

# Amphenol®



## **Amphe-Lite M3 & S1** High Performance Circular Connector

[www.amphenol-industrial.com](http://www.amphenol-industrial.com)

## Amphenol

is one of the largest manufacturers of interconnect products in the world. The company designs, manufactures and markets electrical, electronic and fiber optic connectors, coaxial and flat-ribbon cable, and interconnect systems. Amphenol has long been the accepted leader in providing quality connectors and interconnect systems to the Industrial, Military and Telecommunication markets.



Amphenol

# Company Introduction



## Amphenol Industrial Operations

Amphenol Industrial Operations (AIO), a division of the Amphenol Corporation, is a prominent manufacturer of cylindrical connectors known around the world. Amphenol Industrial's product lines consist of rectangular, standard miniature, fiber optic, EMI/EMP filter, and a variety of special application connectors.

Manufacturing connectors since 1932, we take pride that the Amphenol Industrial Products Group is the undisputed leader in interconnect systems for harsh environment applications. Innovations like our RADSOK® contact technology can provide roughly 50% more current through the same size pin. Connectors utilizing this RADSOK® technology will outperform similar products in the market hands down.

The Sidney, NY facility, nestled at the foothills of the Catskill Mountains, is over 307,000 square feet (28,521m<sup>2</sup>). This complex houses over 1,000+ employees incorporating state-of-the-art manufacturing technologies. The facility is both ISO9001 certified and qualified to MIL-STD-790 requirements.



## Amphenol Technology (Zhuhai) Co., Ltd.

Established in 2007, Amphenol Technology (Zhuhai) Co., Ltd. is a manufacturing facility for Amphenol Industrial Operations, which serves a number of industrial markets, included but not limited to Factory Automation, Transportation, Heavy Equipment, Alternative Energy, Oil & Gas, Server/Data Comm and Power Distribution.

Amphenol Technology (Zhuhai) Co., Ltd. covers an area of 306,449 square feet (28,470m<sup>2</sup>) and is equipped with CNCs, plating, injection molding and assembly workshops. This plant specializes in the design and manufacturing of industrial connectors featuring high power, high density inserts, medium to high voltage electrical properties, and harsh environment applications.

Many of the products produced here have been certified by independent standards including UL, IEC/TUV, ATEX, IECEx and MA. The facility is also certified to ISO 9001, ISO 14001 and TS16949.

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### **Amphe-Lite S1**

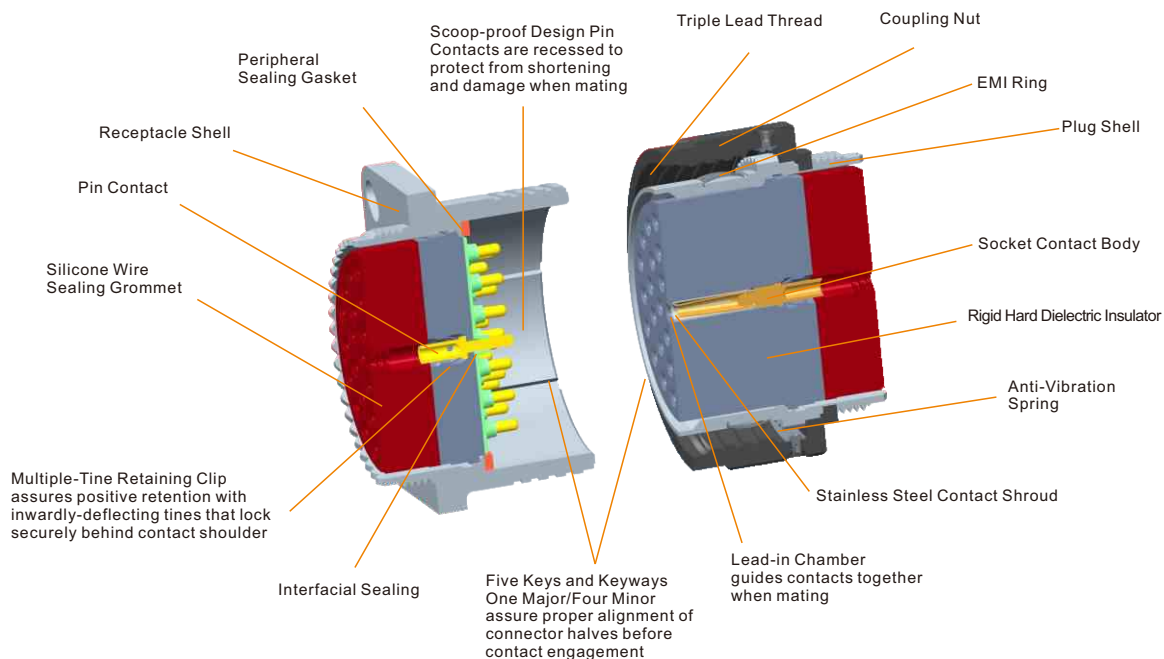
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## Product Introduction For Amphe-Lite M3

Amphenol 's Amphe- Lite M3 is based on the MIL- DTL- 38999 III. Designed for harsh environments, the product is pertinent, but not limited, to the following markets and applications:

- Control Systems
- Commercial Aircraft
- Telecommunications Equipment
- Medical Instrumentation
- Vehicle Signal Interconnects
- High-Performance Test Equipment

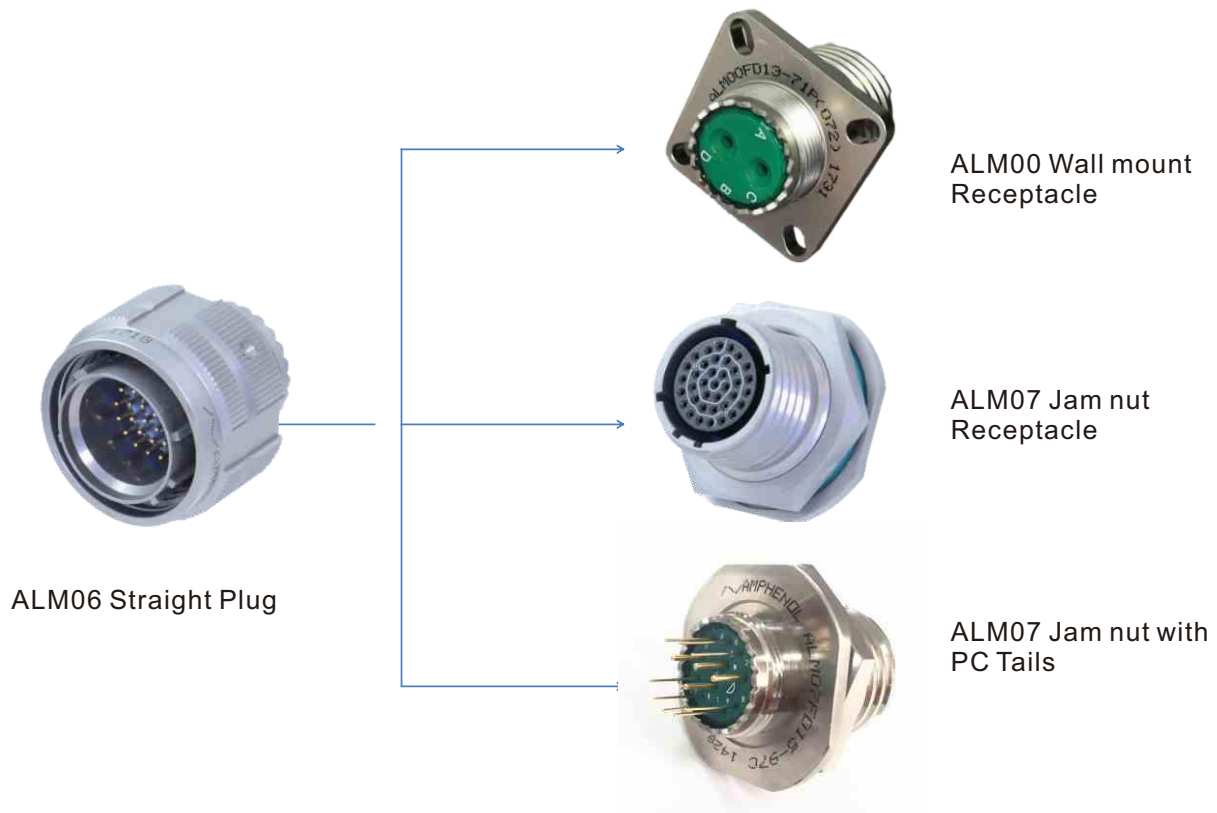


### Key Features:

1. Service Class F Amphe-Lite M3 uses superior silicone seals providing increased fluid resistance.
2. Provides excellent EMI shielding and grounding through 100% metal to metal bottoming.
3. Acme threads provide coupling durability. Completely mates in one 360-degree turn of the coupling nut to provide the fastest and easiest equipment assembly and maintenance possible.
4. Recessed pins minimize potential contact damage in this 100% scoop-proof connector. In a blind mating application, mating shells cannot scoop the pins and cause a shorting or bending of contacts.
5. A rigid dielectric insert provides durable protection to the contacts.
6. With Gray ZnNi Plating the connector can reach 500 hours of salt spray resistance and is RoHS compliant.

## Features and Benefits For Amphe-Lite M3

- Acme threads provide coupling durability and quick-mating.
- High Vibration Resistance.
- High-density connectors suitable for small footprint designs.
- Uses removable crimp contacts.
- 100% scoop-proof shells.
- Self-Locking Threaded Coupling.
- 9 shell sizes and 5 Keyway options are available to eliminate mismatching.
- 17 insert patterns with a sandwich structure design rated to IP67 in the mated condition. Contacts for printed circuit board and fiber optics are available upon request.
- Amphe-Lite M3 can withstand 500-hours of salt spray corrosion when plated with our Gray ZnNi plating, use suffix 072.
- Amphe-Lite M3 is able to be mated with other connectors that are in accordance with MIL-DTL-38999 Series III specifications.



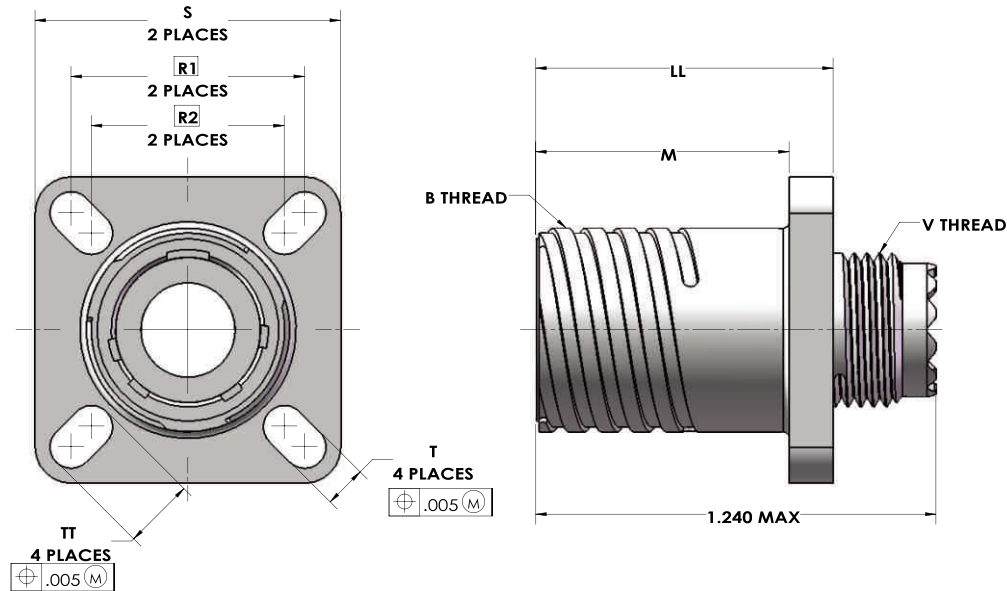
## Technical Data For Amphe-Lite M3

Operating Temperature	-65°C~ +125°C
Relative Humidity	Up to 98% When temperature is 40°C
Mating Life	500 Cycles minimum
Insulation Resistance	Normal Temperature status $\geq 5000$ M
	Humid Status $\geq 100$ M
Flammability of Insulation Material	UL94 V-0
Chemical Resistance	Lubricating oils, hydraulic fluids, coolants, deicing fluids per MIL-STD-1344A Method 1016 condition A-1( F Class)
EMI Shielding	100MHz~10GHz, Minimum attenuation of 50dB
Salt Spray Resistance	Electroless Nickel: 48H
	Gray ZnNi : 500H
Vibration Resistance	Sine Vibration: frequency:10~2000Hz, accelerated speed 294m/S <sup>2</sup>
	Random Vibration: frequency:100~1000Hz, power spectral density:1g <sup>2</sup> /Hz
Shock Resistance	3ms half-sine vibration, accelerated speed peak: 300g

Contact Size	Contact Diameter	Contact Resistance	Current Rating	Lead Wire Sectional Area
22D	0.76	$\leq 12$	5	$< 0.3247$
20	1.00	$\leq 5$	7.5	$< 0.5189$
16	1.6	$\leq 2.5$	13	$< 1.318$
12	2.40	$\leq 1.5$	23	$< 3.332$

## Shell Dimensions For Amphe-Lite M3

### ALM00 - Wall Mounting Receptacle

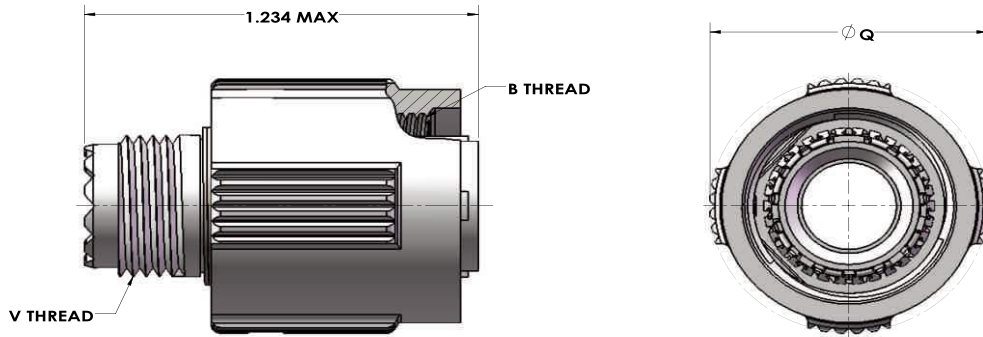


Shell Size	S Max	R1	R2	T +.008 -.006	TT +.008 -.006	M +.000 -.005	LL ±.005	B Thread Class 2A 0.1P-0.3L-TS (PLATED)	V Thread Metric
9	0.948	.719	.594	.128	.216	.775	.913	.6250	M12×1-6g
11	1.043	.812	.719	.128	.194	.775	.913	.7500	M15×1-6g
13	1.137	.906	.812	.128	.194	.775	.913	.8750	M18×1-6g
15	1.232	.969	.906	.128	.173	.775	.913	1.0000	M22×1-6g
17	1.323	1.062	.969	.128	.194	.775	.913	1.1875	M25×1-6g
19	1.449	1.156	1.062	.128	.194	.775	.913	1.2500	M28×1-6g
21	1.575	1.250	1.156	.128	.194	.745	.911	1.3750	M31×1-6g
23	1.701	1.375	1.250	.154	.242	.745	.911	1.5000	M34×1-6g
25	1.823	1.500	1.375	.154	.242	.745	.911	1.6250	M37×1-6g



## Shell Dimensions For Amphe-Lite M3

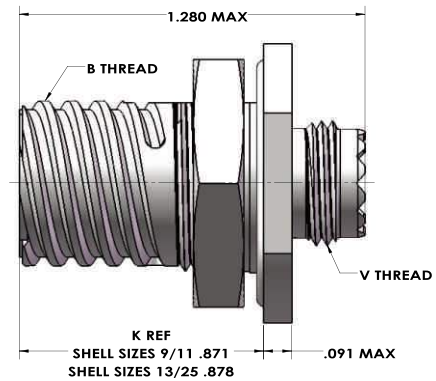
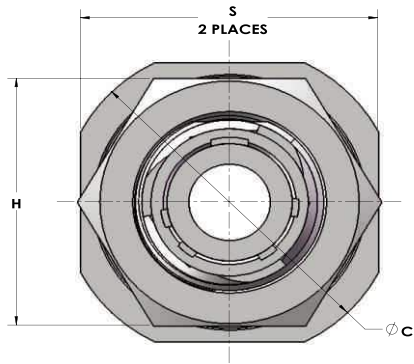
### ALM06 - Straight Plug



Shell Size	Q Dia Max	B Thread Class 2A 0.1P-0.3L-TS (PLATED)	V Thread Metric
9	.858	.6250	M12×1-6g
11	.984	.7500	M15×1-6g
13	1.157	.8750	M18×1-6g
15	1.279	1.0000	M22×1-6g
17	1.405	1.1875	M25×1-6g
19	1.515	1.2500	M28×1-6g
21	1.641	1.3750	M31×1-6g
23	1.767	1.5000	M34×1-6g
25	1.889	1.6250	M37×1-6g

## Shell Dimensions For Amphe-Lite M3

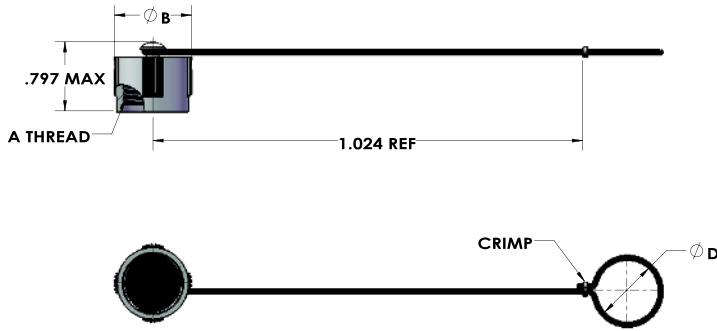
### ALM07 - Jam Nut Receptacle



Shell Size	S $\pm .010$	H Hex $+ .017$ $- .016$	LL $\pm .005$	B Thread Class 2A 0.1P-0.3L-TS (PLATED)	V Thread Metric
9	1.062	.938	1.199	.6250	M12×1-6g
11	1.250	1.062	1.386	.7500	M15×1-6g
13	1.375	1.250	1.511	.8750	M18×1-6g
15	1.500	1.375	1.636	1.0000	M22×1-6g
17	1.625	1.438	1.761	1.1875	M25×1-6g
19	1.182	1.562	1.949	1.2500	M28×1-6g
21	1.938	1.750	2.073	1.3750	M31×1-6g
23	2.062	1.938	2.199	1.5000	M34×1-6g
25	2.188	2.000	2.323	1.6250	M37×1-6g

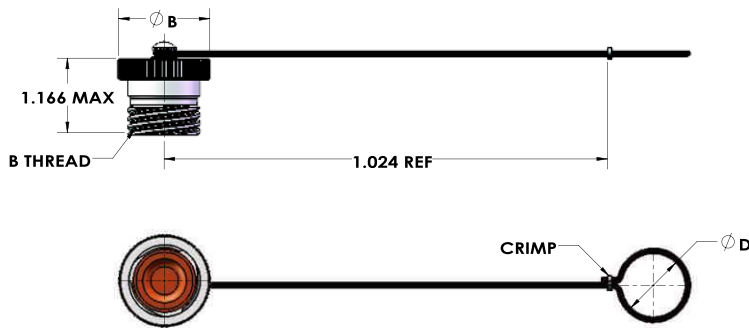
## Dust Cap For Amphe-Lite M3

### Receptacle Cap



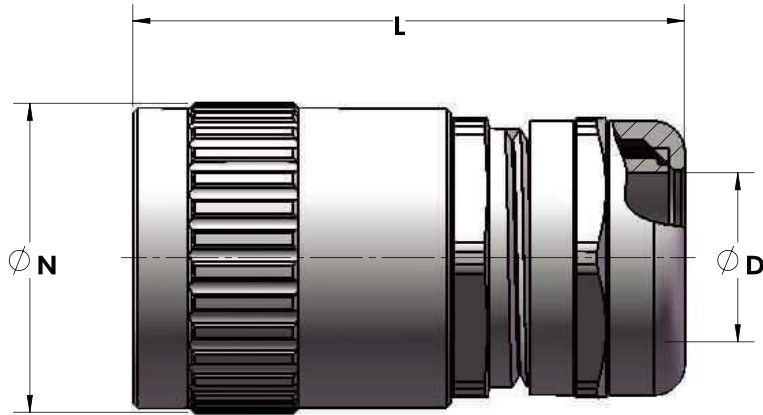
Shell Size	B (Max)	D Dia +.010 -.000	A Thread Class 2B 0.1P-0.3L-TS
9	.875	.703	.6250
11	1.000	.844	.7500
13	1.125	1.016	.8750
15	1.250	1.414	1.0000
17	1.438	1.266	1.1875
19	1.500	1.391	1.2500
21	1.625	1.516	1.3750
23	1.750	1.641	1.5000
25	1.875	1.766	1.6250

### Plug Cap



Shell Size	B (Max)	D Dia +.030 -.000	A Thread Class 2A 0.1P-0.3L-TS
9	.895	.516	.6250
11	1.000	.641	.7500
13	1.171	.766	.8750
15	1.299	.891	1.0000
17	1.436	1.016	1.1875
19	1.543	1.141	1.2500
21	1.670	1.266	1.3750
23	1.787	1.343	1.5000
25	1.914	1.516	1.6250

## Back Shell For Amphe-Lite M3

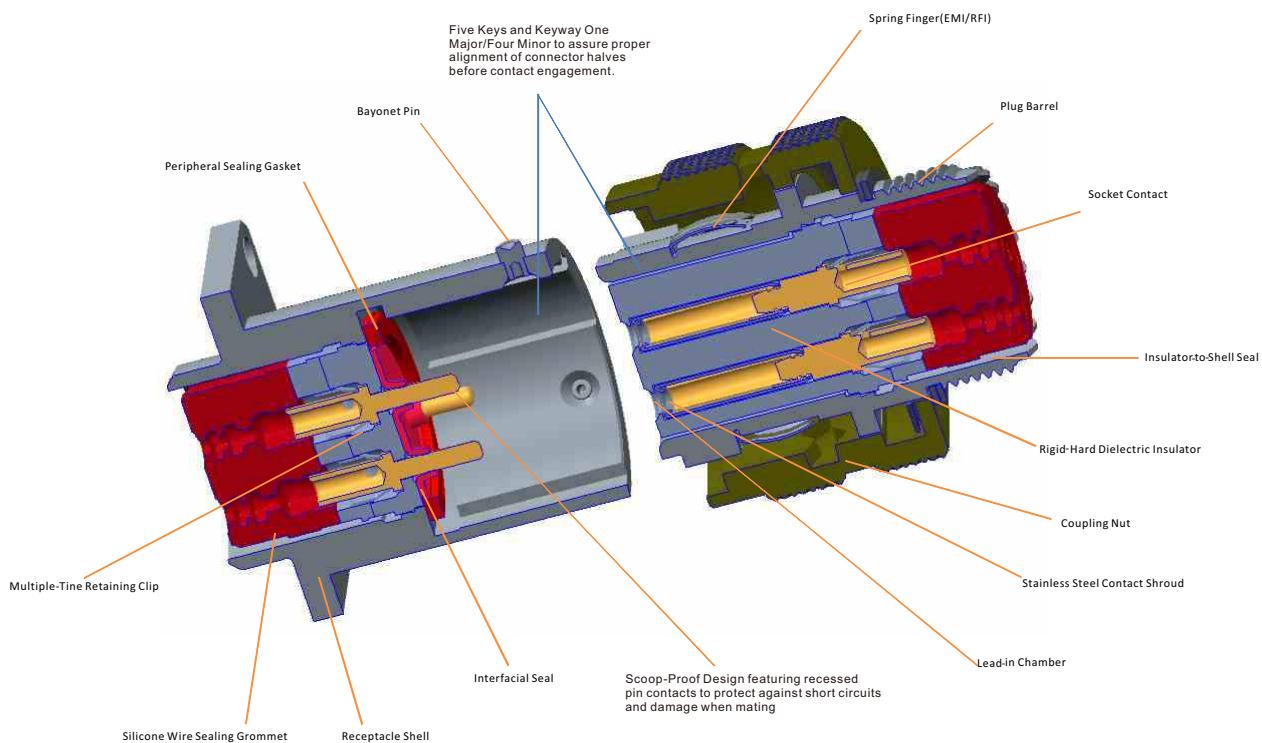


Shell Size	N (Max)	D Cable Range (mm)	L REF
9	.787	3-6.5	2.106
11	.984	4-8	2.106
13	1.024	4-8	2.106
15	1.180	5-10	2.106
17	1.376	5-10	2.106
19	1.417	13-18	2.106
21	1.535	13-18	2.106
23	1.654	18-25	2.106
25	1.712	18-25	2.106

## Product Introduction For Amphe-Lite S1

Amphenol's Amphe-Lite S1 is based on the MIL-DTL-38999 and is RoHS compliant. The product is pertinent, but not limited, to the following markets and applications.

- **Control Systems**
- **Commercial Aircraft**
- **Telecommunication Equipment**
- **Vehicle Signal interconnects**
- **Medical Instrumentation**
- **High-Performance Test Equipment**



### Key Features:

1. Service Class F Amphe-Lite S1 uses superior silicone seals providing increased fluid resistance.
2. Provides excellent EMI shielding and grounding through 100% metal to metal bottoming.
3. Recessed pins minimize potential contact damage in this 100% scoop-proof connector. In a blind mating application, mating shells cannot scoop the pins and cause a shorting or bending of contacts.
4. A rigid dielectric insert provides durable protection to the contacts.
5. With Gray ZnNi Plating the connector can reach 500 hours of salt spray resistance and is RoHS compliant.
6. Bayonet coupling, quick-mating.

## Features and Benefits For Amphe-Lite S1

- **Quick-Mating, Bayonet Coupling**

A three-point positive bayonet coupling system affords the Amphe-Lite S1 a quick-mating mechanism and provides an audible and tactile "click".

- **High Vibration Resistant**

- **High-density connectors suitable for small footprint designs.**

- **Uses removable crimp contacts.**

- **100% scoop-proof shells.**

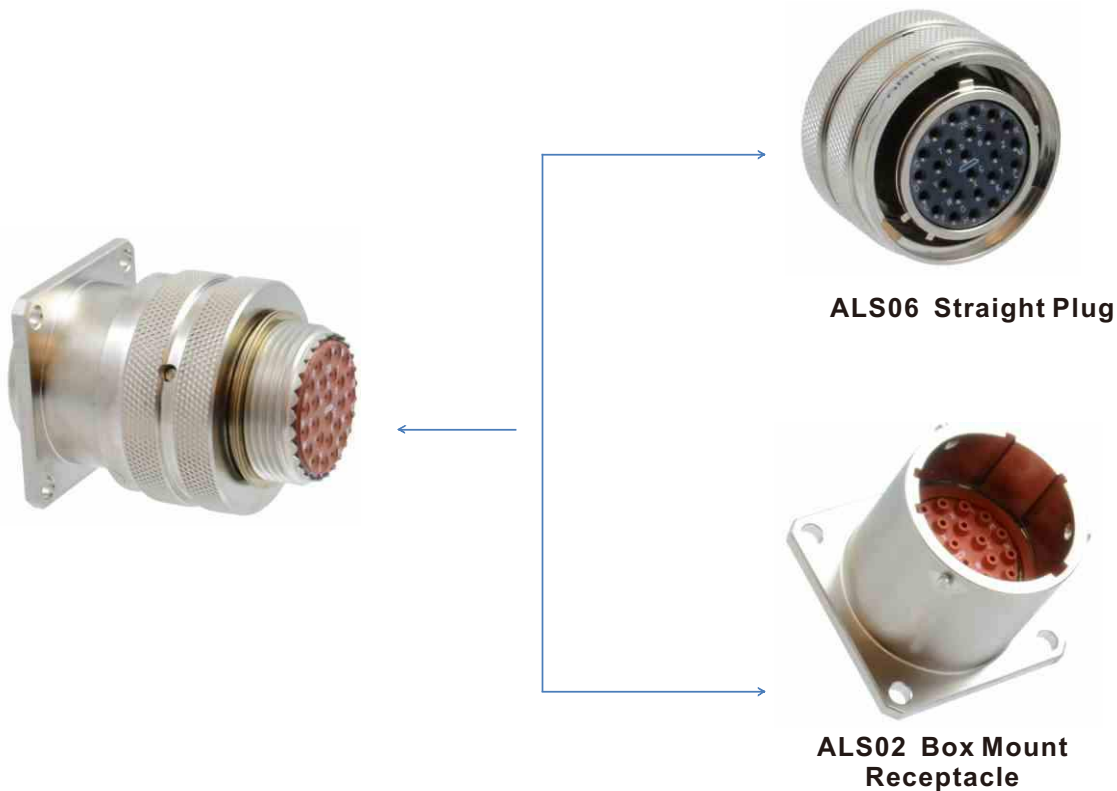
- **9 shell sizes and 5 Keyway options are available to eliminate mismatching.**

- **Various Insert Patterns and Contacts Available**

17 insert patterns with a sandwich structure design rated to IP67 in the mated condition. Contacts for printed circuit board and fiber optics are available upon request.

- **Corrosion Resistance**

Amphe-Lite S1 is able to pass the 500-hour salt spray corrosion test by using Gray ZnNi plating, use suffix 072.



## Shell Dimensions For Amphe-Lite S1

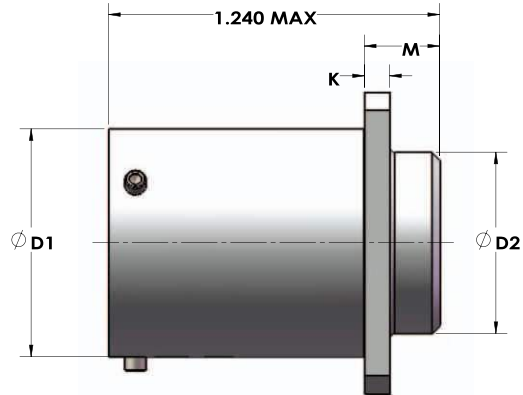
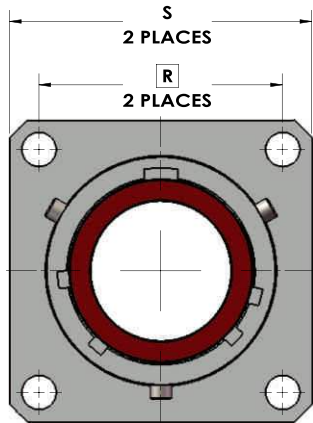
### ALS06 - Straight Plug



Shell Size	Q REF	A Thread Class 2A UNEF
9	.827	.4375-28
11	.949	.5625-24
13	1.121	.6875-24
15	1.234	.8125-20
17	1.378	.9375-20
19	1.488	1.0625-18
21	1.611	1.1875-18
23	1.733	1.3125-18
25	1.856	1.4375-18

## Shell Dimensions For Amphe-Lite S1

### ALS02 - Box Mount Receptacle

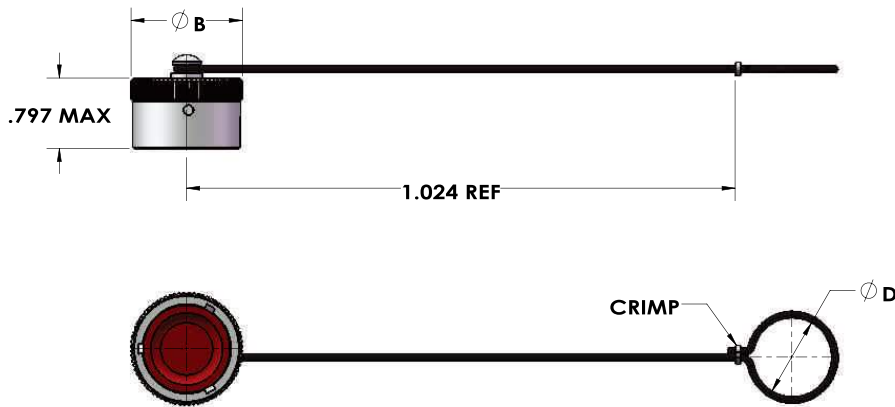


Shell Size	S Max	R	D1 +.000 -.005	D2 ±.005	K +.005 -.000	M +.000 -.005
9	.938	.719	.572	.433	.094	.280
11	1.031	.812	.700	.557	.094	.280
13	1.125	.906	.850	.676	.094	.280
15	1.219	.969	.975	.801	.094	.280
17	1.312	1.062	1.100	.986	.094	.280
19	1.438	1.156	1.207	1.082	.094	.280
21	1.562	1.250	1.332	1.157	.122	.311
23	1.688	1.375	1.457	1.282	.122	.311
25	1.812	1.500	1.582	1.407	.122	.311



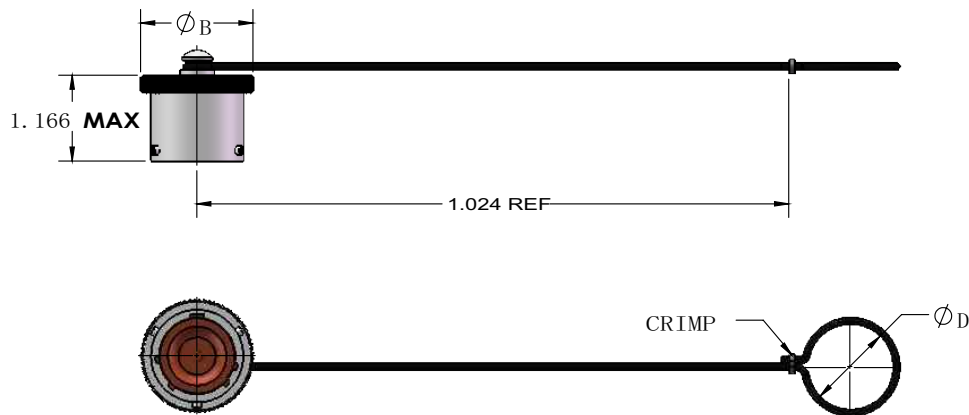
# Dust Cap for Amphe-Lite S1

## S1 Receptacle Cap



Shell Size	B MAX	D Dia +.010 -.000
9	.875	.703
11	1.000	.844
13	1.125	1.016
15	1.250	1.414
17	1.438	1.266
19	1.500	1.391
21	1.625	1.516
23	1.750	1.641
25	1.875	1.766







## S1 Plug Cap

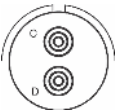
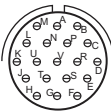
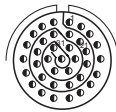
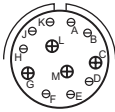
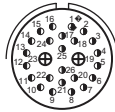
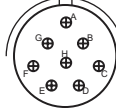


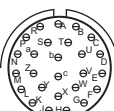

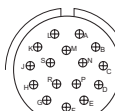
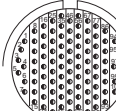
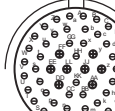
Shell Size	B MAX	D Dia +.010 -.000
9	.895	.516
11	1.000	.641
13	1.171	.766
15	1.299	.891
17	1.436	1.016
19	1.543	1.141
21	1.670	1.266
23	1.787	1.343
25	1.914	1.516

## Insert Patterns

Service Rating	Suggested Operating Voltage(Sea Level)		Test Voltage (Sea Level)
	AC(RMS)	DC	
M	400	550	1300 VRMS
N	300	450	1000 VRMS
I	600	850	1800 VRMS
II	900	1250	2300 VRMS

Insert Pattern						
		9-98	11-2	11-35	13-4	13-98
Service Rating	I	I	M	I	I	I
Number of Contacts	3	2	13	4	10	2
Contact Size	20	16	22D	16	20	12

Insert Pattern						
		15-2	15-19	15-35	15-97	15-AC
Service Rating	I	I	M	I	M	II
Number of Contacts	2	19	37	4 8	24 2	8
Contact Size	10	20	22D	16 20	22D 16	16

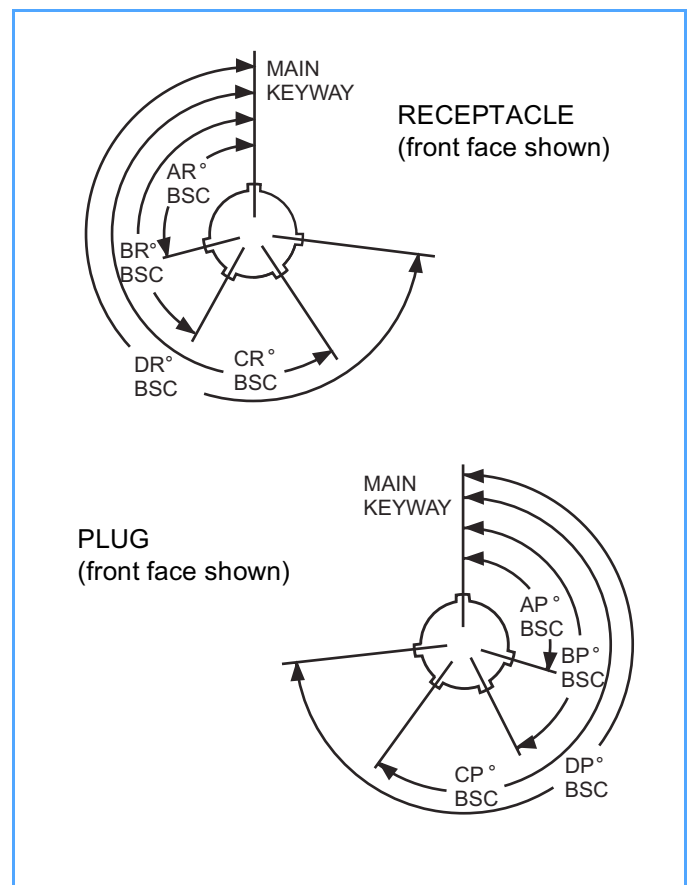
Insert Pattern					
		17-26	17-35	21-16	23-35
Service Rating	I	I	M	I	I
Number of Contacts	26	55	16	100	48 8
Contact Size	20	22D	16	22D	20 16

# Amphe-Lite M3 Series alternate insert positioning

## MASTER KEY/KEYWAY POSITION

Shell Size	Key & keyway arrangement identification letter	AR° or AP° BSC	BR° or BP° BSC	CR° or CP° BSC	DR° or DP° BSC
9	N	105	140	215	265
	A	102	132	248	320
	B	80	118	230	312
	C	35	140	205	275
	D	64	155	234	304
11, 13, and 15	N	95	141	208	236
	A	113	156	182	292
	B	90	145	195	252
	C	53	156	220	255
	D	119	146	176	298
17 and 19	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
	C	66	140	200	257
	D	62	145	180	280
21, 23, and 25	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272

A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The angles for a given connector are the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.



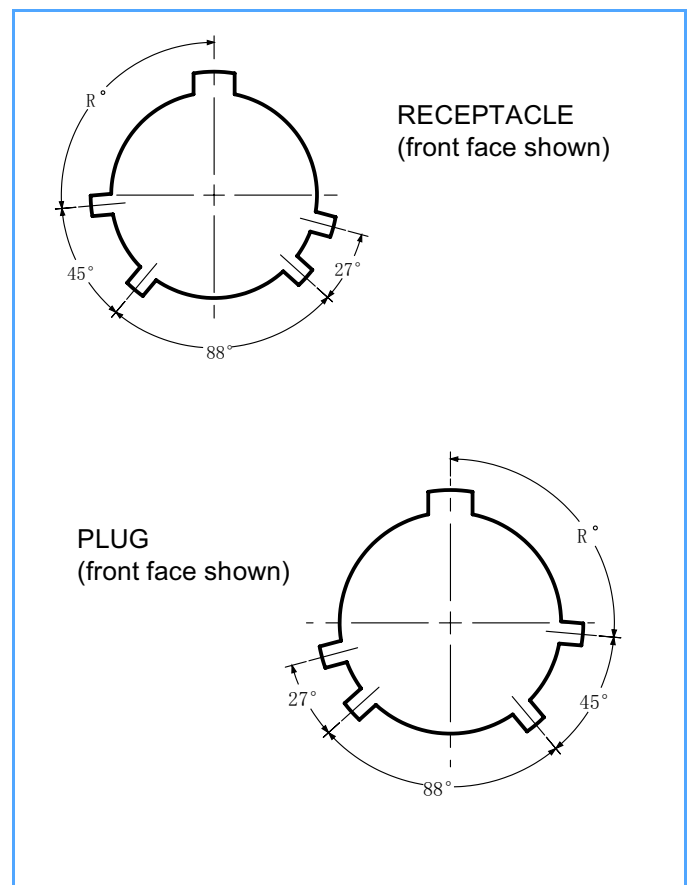
## Amphe-Lite S1 Series alternate insert positioning

### MASTER KEY/KEYWAY POSITION

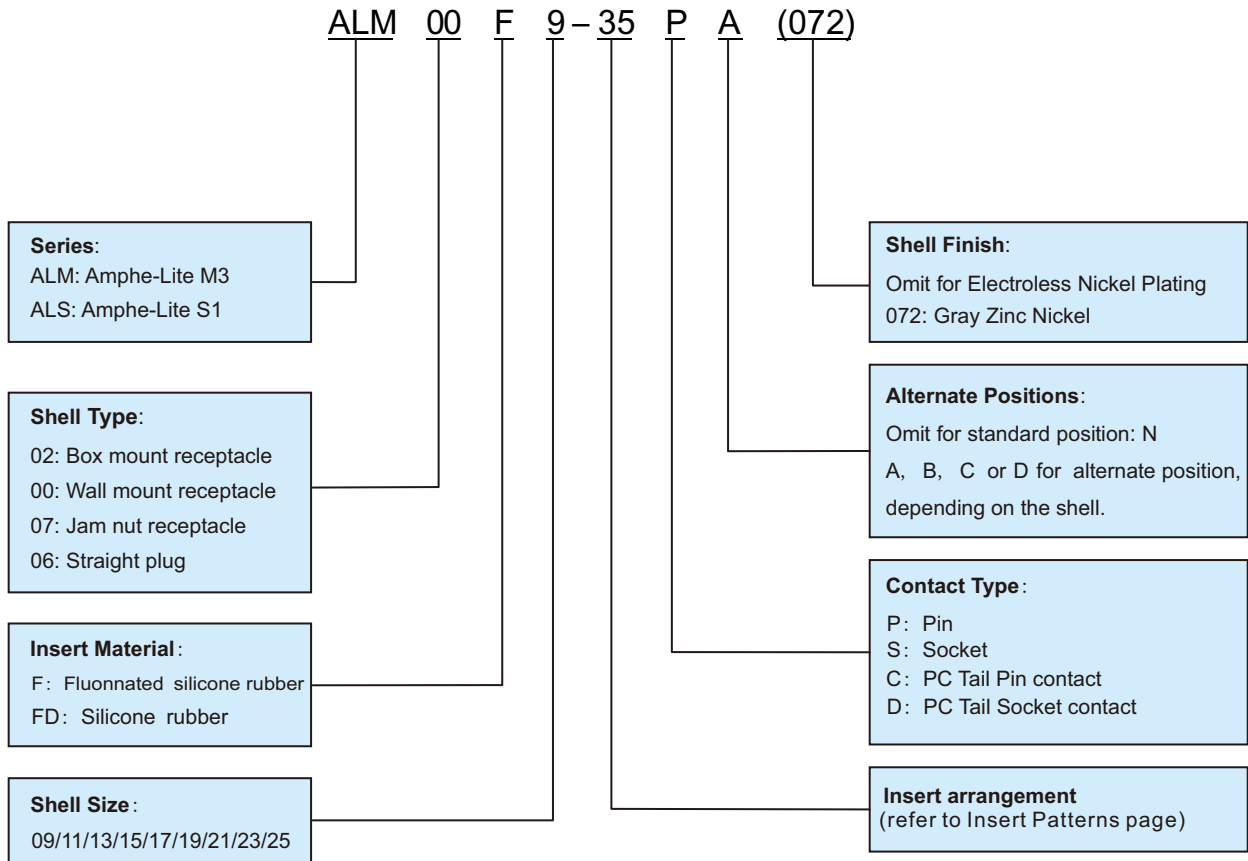
Receptacle Keyway Positon					
Shell Size	Keyway N	Keyway A	Keyway B	Keyway C	Keyway D
13	95°	75°	63°	127°	115°
15	95°	74°	61°	129°	116°
17	95°	77°	65°	125°	113°
19	95°	77°	65°	125°	113°
23	95°	80°	69°	121°	110°
25	95°	80°	69°	121°	110°

Plug Key Positon					
Shell Size	Key N	Key A	Key B	Key C	Key D
13	95°	75°	63°	127°	115°
15	95°	74°	61°	129°	116°
17	95°	77°	65°	125°	113°
19	95°	77°	65°	125°	113°
23	95°	80°	69°	121°	110°
25	95°	80°	69°	121°	110°

A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The angles for a given connector are the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.



## How to Order For Amphe-Lite M3 & S1



### Example:

ALM02F15-19P(072) : Threaded coupling, Box mounting receptacle, Fluorinated silicone rubber, Shell size 15, Insert pattern 15-19, Pin crimp contacts, N keyway, with Gray ZnNi plating..

ALS06F15-19S(072) : Bayonet coupling, Plug, Fluorinated silicone rubber, Shell size 15, Insert pattern 15-19, Socket crimp contacts, N Keyway, with Gray ZnNi plating.

### Standard Packaging

The Amphe-Lite M3 & S1 Series are shipped with connectors and contacts packaged in bulk. Consult Amphenol Industrial, Sidney NY for special packaging requirements.

### Connectors include the contacts

When ordering the connectors, crimp contacts will be packaged with plug and receptacle.

Using suffix (LC), for example, ALM00F15-19P(LC), would provide a connector without contacts.

## Contact Installation Guide

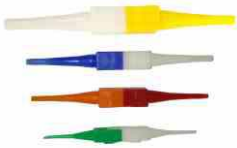
### 1. Crimp Tool Preparation

Crimp Tool DMC M22520/1-01



Contact Size	Hand-Crimp Tool	Power-Crimp Tool	Turret Heads	
			PINS	SOCKETS
22D	M22520/2-01	WA22	M22520/2-09	M22520/2-0
22	M22520/1-01	WA27F	M22520/1-04	M22520/1-04
16	M22520/1-01	WA27F	M22520/1-04	M22520/1-04
22	M22520/1-01	WA27F	M22520/1-04	M22520/1-04
10	TP-201423 or 1716P-1	-	-	-

Insertion/Extraction Tool



SIZE	Tool	Description	Color
10	C10-538988-010	M81969-14-05	Gray/(White)
12	C10-538988-012	M81969-14-04	Yellow/(White)
16	C10-538988-016	M81969-14-03	Blue/(White)
20	C10-538988-020	M81969-14-10	Red/(White)
22D	C10-538988-22D	M81969-14-01	Green/(White)

\*The tool shown in this example is a Size #20



### 2. Crimping Contact

Insert contact and wire into tool jaws. To crimp, squeeze handles together fully until ratchet releases and allows handles to expand; otherwise, contact cannot be extracted.



2.1

2.1 Adjust the locator of the crimp tool.



2.2

2.2 Insert the contact into the crimp tool.



2.3

2.3 Insert the wire into the crimp tool, crimp the wire.



2.4

2.4 Take the wire out, check the wire is well crimped or not through the contact hole.

## Contact Installation Guide

### 3. Contact Insertion

#### 3.1

Use proper plastic insertion tool for corresponding contact, position wire in tip of the tool so that the tool tip presses against the contact shoulder.



3.2 Insert tool against contact shoulder. With firm and even pressure insert wired contact and tool tip into the center of the contact cavity.



#### 3.3

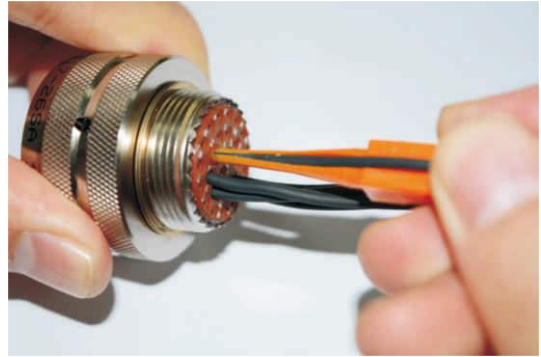
Press on the tool, when the contact bottoms out, a slight "click" can be heard. This signals the tines of the metal retaining clip have snapped into place behind contact shoulder.



### 4. Contact Extraction

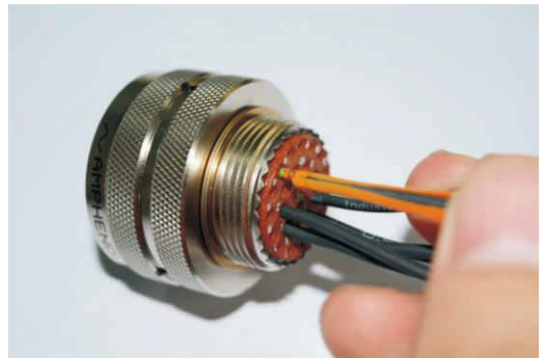
#### 4.1

Using the plastic extraction tool with the proper color code corresponding to contact size, place wire in tool.



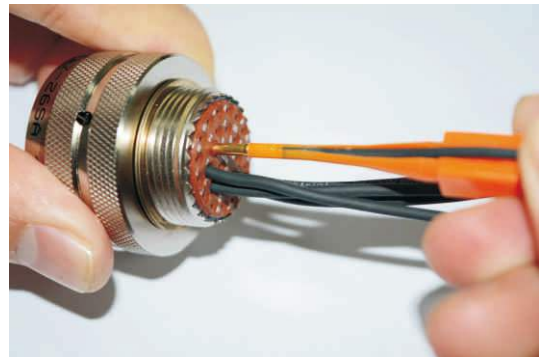
#### 4.2

Insert tool into contact cavity until tool tip bottoms against the contact shoulder, expanding clip retaining tines.



#### 4.3.

Hold wire firmly in tool and extract wired contact and tool. Repeat operation for all contacts to be extracted.



## North America

### **Amphenol Industrial Product Group**

191 Delaware Avenue  
Sidney, NY 13838-1395-USA  
Telephone: +1-888-364-9011 Fax: +1-520-397-7169  
[www.amphenol-industrial.com](http://www.amphenol-industrial.com)  
Email: [tech@amphenol-aio.com](mailto:tech@amphenol-aio.com)

## Asia

### **Amphenol Technology (Zhuhai) Co.,Ltd.**

No.63, Xinghan Rd, Phase 2, Science and Technology  
Industrial Park, Sanzao Town, Jinwan, Zhuhai, PRC  
Tel: +86-756-3989725 Fax: +86-756-3989768  
[www.amphenol-industrial.com](http://www.amphenol-industrial.com)  
Email: [tech@amphenol-aio.com](mailto:tech@amphenol-aio.com)



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