

Contacts

Contacts Overview

Several contacts are used interchangeably across most connector product lines. This commonality improves performance, reliability, and maintainability by reducing changes in the assembly of the wire harness. The use of the same contact systems helps eliminate many of the failures reported in harnesses where hundreds of different terminations are used.

Contact Styles

Two styles of contacts are available: solid and stamped & formed. Both contact types use a crimp style termination, eliminating the need for solder. The variations in the contact system are those dictated by wire gauge and contact style.

Solid

The solid contacts are designed for use with larger wire size and heavy duty applications. Solid contacts are manufactured using a cold heading process with solid copper alloy wire and are available with either a nickel or gold plating finish.

Solid contacts terminate wire from 4 AWG to 20 AWG (25 - 0.5mm²) and are available in 5 sizes each of the pin and socket. The applicable contact is determined by the size of the conductor only.

Stamped & Formed

Stamped & formed contacts are designed for use where wire termination costs are of primary concern without sacrificing reliability of electrical circuits. The stamped & formed contacts are made on a precision stamping machine using flat strip stock, then a durable and corrosion proof nickel, tin, or optional gold plating is applied.

The stamped & formed style contacts terminate wire from 10 AWG to 22 AWG (6.0 - 0.35mm²) and are available in multiple sizes to accommodate a wide range of wire insulation. The specific contact is determined by the outside diameter of wire insulation and conductor size.



Design Materials and Selection

Engineers combined superior material selection with mechanical CAD/CAM designs to create stamped & formed contacts that exceed the demands of today's industrial electrical systems.

To provide exceptional durability, performance, corrosion, and oxidation resistance, contacts are made from copper alloys, finished with nickel, tin, or gold plating. To provide resistance to crimp relaxation and displacement of metal, the contacts are designed with the conductor wings formed in the direction of the crimp to achieve gas tight crimps that eliminate the need for solder.

In keeping with the commitment to total quality, all stamped & formed contacts are manufactured using statistical process controls and are subjected to extensive rigorous testing programs, in the lab and in actual field performance.



Contacts

DEUTSCH Contact Performance Specifications

Durability

No electrical or mechanical defects after 100 cycles of engagement and disengagement.

Current Rating (Contact current rating @ 125° C continuous)

Contact Size	Max. Current
Size 20	7.5 amps
Size 16	13 amps
Size 12	25 amps
Size 8	60 amps
Size 4	100 amps

Crimp Tensile Strength (Solid)

Contact Size	Tensile Strength
Size 20	20 lbs
Size 16	25 lbs
Size 12	70 lbs
Size 8	90 lbs
Size 4	300 lbs

Crimp Tensile Strength (Stamped & Formed)

Contact Size	Tensile Strength
Size 20	20 lbs
Size 16	25 lbs
Size 12	70 lbs

Contact Retention (Solid and Stamped & Formed) Contacts withstand a minimum load of:

- 20 lbs (89 N) for size 20
- 25 lbs (111 N) for size 16
- 30 lbs (133 N) for size 12
- 35 lbs (156 N) for size 8
- 35 lbs (156 N) for size 4

A crimp tensile test easily and rapidly identifies a proper crimp.



Contact Millivolt Drop

Contact Size	Test Current Amps	Millivolt Drop* Solids	Millivolt Drop* S&F
20	7.5	60	100
16	13	60	100
12	25	60	100
8	60	60	N/A
4	100	60	N/A

*Less drop through wire

Typical Wire Insulation Ranges

(measured in diameter inches)

Wire Gauge	TXL	GXL	SXL
20	.065-.072	.080-.087	.092-.099
18	.073-.084	.089-.098	.103-.110
16	.082-.091	.097-.107	.116-.123
14	.098-.105	.114-.122	.138-.145
12	.120-.128	.137-.146	.159-.168
10	.146-.157	.170-.185	.190-.196
8	.178-.185	.209-.221	.222-.236
6	N/A	N/A	.287-.294

Dimensions are for reference only.

Wire Sealing Ranges

Dimensions are for reference only.

AMPSEAL Rear Grommet Sealing Ranges

Contact Size	Standard Seal
1.3 mm 16-20 AWG (1.5-0.5mm ²)	.067-.106 (1.7-2.7)

AMPSEAL 16 Rear Grommet Sealing Ranges

Contact Size	Standard Seal	Reduced Diameter Seal
16 14-20 AWG (2.0-0.5mm ²)	.086-.144 (2.18-3.67)	.051-.100 (1.30-2.54)

AEC, DRB, DRC, HD30, HDP20 Series Rear Grommet Sealing Ranges

Contact Size	Standard/ Normal Seal N-Seal	Thin Seal T-Seal	T-Seal Modified*	Extra Thin Seal E-Seal	E-Seal Modified*
20 16-22 AWG (1.0-0.35mm ²)	.040-.095 (1.02-2.41)	.040-.095 (1.02-2.41)	N/A	.040-.095 (1.02-2.41)	.040-.083 (1.01-2.10)
16 14-20 AWG (2.0-0.5mm ²)	.100-.134 (2.54-3.40)	.088-.134 (2.23-3.40)	.088-.106 (2.24-2.69)	.053-.120 (1.35-3.05)	.053-.103 (1.35-2.62)
12 10-14 AWG (5.0-2.0mm ²)	.134-.170 (3.40-4.32)	.113-.170 (2.87-4.32)	N/A	.097-.158 (2.46-4.01)	.097-.158 (2.46-4.01)
8 8-10 AWG (8.0-5.0mm ²)	.190-.240 (4.83-6.10)	.170-.240 (4.32-6.10)	N/A	.135-.220 (3.43-5.59)	N/A
4 6 AWG (13.0mm ²)	.280-.292 (7.11-7.42)	.261-.292 (6.63-7.42)	N/A	.261-.292 (6.63-7.42)	N/A
4 4 AWG (25.0-21.0mm ²)	.311-.420 (7.90-10.67)	N/A	N/A	N/A	N/A

*DEUTSCH cavity arrangements 24-29, 24-47, and 24-31 are only available with the modified seals. Arrangement 24-31 Modified E Seal = .053-.106. Please see drawings 0425-016-0000 and 0425-021-0000 for full specifications.

DT, DTM, DTP Series Rear Grommet Sealing Ranges

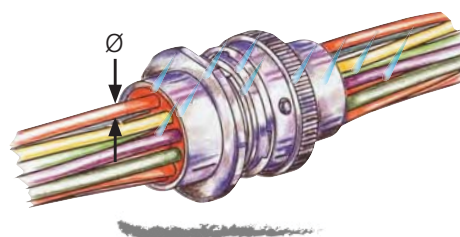
Contact Size	Standard Seal	Extra Thin Seal E-Seal
20 16-22 AWG (1.0-0.35mm ²)	.053-.120 (1.35-3.05)	N/A
16 14-20 AWG (2.0-0.5mm ²)	.088-.145 (2.23-3.68)	.053-.120 (1.35-3.05)
12 10-14 AWG (5.0-2.0mm ²)	.134-.170 (3.40-4.32)	.097-.158 (2.46-4.01)

STRIKE Series Rear Grommet Sealing Ranges

Contact Size	Standard Seal
20 16-22 AWG (1.0-0.35mm ²)	.061-.095 (1.55-2.41)
16 14-20 AWG (2.0-0.5mm ²)	.061-.120 (1.55-3.05)

HD10 Series Rear Grommet Sealing Ranges

Contact Size	Standard Seal	Extra Thin Seal E-Seal
16 14-20 AWG (2.0-0.5mm ²)	.100-.150 (2.54-3.81)	.053-.120 (1.35-3.05)
12 10-14 AWG (5.0-2.0mm ²)	.134-.170 (3.40-4.32)	N/A
4 6 AWG (13.0mm ²)	.280-.292 (7.11-7.42)	N/A



Contacts

Solid Contacts

Solid Contacts - DEUTSCH

Size	Solid Contact Part Numbers		Wire Size AWG (mm ²)	Recom- mended Strip Length Inches (mm)	Min. Contact Reten- tion	Ref Crimp Tensile Lbs. (N)	Max Rated Amps at 125° Con- tinuous
	Pin	Socket					
20	0460-202-20**	0462-201-20**	20 (0.50)	.156-.218 (3.96-5.54)	20 (89)	20 (89)	7.5
20	0460-010-20**	0462-005-20**	16-18 (1.0-0.75)	.156-.218 (3.96-5.54)	20 (89)	20 (89)	7.5
16	0460-202-16**	0462-201-16**	16-20 (1.5-0.50)	.250-.312 (6.35-7.92)	25 (111)	35-20 (156-89)	13
16	0460-215-16**	0462-209-16**	14 (2.0)	.250-.312 (6.35-7.92)	25 (111)	70 (311)	13
12	0460-204-12**	0462-203-12**	12-14 (3.0-2.0)	.222-.284 (5.64-7.21)	30 (134)	75-70 (334-311)	25
8	0460-204-08**	0462-203-08**	8-10 (10.0-5.0)	.430-.492 (10.92-12.50)	35 (156)	125-90 (556-400)	60
4	0460-204-04**	0462-203-04**	6 (16.0-13.0)	.430-.492 (10.92-12.50)	35 (156)	300 (1334)	100

** = Plating Codes. Contact your representative for custom finish needs.

Solid Contacts - C038 Modification

Size	Solid Contact Part Numbers		Wire Size AWG (mm ²)	Recom- mended Strip Length Inches (mm)	Min. Contact Reten- tion	Ref Crimp Tensile Lbs. (N)	Max Rated Amps at 125° Con- tinuous
	Pin	Socket					
4	5960-203-04141	5962-203-04141	4 (25.0-21.0)	.430-.492 (10.92-12.50)	35 (156)	300 (1334)	100

Solid Contact Plating Codes

Part Number Suffix (**)	Material
31	Gold
90	Nickel (Size 4 pin only)
141	Nickel



Stamped & Formed Contacts

Stamped & Formed Receptacles - 1.3 mm AMPSEAL

Size	Receptacles Part Numbers				Wire Size AWG (mm ²)	Insulation Diameter (mm)	Finish
	Strip Form	Package Quantity	Loose Piece	Package Quantity			
1.3 mm	770520-1	5000	770854-1	1000	16-20 (1.5-0.5)	.067-.106 (1.7-2.7)	Pre-tin plated
	770520-3	5000	770854-3	1000			Selective gold plated

Stamped & Formed Pins - HDSF 1.58 mm AMPSEAL 16

Size	Part Numbers				Wire Size AWG (mm ²)	Insulation Diameter (mm)	Wire Insulation Support	Finish
	Strip Form	Package Qty	Loose Piece	Package Qty				
HDSF 16 1.58 mm	1924463-1	4000	1924579-1	1000	18-20 (0.8-0.5)	.107-.05 (2.72-1.27)	yes	Gold
	1924463-3	4000	1924579-3	1000				Nickel
	776349-1	4000	-	-	18-20 (0.8-0.5)	.131-.089 (3.33-2.26)	yes	Gold
	776349-3	4000	-	-				Nickel
	638078-1	4000	776300-1	1000	14-18 (2.0-0.8)	.131-.089 (3.33-2.26)	yes	Gold
	638078-3	4000	776300-2	1000				Nickel
	638112-1	4000	776298-1	1000	14-18 (2.0-0.8)	.155-0.077 (3.94-1.96)	no	Gold
	638112-3	4000	776298-2	1000				Nickel
	2098250-1	4000	-	-	18 (1.5-0.8)	.118-.065 (3.00-1.65)	yes	Gold
	2098250-3	4000	-	-				Nickel
	2098252-1	4000	-	-	14 (2.0-1.5)	.128-.083 (3.25-2.10)	yes	Gold
	2098252-3	4000	-	-				Nickel

Stamped & Formed Receptacles - HDSF 1.58 mm AMPSEAL 16

Size	Part Numbers				Wire Size AWG (mm ²)	Insulation Diameter (mm)	Wire Insulation Support	Finish
	Strip Form	Package Qty	Loose Piece	Package Qty				
HDSF 16 1.58 mm	1924464-1	4000	1924580-1	1000	18-20 (0.8-0.5)	.107-.05 (2.72-1.27)	yes	Gold
	1924464-2	4000	1924580-2	1000				Nickel
	776493-1	4000	-	-	18-20 (0.8-0.5)	.131-.089 (3.33-2.26)	yes	Gold
	776493-2	4000	-	-				Nickel
	776492-1	4000	776299-1	1000	14-18 (2.0-0.8)	.131-.089 (3.33-2.26)	yes	Gold
	776492-2	4000	776299-2	1000				Nickel
	776491-1	4000	776297-1	1000	14-18 (2.0-0.8)	.155-.077 (3.94-1.96)	no	Gold
	776491-2	4000	776297-2	1000				Nickel
	2098251-1	4000	-	-	18 (1.5-0.8)	.118-.065 (3.00-1.65)	yes	Gold
	2098251-2	4000	-	-				Nickel
	2098253-1	4000	-	-	14 (2.0-1.5)	.128-.083 (3.25-2.10)	yes	Gold
	2098253-2	4000	-	-				Nickel



Contacts

Stamped & Formed Contacts- DEUTSCH

Size	Stamped & Formed Contact Part Numbers		Carrier Strip Identification	Wire Size AWG (mm ²)	Wire Insulation O.D. Range	Recommended Strip Length Inches (mm)	Min. Contact Retention	Max Rated Amps at 125° Continuous
	Pin	Socket						
20	1060-20-01**	1062-20-01**	20-01	16-22 (1.5-0.35)	.075-.125 (1.91-3.18)	.150-.200 (3.81-5.08)	20 (89)	7.5
20	1060-20-02**	1062-20-02**	20-02	16-22 (1.5-0.35)	.051-.085 (1.30-2.16)	.150-.200 (3.81-5.08)	20 (89)	7.5
20	N/A	1062-20-03** sleeveless	20-03	16-22 (1.5-0.35)	.075-.125 (1.91-3.18)	.150-.200 (3.81-5.08)	20 (89)	7.5
20	1060-20-06**	1062-20-06**	20-06	14-16 (2.5-1.0)	.075-.125 (1.91-3.18)	.150-.200 (3.81-5.08)	20 (89)	7.5
16	1060-14-01**	1062-14-01**	14-16	14-18 (2.0-.75)	.095-.150 (2.41-3.81)	.150-.200 (3.81-5.08)	25 (111)	13
16	1060-14-10**	1062-14-10**	14-16	14-18 (2.0-.75)	.095-.150 (2.41-3.81)	.150-.200 (3.81-5.08)	25 (111)	13
16	1060-16-01**	1062-16-01**	16-18	14-18 (2.0-.75)	.075-.140 (1.90-3.55)	.150-.200 (3.81-5.08)	25 (111)	13
16	1060-16-06**	1062-16-06**	0.5-1.0	16-20 (1.0-.50)	.055-.100 (1.40-2.54)	.150-.200 (3.81-5.08)	25 (111)	13
16	1060-16-09**	1062-16-09**	16-18	14-18 (2.0-.75)	.075-.140 (1.90-3.55)	.150-.200 (3.81-5.08)	25 (111)	13
16	1060-16-12**	1062-16-12**	1.0-2.5	12-16 (2.5-1.0)	.075-.140 (1.90-3.55)	.175-.225 (4.45-5.72)	25 (111)	13
16	N/A	1062-16-14** sleeveless	14-16	12-16 (2.5-1.0)	.075-.140 (1.90-3.55)	.175-.225 (4.45-5.72)	25 (111)	13
12	1060-12-01**	1062-12-01**	12-14	12-14 (4.0-2.0)	.113-.176 (2.87-4.47)	.225-.275 (5.72-6.99)	30 (134)	25
12	1060-12-02**	1062-12-02**	10-12	10† (6.0-4.0)	.140-.204 (3.56-5.18)	.225-.275 (5.72-6.99)	30 (134)	25

** = Plating Codes. Contact your representative for custom finish needs.

† = TXL wire insulation is preferred

S&F Contact Plating Codes

Part Number Suffix (**)	Material
22	Nickel
44	Gold
66	Tin/Nickel
77	Tin
88	Selective Gold



PCB Pins

Straight reduced diameter extended pins are available for installation in the DEUTSCH family of connectors. The use of removable contacts provides design flexibility and a low cost alternative to meet application needs. These solid copper alloy pins may be specified in various platings and assembled in HD30, HDP20, HD10, DRC, or DT receptacles.



Material

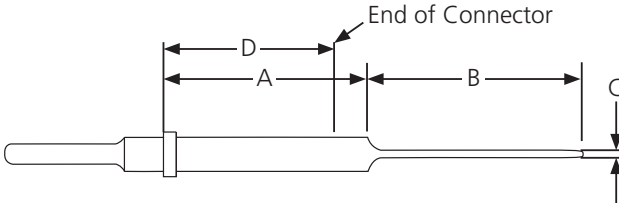
Copper alloy

Plating Codes

- 31: Gold
- 90: Tin
- 141: Nickel

PCB Mounting

Consult factory for PCB mounting details and pin positions.



Contact Size	Part Number	A	B	C
20	0460-208-2031	1.305 (33.15)	.248 (6.30)	.025 (.64)
	0460-208-2090	1.305 (33.15)	.248 (6.30)	.025 (.64)
16	0460-208-16141	1.300 (33.02)	.248 (6.30)	.025 (.64)
	0460-208-1631	1.300 (33.02)	.248 (6.30)	.025 (.64)
	0460-229-16141	.545 (13.84)	.248 (6.30)	.025 (.64)
	0460-241-16141	1.305 (33.15)	.160 (4.06)	.040 (1.02)
	0460-244-16141	.976 (24.79)	.400 (10.16)	.041 (1.04)
	0460-244-1631	.976 (24.79)	.400 (10.16)	.041 (1.04)
12	0460-208-12141	1.305 (33.15)	.248 (6.30)	.025 (.64)
	0460-245-1231	1.024 (26.01)	.500 (12.70)	.041 (1.04)
	0460-245-1290	1.024 (26.01)	.500 (12.70)	.041 (1.04)

Series	D*
HD30/HDP20	.939 (23.85)
HD10	.925 (23.50)
DT	.777 (19.74)
DT04-2P	.677 (17.20)
DT04-3P	.677 (17.20)
DRC	1.063 (27.00)

*D is equal to the distance from the contact shoulder to the end of the connector.

Dimensions are for reference only.



HD10 Series



HDP20 Series



HD30 Series

Contacts

Crimping

Crimping is defined as the act of joining a conductor to a pin or socket contact using a mechanical tool to compress and displace metal. In a good crimp joint, there is a mutual flow of metal, causing a symmetrical distortion of wire strands and contact material. A proper crimp will establish mechanical strength and excellent electrical conductivity.

Crimping Configuration

Stamped & formed contacts use a folded type of crimp (Fig. 1) while solid contacts use a 1, 2, or 4 indent crimp (Fig. 2). In both styles of crimps, the wire strands and the contact material are formed together in a solid mass creating a reduction of the wire strands area. The reduced wire strand area creates a minimum of voids allowing for excellent conductivity. Crimping may be accomplished with hand tools or power tools.

Stamped & Formed Style



Cross-Section Across Axis

Figure 1

Solid Style



Indenter Crimp
Cross-Section Across Axis

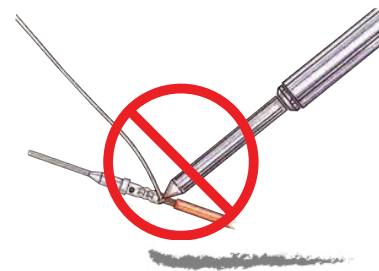
Figure 2

Benefits of a Crimped Contact

Mechanically crimping contacts is the dominant wire termination method, for some very good reasons:

1. With smaller wire, the crimp is as strong as the wire itself.
2. The joint can be visually inspected. Viewing the wire through an inspection hole in the contact makes inspection quick and easy, both by the operator and by the inspector.
3. Plating thickness is not restricted, as in solder joints, so better corrosion resistance and contact reliability are achieved.
4. Crimping can be done anywhere, without special preparation. Terminations are replaced or modified in the field exactly the same as in the shop, using the same tools and the same techniques, and with the same ease of operation and certainty of results.
5. Total installed and maintenance costs are lower.

*Solder should not be added to
DEUTSCH terminals.*



Crimp Inspection

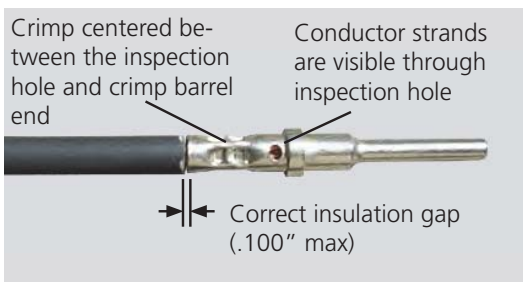
Crimping tools provide lower total installation and maintenance costs. However, controls are required to help ensure that the proper crimp tools designed for the type and size contact are used, the pin or socket is properly inserted into the tool, the wire insulation is stripped properly, and the wire fully inserts into the contact.

When a crimp is completed, correct termination can be visually inspected. The inspector should check for:

- The removed insulation should expose a conductor length that will pass beyond the inspection hole in the contact and still reveal the appropriate length of conductor between the contact and the insulation on the wire.
- Wire strands intact.
- All wire strands enter the contact barrel.
- Wire inserted to the proper depth in the contact.

When the correct crimp tool and process are used, a good termination results.

Solid Contact Crimp

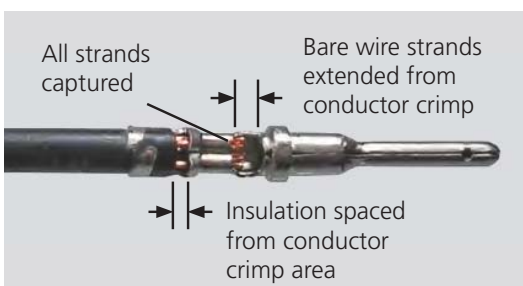


Acceptable Crimp

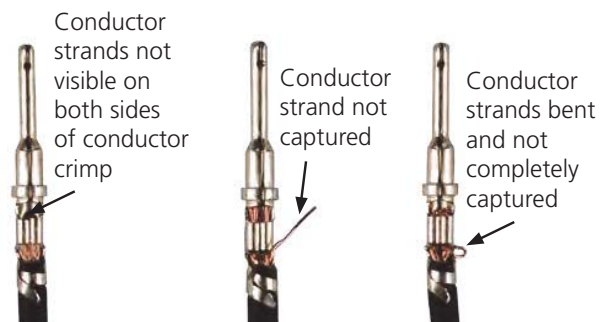


Unacceptable Crimps

Stamped & Formed Contact Crimp



Acceptable Crimp



Unacceptable Crimps

Dalroad



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Dalroad supply a wide range of automotive connectors for use on applications from engines to braking systems, providing a firm, secure cable-to-cable connection.

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