BS-S-D**



① Shell Size	10SL, 12S, 14S, 16S, 16, 18, 20, 22, 24, 28, 32 and 36
② Model	B : Backshell
③ Type	S : Straight
④ Waterproof	S : IP67
⑤ Finish	Trivalent Chromium Finish(Black)

**MATERIAL/FINISH**

Aluminum Alloy / Black Trivalent Chromium Treatment

Shell Size	Part Number	L	A	B	C	D	V	W
10SL	CE02-10SLBS-S-D	20.0	18.6	6.5	6.6	17.9	9/16-24UNEF-2B	5/8-24UNEF-2A
12S	CE02-12SBS-S-D	20.0	21.6	6.5	6.6	20.8	11/16-24UNEF-2B	5/8-24UNEF-2A
14S	CE02-14SBS-S-D	25.0	22.3	7.4	9.8	20.4	3/4-20UNEF-2B	3/4-20UNEF-2A
16	CE02-16BS-S-D	28.0	26.5	7.9	13.0	23.4	7/8-20UNEF-2B	7/8-20UNEF-2A
18	CE02-18BS-S-D	31.0	30.5	10.5	16.3	26.7	1-20UNEF-2B	1-20UNEF-2A
20	CE02-20BS-S-D	35.0	35.0	10.9	17.8	31.6	1 1/8-18UNEF-2B	1 3/16-18UNEF-2A
22	CE02-22BS-S-D	35.0	36.5	10.9	17.8	32.4	1 1/4-18UNEF-2B	1 3/16-18UNEF-2A
24	CE02-24BS-S-D	40.5	40.0	12.2	21.0	36.6	1 3/8-18UNEF-2B	1 7/16-18UNEF-2A
28	CE02-28BS-S-D	45.0	47.2	11.9	21.0	40.0	1 5/8-18UNEF-2B	1 7/16-18UNEF-2A
32	CE02-32BS-S-D	50.0	51.4	10.0	25.8	47.0	1 7/8-16UN-2B	1 3/4-18UNEF-2A
36	CE02-36BS-S-D	55.0	58.4	10.0	33.8	53.1	2 1/8-16UN-2B	2-18UNS-2A

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▶ Waterproof Angle Backshell

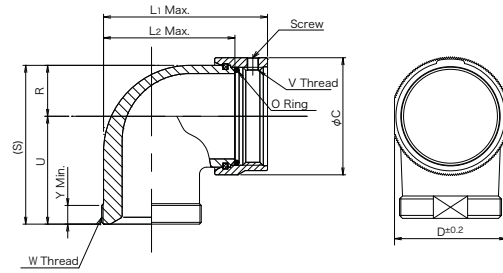
**CE-18BA-S-D**

① ② ③ ④

① Shell Size	10SL, 18, 20, 22, 24, 28 and 32
② Style	BA : Angle Backshell
③ Waterproof	S : Waterproof
④ Finish	D : Trivalent Chromium Finish (Black)

**MATERIAL / FINISH**

Aluminum Alloy/Black Trivalent Chromium Treatment



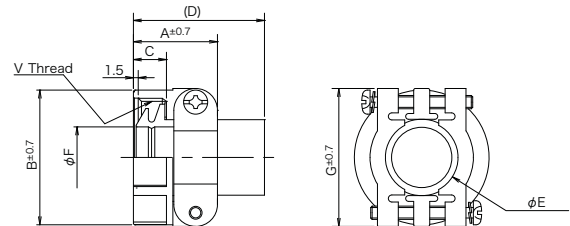
Shell Size	Part Number	L1	L2	C	D	R	U	(S)	V	W	Y
10SL	CE-10SLBA-S-D	30.6	22.5	21.7	20.3	7.9	21.0	(28.9)	9/16-24UNEF-2B	5/8-24UNEF-2A	7.5
18	CE-18BA-S-D	44.6	34.0	32.4	30.0	13.2	30.2	(43.4)	1-20UNEF-2B	1-20UNEF-2A	7.5
20	CE-20BA-S-D	50.5	39.6	36.0	33.6	15.0	33.3	(48.3)	1 1/8-18UNEF-2B	1 3/16-18UNEF-2A	7.5
22	CE-22BA-S-D	50.5	39.6	38.6	36.2	16.3	33.3	(49.6)	1 1/4-18UNEF-2B	1 3/16-18UNEF-2A	7.5
24	CE-24BA-S-D	60.1	47.9	42.4	40.0	18.2	36.5	(54.7)	1 3/8-18UNEF-2B	1 7/16-18UNEF-2A	7.5
28	CE-28BA-S-D	60.9	47.9	49.5	46.4	21.3	36.5	(57.8)	1 5/8-18UNEF-2B	1 7/16-18UNEF-2A	7.5
32	CE-32BA-S-D	69.1	55.1	55.3	52.8	24.6	44.5	(69.1)	1 7/8-16UNEF-2B	1 3/4-18UNEF-2A	8.5

▶ Waterproof Cable Clamp

**CE3057-10A-1-D**

① ② ③

① Clamp Size	4A, 6A, 8A, 10A, 12A, 16A, 20A and 24A
② Bushing Size	Rubber Bushing (Refer to the Applicable Cable Size)
③ Finish	D : Trivalent Chromium Finish (Black)



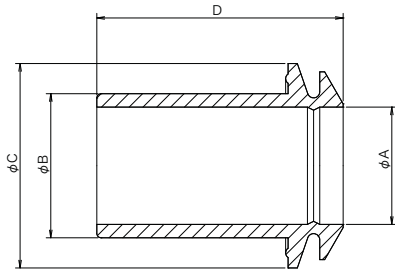
Part Number	Applicable Shell Size	A	B	C	(D)	E	F	G	V	Bushing P/N	Applicable Cable
CE3057-4A-1-D	10SL,12S	20.62	20.6	10.31	(41.3)	8.0	5.6	22.2	5/8-24UNEF-2B	CE3420-4-1	φ 3.6 ~ φ 5.6
CE3057-6A-1-D	14S	22.20	24.6	10.31	(41.3)	10.8	9.0	27.0	3/4-20UNEF-2B	CE3420-6-1	φ 7 ~ φ 9
CE3057-8A-1-D	16S,16	23.83	27.8	10.31	(41.3)	14.0	12.0	29.4	7/8-20UNEF-2B	CE3420-8-1	φ 10 ~ φ 12
CE3057-8A-2-D							10.5			CE3420-8-2	φ 8.5 ~ φ 10.5
CE3057-10A-1-D	18	23.83	30.1	10.31	(41.3)	15.8	14.1	31.7	1-20UNEF-2B	CE3420-10-1	φ 10.5 ~ φ 14.1
CE3057-10A-2-D							11.0			CE3420-10-2	φ 8.5 ~ φ 11
CE3057-10A-3-D							8.7			CE3420-10-3	φ 6.5 ~ φ 8.7
CE3057-12A-1-D	20	23.83	35.0	10.31	(41.3)	19.0	16.0	37.3	1 3/16-18UNEF-2B	CE3420-12-1	φ 12.5 ~ φ 16
CE3057-12A-2-D							13.0			CE3420-12-2	φ 9.5 ~ φ 13
CE3057-12A-3-D							10.0			CE3420-12-3	φ 6.8 ~ φ 10
CE3057-12A-7-D							17.0			CE3420-12-7	φ 14.5 ~ φ 17
CE3057-16A-1-D	24	26.19	42.1	10.31	(41.3)	23.8	19.1	42.9	1 7/16-18UNEF-2B	CE3420-16-1	φ 15 ~ φ 19.1
CE3057-16A-2-D							15.5			CE3420-16-2	φ 13 ~ φ 15.5
CE3057-16A-4-D							21.5			CZY005-GB-3	φ 19.1 ~ φ 21.5
CE3057-16A-6-D							20.0			CE3420-16-6	φ 18.5 ~ φ 20
CE3057-16A-7-D							13.5			CE3420-16-7	φ 11.5 ~ φ 13.5
CE3057-16A-8-D							12.5			CZY005-GB-6	φ 10.5 ~ φ 12.5
CE3057-20A-1-D	32	27.79	51.6	11.91	(43.0)	32.0	23.8	51.6	1 3/4-18UNS-2B	CE3420-20-1	φ 22 ~ φ 23.8
CE3057-20A-2-D							26.6			CE3420-20-2	φ 24 ~ φ 26.6
CE3057-20A-3-D							22.5			CZY005-GB-5	φ 21 ~ φ 22.5
CE3057-24A-1-D	36	29.40	56.4	13.50	(45.8)	34.6	32.5	58.0	2-18UNS-2B	CE3420-24-1	φ 30 ~ φ 32.5
CE3057-24A-2-D							29.6			CE3420-24-2	φ 27.5 ~ φ 29.6

Note: Please make sure to use the cable which is within the specification of the applicable cable listed above. Please use the cable clamp together with the waterproof backshell.

## Waterproof Rubber Bushing

### CE3420-10-1

① ②



① Cable clamp Size	4, 6, 8, 10, 12, 16, 20 and 24
② Bushing Size	Refer to table 1.

#### Material

Synthetic Rubber (Black)

CE3420-□□-□ is a rubber bushing which is fixed into CE3057-□□ A-□-D cable clamp to tighten the cable for keeping a connector waterproof.

Table 1

Part Number	φ A	φ B	φ C	D	Friction Washer
CE3420-4-1	5.6	7.5	12.9	38.3	MS3057-4W
CE3420-6-1	9.0	10.9	15.7	36.4	MS3057-6W
CE3420-8-1	12.0	14.0	19.1	37.5	MS3057-8W
CE3420-8-2	10.5				
CE3420-10-1	14.1	15.5	22.2	38.5	MS3057-10W
CE3420-10-2	11.0				
CE3420-10-3	8.7				
CE3420-12-1	16.0	18.6	26.9	39.3	MS3057-12W
CE3420-12-2	13.0				
CE3420-12-3	10.0				
CE3420-12-7	17.0				
CE3420-16-1	19.1	23.4	33.2	40.0	MS3057-16W
CE3420-16-2	15.5				
CE3420-16-6	20.0				
CE3420-16-7	13.5				
CE3420-20-1	23.8	31.4	40.5	41.0	MS3057-20W
CE3420-20-2	26.6			40.2	
CE3420-24-1	32.5	34.6	45.5	41.0	MS3057-24W
CE3420-24-2	29.6				

Friction washer is not included.