

# Amphenol

SINESYSTEMS

## AT Series™ Connectors and AHD Series™ Connectors



INTERCONNECTING YOUR WORLD

## Who Are We?

We are Amphenol Sine Systems.

We are a global leader in providing you with interconnection options and solutions.

We fulfill the needs of Industrial, Factory Automation, Heavy Duty and Custom-design markets.

Amphenol Sine Systems, with its 42 year history, 325+ employees worldwide and 3 global facilities, draws on the extensive worldwide resources of Amphenol Corporation to find solutions for our customers. Our engineers design innovative combinations of industry standard connectors and application specific shielding components to create assembly systems that set the standards for performance, reliability, and cost effectiveness. Our engineering, materials, and manufacturing organizations meet the high standards imposed by ISO 9001 as well as many customer specific quality systems. Our performance has earned us ship to stock and world class performance awards from many major OEMs.



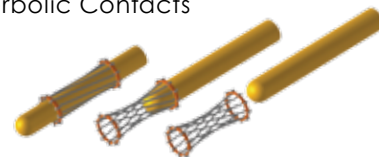
Amphenol Sine Systems is a division of **Amphenol Corporation** ([www.amphenol.com](http://www.amphenol.com)), one of the largest interconnect solution suppliers in the world. Amphenol Corporation supplies a wide range of product solutions worldwide. Amphenol Corporation, and all its subsidiaries, design, manufacture and market electrical, electronic and fiber-optic connectors, interconnect systems and coaxial and specialty cable. Amphenol has a diversified presence in high growth markets including: Information Technology and Data Communications Equipment, Mobile Devices, Mobile Networks, Broadband Communication, Military and Commercial Aerospace, Industrial and Automotive.

# What Are AT Series™ Connectors?

Amphenol Sine Systems AT Series™ connectors were designed as a high-performance, cost-effective solution to be used within the Heavy Equipment, Agricultural, Automotive, Military, Alternative Energy and other demanding interconnect architectures. The AT Series™ connectors contain superior environmental seals, seal retention capabilities and feature Amphenol Sine Systems RockSolid™ Contact technology. In addition, all of our AT Series™ connectors have been developed to be completely compatible with all other existing standard products industry-wide.



Hyperbolic Contacts



- Longer contact life
- Lower contact resistance
- Immunity to shock and vibration
- Low insertion and extraction forces
- Contact area extends 360° around pins



SEALING PLUGS  
- Optional



END CAP  
- Optional



HYPERBOLIC CONTACTS  
- Optional



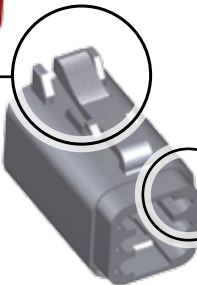
STANDARD REAR SEAL  
- Also available in **Reduced Diameter**



or **Solid**



**ERGONOMICALLY DESIGNED CLIP**  
The increased size and tactile design of our clips allow for easier mating and unmating.



**RECESSED SEALING AREA**  
The recessed cavity allows for a secure fitting front seal.



**FRONT SEAL**  
The superior design ensures a tight environmental seal when used in conjunction with the recessed cavity of the connector body.



**WEDGE (Required)** with Added Seal Retention  
The added seal retention feature ensures that the Front Seal does not move out of place.

# AT Series™ Specifications

The connector design incorporates an integral latching system that ensures a definitive electrical and mechanical connection. Connector housings are manufactured with a thermoplastic material that is not only durable, but has excellent UV resistance, dielectric/mechanical properties and environmentally RoHS compliant. The sealing system is comprised of a front and rear silicone, multi-sealing, perimeter against environmental ingress. Contacts are derived from quality copper alloy to ensure an electrically-reliable connection. For applications demanding higher levels of performance, you can rely on our RockSolid™ contact technology.

## Performance Criteria

CURRENT CAPACITY	No. 16, 13 amps (max)
WIRE RANGE	No 16 contacts will accept wire ranges of 14 thru 20 awg
TEMPERATURE	Operating temperature range: -55°C to +125°C at rated current
DIELECTRIC VALUE	Meets or exceeds 1500 volts minimum
FLAME RESISTANCE	All dielectric materials have a flammability rating of UL94 HB or better
DROP TEST	Shall not become detached or loosened when placed at 750mm and dropped to concrete eight times
SHOCK	No latch disengagement or discontinuity shall be the result when subjected to 50 g's in each of three axis (X, Y & Z)
VIBRATION	Continued continuity without degradation to mechanical or physical attributes following vibration. (max acceleration 20 g's at Sine sweep of 10-2000Hz)
CONNECTOR TERMINAL RETENTION	When subjected to a direct pull, size 14-20 achieves minimum pull-out force of 110 newtons
CONNECTOR RETENTION	A mated connector subjected to a pulling force by the exiting wire bundle at 111 newtons times the number of contacts to a maximum of 444 newtons applying load for 30 seconds
THERMAL SHOCK	Subjected to 10 cycles at -55°C to +125°C with no cracking, chipping or other damage detrimental to the normal operation of the connector
INSULATION RESISTANCE	Insulation resistance at 25°C shall be greater than 20 megohms when 1000 VDC are applied
MATING CYCLE DURABILITY	Following 100 cycles of connection engagement and disengagement, degradation either mechanical or electrical is not evident
CONTACT MILLIVOLT DROP	No. 16 contacts with 16 awg conductor - *100 millivolt drop max at 13 amps test current
ULTRAVIOLET EFFECTS	Test the mated connectors for 1000 hours per ASTM G 154 or ASTM G 153 with 20 hours UV and 4 hours of condensation for each cycle
WATER IMMERSION	A mated connection, properly wired, placed in an oven at +125°C for 1 hour, then placed immediately in a depth of water of 1 meter for 4 hours without loss of electronic performance

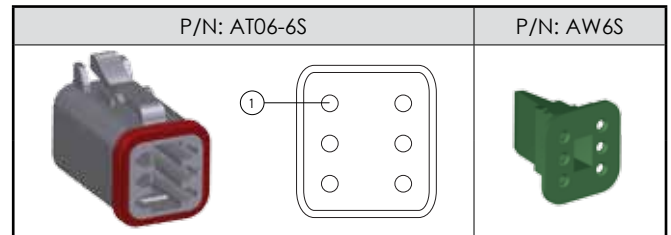
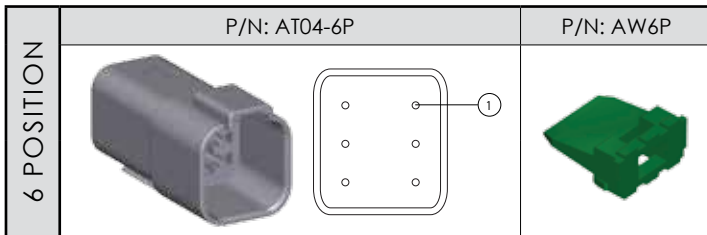
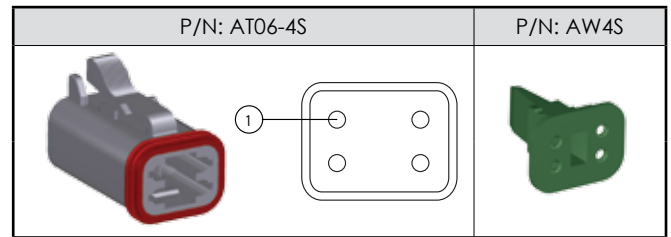
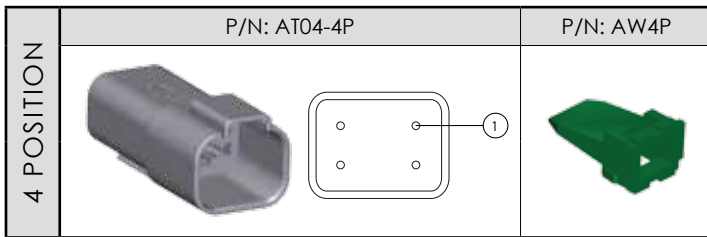
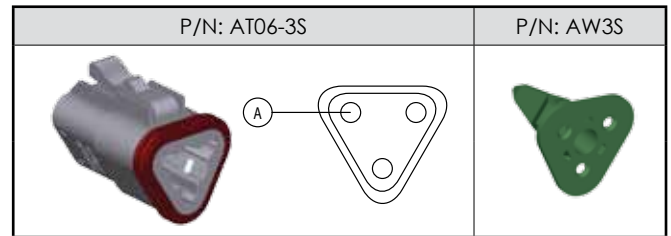
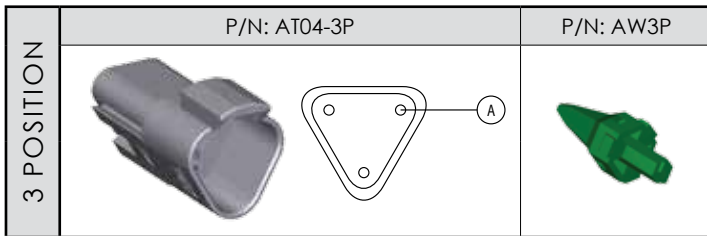
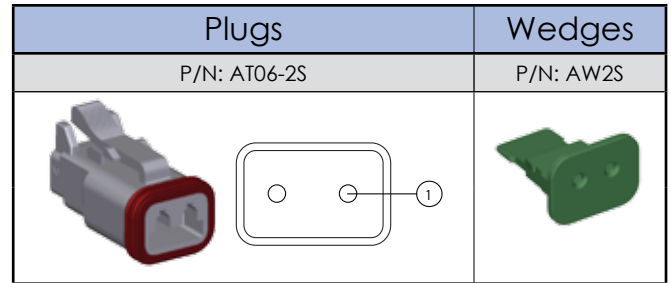
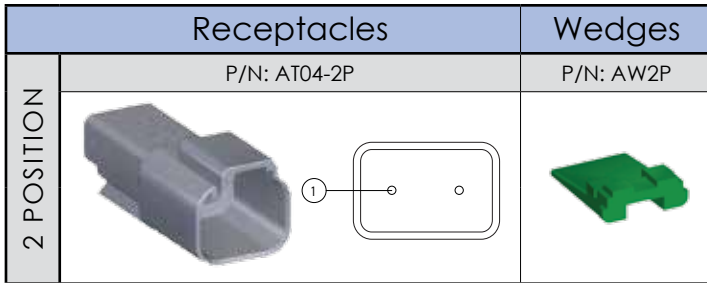
## Product Material

HOUSINGS	Thermoplastic
SEALS	Silicone Elastomer
SECONDARY LOCKS	Thermoplastic
CONTACTS	Copper Alloy, Nickel Plated, Gold optional



# AT Series™ Receptacles, Plugs And Wedges - 2, 3, 4 and 6 Position

Note: the views shown below are mating face views



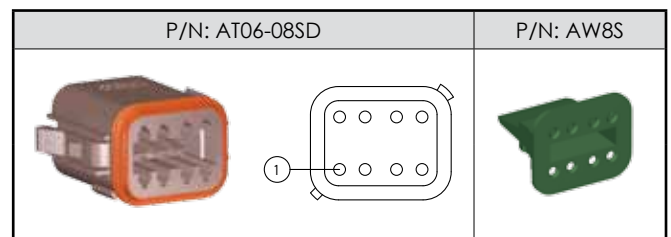
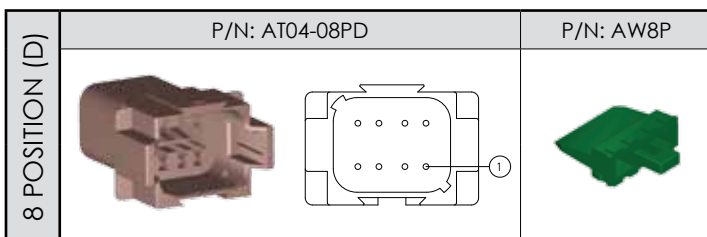
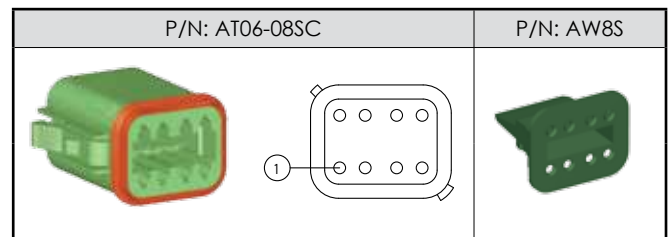
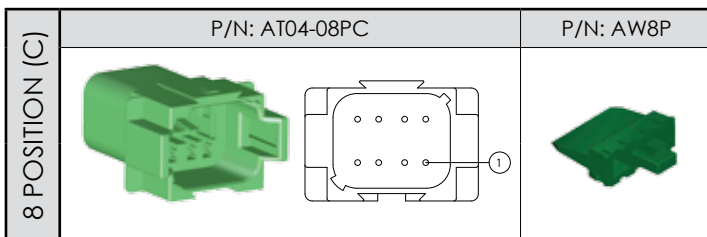
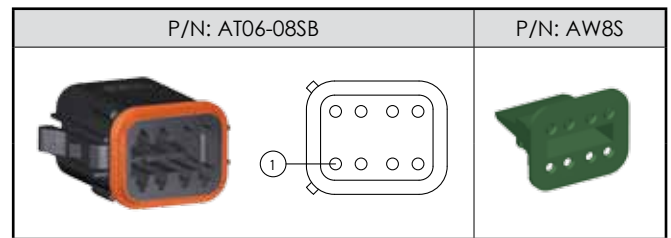
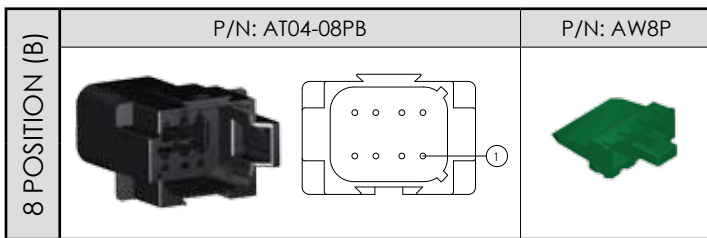
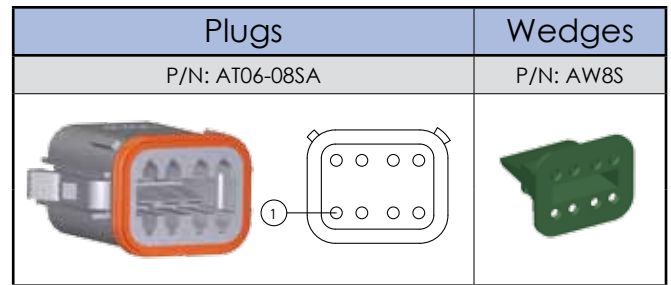
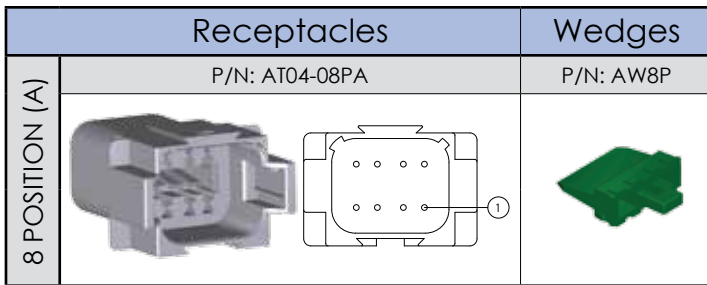
## AT Series™ Part Numbering Sequence

(excluding 18 Position Connector)

<u>AT</u>	<u>06</u> -	<u>12</u>	<u>S</u>	<u>A</u> -	<u>XXXX</u>
Amphenol	<u>06</u> - Plug <u>04</u> - Recept.	# of Positions <u>2, 3, 4, 6</u> <u>08 or 12</u>	<u>S</u> - Socket <u>P</u> - Pin	Key Position <u>A, B, C, D</u> <u>X1, X2</u>	Modifications <u>MMXX</u> - Mixed Modification (Consult Sales Rep.) <u>RD01</u> - Reduced Diameter Seal <u>EC01</u> - End Cap <u>SS01</u> - Solid Seal with End Cap

# AT Series™ Receptacles, Plugs and Wedges - 8 (A-D) Position

Note: The views shown below are Mating Face Views



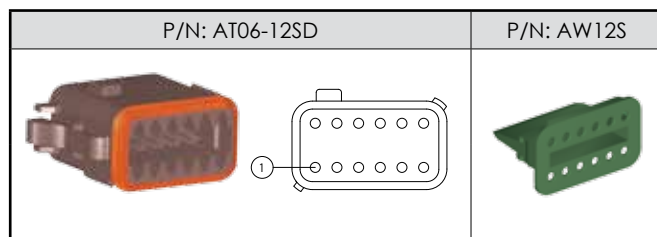
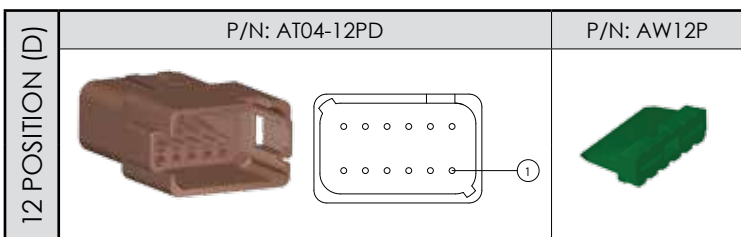
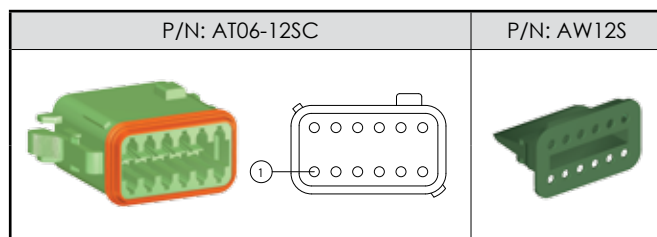
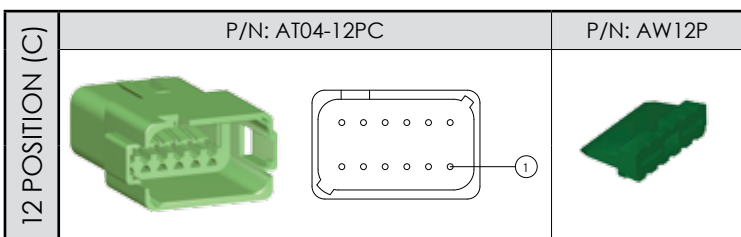
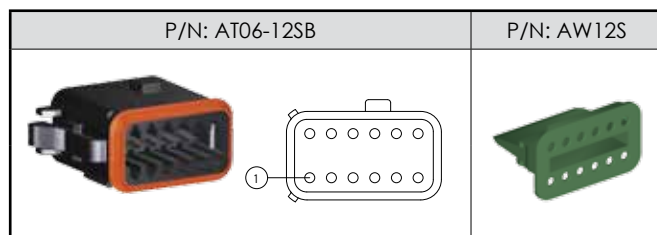
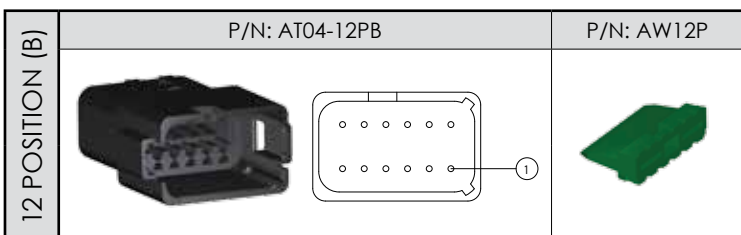
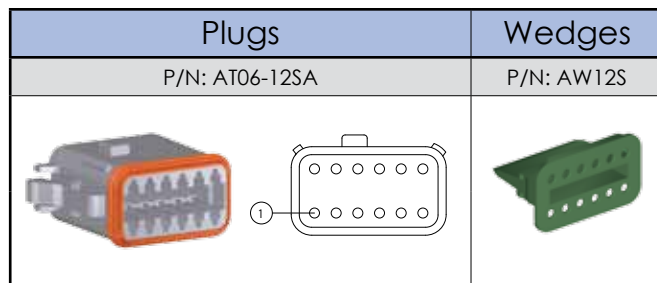
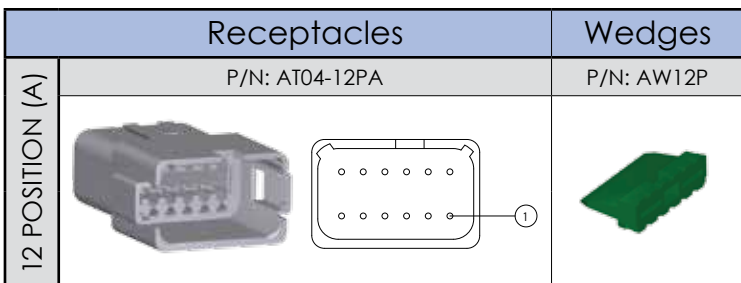
## AT Series™ Part Numbering Sequence

(excluding 18 Position Connector)

<u>AT</u>	<u>06</u>	-	<u>12</u>	<u>S</u>	<u>A</u>	-	<u>XXXX</u>
Amphenol	06 - Plug 04 - Recep.		# of Positions 2, 3, 4, 6 08 or 12	S - Socket P - Pin	Key Position A, B, C, D X1, X2		Modifications MMXX - Mixed Modification (Consult Sales Rep.) RD01 - Reduced Diameter Seal EC01 - End Cap SS01 - Solid Seal with End Cap

# AT Series™ Receptacles, Plugs and Wedges - 12 (A-D) Position

Note: The views shown below are Mating Face Views



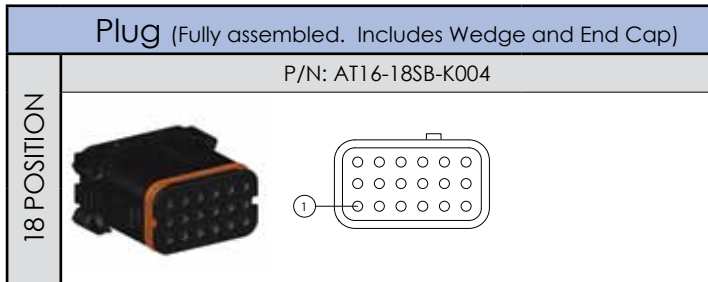
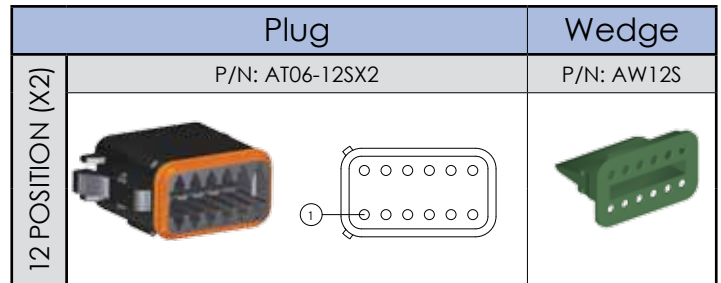
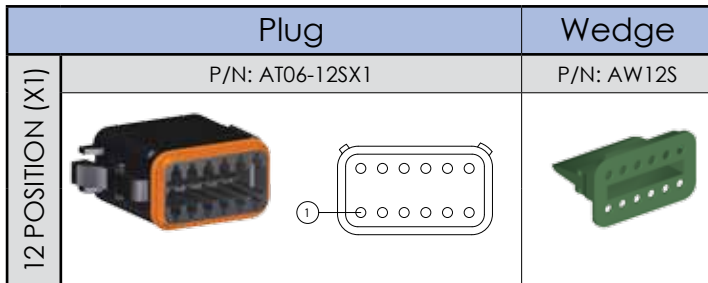
## AT Series™ Part Numbering Sequence

(excluding 18 Position Connector)

<u>AT</u>	<u>06</u>	-	<u>12</u>	<u>S</u>	<u>A</u>	-	<u>XXXX</u>
Amphenol	06 - Plug 04 - Recep.		# of Positions 2, 3, 4, 6 08 or 12	S - Socket P - Pin	Key Position A, B, C, D X1, X2		Modifications MMXX - Mixed Modification (Consult Sales Rep.) RD01 - Reduced Diameter Seal EC01 - End Cap SS01 - Solid Seal with End Cap





# AT Series™ Plugs, Wedges and Connectors - 12 and 18 Position

Note: The views shown below are Mating Face Views



## AT Series™ Optional Modifications with Part Numbering Sequencing

<u>AT</u> Amphenol	<u>XX</u> 06 - Plug 04 - Receptacle	-	<u>XX</u> # of Positions 2, 3, 4, 6 08, 12 or 18	<u>X</u> S - Socket P - Pin	<u>X</u> - Key Position A, B, C, D X1, X2
<u>AT</u> Amphenol	<u>XX</u> 06 - Plug 04 - Receptacle	-	<u>XX</u> # of Positions 2, 3, 4, 6 08, 12 or 18	<u>X</u> S - Socket P - Pin	<u>X</u> - Key Position A, B, C, D X1, X2
<u>AT</u> Amphenol	<u>XX</u> 06 - Plug 04 - Receptacle	-	<u>XX</u> # of Positions 2, 3, 4, 6 08, 12 or 18	<u>X</u> S - Socket P - Pin	<u>X</u> - Key Position A, B, C, D X1, X2
<u>AT</u> Amphenol	<u>XX</u> 06 - Plug 04 - Receptacle	-	<u>XX</u> # of Positions 2, 3, 4, 6 08, 12 or 18	<u>X</u> S - Socket P - Pin	<u>X</u> - Key Position A, B, C, D X1, X2

<u>EC01</u> <b>END CAP</b> • End Cap • Standard Seal (.088 - .145 range)	
<u>RD01</u> <b>REDUCED DIAMETER</b> • Reduced Seal (.053 - .120 range)	
<u>MM01</u> <b>MIXED MODIFICATION</b> • End Cap • Reduced Seal (.053 - .120 range)	
<u>SS01</u> <b>SOLID SEAL</b> • End Cap • Solid Seal	

Note: All dimensions are in inches.



Customized Colors are available in a wide range allowing you complete control over your project. To the left is a sampling of the available colors. Contact a Sales Representative for more details.



# What are AHD Series™ Connectors?

Amphenol Sine Systems AHD Series™ Connectors were developed in response to the overwhelming need for an economic alternative to today's existing diagnostic product options. Designed specifically as a cost-conscious, reliable alternative, intermateable to industry standard 6 and 9 pin connectors, the AHD Series™ is ideal for any situation where either controlled and/or uncontrolled environmental conditions exist.

Amphenol Sine Systems AHD Series™ Connectors offer both a smooth, non-sealing option for controlled applications, as well as an environmentally-sealed, threaded option for more demanding applications. The same applies for our DiagnosticGrade™ Cable Assemblies in that we provide both options for our customers.

## Features and Advantages

INTEGRATED ALIGNMENT KEYS	Tactile verification for blind mating
STRONG THERMOPLASTIC HOUSING	Extended service life
OPERATING TEMPERATURE RANGE	-55°C TO +125°C - Wide range compatibility
ECONOMICALLY SOUND	Low overall cost
RoHS COMPLIANT	Environmentally friendly
UL Approval	Certified and compliant

## Performance Criteria

CONTACT CURRENT RATING	<b>DiagnosticGrade™ / Military Style:</b> At +125°C, continuous, less thru wire: #12 contact = 25 amps max. current; #16 contact = 13 amps max. current
PHYSICAL SHOCK	<b>Military Style:</b> No locking, unmating or other unsatisfactory result after 50 g's in each of three mutually perpendicular planes.
DIELECTRICAL STRENGTH	<b>DiagnosticGrade™ / Military Style:</b> 1500 volts minimum
VIBRATION	<b>Military Style:</b> Maintains continuity and exhibits no mechanical or physical damage after vibration. (20 g's at 10-2000 Hz)
TEMPERATURE	<b>DiagnosticGrade™ / Military Style:</b> Operating temperature range: -55°C TO +125°C at rated current.
INSULATION RESISTANCE	<b>DiagnosticGrade™ / Military Style:</b> 1000 megohms minimum at 25°C.
DURABILITY	<b>DiagnosticGrade™ / Military Style:</b> No electric or mechanical defects after 100 cycles of engagement and disengagement.
CORROSION RESISTANCE	<b>DiagnosticGrade™ / Military Style:</b> Connectors show no evidence of corrosion after exposure to 48 hours of salt spray per MIL-STD 1344 method 1001.

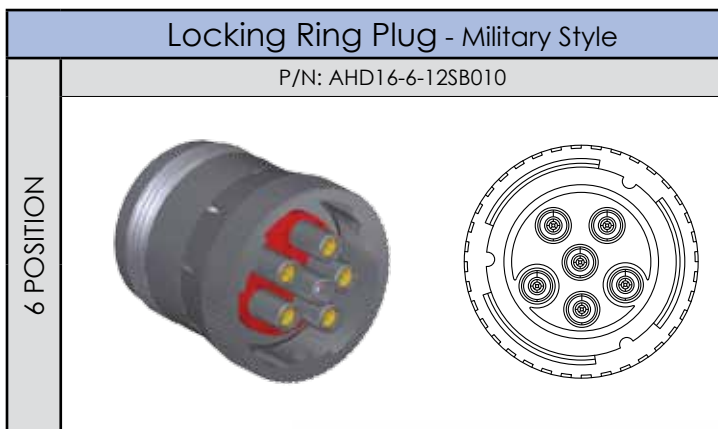
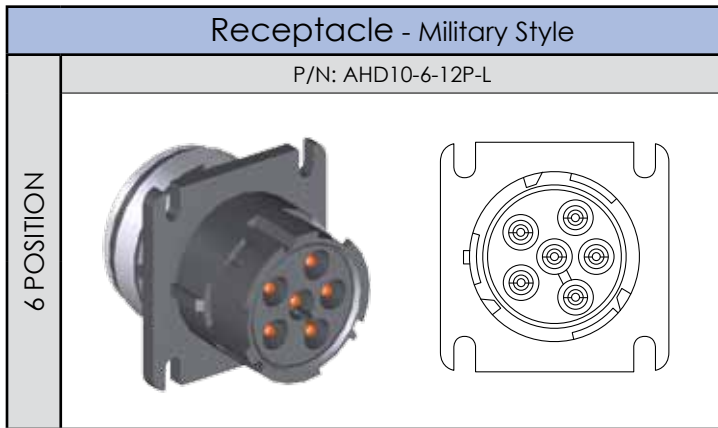
## Product Material

HOUSINGS	Thermoplastic
SEALS	Silicone Elastomer
CONTACTS	Copper Alloy/Gold plated



## AHD Series™ Receptacles, Plugs and Caps - 6 Pin

The AHD Series™ products listed below provide a quick connection between Amphenol Sine Systems 6 Pin products and equivalent industry 6 Pin products.



# AHD Series™ Receptacles and Plugs - 9 Pin (J1939)

The AHD Series™ products listed below provide a quick connection between Amphenol Sine Systems 9 Pin products and equivalent industry 9 Pin products.

Receptacle - Military Style	
P/N: AHD10-9-1939P	
9 POSITION	

Smooth Shell Plug - DiagnosticGrade™	
P/N: AHD17-9-1939S (available w/out Rear Seal)	

Receptacle	
P/N: AHD10-9-96P	
9 POSITION	

In-line Receptacle	
P/N: AHD14-9-1939P	

Locking Ring Plug - Military Style	
P/N: AHD16-9-1939S	
9 POSITION	

Locking Ring Plug (Non J1939) - Military Style	
P/N: AHD16-9-96S	

In-line Receptacle	
P/N: AHD14-9-96P	
9 POSITION	

Receptacle Cap - Military Style	
P/N: AHDC-16-9	

# Pin Contacts, Socket Contacts and Tooling

The AHD Series™ products listed below provide a quick connection between Amphenol Sine Systems 6 Pin products and equivalent industry 6 Pin products. **Note:** All dimensions are in Inches.

Military-Style Solid Crimp							
Part Numbers (Fits AT Series™ and AHD Series™)	Size/ Type	A Max	B Min	C Max	D Min	Wire Gauge Range	Recomm'd Strip Length
AT60-202-1631 (Gold) AT60-202-16141 (Nickel)	16 PIN	.821	.066	.103	.250	16 and 18	.250-.312
AT62-201-1631 (Gold) AT62-201-16141 (Nickel)	16 SOC	.759	.066	.103	.250	16 and 18	.250-.312
Part Numbers (Fits AHD Series™ only)	Size/ Type	A Max	B Min	C Max	D Min	Wire Gauge Range	Recomm'd Strip Length
AT60-220-1231 (Gold)	12 PIN	.821	.098	.151	.250	12 and 14	.250-.312
AT62-210-1231 (Gold)	12 SOC	.759	.098	.151	.250	12 and 14	.250-.312

DiagnosticGrade™ - Solid Crimp							
Part Numbers (Fits AT Series™ and AHD Series™)	Size/ Type	A Max	B Min	C Max	D Min	Wire Gauge Range	Recomm'd Strip Length
65-54756 (Gold)	16 PIN	.826	.047	.078	.165	20	.250-.303
65-54757 (Gold)	16 SOC	.763	.047	.078	.165	20	.250-.303
Part Numbers (Fits AHD Series™ only)	Size/ Type	A Max	B Min	C Max	D Min	Wire Gauge Range	Recomm'd Strip Length
65-54749 (Gold)	12 PIN	.826	.047	.078	.165	20	.250-.303
65-54748 (Gold)	12 SOC	.763	.047	.078	.165	20	.250-.303

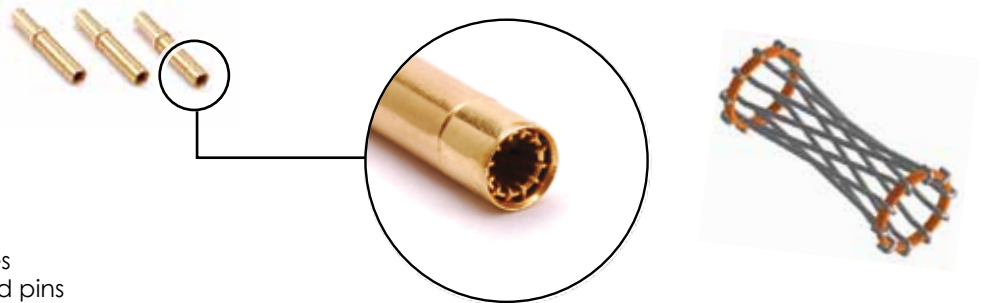


Listed below are quick reference illustrations for RockSolid™ and stamped and formed crimp options, as well as the Amphenol Sine Systems part numbers.

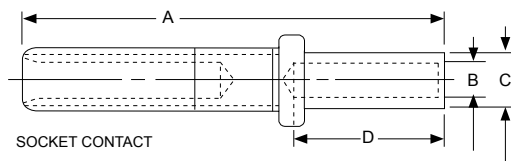


### Hyperbolic Contacts

- Longer contact life
- Lower contact resistance
- Immunity to shock and vibration
- Low insertion and extraction forces
- Contact area extends 360° around pins

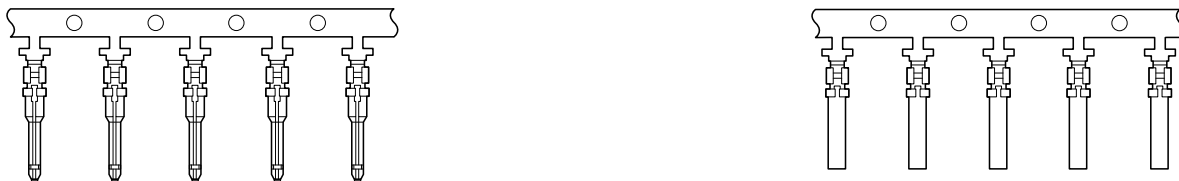


### RockSolid™ Gold Contacts



Part Numbers (Fits AT Series™ and AHD Series™)	Size/ Type	A Max	B Min	C Max	D Min	AWG Range	Recomm'd Strip Length
65-54942-14	16 SOC	.759	.073	.106	.250	14	.250-.312
65-54942-16	16 SOC	.759	.068	.103	.250	16	.250-.312
65-54942-20	16 SOC	.759	.048	.078	.172	20	.250-.312

### Pins and Contacts - Size 16 (Stamped and Formed)



Part Numbers	AWG Range	Recomm'd Strip Length	Material	Part Numbers	AWG Range	Recomm'd Strip Length	Material
AT60-14-0122	14-16	.125 - .175	Nickel	AT62-14-0122	14-16	.125 - .175	Nickel
AT60-14-0144			Gold	AT62-14-0144			Gold
AT60-16-0122	16-18		Nickel	AT62-16-0122	16-18		Nickel
AT60-16-0144			Gold	AT62-16-0144			Gold
AT60-16-0622	18-20		Nickel	AT62-16-0622	18-20		Nickel
AT60-16-0644			Gold	AT62-16-0644			Gold

### Crimp Die (Stamped & Formed Contacts)

P/N: \*MFX 3950 (Size 16)

P/N: \*MFX 3953 (Size 16 and 20)

\*Consult the Factory for availability



### Sealing Plug (Size 16)

P/N: A114017



## Plug Assembly - Contact and Wedge Insertion



1. Grasp crimped contact approx. one inch behind the contact barrel.



2. Hold connector with rear grommet facing you.



3. Push contact straight into connector until a 'click' is felt. A slight tug will confirm placement.



4. Insert wedge into connector.



5. A 'click' will be felt when the wedge is fully installed.

## Plug Assembly - Contact and Wedge Removal



1. Remove wedge by inserting a flathead screwdriver head underneath the lip of the wedge.



2. Twist the flathead screwdriver until wedge 'pops' out of connector.



3. Use the same flathead screwdriver to remove contact inside connector.

### Optional - Contact and Wedge Removal Tool

P/N: ATRT-100



## Receptacle Assembly - Contact and Wedge Insertion



1. Grasp crimped contact approx. one inch behind the contact barrel.



2. Hold connector with rear grommet facing you.



3. Push contact straight into receptacle until a 'click' is felt. A slight tug will confirm placement.



4. Insert wedge into receptacle.



5. A 'click' will be felt when the wedge is fully installed.

## Receptacle Assembly - Contact and Wedge Removal



1. Remove wedge by inserting a hook into an opening of the wedge.



2. Pull until wedge 'pops' out of receptacle.



3. Remove wedge.

## NORTH AMERICA

### Amphenol Sine Systems MICHIGAN

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Clinton Township, MI 48036  
Toll-Free: 1-800-394-7732  
Fax: 1-586-465-1216  
Email: sine\_info@sineco.com

## EUROPE

### Amphenol Air LB

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F-08110 Blagny, France  
Phone: 33-3-2422-7849  
Fax: 33-3-2422-7875  
Email: accueil@amphenol-airlb.fr

### Amphenol AIR LB GmbH

Am Kleinbahnhof 4  
Saarlouis D-66740, Germany  
Phone: 49-6831-981-00  
Fax: 49-6831-981-030  
Email: info@amphenol-airlb.de

### Amphenol BENELUX

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