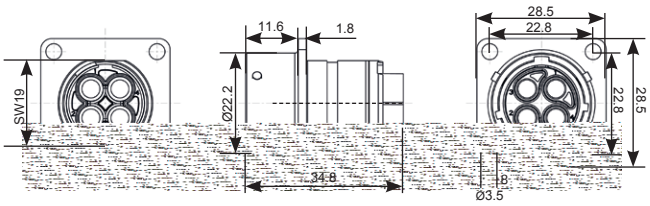
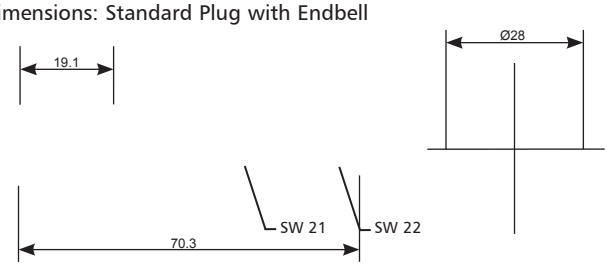
Dimensions: Standard Receptacle




Dimensions: Standard Plug with Endbell




## High Voltage 4-way for Power Contacts

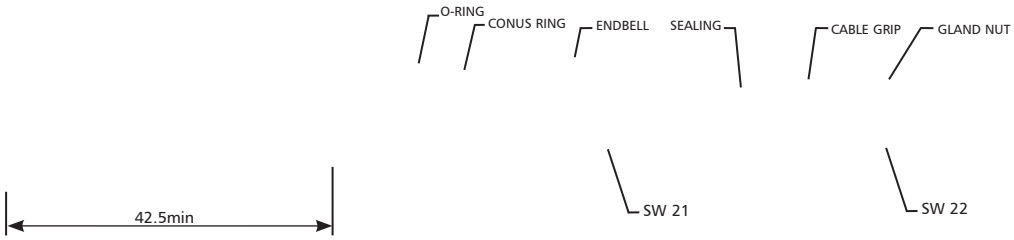
- Standard and reversed version available.
- Uses APK Power contacts, see page 61.
- For sealing the receptacle use panel gasket, see page 47.

| Shell Size | Type | Contact Layout | Part Number | Nomenclature |
|---|---|---|---|---|
| 14 | Standard Plug with Endbell* | 04-00 | 192993-0702 | THV6U14-0400P1L-02 |
| 14 | Standard Receptacle* | 04-00 | 192993-0704 | THV0U14-0400S1L-02 |
| 14 | Reversed Plug with Endbell** | 04-00 | 192993-0706 | THV6U14-0400S1L-02 |
| 14 | Reversed Receptacle** | 04-00 | 192993-0708 | THV0U14-0400P1L-02 |

* Parts are VDE-qualified.
** Parts are not VDE-qualified.

## High Voltage 4-way Jam Nut Receptacle for Power Contacts

Information available upon request.




## Shielded Endbell

**Part Number (Pack of 100)**
192993-0087

General recommendations for the selection of Trident contacts are listed below.

**Platings:** Tin is recommended for most applications (with 50 or fewer mating cycles). It is cost effective and matches well to most wires. Gold is preferred for special situations. Gold resists oxidation, has high surface conductivity, and has a low coefficient of friction. These features make gold the preferred plating for low level signals (a rule of thumb is <100 mA), corrosive environments (for unsealed connectors), and for increased mating cycles. The electrical performance of the contact is determined at the surface of the contact. For this reason, flash gold platings are suitable for applications with 50 or fewer mating cycles. Thicker gold platings are recommended for more than 50 mating cycles. All Trident Contacts are RoHS Compliant.

Stamped versus Machined: The two part stamped contacts are manufactured to precise tolerances and are field proven.

They can be supplied on reels which lowers assembly costs for volume production. Machined contacts offer improved precision and durability. They are recommended for applications with more than 200 mating cycles.

Crimp versus Solder: Crimp contacts offer improved electrical performance, strain relief and quality control compared to solder cup contacts. Solder cup contacts are recommended for low volume and prototype applications where the added cost of crimp tools is not justified.

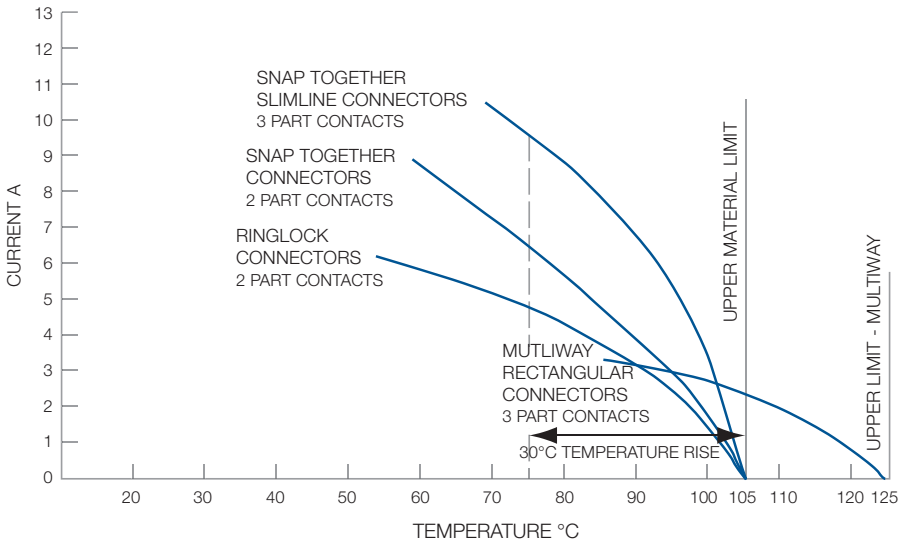
High Conductivity: These contacts use a different base material then the standard contacts. They are recommended for high current applications. These contacts will also reduce the derating of connectors with several high current lines.

## Temperature/Current Rating

Derating curves define the max. current that can be applied to a connector at a given ambient temperature so that the additional temperature rise caused by the current does not exceed the material limit of the connector.

The following curves show the max. currents based on the assumption attached: As factors like current load per contact, wire size etc. may be different in your application. This chart is an indication only.

- Derived in accordance with IEC 512-3, Test 5b.
- Figures are for maximum wire sizes. Smaller wires will reduce rating.
- All contacts equally loaded.
- PCB mounted connectors will be limited by PCB performance.
- Bunched cables will further reduce values.
- Cable insulation type will affect temperature and loading.
- Figures are for maximum connector sizes in each range. Smaller connectors will increase rating.




Dimensions shown in mm
Specifications and dimensions subject to change

| | **T2P**<br>• Two piece formed (stamped) contact<br>• For up to 200 mating cycles<br>• Full support tooling available | | **T3P**<br>• Three piece machined contact<br>• For up to 500 mating cycles<br>• Full support tooling available | | |
|---|---|---|---|---|---|
| | **Standard Crimp** | **High Conductivity Crimp** | **Machined Crimp** | **Solder Cup** | **Flow Solder (PCB)** |
| | | | | | |
| **Technical and Performance Data** | | | | | |
| Supported wire sizes | AWG 14 to 26 | AWG 14 to 26 | AWG 16 to 26 | AWG 14 to 26 | - |
| Current rating | 13 A | 16 A | 13 A | 13 A | Up to 30 A |
| Contact Resistance (initial) | 5 mΩ | 5 mΩ | 5 mΩ | 5 mΩ | 5 mΩ |
| Mechanical endurance | Up to 200 insertions | Up to 200 insertions | Up to 500 insertions | Up to 500 insertions | Up to 500 insertions |
| Body material | Brass | Copper Alloy | Brass | Brass | Brass |
| Retention spring material | Stainless Steel | Stainless Steel | Beryllium Copper | Beryllium Copper | Beryllium Copper |
| Contact retention force (minimum) | 67 N | 67 N | 67 N | 67 N | 67 N |
| **Plating Availability** | | | | | |
| Tin | Yes | Yes | Yes | Yes | Yes |
| Gold Flash (0,1 µm) | Yes | Yes | Yes | Yes | Yes |
| Gold | 0,75 µm | 0,75 µm | 0,4 µm (pin)<br>0,75 µm (socket) | 0,4 µm (pin)<br>0,75 µm (socket) | 0,4 µm (pin)<br>0,75 µm (socket) |
| **Connector/Contact Capability** | | | | | |
| Snap Together Rectangular, Slimline (TST) and Flame Retardant (TFR) | Yes | Yes | Yes | Yes | Yes, pre-installed in connectors |
| Ringlock (TR) | Yes | Yes | Yes | Yes | Yes |
| Neptune (TN) | Yes | Yes | Yes | Yes | Yes |
| Neptune Metal (TNM) | Yes | Yes | Yes | Yes | - |
| High Voltage (THV) | — | — | — | — | — |
| **Page Number** | | | | | |
| | 63 | 63 | 65 | 66 | 66 |

| | **High Power**<br>• For mixed Neptune and TNM layouts<br>• Full support tooling available | |
|---|---|---|
| | **APK25** | **D Sub** |
| | | |
| **Technical and Performance Data** | | |
| Supported wire sizes | AWG 12 to 20 | AWG 8 to 14 |
| Current rating | 30 A | Up to 40 A |
| Contact Resistance (initial) | 2,5 mΩ | * |
| Mechanical endurance | Up to 200 insertions | Up to 500 insertions |
| Body material | Copper Alloy | Copper Alloy |
| Retention spring material | Stainless Steel | * |
| Contact retention force (minimum) | 100 N | * |
| **Plating Availability** | | |
| Tin | Yes | - |
| Gold Flash (0,1 µm) | - | - |
| Gold | - | 0,76 µm |
| **Connector/Contact Capability** | | |
| Snap Together Rectangular, Slimline (TST) and Flame Retardant (TFR) | - | - |
| Ringlock (TR) | - | - |
| Neptune (TN) | Yes | - |
| Neptune Metal (TNM) | - | Yes |
| High Voltage (THV) | Yes | — |
| **Page Number** | | |
| | 67 | 67 |

* For details please consult the factory

Dimensions shown in mm
Specifications and dimensions subject to change

## Overview - T2P Contacts

Typical Nomenclature: T2P 16 M C 1 L T

**Series**

T2P = Two Part Stamped Contact

**Contact Size**

14 = 14-16 AWG
16 = 16-20 AWG
20 = 20-22 AWG
24 = 24-26 AWG

**Gender**

M = Male (Pin)
F = Female (Socket)

**Plating**

T = Tin
Y = Gold
Z = Gold Flash

**Packaging**

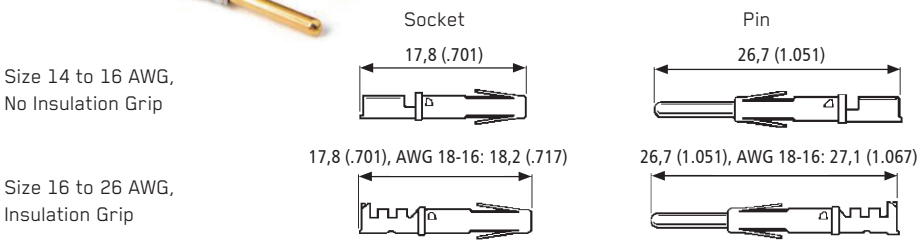
L = Loose (bag of 100)
S = Reel of 3000

| Contact Type | | |
|---|---|---|
| **Crimp Contact** | | |
| C | 1 | Standard, Brass |
| C | 4 | High Conductivity |

Note: This overview shows available options for formed (stamped) T2P contacts. The T2P nomenclature above appears as our description on ITT paperwork, etc, and this is for reference only. To order use the order codes on the following page.

## Formed (Stamped) Crimp Contacts – Standard Brass Material

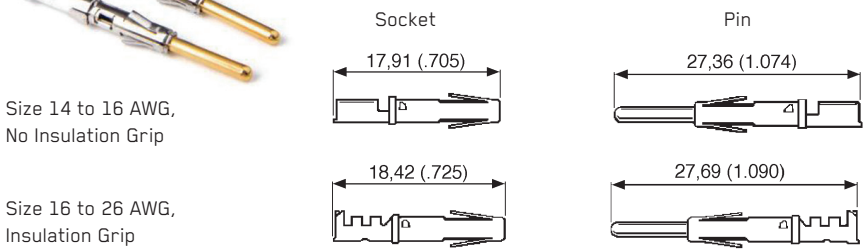
- 13 A current rating.
- Three plating styles available.
- Separate retention spring.
- Up to 200 mating cycles.
- Wide range of wire sizes.
- Full support tooling available, see pages 69-70.
- Two part design.




| Wire Range mm² | Wire Size | Contact | Part Number Pack (100) Tin Plating | Gold Flash | 0,8 µm (32 µ in.) Gold Plating | Part Number Reeled (3000) Tin Plating | Gold Flash | 0,8 µm (32 µ in.) Gold Plating | Insulation Diameter | Strip Length |
|---|---|---|---|---|---|---|---|---|---|---|
| 0,14 - 0,25 | 26-24 AWG | Pin | 192990-0020 | 192990-0080 | 192900-0448 | 192990-2510 | 192990-2650 | 192900-0406 | 0,89 (.035) - 1,58 (.062) | 3,95 (.155)±0,25(.009) |
| 0,14 - 0,25 | 26-24 AWG | Socket | 192990-0030 | 192990-0090 | 192900-0452 | 192990-2550 | 192990-2690 | 192900-0410 | 0,89 (.035) - 1,58 (.062) | 3,95 (.155)±0,25(.009) |
| 0,32 - 0,50 | 22-20 AWG | Pin | 192990-0040 | 192922-1460 | 192900-0447 | 192990-2500 | 192990-2640 | 192900-0405 | 1,17 (.046) - 2,08 (.081) | 3,95 (.155)±0,25(.009) |
| 0,32 - 0,50 | 22-20 AWG | Socket | 192990-0050 | 192922-1470 | 192900-0451 | 192990-2540 | 192990-2680 | 192900-0409 | 1,17 (.046) - 2,08 (.081) | 3,95 (.155)±0,25(.009) |
| 0,75 - 1,50 | 18-16 AWG | Pin | 192990-0060 | 192990-0100 | 192900-0446 | 192990-2490 | 192990-2630 | 192900-0404 | 2,00 (.078) - 2,70 (.106) | 3,95 (.155)±0,25(.009) |
| 0,75 - 1,50 | 18-16 AWG | Socket | 192990-0070 | 192990-0110 | 192900-0450 | 192990-2530 | 192990-2670 | 192900-0408 | 2,00 (.078) - 2,70 (.106) | 3,95 (.155)±0,25(.009) |
| 1,50 - 2,50 | 16-14 AWG | Pin | 192990-1240 | 192990-1220 | 192900-0445 | 192990-2480 | 192990-2620 | 192900-0403 | Without insulation support | 5,60 (.220)±0,25(.009) |
| 1,50 - 2,50 | 16-14 AWG | Socket | 192990-1250 | 192990-1230 | 192900-0449 | 192990-2520 | 192990-2660 | 192900-0407 | Without insulation support | 5,60 (.220)±0,25(.009) |

## Formed (Stamped) Crimp Contacts – High Conductivity Material

- 16 A current rating.
- Recommended for elevated temperatures.
- High conductivity copper alloy with tin plating.
- For use with standard crimp tooling, see pages 69-70.
- Two part design.
- Up to 200 mating cylces.




| Wire Range mm² | Wire Size | Contact | Part Number Pack (100) Tin Plating | Reeled (3000) Tin Plating | Insulation Diameter | Strip Length |
|---|---|---|---|---|---|---|
| 0,14 - 0,25 | 26-24 AWG | Pin | 192900-0122 | 192900-0120 | 0,89 (.035) - 1,58 (.062) | 3,95 (.155)±0,25 (.009) |
| 0,14 - 0,25 | 26-24 AWG | Socket | 192900-0123 | 192900-0121 | 0,89 (.035) - 1,58 (.062) | 3,95 (.155)±0,25 (.009) |
| 0,32 - 0,50 | 22-20 AWG | Pin | 192900-0126 | 192900-0124 | 1,17 (.046) - 2,08 (.081) | 3,95 (.155)±0,25 (.009) |
| 0,32 - 0,50 | 22-20 AWG | Socket | 192900-0127 | 192900-0125 | 1,17 (.046) - 2,08 (.081) | 3,95 (.155)±0,25 (.009) |
| 0,75 - 1,50 | 18-16 AWG | Pin | 192900-0002 | 192900-0000 | 2,00 (.078) - 2,70 (.106) | 3,95 (.155)±0,25 (.009) |
| 0,75 - 1,50 | 18-16 AWG | Socket | 192900-0003 | 192900-0001 | 2,00 (.078) - 2,70 (.106) | 3,95 (.155)±0,25 (.009) |
| 1,50 - 2,50 | 16-14 AWG | Pin | 192900-0005 | 192900-0004 | Without insulation support | 5,60 (.220)±0,25 (.009) |
| 1,50 - 2,50 | 16-14 AWG | Socket | 192900-0007 | 192900-0006 | Without insulation support | 5,60 (.220)±0,25 (.009) |

Dimensions shown in mm
Specifications and dimensions subject to change

## Overview - T3P Contacts

Typical Nomenclature: T3P 16 M C 1 L T

**Series**

T3P = Three Part machined Contact

**Gender**

M = Male (Pin)
F = Female (Socket)

**Plating**

T = Tin
X = 3µm (120µ in.) Gold
Y = Gold
Z = Gold Flash (only for Pin Contacts)

**Packaging**

L = Loose (bag of 100)

| Type and Configuration Variant | | | | |
|---|---|---|---|---|
| AWG Size | Gender | **Crimp Contacts** | | |
| 16 | | C | 1 | No insulation support, Black colorband |
| 20 | | C | 1 | Insulation dia Ø1,6 (.062)-2,1 (.082), Green colorband |
| 22 | | C | 1 | Insulation dia Ø1,6 (.062)-2,15 (.084), Red colorband |
| 24 | | C | 1 | Insulation dia Ø1,05 (.041)-1,6 (.062), Blue colorband |
| 26 | | C | 1 | Insulation dia Ø0,9 (.035)-1,4 (.055), Black colorband |
| | | **Earth Contact** | | |
| 16 | | E | 1 | Black colorband |
| 20 | | E | 1 | Green colorband |
| | | **Solder Cup Contact** | | |
| 16 | | S | 1 | |
| | | **Flow Solder Contact** | | |
| 20 | | F | 1 | Ø0,72 (.028) short (female only) |
| 20 | | F | 3 | Ø0,72 (.028) long (female only) |
| 20 | | F | 5 | Ø0,73 (.029) |
| 25 | | F | 5 | Ø1,52 (.060) *(TN)* |

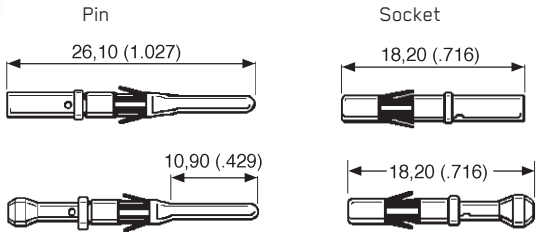
Note: This overview shows available options for formed (stamped) T3P contacts. The T3P nomenclature above appears as our description on ITT paperwork, etc, and this is for reference only. To order use the order codes on the following page.

## Machined Crimp Contacts

- 13 A current rating.
- Separate contact and retention spring.
- Up to 500 mating cycles.
- Variety of plating options.
- Full support tooling available, see pages 69-70.

Size 16 AWG,
No Insulation Grip

Size 20 to 26 AWG,
Insulation Grip




| Wire Range mm² | Wire Size | Contact | Part Number (Pack of 100) Gold Plating(X) | Gold Plating(Y) | Tin Plating | Insulation Diameter | Strip Length | Color Band |
|---|---|---|---|---|---|---|---|---|
| 0,08 - 0,23 | 26 AWG | Pin | 192991-0101 | 192991-0100 | 192991-0102 | 0,90 (.035) - 1,40 (.055) | 5,08 (.200)±0,25 (.009) | Black |
| 0,08 - 0,23 | 26 AWG | Socket | 192991-0054 | 192991-0042 | 192991-0048 | 0,90 (.035) - 1,40 (.055) | 5,08 (.200)±0,25 (.009) | Black |
| 0,20 - 0,24 | 24 AWG | Pin | 192991-0093 | 192991-0092 | 192991-0094 | 1,05 (.041) - 1,60 (.062) | 5,08 (.200)±0,25 (.009) | Blue |
| 0,20 - 0,24 | 24 AWG | Socket | 192991-0055 | 192991-0043 | 192991-0049 | 1,05 (.041) - 1,60 (.062) | 5,08 (.200)±0,25 (.009) | Blue |
| 0,25 - 0,50 | 22 AWG | Pin | 192991-0097 | 192991-0096 | 192991-0098 | 1,60 (.062) - 2,15 (.084) | 5,08 (.200)±0,25 (.009) | Red |
| 0,25 - 0,50 | 22 AWG | Socket | 192991-0056 | 192991-0044 | 192991-0050 | 1,60 (.062) - 2,15 (.084) | 5,08 (.200)±0,25 (.009) | Red |
| 0,44 - 0,64 | 20 AWG | Pin | 192991-0089 | 192991-0088 | 192991-0090 | 1,60 (.062) - 2,10 (.082) | 5,08 (.200)±0,25 (.009) | Green |
| 0,44 - 0,64 | 20 AWG | Socket | 192991-0058 | 192991-0046 | 192991-0052 | 1,60 (.062) - 2,10 (.082) | 5,08 (.200)±0,25 (.009) | Green |
| 0,60 - 1,51 | 16 AWG | Pin | 192991-0085 | 192991-0084 | 192991-0086 | Without insulation support | 7,11 (.279)±0,25 (.009) | Black |
| 0,60 - 1,51 | 16 AWG | Socket | 192991-0059 | 192991-0047 | 192991-0053 | Without insulation support | 7,11 (.279)±0,25 (.009) | Black |
| 1,50 - 2,50 | 14 AWG | Pin | 121587-0028 | on request | on request | Without insulation support | 7,11 (.279)±0,25 (.009) | White |
| 1,50 - 2,50 | 14 AWG | Socket | 121587-0039 | on request | on request | Without insulation support | 7,11 (.279)±0,25 (.009) | White |

(Y) Gold plating Pin: 0,4 μ m (16 μ in.). Gold plating Socket: 0,75 μ m (30 μ in.).

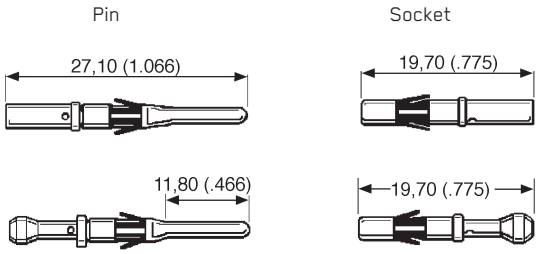
(X) Gold plating Pin & Socket: 3 μ m (120 μ in.).

## Machined Earth (First Mate/Last Break) Contacts

- 13 A current rating.
- Separate contact and retention spring.
- Up to 500 mating cycles.
- Variety of plating options.
- Full support tooling available, see pages 69-70.

Size 16 AWG,
No Insulation Grip

Size 20 AWG,
Insulation Grip




| Wire Range mm² | Wire Size | Contact | Part Number (Pack of 100) Gold Plating(Y) | Description | Insulation Diameter | Strip Length | Color Band |
|---|---|---|---|---|---|---|---|
| 0,44 - 0,64 | 20 AWG | Pin | 192991-0164 | T3P20ME1LY | 1,60 (.062) - 2,10 (.082) | 5,08 (.200)±0,25 (.009) | Green |
| 0,44 - 0,64 | 20 AWG | Socket | 192991-0207 | T3P20FE1LY | 1,60 (.062) - 2,10 (.082) | 5,08 (.200)±0,25 (.009) | Green |
| 0,60 - 1,51 | 16 AWG | Pin | 192991-0160 | T3P16ME1LY | Without insulation support | 7,11 (.279)±0,25 (.009) | Black |
| 0,60 - 1,51 | 16 AWG | Socket | 192991-0208 | T3P16FE1LY | Without insulation support | 7,11 (.279)±0,25 (.009) | Black |

(Y) Gold plating Pin: 0,4 μ m (16 μ in.). Gold plating Socket: 0,75 μ m (30 μ in.).
For Gold Flash Plating, please consult the factory.

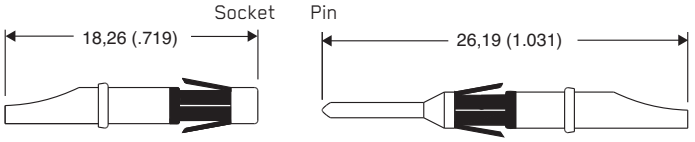
Dimensions shown in mm
Specifications and dimensions subject to change

## Solder Cup Contacts

- 13 A current rating.
- Ideal for prototypes and small volume applications.
- Fits into all Trident connectors.
- Simple solder, then insert.

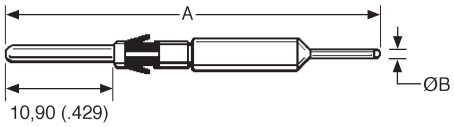
| Description | Part Number Tin Plating | Gold Plating (Y) |
|---|---|---|
| Socket | **192900-0634** | **192900-0635** |
| Pin | **192900-0632** | **192900-0633** |

(Y) Gold plating 0,4 $\mu$ m (16 $\mu$ in.)




## Flow Solder (PCB) Contacts

- 13 A current rating.
- Available in different lengths depending on connector.
- 30 A power version available.




| Connector Series | Type | Part Number (Pack of 100) Tin Plating | Gold Flash Plating | A ±1,00 (.039) | ØB ±0,06 (.002) |
|---|---|---|---|---|---|
| Ringlock Standard Receptacle | Socket | *** | 192991-0524 | 33,6 (1.323) | 0,72 (.028) |
| Ringlock Standard Receptacle | Socket | *** | 192991-0066 | 26,5 (1.043) | 0,72 (.028) |
| Neptune | Pin | 192900-0465 | 192900-0356 | 40,6 (1.598) | 0,73 (.029) |
| Neptune Power** | Pin | 192991-0617 | 192991-0618 | 40,6 (1.598) | 1,52 (.060) |

** Note: Appearance differs slightly from the picture.
*** For details please consult the factory

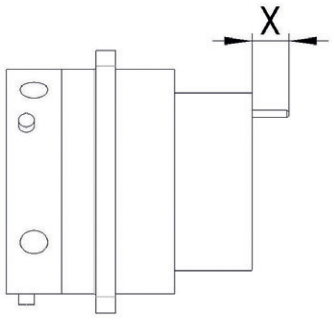
## Nominal lengths (x) of Flow Solder Contacts out of the connector*

Ringlock Standard Receptacle

| Shell Size | 192991-0066 | 192991-0524 |
|---|---|---|
| 10 | 4,5 (.177) | 11,6 (.456) |
| 12 | 2,7 (.106) | 9,8 (.386) |
| 14 | 4,5 (.177) | 11,6 (.456) |
| 16 | 2,7 (.106) | 9,8 (.386) |
| 18 | 2,7 (.106) | 9,8 (.386) |
| 20 | 3,0 (.118) | 10,1 (.398) |
| 22 | 2,0 (.079) | 9,1 (.358) |
| 24 | 1,2 (.047) | 8,3 (.327) |

Ringlock Reversed Receptacle

| Shell Size | 192991-0119<br>192991-0122 |
|---|---|
| 10 | 4,7 (.177) |
| 12 | 4,7 (.177) |
| 14 | 4,7 (.177) |
| 16 | 4,7 (.177) |
| 18 | 4,7 (.177) |
| 20 | 4,6 (.181) |
| 22 | 4,6 (.181) |
| 24 | 4,6 (.181) |

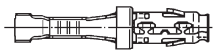



* For other connector series please consult the factory

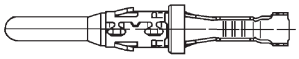
## APK
## Power Contacts

- 30 A current rating.

Socket



Pin

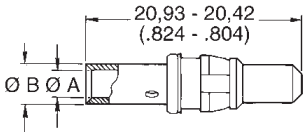


| Wire Range mm² | Wire Size | Contact | Description* | Part Number Loose (100) Tin Plated | Reeled (3000) Tin Plated | Insulation Diameter | Strip Length |
|---|---|---|---|---|---|---|---|
| 0,50 - 1,00 | 20-18 AWG | Pin | APK-PB25A10 | 031-8717-020 | 121668-0000 | 1,40 (.055) - 2,00 (.078) | 5,00 (.196)±0,25 (.009) |
| 0,50 - 1,00 | 20-18 AWG | Socket | APK-SB25A10 | 031-8717-120 | 121668-0100 | 1,40 (.055) - 2,00 (.078) | 5,00 (.196)±0,25 (.009) |
| 1,50 - 2,50 | 16-14 AWG | Pin | APK-PB25A25 | 031-8717-021 | 121668-0001 | 2,00 (.078) - 2,90 (.114) | 5,00 (.196)±0,25 (.009) |
| 1,50 - 2,50 | 16-14 AWG | Socket | APK-SB25A25 | 031-8717-121 | 121668-0101 | 2,00 (.078) - 2,90 (.114) | 5,00 (.196)±0,25 (.009) |
| 2,50 - 4,00 | 14-12 AWG | Pin | APK-PB25A40 | 031-8717-022 | 121668-0002 | 2,90 (.114) - 3,60 (.141) | 5,00 (.196)±0,25 (.009) |
| 2,50 - 4,00 | 14-12 AWG | Socket | APK-SB25A40 | 031-8717-122 | 121668-0102 | 2,90 (.114) - 3,60 (.141) | 5,00 (.196)±0,25 (.009) |

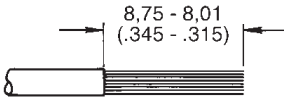
* Referring to reeled contacts

## D Subminiature Loose Contacts, Size 8- High Power-Crimp

Plug

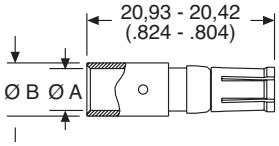



Recommended Wire Trim Length

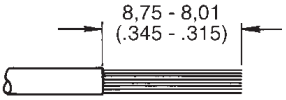



| Part Number (30 µin) 0,76µm Gold over Copper | A | B | Current Rating A | Wire Size AWG |
|---|---|---|---|---|
| DM130338 | 4,60 (.181) | 5,84 (.230) | 40 A | 8 AWG |
| DM130339 | 2,54 (.100) | 5,54 (.218) | 20 A | 12 AWG |

Receptacle




Recommended Wire Trim Length




| Part Number (30 µin) 0,76µm Gold over Copper | A | B | Current Rating A | Wire Size AWG |
|---|---|---|---|---|
| DM130341 | 4,60 (.181) | 5,84 (.230) | 40 A | 8 AWG |
| DM130342 | 2,54 (.100) | 5,54 (.218) | 20 A | 12 AWG |

Dimensions shown in mm
Specifications and dimensions subject to change

## Accessories

| Description | Part Number | Pack Size |
|---|---|---|
| Discriminating (Keying) Pin, Signal Contacts | **192990-0000** | Bulk Pack (25) |
| Discriminating (Keying) Pin, Power Contacts | **192900-0189** | Bulk Pack (25) |
| Discriminating (Keying) Cap, Pin Contacts | **192990-0010** | Bulk Pack (100) |
| Discriminating (Keying) Peg, Socket Contacts | **192990-7650** | Bulk Pack (100) |

## Discriminating (Keying) Pins and Caps

Discriminating (Keying) Pins are used to prevent cross-mating of similar connectors. These pins are used in place of a pin contact. The corresponding socket cavity must be left open. If a socket contact is present, the discriminating pin will prevent mating. There are two types of discriminating pins. Board Mount PCB connectors have caps and pegs. All other connectors have signal or power pins.

## Hand Tools
## for Formed (Stamped) contacts

Ratcheted Hand Tool

A range of single action, factory calibrated tools are available to support the stamped contacts and 30 A power contacts.

| Signal Contact | Power Contact | Part Number |
|---|---|---|
| 14-16 AWG | N/A | **121586-5238** |
| 16-18 AWG | N/A | **121586-5237** |
| 20-22, 24-26 AWG | N/A | **121586-5236** |
| N/A | 12-14, 14-16, 18-20 AWG | **121586-5241** |

## Hand Tool
## for Machined Contacts

This is a ratcheted, four indent crimptool that is fully adjustable. They crimp all sizes of machined contacts.

| Description | Hand Tool Part Number | Locator |
|---|---|---|
| Machined Crimp* | **995-0001-585** | **192990-7600 (Calibrated)[1]** |

[1]Nomenclature: TH-Trident

* M22520-1-01

## Extraction Tools

Contacts can readily be removed from the housings using an extraction tool. The tool is placed over the contact and the sleeve rotated slightly as it is pushed home to release the spring. Light pressure on the knob then ejects the contact from the rear of the housing.

| | Part Number |
|---|---|
| For Signal Contact | **192922-1450** |
| For Power Contact | **192900-0176** |

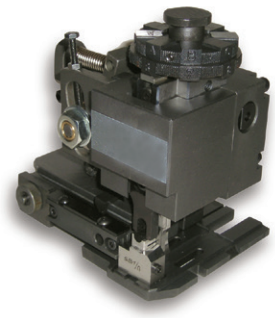
| | Part Number |
|---|---|
| For Power Contact | **121086-3278** |

Dimensions shown in mm
Specifications and dimensions subject to change

## Wiring Assist Tool

These wiring needles are available as a wiring aid for high density layouts to ease insertion of individual contacts.

| Description | Part Number |
|---|---|
| For Pin Contact | 192900-0605 |
| For Socket Contact | 192900-0606 |

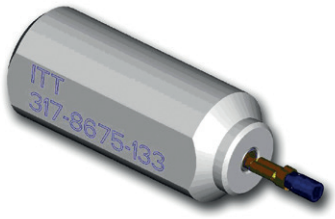


## Mini Applicators (for Stamped Contacts)

Mini Applicators are interchangeable modules that will fit into many standard crimping machines. They are available for all sizes of stamped signal and power contacts.

| AWG Size | Contact Description | Mecal Part Number |
|---|---|---|
| 14-16 | Trident Signal | 121586-5240 |
| 16-18 | Trident Signal | 121586-5217 |
| 20-26 | Trident Signal | 121586-5239 |
| 12-14 | Trident 30 A Power | * |
| 14-16 | Trident 30 A Power | * |
| 18-20 | Trident 30 A Power | * |

* For details please consult the factory




## Testing Gauge (for Stamped Contacts)

The testing gauge will be helpful to check whether a crimp is ok or not.
The contact should be inserted into the test fixture without scratching the test hole (diameter 3.3 mm).

| Description | Part Number |
|---|---|
| Testing Gauge | 317-8675-133 |

## Pneumatic Table Crimp Tool (for Machined Contacts)

This Hand Crimp Tool fully meets the requirements of specification MIL-C-22520. The tool produces eight-indent crimp terminations of excellent quality. Together with the bench mount BM-2 and the food pedal WA-10 it becomes an installed tool facilitating the work: The Hands of the operator are free to insert the contact and the wire and to remove the terminated contact.

| Nomenclature | Description | Part Number | AWG |
|---|---|---|---|
| WA27F-CE | Pneumatic Crimp Tool | 121586-5067 | 12-20 |
| WA22F-CE | Pneumatic Crimp Tool | 121586-5070 | 20-32 |
| BM-2 | Bench Mount | 121586-5068 | |
| WA10 | Foot Pedal | 121586-5069 | |

## Crimping Instructions – Formed (Stamped) Crimp Contacts

Assembly Instructions:

1. Strip wires to length. For wire strip lengths, see page 63.

2. Open the hand tool and place the contact in the chosen die, ensuring that the locating plate is positioned between the collar and crimp saddle. Then squeeze tool gently to hold the contact in place.

3. Insert the wire.

4. Cycle the tool.

5. Remove the wire and inspect the crimp. The strands should be visible at both ends of the crimp. There should be no loose strands (see Figures 1-3). The contact should be co-linear with the wire (see Figure 4). Bent contacts are unacceptable (see Figure 5).

Figure 1 - Correct

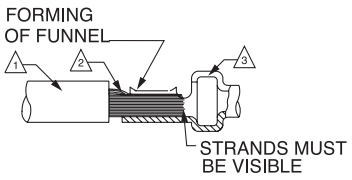



Figure 2 - Unacceptable

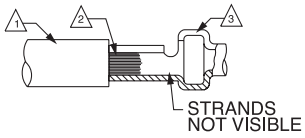



Figure 3 - Unacceptable

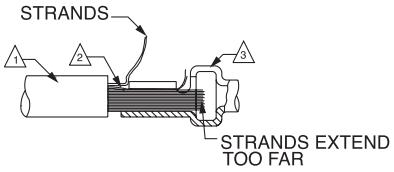
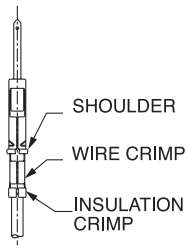



Figure 4 - Correct

Side View




Front View

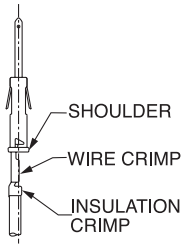
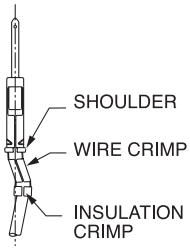
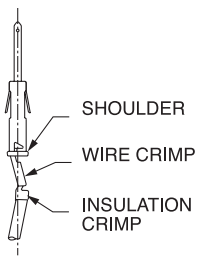



Figure 5 - Unacceptable

Side View




Front View




## Crimping Instructions – Machined Crimp Contacts

Assembly Instructions:

1. Strip wires to length. For wire strip lengths, see page 65.

2. Attach the correct locator (turret) to the hand tool.

| Contact Type | Locator Color |
|---|---|
| Pin | Blue |
| Socket | Green |
| Earthing | Black |

3. Adjust the dial for the wire gauge.

4. Place the contact into the locator and insert the wire into the contact as indicated on the locator (turret) label.

Figure 6 - Correct

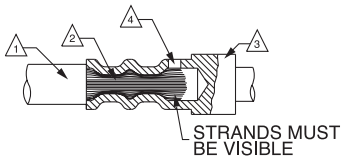
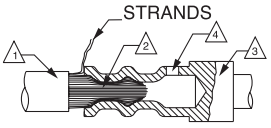



Figure 7 - Unacceptable




Notes:

1. Wire Insulation.
2. Wire Strands.
3. Contact.
4. Inspection Window. Strands must be visible.

5. Cycle the tool.

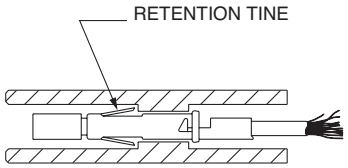
6. Remove and inspect the contact. Strands should be visible through the inspection window (see Figure 6). There should be no loose strands (see Figure 7).

Dimensions shown in mm
Specifications and dimensions subject to change

## Contact Insertion

No insertion tool is required. Trident contacts are inserted from the rear of the connector and held in place by retention tines (cantilever springs). These tines compress during insertion. They expand once contact is in place and prevent the contact from backing out.

Proper Insertion of Trident Contact




## Contact Retention Forces

- Minimum retention force of the contact to the insulator.

| Contact | Newton(s) |
|---|---|
| Signal Contacts (Formed Crimp, Machined Crimp, Solder Cup, Flow Solder) | 67 |
| 30 A Power Contacts | 100 |

Note: Newton is a metric unit of force. One pound = 4.45 Newtons

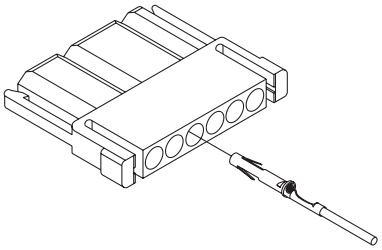
## Trident Assembly Instructions

(For Neptune and TNM Assembly, see page 73)

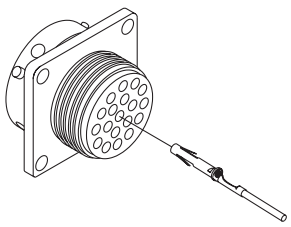
Assembly instructions:

1. Grasp the crimped or soldered contact just behind where the wire enters the contact.
2. Push the contact into the connector cavity until it locks into place.
3. Pull on the wire slightly to verify that the contact is secure.
4. Inspect the mating face of the connector. The contacts should extend the same distance into the connector.

Contact Insertion - Slimline



Contact Insertion - Ringlock



## Neptune and TNM Assembly Instructions

### Contact Insertion For Neptune and TNM Connectors

(For Trident Assembly, see page 72)

Neptune and TNM connectors feature membrane seals. These seals have a thin membrane that seals unused contact cavities. No sealing plugs are required for unused cavities. Neptune connectors do not require insertion tools. Cannon offers stitching tools as an optional assembly aid for high volume usage. Many customers find that stitching tools reduce the assembly time.

### Assembly Instructions:

1. On Neptune and TNM connectors do not remove the Securing Nut holding the Wire Seal in place, unless an accessory such as Metal Endbell, Conduit Adapter, HC or SR Clamp assembly is to be used in its place. Then remove the Securing Nut (to be replaced by the accessory), make sure the tab on the Seal is positioned in the receiving slot in the connector, fit the accessory over the cables/wires and proceed as follows.

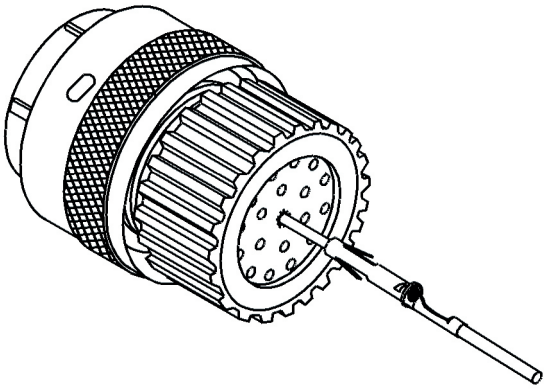
2. Grasp the crimped or soldered contact just behind where the wire enters the contact. If using a stitching tool, insert the contact into the rear of the tool.

3. Push the contact through the membrane seal into the insulator. Continue to push until the contact locks into place. If using a stitching tool, first insert the tool into the required contact position in the seal and examine the mating face to confirm that the correct contact cavity has been entered, if not, this can be corrected by partially removing the tool and engaging the correct position. Then fit the contact to the stitching tool and push the CONTACT through until it locks into place; remove the stitching tool.

4. Pull on the wire slightly to verify that the contact is secure.

5. Inspect the mating face of the connector. The contacts should extend the same distance into the connector.

6. Secure the nut, or other accessory, to hold the membrane seal in place.



IMPORTANT NOTE: The stitching tool is not designed to pull the contact through; it is intended to ease the insertion process with high density connectors.
On the high density connectors, such as 0-48, it is beneficial to start loading contacts on a center row first and filling adjacent rows fully each side, so progressively filling the connector from the center in a controlled manner.

Dimensions shown in mm
Specifications and dimensions subject to change

## Contact Extraction

Contacts may be removed with an extraction tool. The tool has an outer tube and an internal spring loaded plunger. The outer tube depresses the retention tines on the contact. The plunger then pushes the contact back out of the connector.

Extraction Instructions:

1. Grasp the extraction tool on the knurled portion of the outer tube. Do not push on the plunger knob yet.

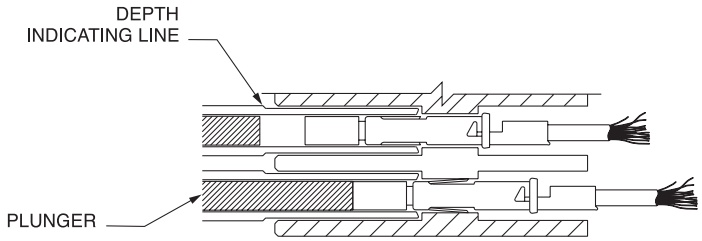
2. Insert the tube into the contact cavity from the mating surface. Push the tube fully into the cavity.

IMPORTANT: Verify that the depth indicating line on the tool is even with the mating face of the connector before depressing the plunger.

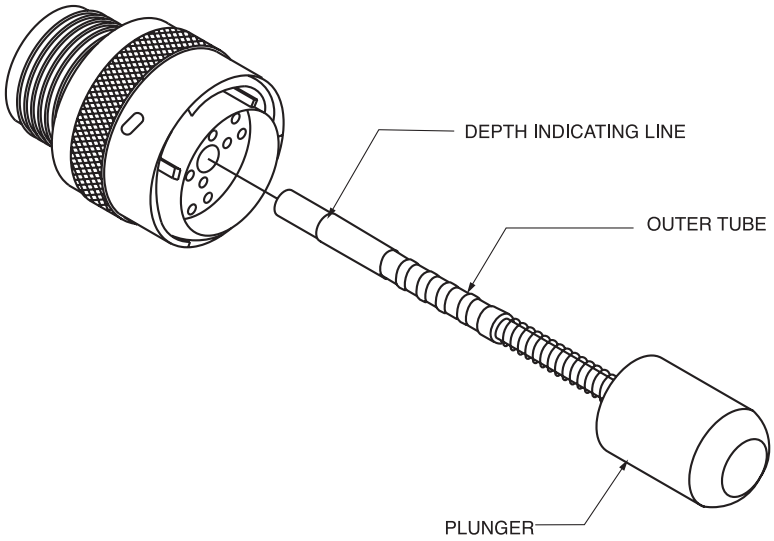
3. Depress the plunger. This should only require light pressure to eject the contact. The contact can now be removed from the back of the connector.

4. Inspect the contact. Verify the tines are not damaged.

Contact Extraction




Extraction Tool



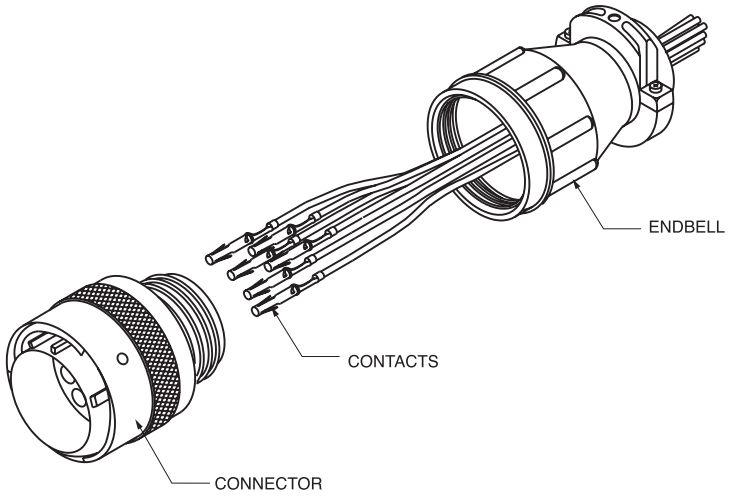
## Endbell – Unsealed

Assembly Instructions:

1. Separate the body of the clamp, the two screws, and the clamping bar.

2. Slide the body over the wires or cable and screw onto the threads on the back of the connector. The backshell should be hand-tight. For Neptune and TNM connectors, the cable clamp will fit over the membrane seal and will hold it in place.

3. There are three clamp bars supplied. Select the appropriate one for the wire bundle and attach to the clamp body with the screws.




## Endbell – Sealed

Assembly Instructions:

1. Separate the body of the clamp body, the two pressure rings, the sealing grommet, the clamp, and O-ring.

2. Slide the backshell components over the cable prior to crimping the contacts and assembling the connector. The farthest part from the connector is the clamp, followed by a pressure ring, then the grommet, then the other pressure ring, then the clamp body and then the O-ring.

Assembly Note: The grommet is a layered design. For large cables one or more of the interior sections can be removed. If the grommet resists sliding over the cable, lubricate with isopropyl alcohol.

3. Crimp and insert the contacts.

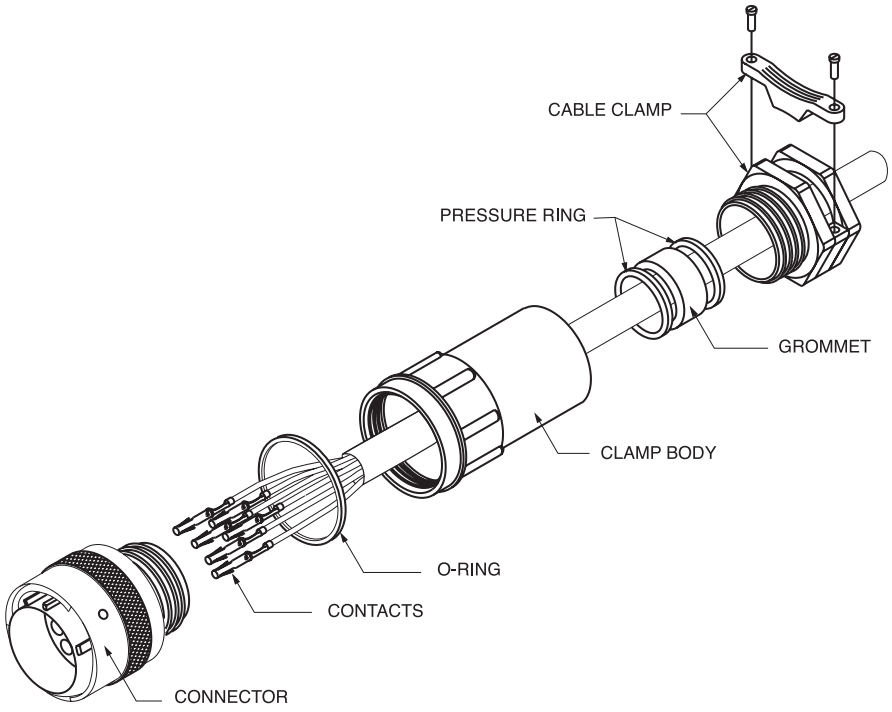
4. Slide the O-ring up and over the back of the connector.

5. Screw the clamp body onto the back of the connector. It should be hand-tight. For Neptune and TNM connectors, the cable clamp will fit over the membrane seal and will hold it in place.

6. Slide the pressure rings and grommet forward into the body.

7. Screw the cable clamp into the clamp body. The cable clamp will apply pressure to the grommet causing it to seal the backshell to the cable.

8. Screw down the clamp bar to secure the cable. Note that the bar is reversible, depending on the size of the cable.




Dimensions shown in mm
Specifications and dimensions subject to change

## Universal Endbell

The Universal Endbell is suitable to accept shielded and unshielded cable. This cable is sealed with a highly flexible seal and an additional sealing ring with a flexible plastic cable clamp serving as a strain relief. The Universal Endbell can be screwed onto plug and receptacle connectors. The O-ring and the cable sealing meet IP67.

Assembly Instructions:

1. Slide O-ring over the back of the connector body.

2. Slide the endbell components onto the cable in the following order:

- Clamp Nut
- Cable Grip1
- Cable Seal2
- Housing
- Grounding Ring
- Support Sleeve
- O-Ring

Note: 1. The compression fingers of the Cable Grip face toward the connector.

Note: 2. Isopropyl alcohol will lubricate the Cable Seal making it easier to slide over the cable.

3. Cut back the Outside Jacket to expose 25,40 (1.000) of Braid followed by 12,70 (.500) of Insulated Wires.

4. Terminate the wires and insert contacts per assembly instructions, see page 73.

5. Slide the Support Sleeve down until it reaches the back of the connector.

6. Pull the Braid over the Grounding Ring.

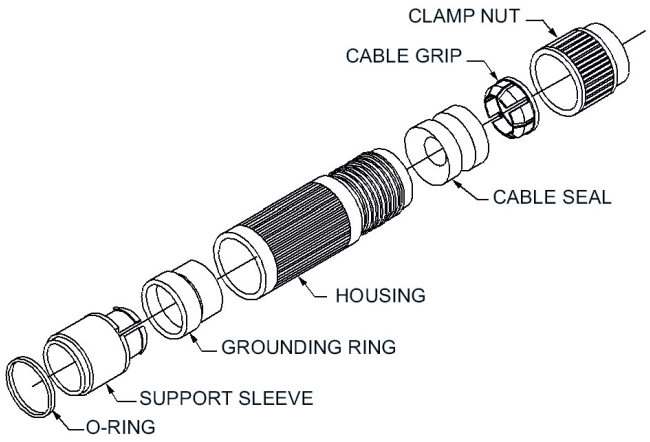
7. Slide the Grounding Ring down until it snaps onto the Support Sleeve. The Braid should be secured between the Support Sleeve and the Grounding Ring. Fold any excess shielding over the Grounding Ring.

8. Slide the Housing over the Grounding Ring and the Support Sleeve and screw it into the connector body. The recommended torque is 10 ± 1 Nm (88.50 in lbs).

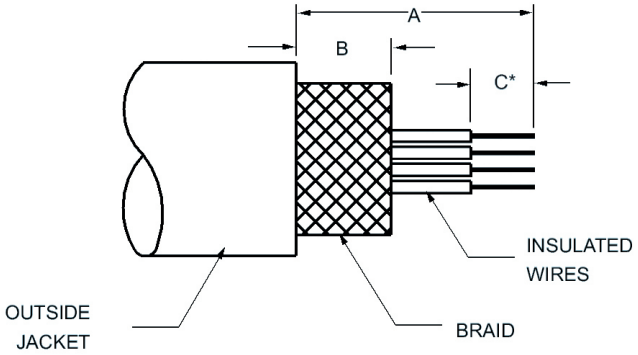
9. Slide the Cable Seal and Cable Grip onto the Housing.

10. Tighten the Clamp Nut into the Housing. The recommended torque is 10 ± 1 Nm (88.50 in lbs).

Universal Endbell Assembly




Wire Strip Length




| | Wire Strip Length | | |
|---|---|---|---|
| Shell Size | A | B | C |
| 10 | 38,00 (1.500) | 22,00 (.870) | * |
| 12 | 38,00 (1.500) | 22,00 (.870) | * |
| 14 | 40,00 (1.600) | 24,00 (.950) | * |
| 16 | 40,00 (1.600) | 24,00 (.950) | * |

* Strip length will vary based on the contact selected, see page 64-65.

## Shielded Endbell for Larger Cable Sizes

This Endbell is an alternative to the Universal Endbell for use with larger diameter cables. The outer body is sealed to the connector with an O-ring and the rear cable clamp also incorporates sealing rings for a complete sealed termination. The cable braid is terminated between metal cones. A rear cable clamp provides mechanical strain relief in addition to the clamping and holding of the rear cable seal.

Assembly Instructions:

1. Assemble all parts onto the cable as shown (Figure 1). Strip sheath of cable to dimensions shown in table below.

| Size | Dimension A min. | Shell |
|---|---|---|
| 10 | 22,30 (.877) | |
| 12 | 22,30 (.877) | |
| 14 | 26,20 (1.031) | |
| 16 | 28,10 (1.106) | |

2. Fold braid back over cable. Strip and terminate wires with selected contacts (Figure 2).

3. Assemble O-ring in groove of the shell after positioning coupling nut (Figure 3).

Figure 1

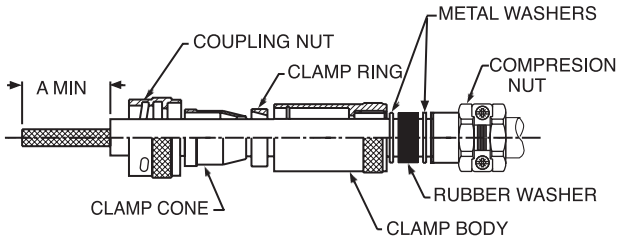
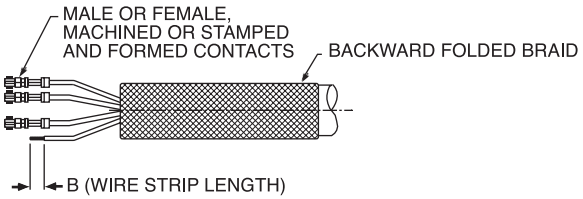


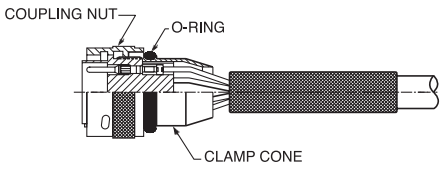

Figure 2




## Wire Stripping Lengths

| Contact Type | Wire Size | Wire Range mm2 | Dimension B |
|---|---|---|---|
| Formed | 24-16 AWG | 0,08 - 1,50 | 3,95 ± 0,25 (.155 ± .009) |
| contact | 14 AWG | 1,50 - 2,50 | 5,60 ± 0,25 (.220 ± .009) |
| | | | |
| Machined | 26-20 AWG | 0,08 - 0,64 | 5,08 ± 0,25 (.200 ± .009) |
| contact | 16 AWG | 0,60 - 1,51 | 7,11 ± 0,25 (.279 ± .009) |

Figure 3




## Cable Sizes

| Shell Size | Endbell Part Number | Cable Outer Sheath Diameter Maximum | Minimum |
|---|---|---|---|
| 10 | 192993-0091 | 10,00 (.393) | 5,00 (.196) |
| 12 | 192993-0092 | 12,00 (.472) | 6,00 (.236) |
| 14 | 192993-0093 | 14,00 (.551) | 7,00 (.279) |
| 16 | 192993-0094 | 16,00 (.629) | 8,00 (.314) |

Dimensions shown in mm
Specifications and dimensions subject to change

## Shielded Endbell for Larger Cable Sizes

(continued from page 77)

4. Fold braid forward as shown and trim to length (Figure 4).

5. Slide on clamp ring in position shown (Figure 5).

6. Screw clamp body onto the connector using a strap wrench (Figure 6). Tighten to the recommended torque values in table below.

| Shell Size | Clamp body Torque max. |
|---|---|
| 10 | 4 Nm |
| 12 | 6 Nm |
| 14 | 10 Nm |
| 16 | 10 Nm |

7. Push metal washers and rubber washer into rear of clamp body. Then screw compression nut to compress rubber washer. Avoid overtightening as this may twist the cable. Finally tighten screws to provide the mechanical strain relief (Figure 7).

8. Assembled connector (Figure 8).

**Figure 4**

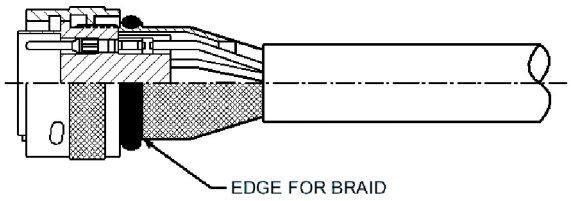



**Figure 5**

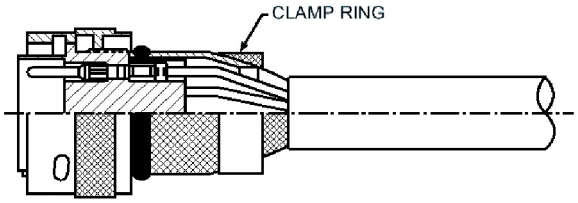



**Figure 6**

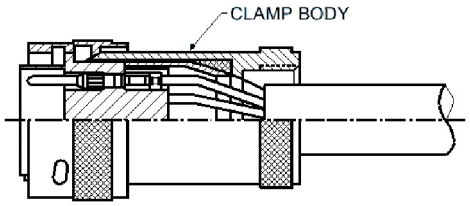



**Figure 7**

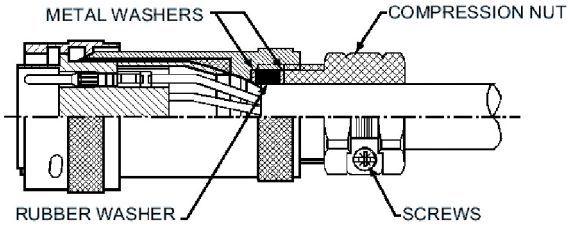
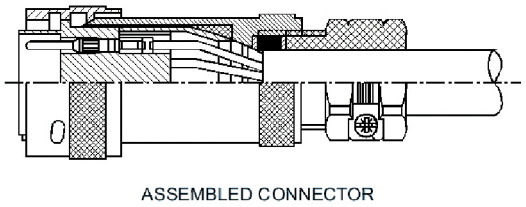



**Figure 8**

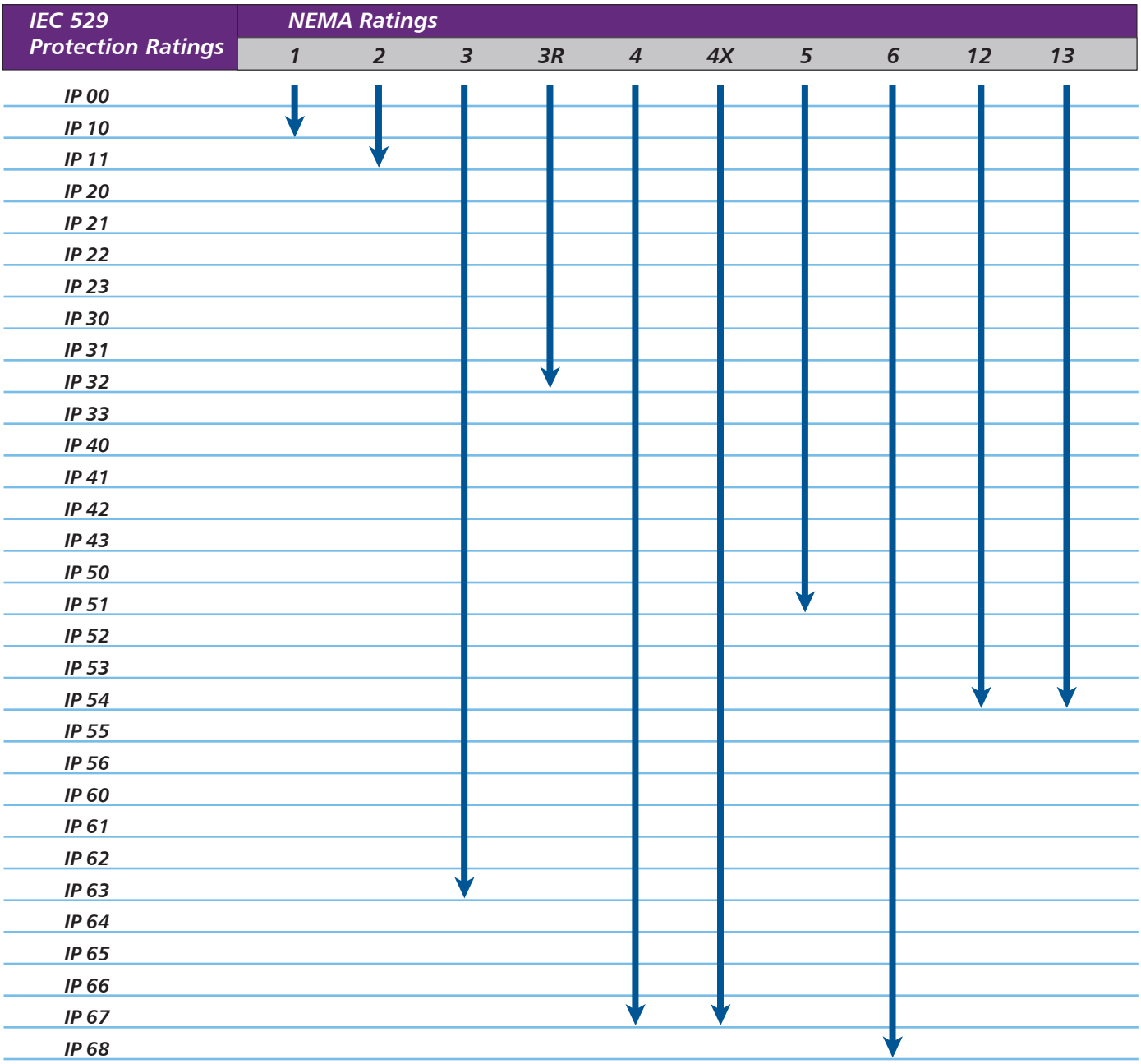


## Chart 1 International Protection (IP) ratings for IEC 529

| ***First digit of IP Number – Ingress of foreign objects*** | | | ***Second digit of IP Number – Ingress of water*** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ***IP 0*** | ***IP 1*** | ***IP 2*** | ***IP 3*** | ***IP 4*** | ***IP 5*** | ***IP 6*** | ***IP 7*** | ***IP 8*** |
| | Meaning for the protection of equipment against ingress of solid foreign objects | Meaning for the protection of persons against access to hazardous parts with | non-protected | Protected against vertically falling water drops | Protected against vertically falling water drops when device is tilted up to 15° | Water sprayed an angle up to 60° on either side of the vertical shall have no harmful effects | Water splashed from any direction shall have no harmful effects | Water projected in jets from any direction shall have no harmful effects | Water projected in powerful jets from any direction shall have no harmful effects | Protected against temporary immersion | Protected against continuous immersion |
| ***IP 0*** | non-protected | non-protected | ***IP 00*** | | | | | | | | |
| ***IP 1*** | Protected against solid foreign objects larger in diameter than 50 mm (1.97 in) | Protected against access to hazardous parts with the back of the hand | ***IP 10*** | ***IP 11*** | ***IP 12*** | | | | | | |
| ***IP 2*** | Protected against solid foreign objects larger in diameter than 12.5 mm (.49 in) | Protected against access to hazardous parts with a finger | ***IP 20*** | ***IP 21*** | ***IP 22*** | ***IP 23*** | | | | | |
| ***IP 3*** | Protected against solid foreign objects larger in diameter than 2.5 mm (.10 in.) | Protected against access to hazardous parts with a tool larger in diameter than 2.5 mm (.10 in.) | ***IP 30*** | ***IP 31*** | ***IP 32*** | ***IP 33*** | ***IP 34*** | | | | |
| ***IP 4*** | Protected against solid foreign objects larger in diameter than 1.0 mm (.04 in.) | Protected against access to hazardous parts with a wire larger in diameter than 1.0 mm (.04 in.) | ***IP 40*** | ***IP 41*** | ***IP 42*** | ***IP 43*** | ***IP 44*** | | | | |
| ***IP 5*** | Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety | Protected against access to hazardous parts with a wire larger in diameter than 1.0 mm (.04 in.) | | | | | ***IP 54*** | ***IP 55*** | | | |
| ***IP 6*** | No ingress of dust | Protected against access to hazardous parts with a wire larger in diameter than 1.0 mm (.04 in.) | | | | | | | ***IP 66*** | ***IP 67*** | ***IP 68*** |

Dimensions shown in mm
Specifications and dimensions subject to change

## Chart 2 NEMA / IP Cross Reference




The chart above provides a cross-reference from NEMA to International Protection (IP) Ratings. This cross-reference is an approximation based on the most current information available. It is not sanctioned by NEMA, IEC, or any other regulatory body. This chart should be used only as a guideline.

## GLOSSARY OF TERMS

In every job speciality there are certain words and phrases used by "insiders" which after a time become almost a language unique to that speciality. Trident technology is a typical example of that condition.

This page provides some explanations, in an attempt to clarify some of the terms that are commonly used by engineers and sales staff at Cannon.

The list is not comprehensive, but highlights many of the expressions commonly used. Should you have any comments or additions please contact us. Feedback will be appreciated.

ADAPTER – A device used to modify the accessory threading on the rear of the connector. Typical adapters are used to attach conduit, heat shrink, overmolds, or tubing to the connectors. They are generally used in place of a cable clamp.

AWG – American Wire Gauge. A method of specifying wire diameter. The higher the number, the smaller the diameter (a size 16 AWG wire has a larger diameter than a size 22 AWG).

BAYONET COUPLING – A quick coupling mechanism for mechanically mating and unmating connector halves. The plug half has a coupling nut with internal ramps and the receptacle has three "bayonet" pins. The two halves are mated and unmated by rotating the coupling nut. The two haves are mated and unmated by rotating the coupling nut.

BACKSHELL – See ENDBELL.

BODY - The main portion of the connector made of the shell, insulator, and contacts.

CABLE CLAMP – A rear connector clamping accessory which tightens over a cable or wire bundle to provide strain relief to the cable. The cable clamp may be part of a more elaborate endbell or it may be used alone. Some cable clamps also provide cable jacket sealing using a resilient gland, others provide only strain relief.

CABLE SEAL – An endbell or cable clamp that is used to seal a round jacketed cable as it enters the rear of the connector.

CONTACT – The conductive element in a connector which makes the actual connection between the wire and the mating connector for the purpose of transferring electrical energy. Ideally the contact should add nothing to the circuit. In the real world, however, contacts typically have a small CONTACT RESISTANCE and associated potential drop. Contacts come in many styles such as solder, crimp, printed circuit (PC), to name just those found in this catalog. Also see SOLDER CONTACT, CRIMP CONTACT, STAMPED AND FORMED CONTACT, PIN CONTACT, and SOCKET CONTACT.

CONTACT ALIGNMENT – The overall play that a contact has in the insulator cavity to allow the mating contacts to self align. Also called contact float.

CONTACT ARRANGEMENT – See LAYOUT.

CONTACT CAVITY – A defined hole in the connector insulator into which the contacts fit. The cavities are generally marked with a unique designation or number for ease of identification.

CONTACT RESISTANCE – The maximum amount of resistance which a contact introduces into the connection when carrying a specified current (usually stated in milliohms). When not stated, values are typically given for "Initial" or new contacts. Most specifications also limit the maximum resistance during or after each of a series of extreme tests, such as "Contact Resistance After Corrosion Test". These figures are typically slightly higher than "Initial".

CONTACT RETENTION – The maximum allowable axial load which can be applied to a contact from either direction without it being dislodged from the insulator. Usually stated in Newtons or pounds of force (4.45 = 1 lbf).

CONTACT SEPARATION FORCE – The force required to separate a pair of mated contacts. Usually stated in grams or ounces.

CONTACT SIZE – The size of the engaging pin and socket contacts in AWG size or metric diameter of the pin.

CONTACT SPACING – The distance between two centers of adjacent contacts.

COUPLING NUT (Also known as LOCKING RING) - The rotating ring on plug style connectors which mechanically locks the two connector halves together.

CRIMP CONTACT – A contact which is terminated to a wire by means of mechanical deformation of the receiving area by means of an appropriate tool.

CSA – Abbreviation for Canadian Standards Association.

CURRENT RATING – The maximum current that a particular wire, contact, or connector can accommodate. NOTE: When several wires are used in a single connector or elevated temperature or altitude is involved, derating curves must be applied to these ratings.

DERATING CURVE – A graph of the change in power handling capability of a connector as a function of ambient temperature or altitude. Typically the graphed function is curved, hence the name.

DISCRIMINATION – A method of ensuring that two similar size connectors cannot be mated. This may be achieved by inclusion of discriminating pins, which enter an empty contact cavity, or by other mechanical means.

DISCRIMINATING PINS – See KEYING.

ENDBELL (also know as BACKSHELL) – The outer rear end of the connector, which is attached by means of internal threads or screws. It adapts the connector to its wire connections in a variety of ways. Typical endbells might have cable clamps to secure a wire bundle, ridges for heat shrink tubing, pipe threads, or shield termination mechanisms.

EXTRACTION TOOL – A device used to remove a contact from a connector insulator. The extraction tool is inserted into the mating face of the insulator and the contact comes out the rear, or wire side, of the connector.

FIRST-MAKE LAST-BREAK CONTACT – A contact which is longer than a standard contact or which sits in the insulator in such a way that it mates with the opposing connector half before any of the other contacts. Used to ensure that a ground connection between the connector halves mates before any of the other contacts.

FLANGED RECEPTACLE – The shell of this connector has a square flange with mounting holes at each corner. Mounting holes are usually clearance holes, but may

be threaded. Receptacle flanges may be mounted in front or at the rear of the panel.

FLASH PLATING. – As commonly used in connector terminology, flash refers to extremely thin platings of metal. A flash plating is the minimum thickness required to ensure complete surface coverage. It is typically used on contacts that will have only occasional mating and unmating.

IEC – Abbreviation for the International Electrotechnical Commission. An international organization, which develops standards exclusively for electrical engineering. CENELEC is the equivalent organization at the European level.

INSULATOR – The insulating element into which the contacts are mounted in a connector.

IP67 - One classification from a rating system used in Europe covering the environmental sealing capability of an enclosure. The system uses two digits, the first digit relates to the degrees of protection the connector has from dirt and dust under the conditions defined in the specification. The second digit relates to the degrees of protection it has against moisture. The degree of protection against dirt ranges from 1 (no protection), to 6 (dust tight). Moisture sealing in the specification ranges from 1 (no protection), to 8 (protected against continuous submersion). The classification IP67 states that the connector is "dust-tight" (6), allowing no ingress of dust what-so-ever, and "protected against the effects of immersion" (7), the ingress of water in harmful quantity shall not be possible when the connector is immersed in water under defined conditions of pressure and time.

JAM NUT RECEPTACLE – A receptacle connector that is mounted from the rear side of the panel and is held in place by a large hex nut (jam nut).

KEYING – A method of differentiating a connector if more than one connector with the same sex and layout is to be used in a system. The key is a pin which can be located in a contact cavity or slot. The key will prevent a connector without a matching orifice from mating.

LAYOUT – The number, size, and geometric arrangement of the contacts in a connector. When a connector is said to have a certain "layout" it refers to a specific contact configuration. For example, the Snap Together Connector series has a page of drawings showing the arrangement of the contacts in the insulator. Each of these arrangements can be referred to as a layout.

LOCKING RING – See COUPLING NUT.

PIN CONTACT – The contact that has a long shaft at the engagement end which enters the socket contact.

PLUG – The male portion of the connector pair usually employing a coupling nut to secure it to the receptacle half. A Plug may have either pin or socket contacts.

POLARIZATION – Polarization ensures that connector halves engage in such a way that the identified contact cavities always engage each other, A to A etc. The connector is polarized.

POLARIZING PIN – See KEYING.

REAR MOUNTING – A receptacle that mounts through the panel from the rear, with its mounting flange inside the equipment. Typically, rear mount receptacles are slightly longer than front mount types to allow for the thickness of the panel. Flange mount receptacles usually come in front and rear mount versions. All Jam nut receptacles are rear mount.

RECEPTACLE – The connector which mates with the plug. The receptacle has threads, pins or ramps that engage the coupling nut on the plug, locking the two halves together. A receptacle may have either pin or socket contacts.

SHELL – The outside case of a connector into which the insulator and contacts are situated.

SHELL SIZE – A standard system developed for military circular connectors for indicating the diameter of the shell. The system is based upon 1/16" increments, that is, a size 16 shell is one inch in diameter.

SOCKET CONTACT – The contact that has an opening at the engagement end to accept the pin contact.

SOLDER CONTACT – A contact that is terminated to the wire or printed circuit with solder. The alternative is crimp contacts to which a wire is attached by crimping.

SOLDER CUP – The end of a SOLDER CONTACT designed to accept a wire, which will then be soldered to the contact.

STAMPED AND FORMED CONTACT – Contacts made by stamping and forming a sheet of metal rather than by machining metal stock.

UL – Abbreviation for Underwriter's Laboratories, a corporation supported by a group of underwriters for the purpose of establishing safety standards covering certain types of equipment and components in the United States. Product Safety Information

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**1. MATERIAL CONTENT AND PHYSICAL FORM**

Electrical connectors do not usually contain hazardous materials. They contain conducting and non-conducting materials and can be divided into two groups.

a) Printed circuit types and low cost audio types which employ all plastic insulators and casings.

b) Rugged, Fire Barrier and High Reliability types with metal casings and either natural rubber, synthetic rubber, plastic or glass insulating materials. Contact materials vary with type of connector and also application and are usually manufactured from either: Copper, copper alloys, nickel, alumel, chromel or steel. In special applications, other alloys may be specified.

**2. FIRE CHARACTERISTICS AND ELECTRIC SHOCK HAZARD**

**There is no fire hazard when the connector is correctly wired and used within the specified parameters. Incorrect wiring or assembly of the connector or careless use of metal tools or conductive fluids, or transit damage to any of the component parts may cause electric shock or burns. Live circuits must not be broken by separating mated connectors as this may cause arcing, ionization and burning.** Heat dissipation is greater at maximum resistance in a circuit. Hot spots may occur when resistance is raised locally by damage, e.g. cracked or deformed contacts, broken strands of wire. Local overheating may also result from the use of the incorrect application tools or from poor quality soldering or slack screw terminals. Overheating may occur if the ratings in the product Data Sheet/Catalog are exceeded and can cause breakdown of insulation and hence electric shock. If heating is allowed to continue it intensifies by further increasing the local resistance through loss of temper of spring contacts, formation of oxide film on contacts and wires and leakage currents through carbonization of insulation and tracking paths. Fire can then result in the presence of combustible materials and this may release noxious fumes. Overheating may not be visually apparent. Burns may result from touching overheated components.

**3. HANDLING**

Care must be taken to avoid damage to any component parts of electrical connectors during installation and use. Although there are normally no sharp edges, care must be taken when handling certain components to avoid injury to fingers. Electrical connectors may be damaged in transit to the customers, and damage may result in creation of hazards. Products should therefore be examined prior to installation/use and rejected if found to be damaged.

**4. DISPOSAL**

Incineration of certain materials may release noxious or even toxic fumes.

**5. APPLICATION**

Connectors with exposed contacts should not be selected for use on the current supply side of an electrical circuit, because an electric shock could result from touching exposed contacts on an unmated connector. Voltages in excess of 30 V ac or 42.5 V dc are potentially hazardous and care should be taken to ensure that such voltages cannot be transmitted in any way to exposed metal parts of the connector body. The connector and wiring should be checked, before making live, to have no damage to metal parts or insulators, no solder blobs, loose strands, conducting lubricants, swarf, or any other undesired conducting particles. Circuit resistance and continuity check should be made to make certain that there are no high resistance joints or spurious conducting paths. Always use the correct application tools as specified in the Data Sheet/Catalog. Do not permit untrained personnel to wire, assemble or tamper with connectors. For operation voltage please see appropriate national regulations.

**IMPORTANT GENERAL INFORMATION**

**(i) Air and creepage paths/Operating voltage.** The admissible operating voltages depend on the individual applications and the valid national and other applicable safety regulations.

For this reason the air and creepage path data are only reference values. Observe reduction of air and creepage paths due to PC board and/or harnessing.

**(ii) Temperature**

All information given are temperature limits. The operation temperature depends on the individual application.

**(iii) Other important information**

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