ORDERING GUIDE FOR 97 SERIES STANDARD CIRCULAR CONNECTORS

97 series medium- to heavy-weight, standard circular connectors feature nonrotating contact design that simplifies soldering and helps lower termination costs. Standard MIL-C-5015 contacts are silver-plated w/ pre-tinned solder cups. Single key/keyway polarization. High-grade aluminum alloy shell components feature strong threaded couplings. Diallylphthalate inserts provide high arc and insulation resistance under both humidity and thermal stress. Your choice of 5 shell styles, environmental, solid or split shell construction, 128 contact arrangements (from 1 to 52 circuits) and alternate insert positioning. Standard, nonreflective cadmium-plated shell available in 3 finishes. Choose: olive drab chromate finish; shiny, clear cadmium-plated finish; or environmental-resistant black zinc cobalt finish. All shell finishes give the same high conductivity and resistance to corrosion. Operating temp.: –55°C to +125°C. Intermateable and intermountable with all 97 series and MIL-C-5015 connectors. UL recognized File E115497; CSA certified File LR69183. Newark has a completely equipped Amphenol MS assembly center which allows the quick shipment of complete connectors from an extensive component inventory.

HOW TO SELECT AN AMPHENOL 97 SERIES CIRCULAR CONNECTOR IN 8 EASY STEPS . . .

Once you have determined that a 97 series circular connector is required, answer the questions in the following 8 STEPS to help formulate the part number of your choice.

STEP 1, *How many wires are you going to connect and what gauge?*
The answer to this question determines which insert you need. The Insert Chart that follows illustrates the 128 inserts available. Here's an example of how to use the *Insert Chart.* Say you want to connect 8 16-gauge wires. Just find the section of the chart marked 8 contacts. Under this section, find insert number 20-7— it's the one you want because it contains 8 16-gauge contacts. Your space limitations and voltage requirements also determine your choice of insert. The voltage capacity code for each insert is listed under its diagram. If you have more than one wire size to connect, the method is the same because you can always solder a smaller wire to a larger contact. However, soldering a large wire to a small contact is not recommended.

STEP 2, *What if several identical connectors have different functions?*
Here's a situation to watch out for! You have 4 identical receptacles on a panel. One carries high current loads. The others have low current functions. A plug mated with the wrong receptacle (cross-mating) could damage your valuable equipment. To avoid cross-mating, you can order identical inserts positioned in both the plugs and receptacles at various angles from standard. These variations from standard positions are called alternate Insert Positions, explained on. The Alternate insert position is listed in parenthesis under each insert diagram in the *Insert Chart.*

STEP 3, *What kind of RECEPTACLE do you need?*
For wall mounting, use a Wall Receptacle, type 3100. The elongated back of this receptacle extends through thick wall material. It is threaded to accept standard hardware fittings. For unmounted applications, use the Cable Receptacle, type 3101. For box or panel mounting, use the Box Receptacle, type 3102. This receptacle's back is short to conserve space. It is not threaded on the back end and is used when no accessories such as clamps are needed.

STEP 4, *What kind of PLUG do you need?*
For ordinary situations, the Straight Plug, type 3106, meets most connector requirements. However, when space is critical you may want to consider using an Angle Plug, type 3108. This type plug lets the cable enter your equipment at a right angle.

STEP 5, *Do you need a Plug with SOLID or SPLIT Back Shell?*
You can get both straight and angle plugs in solid or split back shell designs. With the Solid Back Shell, you have greater strength and save space, too. On the other hand, the Split Back Shell design lets you quickly inspect the solder terminals, which is important if you'll be subjecting the connector to rough handling and heavy use. The type identification for Solid Back Shell construction in a non-environmental style is the letter A immediately after the main shell type number, for example 3106A. For a Solid Back Shell construction in the 97E environmental sealing style, the letter E should be placed immediately after the main shell type. Likewise, the type identification for Split Back Shell construction is B, for example 3106B. Split Back Shell construction is available in non-environmental types only. Because of applicaton, receptacles are made in Solid Back Shell construction only. Their type identifications are 3100A/E, 3101A/E, and 3102A.

STEP 6, *Which connector gets the socket: the receptacle or the plug?*
Now you have to designate which inserts are used with which shells. Since either pin or socket inserts can be used with plugs or receptacles, now's the time to make your choice. Here's a good rule of thumb: Order the sockets for the connector at the "hot" side of the circuit. By having sockets at the power source, there's less chance that a wayward finger or screwdriver will short the circuit or cause personal injury. The code for Socket is simply an S following the insert code number. For Pins, it is P. Therefore, 20-7P insert would have Pin contacts while a 20-S insert would have Socket contacts.

STEP 7, *What kind of finish do you need?*
If you prefer the standard olive drab, nonreflective cadmium plate finish, no suffix number is needed. If you would rather have the shiny, clear cadmium plate finish, just add the suffix number 639 at the end of the part number. If you would like an environmental-resistant black zinc cobalt finish, just add the suffix number 621 at the end of the part number.

STEP 8, *Do you need any accessories?*
Accessories, such as cable clamps and protection caps and chains, are available, too; order them separately.

BEFORE YOU ORDER . . .
Review the following **EXAMPLE 1** on PAGE 2 to correctly formulate the part number of your choice:

Amphenol Industrial

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RECEPTACLES

Wall Receptacle
97-3100A

Cable Receptacle
97-3101A

Box Receptacle
97-3102A

MATING PLUGS

Straight plug
97-3106A

Straight (split) Plug
97-3106B

Straight
Quick Disconnect Plug
97-3107A

Angle Plug
97-3108A

Angle (split) Plug
97-3108B

ORDERING GUIDE FOR 97 SERIES STANDARD CIRCULAR CONNECTORS, EXAMPLE 1

97 3101 A 28-21 P W (290)† (639)

Series Number
97 - Like MS, but Amphenol®

Shell Construction
A - Solid Backshell
B - Split Backshell
Connector Class
E - Environmental

Contact
P - Pin
S - Socket

Shell Finish
Leave Blank - For Standard Olive Drab Cadmium Finish
(639) - Shiny, Clear Cadmium Finish
(621) - Environmental-Resistant, Black Zinc Cobalt Finish

Shell Type
3100 - Wall Receptacle
3101 - Cable Receptacle
3102+ - Box Receptacle
3106 - Straight Plug
3107+ - Quick-Disconnect Plug
3108+ - Angle Plug

Alternate Insert Position
Omit for Standard Position. **W,X,Y,** or **Z** for Alternate Positions, depending on Insert. Alternate Insert Positions are listed in parenthesis under each diagram in the Insert Chart at the beginning of this section.

Deviation
(290) Backshell for use with jacketed cable
Contact your local Newark InOne Sales Office for additional deviations.

Insert Number
(Consists of)

Shell	**Configuration**
8S+, 10SL, 12S, 12†, 14S, 14, 16S, 16, 18, 20, 22, 24, 28, 32, 36, 40+	Code Numbers are listed under each diagram in the Insert Chart at the beginning of this section.

Review this example to correctly formulate the part number of your choice. See above explanation for more ordering information.
(+ Not for use with Environmental connectors;
† For use with Environmental connectors only)

SERVICE RATINGS
Codes are listed in **[BRACKETS]** under each diagram in the Insert Chart.

Service Codes		INST+	A	D	E	B	C
Limiting Operating	DC	250	700	1250	1750	2450	4200
Voltages at Sea Level	AC (rms)	200	500	900	1250	1750	3000
Effective Creepage (nominal)	mm	1.57	3.18	4.75	6.35	7.92	25.40
Mechanical Spacing (nominal)	mm	...	1.57	3.18	4.75	6.35	7.92

*Army-Navy ratings for aircraft use; Transients were not considered in calculating these values;
Limiting operating voltages of 50,000 feet (15,240M) altitude are approximately 25% of the sea level values.
+Normally for low voltages and currents.

WIRE SIZE CODES

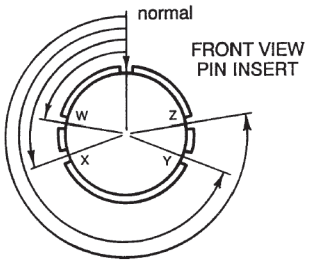
16	12	8	4	0

TEST CURRENT VALUES

Contact Size	16	12	8	4	0
Amperes	13	23	46	80	150

Amphenol Industrial

ALTERNATE INSERT POSITIONS



Codes are listed in **(PARENTHESIS)** under each diagram in the Insert Chart .

Insert	W	X	Y	Z
12S-3, 14S-9, 16S-5, 18-1, 18-22, 20-3, 20-6, 22-2, 22-9, 28-3, 28-6, 28-18	70°	145°	215°	290°
14S-2, 18-10, 36-5	…	120°	240°	…
14S-5	…	110°	…	…
14S-7, 16S-6, 16-10, 18-20, 18-29, 20-17, 20-19, 28-12	90°	180°	270°	…
16S-1, 18-12, 20-15, 20-29, 22-28, 24-2, 24-10	80°	…	…	280°
16S-4, 16-9, 16-11, 16-13, 18-3, 18-4, 20-18, 20-21, 20-23, 20-24, 20-27, 22-1, 22-4 22-5, 22-8, 22-10, 22-11, 22-13, 22-20, 24-9, 24-11, 28-2, 28-5, 32-5, 36-6	35°	110°	250°	325°
16-7, 18-5, 18-9, 18-13, 20-7, 20-8, 20-14, 20-16, 22-12, 22-14, 22-15, 22-16, 22-18, 22-19, 22-34, 24-5, 24-6, 24-7, 24-12, 24-16, 24-20, 24-21, 24-28, 28-1, 28-8, 28-9, 28-10, 28-11, 28-15, 28-16, 28-17, 28-19, 28-20, 28-21, 32-6, 32-13, 36-1, 36-7, 36-8	80°	110°	250°	280°
16S-8, 18-11	…	170°	265°	…
18-8	70°	…	…	290°
20-4, 24-22, 32-17	45°	110°	250°	…
22-22	…	110°	250°	…
22-23	35°	…	250°	…
22-27	80°	…	250°	280°
32-7, 32-8, 36-9, 36-10	80°	125°	235°	280°
36-15	60°	125°	245°	305°

97 SERIES STANDARD CIRCULAR CONNECTORS INSERT CHARTS

1 Contact

12-5-[D]

14S-4 [D]

16-12 [A]

18-16 [C]

18-420

2 Contacts

10SL-4 [A]

12S-3 [A] (W-X-Y-Z)

14S-9 [A] (W-X-Y-Z)

16S-4 [D] (W-X-Y-Z)

16-11 [A] (W-X-Y-Z)

16-13 [A] (W-X-Y-Z)

18-3 [D] (W-X-Y-Z)

2 Contacts (Cont.)

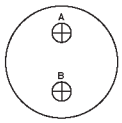
20-23 [A] (W-X-Y-Z)

22-1 [D] (W-X-Y-Z)

22-8 [E] (W-X-Y-Z)

22-11 [B] (W-X-Y-Z)

24-9 [A] (W-X-Y-Z)


32-5 [D] (W-X-Y-Z)

3 Contacts

10-SL-3 [A]

14S-1 [A]

14S-7 [A] (W-X-Y)

16S-5 [A] (W-X-Y-Z)

3 Contacts (Cont.)

16S-6 [A] (W-X-Y)

16-10 [A] (W-X-Y)

18-5 [D] (W-X-Y-Z)

18-22 [D] (W-X-Y-Z)

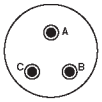
20-3 [D] (W-X-Y-Z)

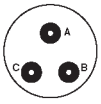
20-6 [D] (W-X-Y-Z)

20-19 [A] (W-X-Y-Z)

22-2 [D] (W-X-Y-Z)

22-9 [E] (W-X-Y-Z)


28-3 [E] (W-X-Y-Z)


28-6 [D] (W-X-Y-Z)

4 Contacts

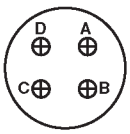
12SL-844

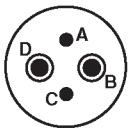
14S-2 [Inst] (X-Y)

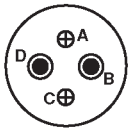
16-9 [A] (W-X-Y-Z)

18-4 [D] (W-X-Y-Z)

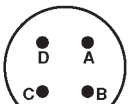
18-10 [A] (X-Y)

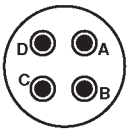

20-4 [D] (W-X-Y)

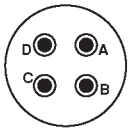

20-24 [A] (W-X-Y-Z)

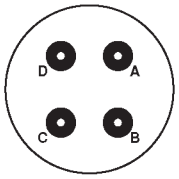

22-4 [A] (W-X-Y-Z)

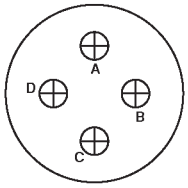
4 Contacts (Cont.)


22-10 [E-A]


22-22 [A] (X-Y)


24-22 [D] (W-X-Y)


32-17 [D] (W-X-Y)


36-5 [A] (X-Y)

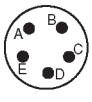
5 Contacts

14S-5 [Inst-X]

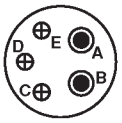
5 Contacts (Cont.)

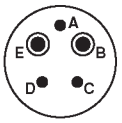
16S-8 [A] (X-Y)

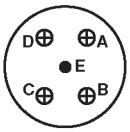
18-11 [A] (X-Y)

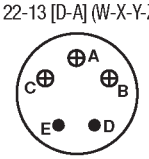

18-20 [A] (W-X-Y)

18-29 [A] (W-X-Y)

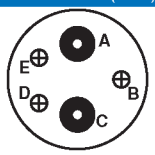

20-14 [A] (W-X-Y-Z)


22-12 [D] (W-X-Y-Z)


22-13 [D-A] (W-X-Y-Z)


22-34 [D] (W-X-Y-Z)

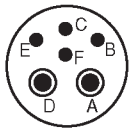
5 Contacts (Cont.)

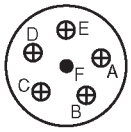

24-12 [A] (W-X-Y-Z)

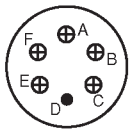
6 Contacts

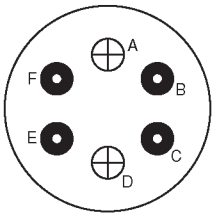
14-S6 [Inst]

18-12 [A] (W-Z)


20-8 [Inst] (W-X-Y-Z)


20-17 [A] (W-X-Y)


22-15 [E-A] (W-X-Y-Z)


36-6, 2 #0, 4 #4 [Serv. A] (W-X-Y-Z)

Amphenol Industrial

Newark

97 SERIES STANDARD CIRCULAR CONNECTORS INSERT CHARTS (CONTINUED)

Amphenol Industrial

7 Contacts

16S-1, 7 #16
[Serv. A] (W-Z)

18-9, 5 #16, 2 #12
[Serv. INST] (W-X-Y-Z)

20-15, 7 #12
[Serv. A] (W-Z)

22-26*, 2 #12, 5 #16
1/8"(3.176) Spacing

22-28, 7 #12
[Serv. A] (W-Z)

24-2, 7 #12
[Serv. D] (W-Z)

24-10, 7 #8
[Serv.A] (W-Z)

24-27, 7 #16
[Serv.E] (W-Z)

28-10
3 #12, 2 #8, 2 #4
[Serv. D (G), A (Others)]
(W-X-Y-Z)

8 Contacts

18-8, 1#12, 7 #16
[Serv. A] (W-Z)

20-7, 8 #16,
[Serv. D (ABHG), A (CDEF)] (W-X-Y-Z)

8 Contacts (Cont.)

22-18, 8 #16
[Serv. D (ABHFG), A (Others)] (W-X-Y-Z)

22-23, 8 #12
[Serv. D (H), A (Others)]
(W-Y)

24-6, 8 #12
[Serv. D (AGH), A (Others)] (W-X-Y-Z)

9 Contacts

20-16, 7 #16, 2#12
[Serv. A] (W-X-Y-Z)

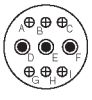
20-18, 3 #12, 6 #16
[Serv.A] (W-X-Y-Z)

20-21, 1 #12, 8 #16
[Serv.A] (W-X-Y-Z)

22-16, 3 #12, 6 #16
[Serv. A] (W-X-Y-Z)

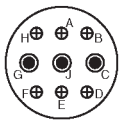
22-20, 9 #16
[Serv. A] (W-X-Y-Z)

22-27, 1 #8, 8 #16
[Serv. D (J), A (Others)]
(W-Y-Z)



24-11, 3 #8, 6 #12
[Serv. A] (W-X-Y-Z)

9 Contacts (Cont.)



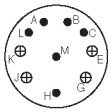
28-1, 3 #8, 6 #12
[Serv. D (AJE), A (Others)] (W-X-Y-Z

10 Contacts

18-1, 10 #16
[Serv. A (BCFG), INST (Others)] (W-X-Y-Z)

18-19, 10 #16,
[Serv.A] (X-Y)

24-21, 1 #8, 9 #16
[Serv. D] (W-X-Y-Z)



28-19, 4 #12, 6 #16
[Serv. B (HM), D (AB), A (Others)] (W-X-Y-Z)

11 Contacts

20-33, 11 #16 [Serv.A]

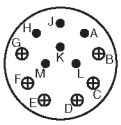
24-20, 2 #12, 9 #16
[Serv. D] (W-X-Y-Z)

12 Contacts

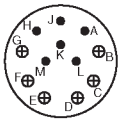
24-19, 12 #16
1/16" (1.588) Spacing

28-8, 2 #12, 10 #16
[Serv. E (LM), D (B), A (Others)] (W-X-Y-Z)

12 Contacts (Cont.)



28-9, 6 #12, 6 #16
[Serv. D] (W-X-Y-Z)



28-18, 12 #16,
[Serv. C (M), D (GHJKL),A (AB), INST (CDEF)] (W-X-Y-Z)

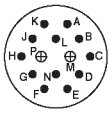
13 Contacts

20-11, 13 #16
[Serv. INST]

14 Contacts

20-27, 14 #16
[Serv. A] (W-X-Y-Z)

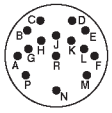
22-19, 14 #16,
[Serv. A] (W-X-Y-Z)



28-2, 2 #12, 12 #16
[Serv. D] (W-X-Y-Z)

28-20, 10 #12, 4 #16
[Serv. A] (W-X-Y-Z)

15 Contacts



28-17, 15 #16
[Serv. B (R), D (MNP), A (Others)] (W-X-Y-Z)

16 Contacts

24-5, 16 #16
[Serv. A] (W-X-Y-Z)

24-7, 2 #12, 14 #16
[Serv. A] (W-X-Y-Z)

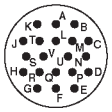
17 Contacts

20-29, 17 #16
[Serv. A] (W-Z)

19 Contacts

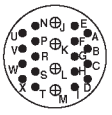
22-14, 19 #16
[Serv. A] (W-X-Y-Z)

20 Contacts



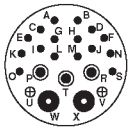
28-16, 20 #16
[Serv. A] (W-X-Y-Z)

22 Contacts



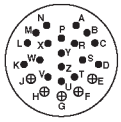
28-11, 4 #12, 18 #16
[Serv. A] (W-X-Y-Z)

23 Contacts



32-6, 2 #4, 3 #8
2 #12, 16 #16
[Serv. A] (W-X-Y-Z)

23 Contacts (Cont.)

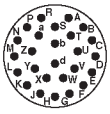


32-13, 5 #12, 18 #16
[Serv. D] (W-X-Y-Z)

24 Contacts

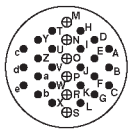
24-28, 24 #16
[Serv. INST] (W-X-Y-Z)

26 Contacts



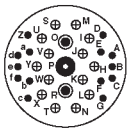
28-12, 26 #16
[Serv. A] (W-X-Y)

30 Contacts



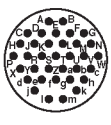
32-8, 6 #12, 24 #16
[Serv. A] (W-X-Y-Z)

31 Contacts

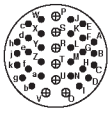


36-9, 1 #4, 2 #8
14 #12, 14 #16
[Serv. A] (W-X-Y-Z)

35 Contacts

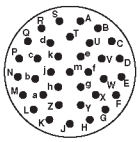


28-15, 35 #16
[Serv. A] (W-X-Y-Z)



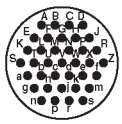
32-7, 7 #12, 28 #16
[Serv. INST (ABhj), A (Others)] (W-X-Y-Z)

35 Contacts (Cont.)



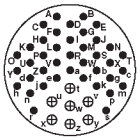
36-15, 35 #16
[Serv. D (m), A (Others)] (W-X-Y-Z)

37 Contacts

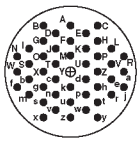


28-21, 37 #16
[Serv. A] (W-X-Y-Z)

47 Contacts

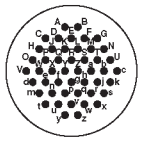


36-7, 7 #12, 40 #16
[Serv. A] (W-X-Y-Z)



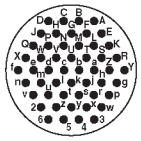
36-8, 1 #12, 46 #16
[Serv. A] (W-X-Y-Z)

48 Contacts

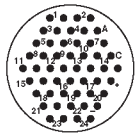


36-10, 48 #16
[Serv. A] (W-X-Y-Z)

52 Contacts



32-414*, 52 #16
[Serv. A]



36-403*, 52 #16
[Serv. A]

* *MS number not assigned, use **97 prefix** in completing part number.*