

UTO SERIES



SOURIAU

Robust Metal & Shielded Connector



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Typical Applications



Energy - Power



Robotics - Machine tools



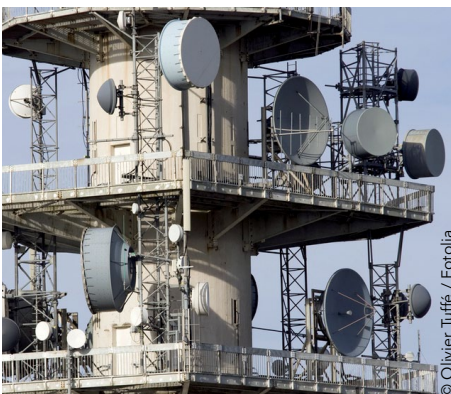
Building Automation & Control



Instrumentation measurement



Off road - Mining - Railway



Telecom - Data infrastructure

Features & Benefits

WATER PROOF

IP68/69K Dynamic Mated

Ideal for outdoor and indoor dynamic applications requiring continuous underwater immersion, routine pressure washing and dust protection.

SIGNAL INTEGRITY

EMI Shielded

65 dB at 100 Mhz: Qualified and compatible to be used in electromagnetic radiation areas and ensures proper signal integrity and transmission.

CORROSION RESISTANT

Salt Spray 48 & 96 hours

Designed to withstand climate ingress and exposure to salt spray or corrosive atmospheres while still maintaining mechanical and electrical functionality.

QUICK MATING

1/3 Bayonet Coupling

With only 1/3 twist of the bayonet coupling system, connectors are mated with audible "click" and tactile feel to confirm proper mating. This mating feature eliminates connection uncertainty and reduces time and labor during installation.

COST SAVINGS

Mixed Power & Signal Layouts

Power supply and signal transmission can be combined in a unique interconnect solution to reduce system complexity and minimize component/installation costs.

Single Wire Sealing



Straight Strain Relief



Right Angle Strain Relief



Short Cable Gland



Long Cable Gland



Heat Shrink Boot Adapter



Overmolded



Choice of Crimp Contacts

- machined
- stamped and formed
- coaxial
- fiber optics



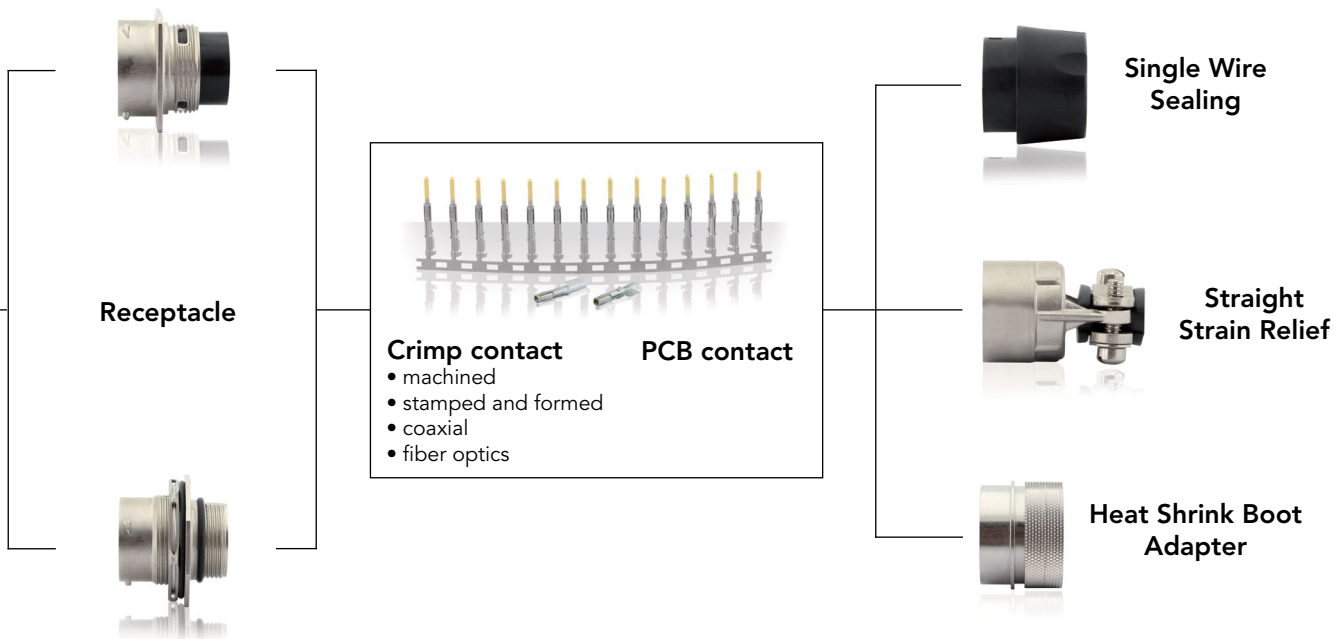
Plug

UTO Series

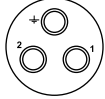
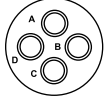
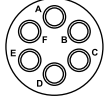
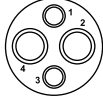
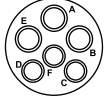
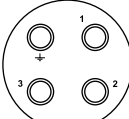
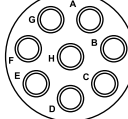
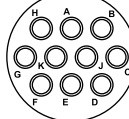
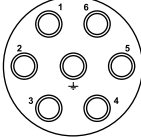
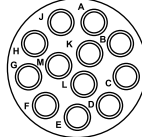
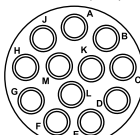
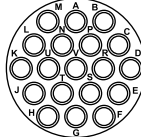
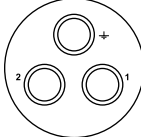
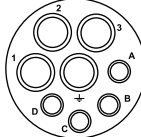
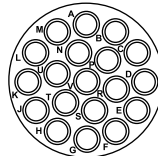
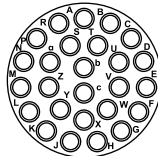


Sealed: IP68/69K
Shielded
Corrosion resistant
UL compliant

overview



Layouts (Electrical parameter according to UL1977)

Shell size	Contact #16 (Ø 1.6)	Contact #20 (Ø 1.0)	Contact #8 (Ø 3.6)	Mixed power
10	103 10A 500V 2 contacts +ground 3xØ1.6 (#16)  Page 20 104* 10A 500V 4 contacts 4xØ1.6 (#16)  Page 36	106* 5A 250V 6 contacts 6xØ1.0 (#20)  Page 44		102W2 20A 500V 4 contacts 2xØ2.4 (#12) 2xØ1.0 (#20)  Page 32 103W3 5A 250V 6 contacts 3xØ1.6 (#16) 3xØ1.0 (#20)  Page 40
12	124 16A 500V 3 contacts +ground 4xØ1.6 (#16)  Page 28 128 10A 500V 8 contacts 8xØ1.6 (#16)  Page 52	1210* 5A 250V 10 contacts 10xØ1.0 (#20)  Page 60		
14	147 10A 500V 6 contacts +ground 7xØ1.6 (#16)  Page 48 1412 10A 500V 12 contacts 12xØ1.6 (#16)  Page 64 1492 10A 500V 12 contacts 12xØ1.6 (#16)  Page 68	1419 5A 250V 19 contacts 19xØ1.0 (#20)  Page 72	142G1 44A 600V 2 contacts +ground 3xØ3.6 (#8)  Page 24	148 25A 250V 8 contacts 4xØ2.4 (#12) 4xØ1.6 (#16)  Page 56
16	1619* 9A 500V 19 contacts 19xØ1.6 (#16)  Page 76	1626 4A 250V 26 contacts 26xØ1.0 (#20)  Page 84		

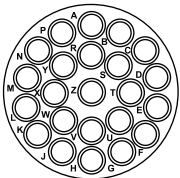
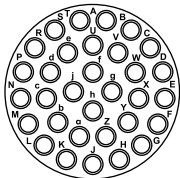
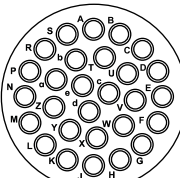
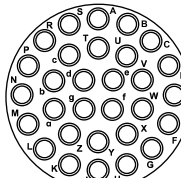
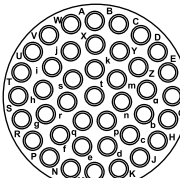
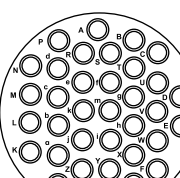
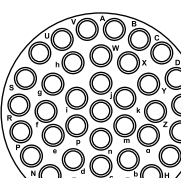
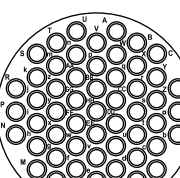
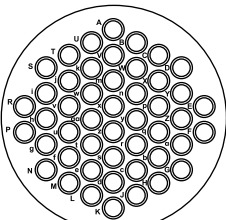
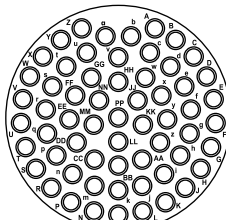
* Ethernet compatible see page 164 & 165

Contacts #16:
from AWG 30 to 14,
0.05 to 2.5 mm²

Contacts #20:
from AWG 26 to 18,
0.13 to 0.93 mm²

Contacts #8:
from AWG 16 to 8,
1.5 to 10 mm²

Contacts #12:
from AWG 22 to 12,
0.13 to 4 mm²

Shell size	Contact #16 (Ø 1.6)	Contact #20 (Ø 1.0)
18	1823 8A 500V 23 contacts 23xØ1.6 (#16)  Page 80	1832 4A 250V 32 contacts 32xØ1.0 (#20)  Page 96
20	2028 5A 500V 28 contacts 28xØ1.6 (#16)  Page 88 2030 5A 500V 30 contacts 30xØ1.6 (#16)  Page 92	2041 3A 250V 41 contacts 41xØ1.0 (#20)  Page 108
22	2235 5A 500V 35 contacts 35xØ1.6 (#16)  Page 100 2238 5A 500V 38 contacts 38xØ1.6 (#16)  Page 104	2255 3A 250V 55 contacts 55xØ1.0 (#20)  Page 116
24	2448 5A 500V 48 contacts 48xØ1.6 (#16)  Page 112	2461 3A 250V 61 contacts 61xØ1.0 (#20)  Page 120

General technical characteristics



Materials

- **Shell:** Zinc alloy
- **Backshells and cable glands:** Brass
- **Coupling ring:** Aluminum alloy
- **Coupling spring:** Spring stainless steel
- **Insert:** Glass-filled thermoplastic
- **Contacts:** See page 125
- **Halogen free**
- **RoHS compliant & conforms to the Chinese standard SJ/T1166-2006 (Chinese RoHS equivalent)**



Environmental

- **Operating temperature:**
from -40°C to +105°C
40/100/21 per NFF 61-030
- **Flammability rating:**
UL94 V-0
I2F3 according to NFF 16101 and NFF 16102
- **Salt spray:**
per MIL-STD-202 method 101
- 48 h (standard version)
- 96 h (black anodized coupling ring)
Higher salt spray resistance (200/500 h) upon request
- **Sealing:**
Per IEC 60529/DIN 40050: Dynamic IP67 / IP68 (under 10 m of water during 1 week) / IP69K in mated condition and in combination with sealed backshell.
- **Fluid resistance:**
- Gas and oil
- Mineral oil
- Acid bath
- Basic bath
- **Shielding effectiveness:**
65 dB at 100 MHz

Electrical



- **In accordance with:**
- UL 1977: Certificate ECBT2
File number: E169916
- CSA C22.2: Certificate ECBT8
File number E169916
- Also see pages 10 & 11

Mechanical

- **Durability:**
500 matings & unmatings per MIL-C-26482
- **Vibration resistance:**
55-2000 Hz, acceleration 15 g per MIL-C-26482 (Series 1)
10-100 Hz, acceleration 2 g per NFF61030
- **Thermal shock:**
5 cycles 30 min. from -40°C to 105°C per MIL-STD-202 method 207
- **Mechanical shock:**
50 g, 11 ms period per MIL-C-26482 (Series 1)
30 g, 18 ms period per NFF61030

Connector

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Cable Assembly	17
2 contacts + ground	
103: 10A 500V.....	20
142G1: 44A 600V.....	24
3 contacts + ground	
124: 16A 500V.....	28
4 contacts	
102W2: 20A 500V.....	32
104*: 10A 500V.....	36
6 contacts	
103W3: 5A 250V.....	40
106*: 5A 250V.....	44
6 contacts + ground	
147: 10A 500V.....	48
8 contacts	
128: 10A 500V.....	52
148: 25A 250V.....	56
10 contacts	
1210*: 5A 250V.....	60
12 contacts	
1412: 10A 500V.....	64
1492: 10A 500V.....	68
19 contacts	
1419: 5A 250V.....	72
1619*: 9A 500V.....	76
23 contacts	
1823: 8A 500V.....	80
26 contacts	
1626: 4A 250V.....	84
28 contacts	
2028: 5A 500V.....	88
30 contacts	
2030: 5A 500V.....	92
32 contacts	
1832: 4A 250V.....	96
35 contacts	
2235: 5A 500V.....	100
38 contacts	
2238: 5A 500V.....	104
41 contacts	
2041: 3A 250V.....	108
48 contacts	
2448: 5A 500V.....	112
55 contacts	
2255: 3A 250V.....	116
61 contacts	
2461: 3A 250V.....	120

Electrical parameters according to UL1977

* Ethernet compatible see pages 164 & 165

Upgrade of the UTO Series



Description of Change:

To better meet the demanding requirements and diversity of industrial markets/applications, SOURIAU changed the position of the wavy washer inside the plug. This slight modification makes the new version of the UTO sealed to IP68/69K in dynamic conditions.

Product Part Number:

Below is an overview of the old part numbers with the corresponding new part numbers.

Note that some of the old part numbers where backshells were included will now be sold individually, i.e. plug connector + backshell.

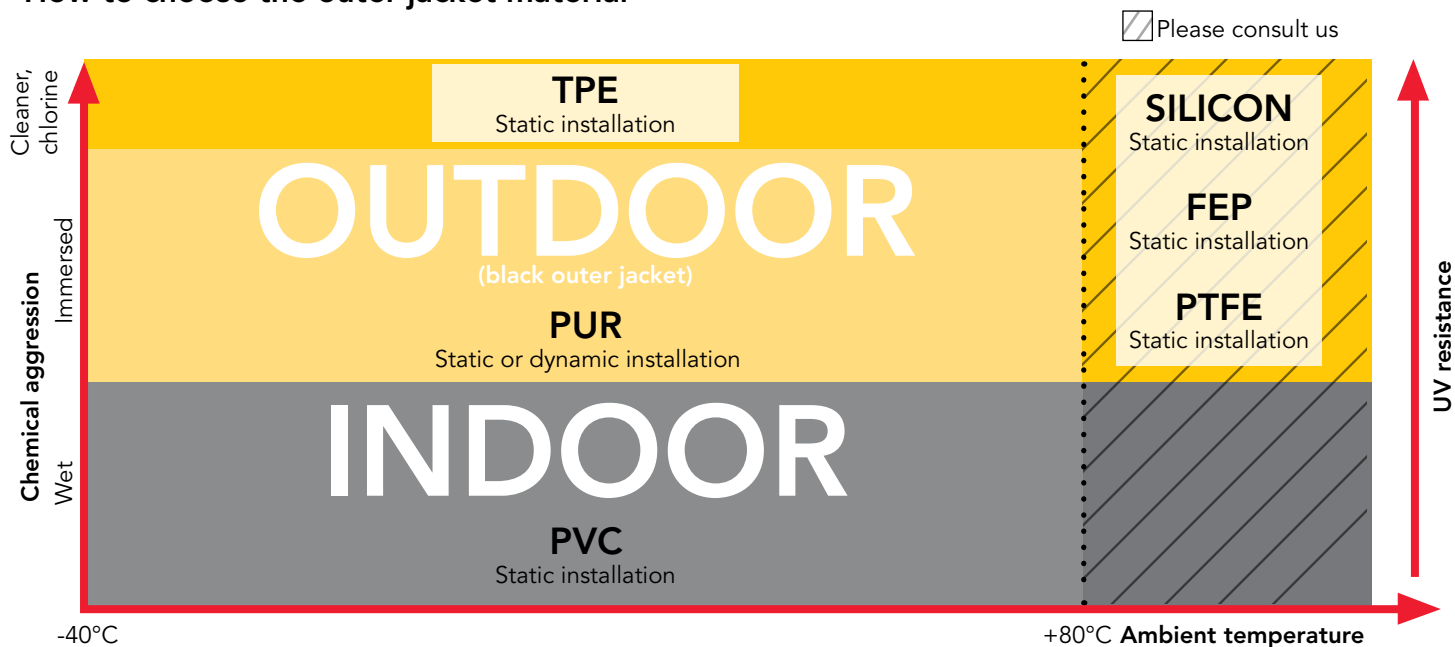
Old part number	New part number connector	New part number backshell	Comments
UTO0/6-S/PT	UT00/6-S/PH(6)	-	-
UTO0-S/PHT	UT00-S/PH(6)	-	-
UTO0/6AC-S/PT	UT00/6-S/PH(6)	-	-
UTO0/6PG-S/PHT	UT00/6-S/PH(6)	UT0-AC	-
UTO-21/22-	Keep old part number	UT0-JC	Silkscreen version
UTO-44/45-	Keep old part number	-	Screw coupling version
UTO-ACT	-	UT0-AC	851 backshell Nickel plated
UTO-PGT	-	UT0-JC	Longer threading on connector side + metric cable gland
UTOS-PGT	-	UT0S-JC	Longer threading on connector side + shielded metric cable gland
U-AD01T	UT0-AD01	UT0-AD01	Longer threading to achieve sealing
U-AD01N	Keep old part number	-	Used on old UT06-45N screw coupling version

Cable Assembly

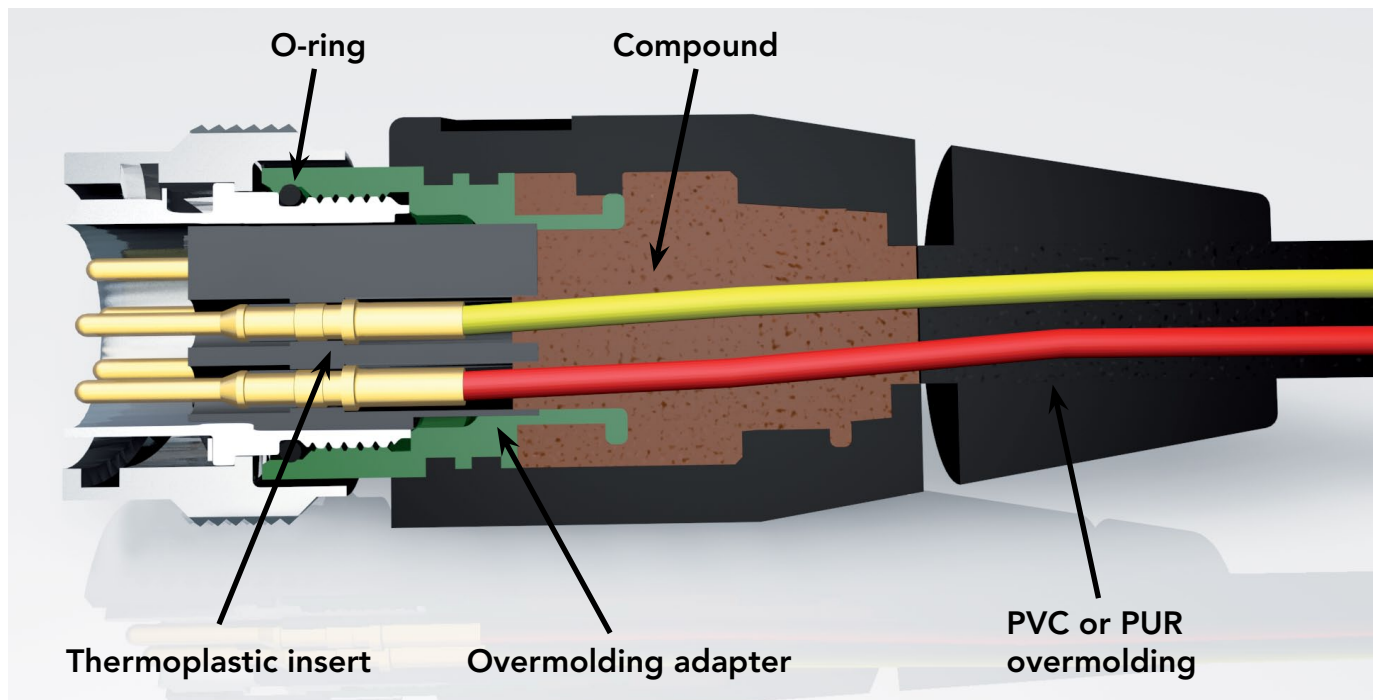
SOURIAU has provided connectors for various applications for more than 90 years and has been used in the most extreme environments. Conscious about the difficulty in finding a quick and reliable harness manufacturer, we began our own in-house cable assembly production. It allows customers to reduce the number of suppliers and to take advantage of the "best in class" quality of the SOURIAU group. Overmolding is a process that further enhances the sealing properties and helps to minimize stress on the cable termination to the connector. In addition, the wires are encapsulated inside the molding which creates a barrier preventing liquid/moisture from entering the equipment through the connector or cable jacket if breached.



How to choose the outer jacket material

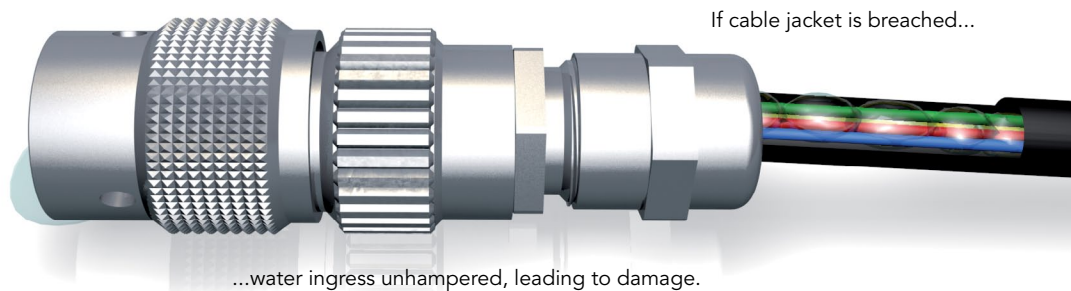


Overmolding Description



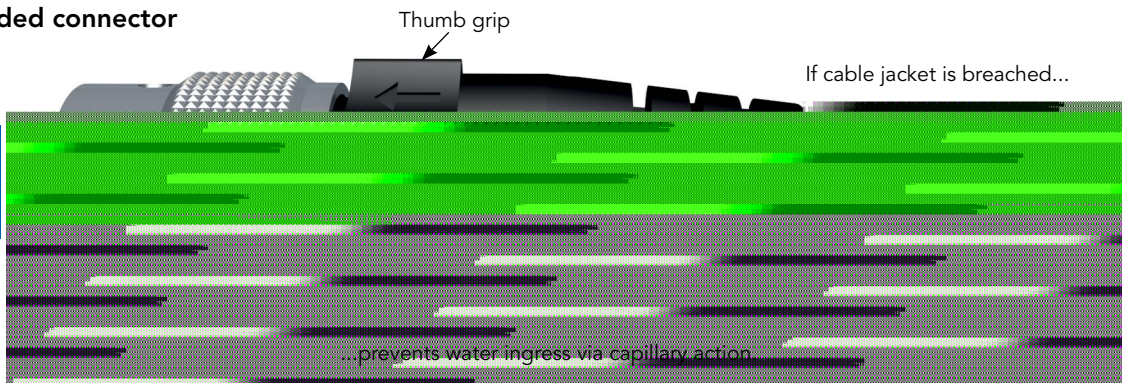
Discrete connector

GOOD

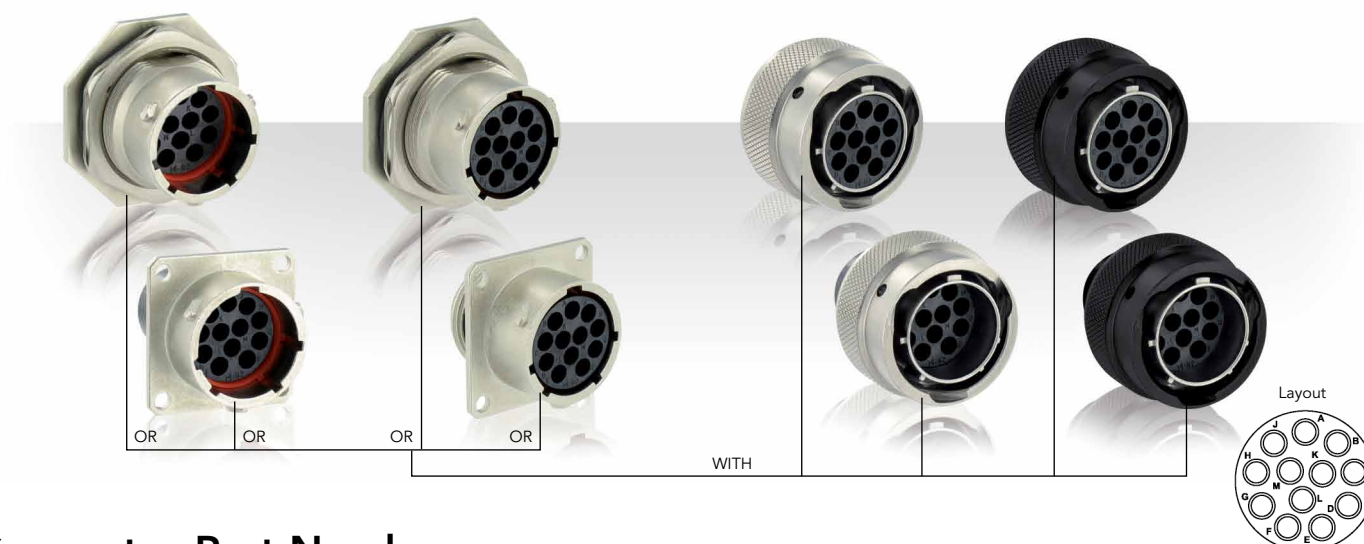


Overmolded connector

BEST



1492 (Shell size 14, 12x#16)



Connector Part Numbers

Drilling pattern see page 176

Contact type	Connector type	Sealing	Salt spray	Part number*	
				Male insert	Female insert
Contacts supplied separately see page 71	Square flange receptacle	IP67	96h	UT001492PH	UT001492SH
		IP68 & IP69K	96h	UT001492PH6	UT001492SH6
	Plug	IP67, IP68 & IP69K	48h	UT061492PH	UT061492SH
		IP67, IP68 & IP69K	96h	UT061492PH02 (Black)	UT061492SH02 (Black)
	Jam nut receptacle	IP67	48h	UT071492PH	UT071492SH
		IP68 & IP69K	48h	UT071492PH6	UT071492SH6
		IP67	96h	UT071492PH01	UT071492SH01
		IP68 & IP69K	96h	UT071492PH601	UT071492SH601

* Other discrimination keying option, see page 180

Backshells

Backshell type	Shielding	Cable range (Ø inch) min/max	Part number	
			Short version	Long version
Cable gland with strain relief nut for water protected applications (IP68 & IP69K) (Fig.1)	-	0.236"/0.393"	UT014JCS	UT014JC
Cable gland with large strain relief nut for water protected applications (IP68 & IP69K) (Fig.2)	-	0.314"/0.472"	UT014JCSL	UT014JCL
Shielded cable gland with strain relief nut for water protected applications (IP68 & IP69K) (Fig.3)	✓	0.275"/0.413"	UT0S14JCS	UT0S14JC
Shielded cable gland with large strain relief nut for water protected applications (IP68 & IP69K) (Fig.4)	✓	0.314"/0.492"	UT0S14JCSL	UT0S14JCL
Metal cable clamp with strain relief (Fig.5)	-	0.393"	UT014AC	
Metal shrink boot adaptor (Fig.6)	-	-	UT014AD	
Metal right angle cable clamp with strain relief nut (Fig.7)	-	0.255"/0.551"	UT014LPGN	
Shielded cable clamp with plastic strain relief nut (Fig.8)	✓	0.255"/0.531"	UT0S14JCPGN	
Cable clamp with plastic strain relief nut (Fig.8)	-	0.255"/0.531"	UT014JCPGN	

Contact Selector Guide

Contacts supplied separately

Electrical characteristics: contact resistance		
#20 Ø1mm	Machined	< 6mΩ
	Stamped & formed	< 6mΩ
#16 Ø1.6mm	Machined	< 3mΩ
	Stamped & formed	< 6mΩ
#12 Ø2.4mm	Machined	< 5mΩ
#8 Ø3.6mm	Machined	< 5mΩ

Available plating options	
A	2μ Ni + 2μ Ag
J	Gold flash over 2μ Ni
K	Min 0.4μ gold over 2μ Ni
S31	Active part: 0.4μ gold over Ni Crimp area: Nickel
S18	Active part: 0.75μ gold min over 2μ Ni Crimp area: 1.3μ tin over Ni Other: Nickel
S25 S26	Active part: 0.75μ Au over Ni Crimp area: flash Au over Ni
TK6	2-5μ Sn pre-plated
D70	Superseded by S31
S6	Superseded by S18
Other platings on request (contact supplied separately)	
T	T: 2μ Ni mini all over + 3 to 5 μm Sn all over
D28	0.75μ gold over Ni

Packaging

Due to the wide variety of applications, contact packaging is offered for small series (bulk package) and high volume production (reeled contacts):

Size contacts #20 & #16



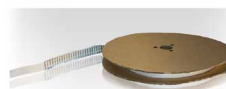
- 25 pieces loose package (stamped & formed contacts)



- 50 pieces bulk package (machined contacts)



- 1000 pieces bulk package (machined contacts)



- 3000 pieces reeled (stamped & formed contacts)



- 5000 pieces reeled (machined contacts)

Size contacts #12 & #8



- 100 pieces bulk package (machined contacts)

Note: 1,000 pieces bulk package available by adding 1000 at the end of the part number: e.g. RC16M23K1000
2,000 pieces reeled package available by adding K at the beginning of the part number: e.g. KRC16M23K

Crimp Contacts

Standard Version



Contact size	Type	Wire size		Part number		Max wire Ø	Max insulator Ø	Available plating see page 128
		AWG	mm ²	Male	Female			
#20 Ø1 mm	Machined	26-24	0.13-0.20	RM24W3K	RC24W3K		1.58 max	K
	Stamped & Formed	26-24	0.13-0.25	SM24W3 - ⁽¹⁾	SC24W3 - ⁽¹⁾		0.89-1.58	TK6 S25 (female) S26 (male)
				SM24WL3 - ⁽²⁾	SC24WL3 - ⁽²⁾			
	Machined	22-20	0.32-0.52	RM20W3K	RC20W3K		1.58 max	K
	Stamped & Formed	22-20	0.35-0.5	SM20W3 - ⁽¹⁾	SC20W3 - ⁽¹⁾		1.17-2.08	TK6 S25 (female) S26 (male)
				SM20WL3 - ⁽²⁾	SC20WL3 - ⁽²⁾			
#16 Ø1.6 mm	Machined	20-18	0.50-0.93	RM18W3K	RC18W3K		2.10 max	K
	Machined	30-28	0.05-0.08	RM28M1 -	RC28M1 -	0.55	1.1	K, J
	Machined	26-24	0.13-0.2	RM24M9 -	RC24M9 -	0.8	1.6	K, J
	Stamped & Formed	26-24	0.13-0.25	SM24M1 - ⁽¹⁾	SC24M1 - ⁽¹⁾	0.89-1.28	No insulation grip	S31, S18, TK6
				SM24ML1 - ⁽²⁾	SC24ML1 - ⁽²⁾			
	Machined	22-20	0.32-0.52	RM20M13 -	RC20M13 -	1.18	1.8	K, J
				RM20M12 -	RC20M12 -		2.2	
	Stamped & Formed	22-20	0.35-0.5	SM20M1 - ⁽¹⁾	SC20M1 - ⁽¹⁾	1.17-2.08	No insulation grip	S31, S18, TK6
				SM20ML1 - ⁽²⁾	SC20ML1 - ⁽²⁾			
	Machined	20-16	0.52-1.5	RM16M23 -	RC16M23 -	1.8	3.2	K, J
	Stamped & Formed	18-16	0.8-1.5	SM16M1 - ⁽¹⁾	SC16M1 - ⁽¹⁾	3.0	No insulation grip	S31, S18, TK6
				SM16ML1 - ⁽²⁾	SC16ML1 - ⁽²⁾			
#12 Ø2.4 mm	Machined	18-16	0.8-1.5	SM16M11 - ⁽¹⁾	SC16M11 - ⁽¹⁾	2.0-3.0	Insulation grip	S31, S18, TK6
		18-16	0.8-1.5	SM16ML11 - ⁽²⁾	SC16ML11 - ⁽²⁾			
		16-14	1.5-2.5	RM14M30 -	RC14M30 -			
		14	2.0-2.5	SM14M1 - ⁽¹⁾	SC14M1 - ⁽¹⁾			
		14	2.0-2.5	SM14ML1 - ⁽²⁾	SC14ML1 - ⁽²⁾			
		14	2.0-2.5	SM14ML1 - ⁽²⁾	SC14ML1 - ⁽²⁾			
	Machined	22	0.13-0.4	82911457N -	82911456 -	-	4.9	A, K
		20	0.5	82911459N -	82911458 -			
		18	0.75-1.0	82911461N -	82911460 -			
		16	1.5	82911463N -	82911462 -			
		14	2.5	82911465N -	82911464 -			
#8 Ø3.6 mm	Machined	12	4	82911467N -	82911466 -	-	6.5	A
		16	1.5	82913601A	82913600A			
		14	2.5	82913603A	82913602A			
		12	4	82913605A	82913604A			
		10	6.0	82913607A	82913606A			
#8 Ø3.6 mm	Machined	8	10.0	82913609A	82913608A	-	6.5	A
		8	10.0	82913609A	82913608A			

(1) contact reeled (2) loose contact
Example: RM24W3K - Size #20, Machined, AWG24 wire.

Note: all dimensions are in mm

Crimping

One of the key factors which affects the performance of a connector is the way contacts are terminated. Crimped connections are nowadays seen as the best solution to ensure quality throughout the lifetime of the product. Here are some reasons why we recommend this method of termination for UTO connectors:

Advantages (Extract from the IEC 60352-2):

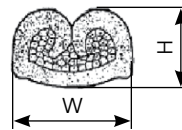
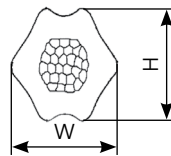
- Efficient processing of connections at each production level
- Processing by fully-automatic or semi-automatic crimping machines, or with hand operated tools
- No cold-soldered joints
- No degradation of the spring characteristic of female contacts by the soldering temperature

- No health risk from heavy metal and flux steam
- Preservation of conductor flexibility behind the crimped connection
- No burnt, discolored and overheated wire insulation
- Good connections with reproducible electrical and mechanical performances
- Easy production control.

To ensure that the crimp tooling is performing according to original specifications, it is important to carry out regular checks. A common way to check the performance of tooling is with a simple pull test, ideally using a dedicated electric pull tester. Minimum recommended pull forces are indicated in the tables below:



Machined contact



Stamped & Formed contact



Active contact part	Contact type	Die location on heads	Wire section range	Section (mm ²)	Tensile straight test (mini)	Height (inch) H (±0.075)	Width (mm) W (±0.075)	Tooling head p/n
Machined contacts size #20 Ø 1 mm	RM24W3K RC24W3K	26/24	AWG 26	0.12 min	15 N	0.037"	0.050"	S20RCM
			AWG 24	0.25 max	32 N			
	RM20W3K RC20W3K	22/20	AWG 22	0.32 min	40 N	0.049"	0.070"	
			AWG 20	0.50 max	60 N			
	RM18W3K RC18W3K	20/18	AWG 20	0.50 max	60 N	0.053"	0.073"	
			AWG 18	0.82 max	90 N			
S & F contacts size #20 Ø 1 mm	SM24WL3TK6* SC24WL3TK6*	26/24	AWG 26	0.12 min	15 N	0.031"	0.058"	S20SCM20
			AWG 24	0.25 max	32 N			
	SM20WL3TK6* SC20WL3TK6*	22/20	AWG 22	0.32 min	40 N	0.039"	0.060"	
			AWG 20	0.50 max	60 N			
Machined contacts size #16 Ø 1.6 mm	RM28M1K* RC28M1K*	30/28	AWG 30	0.05 min	11 N	0.044"	0.055"	S16RCM20
			AWG 28	0.08 max	11 N			
	RM24M9K* RC24M9K*	26/24	AWG 26	0.12 min	15 N	0.045"	0.055"	
			AWG 24	0.25 max	32 N			
	RM20M13K* RC20M13K* RM20M12K* RC20M12K*	22/20	AWG 22	0.32 min	40 N	0.049"	0.069"	
			AWG 20	0.50 max	60 N			
			AWG 22	0.32 min	40 N			
		AWG 20	0.50 max	60 N				
	RM16M23K* RC16M23K*	20	AWG 20	0.50 max	60 N	0.065"	0.085"	S16RCM16
		18	AWG 18	0.82 max	90 N	0.070"	0.089"	
		16	AWG 16	1.50 max	150 N	0.077"	0.095"	
	RM14M30K* RC14M30K*	16	AWG 16	1.50 min	150 N	0.082"	0.105"	S16RCM14
		14	AWG 14	2.50 min	230 N	0.090"	0.109"	
S & F contacts size #16 Ø 1.6 mm	SM24ML1TK6* SC24ML1TK6*	26/24	AWG 26	0.12 min	15 N	0.033"	0.059"	S16SCM20
			AWG 24	0.25 max	32 N			
	SM20ML1TK6* SC20ML1TK6*	22/20	AWG 22	0.32 min	40 N	0.040"	0.060"	
			AWG 20	0.50 max	60 N			
	SM16ML11TK6* SC16ML11TK6*	18	AWG 18	0.75 min	90 N	0.051"	0.082"	S16SCML11
		16	AWG 16	1.50 max	150 N	0.053"	0.082"	
	SM16ML1TK6* SC16ML1TK6*	18	AWG 18	0.75 min	90 N	0.058"	0.079"	S16SCML1
		16	AWG 16	1.50 max	150 N	0.066"	0.080"	
	SM14ML1TK6* SC14ML1TK6*	14	AWG 14	2.50 max	230 N	0.070"	0.101"	

*: example of plating options, for other plating see page 129

Handle & Interchangeable Heads

User Guide

- 1) Fully close then release the tool, keep it open.
Open the 2 pins.



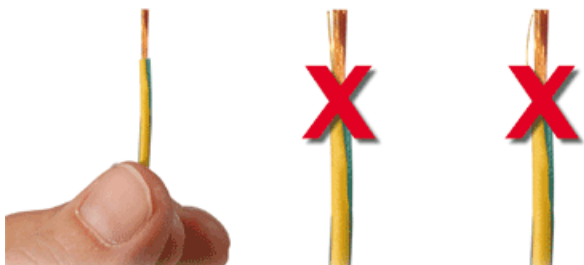
- 2) Choose the adapter head (sold separately), keep vertical and slide it into the handle until the mechanical end.



- 3) Close the two pins simultaneously to maintain the head.



- 4) Strip the cable properly checking the size recommended in the catalog on page 140.



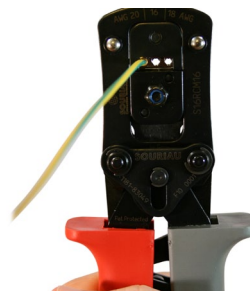
- 5) Place conductors, with no deteriorations, in the bucket contact. All strands to be located in the crimp bucket.



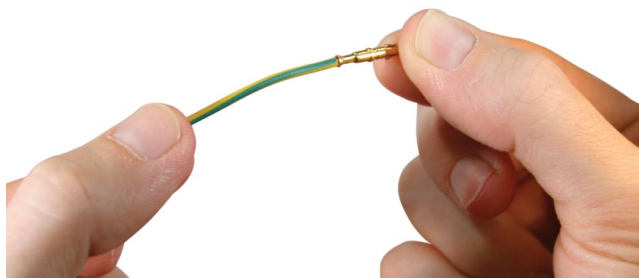
- 6) Position the contact in the bottom of the tool by checking its orientation.



- 7) To crimp contact assembly-cable, tighten sharply the clip to the end of the mechanism.



- 8) To control crimp quality, slightly pull cable with two fingers to control retention.



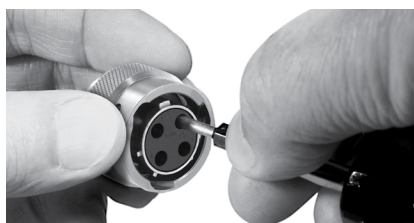
Extraction Tools

Contact size	Extractor
#20	RX20D44
#16	RX2025GE1
#12	51060210924
#8	51060210936



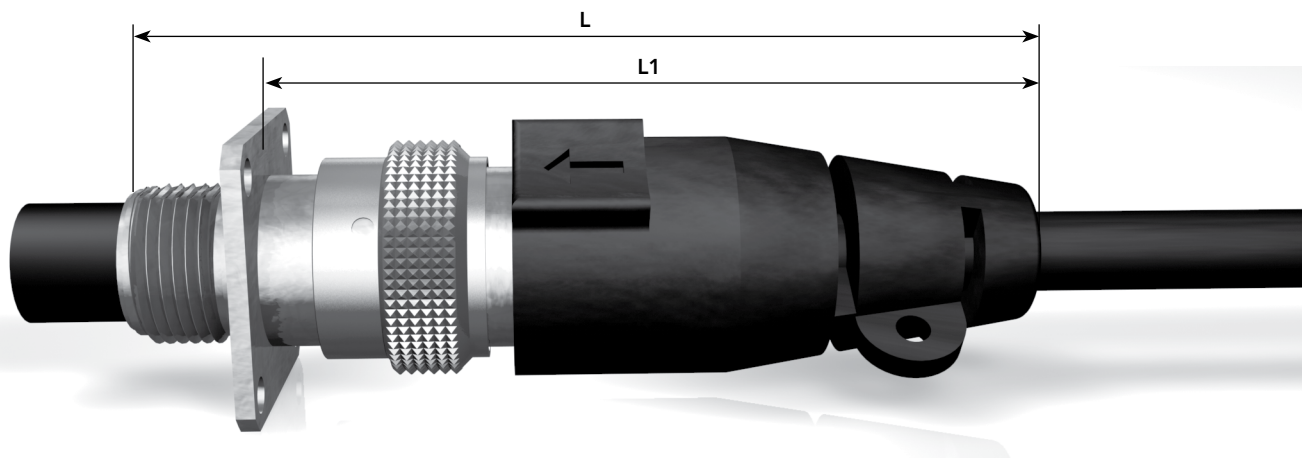
Contact Extraction Instructions

Place the tool into the cavity from front face of the connector, push on the handle, then remove the contact.



Dimensions Overmolded harnesses

Shell size	UTO0		UTO7	
	L max (inch)	L1 max (inch)	L max (inch)	L1 max (inch)
12	3.909"	3.688"	4.188"	3.688"



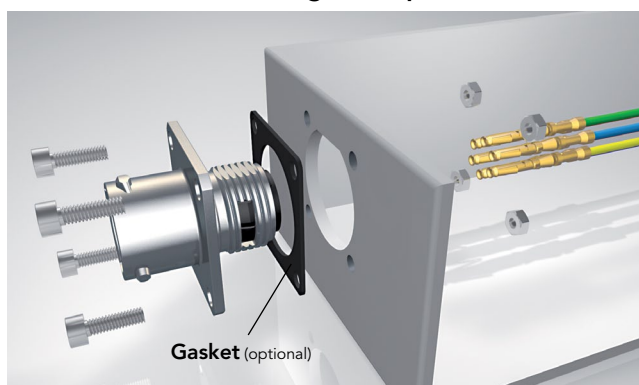
Note: all dimensions are in inches

Assembly Instructions

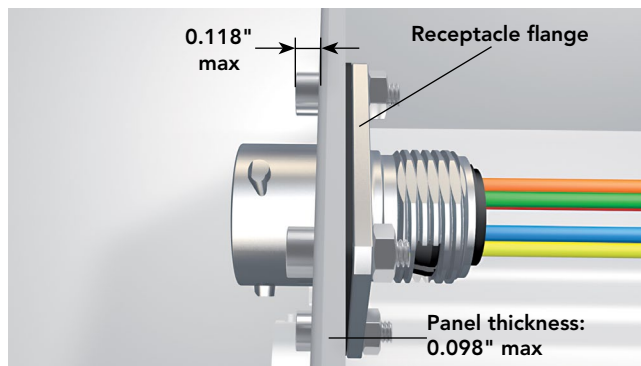
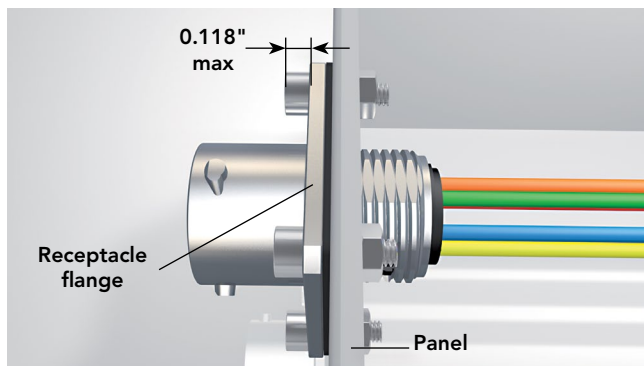
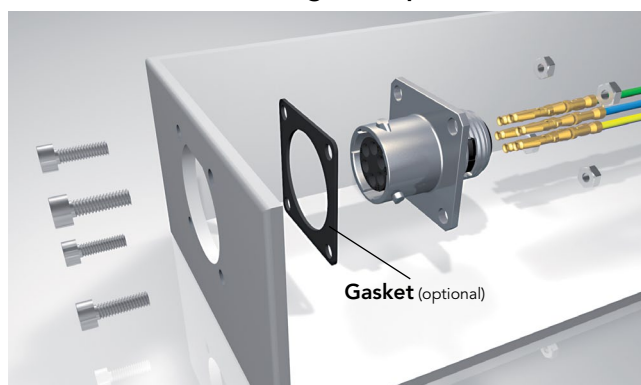
UTO0 Assembly (Mounting Suggestion)

- Strip wires and crimp contacts (see pages 140 & 141)
- Insert contacts into connector cavities (insert manually or use tool RTM205 crimp contacts)
- Place receptacle in the panel cut-out
- Secure receptacle with screws (not supplied)
Tighten screws: 4.40 UNC (Ø0.112") for size connectors 10 to 22, 6.32 UNC (Ø0.137") for size connectors 24 (recommended torque: see table below)
- For complete sealing of the system use optional gasket and sealed screw solution (not sold by SOURIAU).

Front mounting : Crimp version



Rear mounting : Crimp version

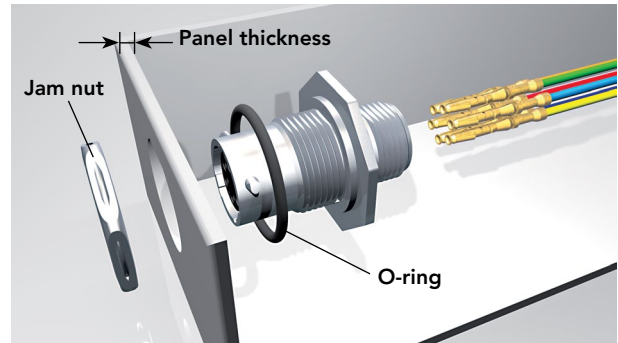


	Shell size							
	10	12	14	16	18	20	22	24
Screws tightening torque (Nm)	0.30/0.40	0.30/0.40	0.30/0.40	0.30/0.40	0.35/0.45	0.50/0.60	0.55/0.65	0.55/0.65

UTO7 Assembly (Mounting Suggestion)

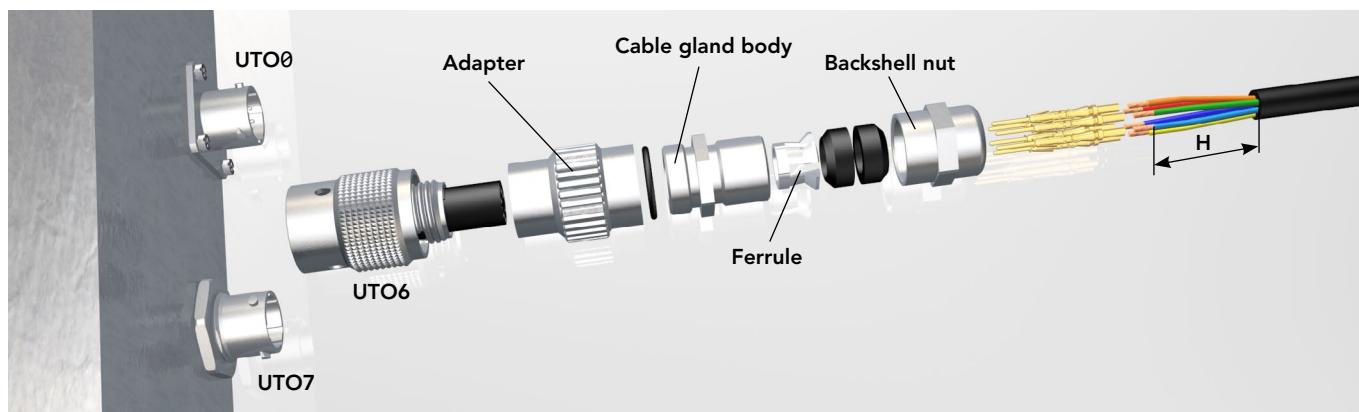
- Strip wires and crimp contacts (see pages 140 & 141)
- Insert contacts into connector cavities (insert manually or use tool RTM205 crimp contacts)
- Seat o-ring, place receptacle in the panel cut-out
- Tighten jam nut

Shell size	Jam nut torque (Nm)	Exterior jam nut dim. (inch)	Ø Wire max (inch)	Panel thickness max (inch)
10	6	0.874 "	0.125 "	0.125 "
12	9	1.062 "	0.125 "	0.125 "
14	10	1.259 "	0.125 "	0.125 "
16	13	1.311 "	0.125 "	0.125 "
18	20	1.437 "	0.125 "	0.125 "
20	23	1.562 "	0.125 "	0.251 "
22	25	1.688 "	0.125 "	0.251 "
24	26	1.811 "	0.125 "	0.251 "



Assembly Instructions (Continued)

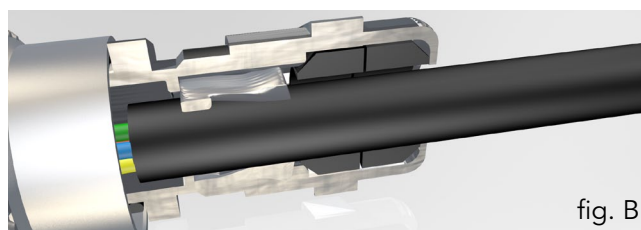
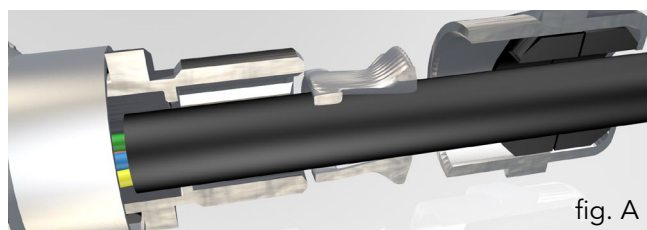
UTO0 or UTO7 with UTO6 + JCS or JC or JCSL or JCL for Unshielded Cable



- Slide accessories onto the cable
- Strip external cable jacket (see dimension H in the table below)
- Strip wires and crimp contacts (see pages 140 & 141)
- Insert contacts into connector cavities (insert manually or use tool RTM205)
- Screw adapter to the rear of the connector body and screw cable

gland body to adapter and tighten (recommended torque: see table below)

- Mate the plug with the receptacle to make the following step easier
- Slide ferrule inside the cable gland body as shown in fig. A
- Tighten backshell nut with cable gland body as shown in fig. B (recommended torque: see below).



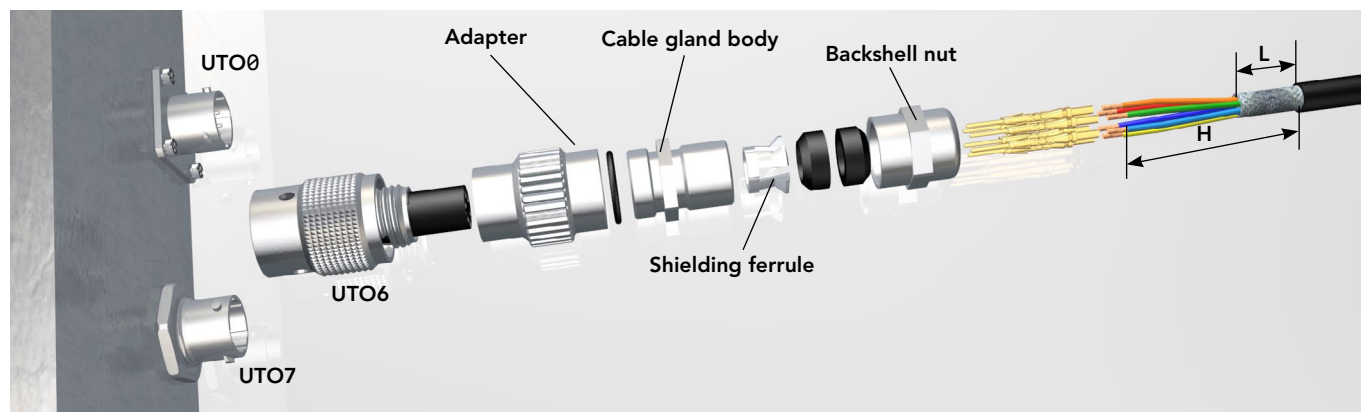
Shell size	Adapter tightening torque (Nm)	Cable gland body tightening torque (Nm)	Backshell nut tightening torque* (Nm)	H min. (inch)			
				JCS/JCSL		JC/JCL	
				Male	Female	Male	Female
10	6	6	5	0.826"	1.141"	1.259"	1.535"
12	10	10	8	0.826"	1.141"	1.220"	1.535"
14	10	10	8	0.984"	1.299"	1.535"	1.850"
16	14	14	12	1.259"	1.574"	1.692"	2.007"
18	14	14	12	1.456"	1.771"	1.850"	2.165"
20	24	24	20	1.535"	1.850"	1.929"	2.244"
22	24	24	20	1.614"	1.968"	2.086"	2.401"
24	24	24	20	1.850"	2.165"	2.244"	2.558"

* Indicative torque, needs to be adjusted depending on the cable used

Spanner size

Shell size	JCS/JC		JCSL/JCL	
	Cable gland body	Backshell nut	Cable gland body	Backshell nut
10	0.669"	0.551"	0.669"	0.669"
12 & 14	0.866"	0.787"	0.866"	0.866"
16 & 18	1.023"	0.944"	1.181"	1.181"
20, 22 & 24	1.299"	1.181"	1.574"	1.574"

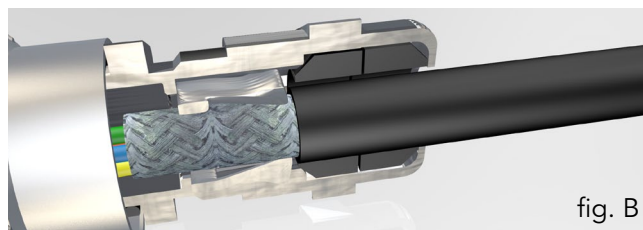
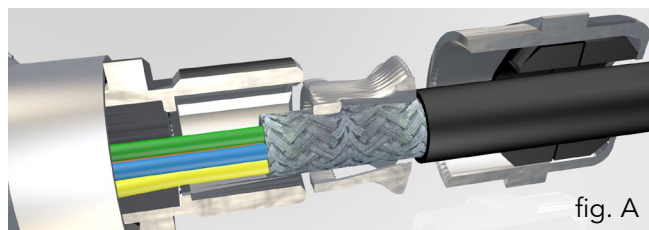
UTO0 or UTO7 with UTO6 + JCS or JC or JCSL or JCL for Shielded Cable



- Slide accessories onto the cable
- Strip external cable jacket (see dimension H and L in the table below)
- Strip wires and crimp contacts (see pages 140 & 141)
- Insert contacts into connector cavities (insert manually or use tool RTM205)
- Screw adapter to the rear of the connector body and screw cable

gland body to adapter and tighten (recommended torque: see table below)

- Mate the plug with the receptacle to make the following step easier
- Slide ferrule inside the cable gland body as shown in fig. A
- Tighten backshell nut with cable gland body as shown in fig. B (recommended torque: see below).



Shell size	Adapter tightening torque (Nm)	Cable gland body tightening torque (Nm)	Backshell nut tightening torque (Nm)	H min. (inch)				L min. (inch)
				JCS/JCSL		JC/JCL		
				Male	Female	Male	Female	
10	6	6	5	1.968"	2.283"	2.401"	2.677"	0.314"
12	10	10	8	2.126"	2.401"	2.559"	2.874"	0.472"
14	10	10	8	2.322"	2.598"	2.874"	3.149"	0.472"
16	14	14	12	2.677"	2.952"	3.110"	3.385"	0.472"
18	14	14	12	2.834"	3.149"	3.267"	3.582"	0.472"
20	24	24	20	3.149"	3.503"	3.543"	3.858"	0.551"
22	24	24	20	3.267"	3.582"	3.700"	4.015"	0.551"
24	24	24	20	3.464"	3.779"	3.858"	4.173"	0.551"

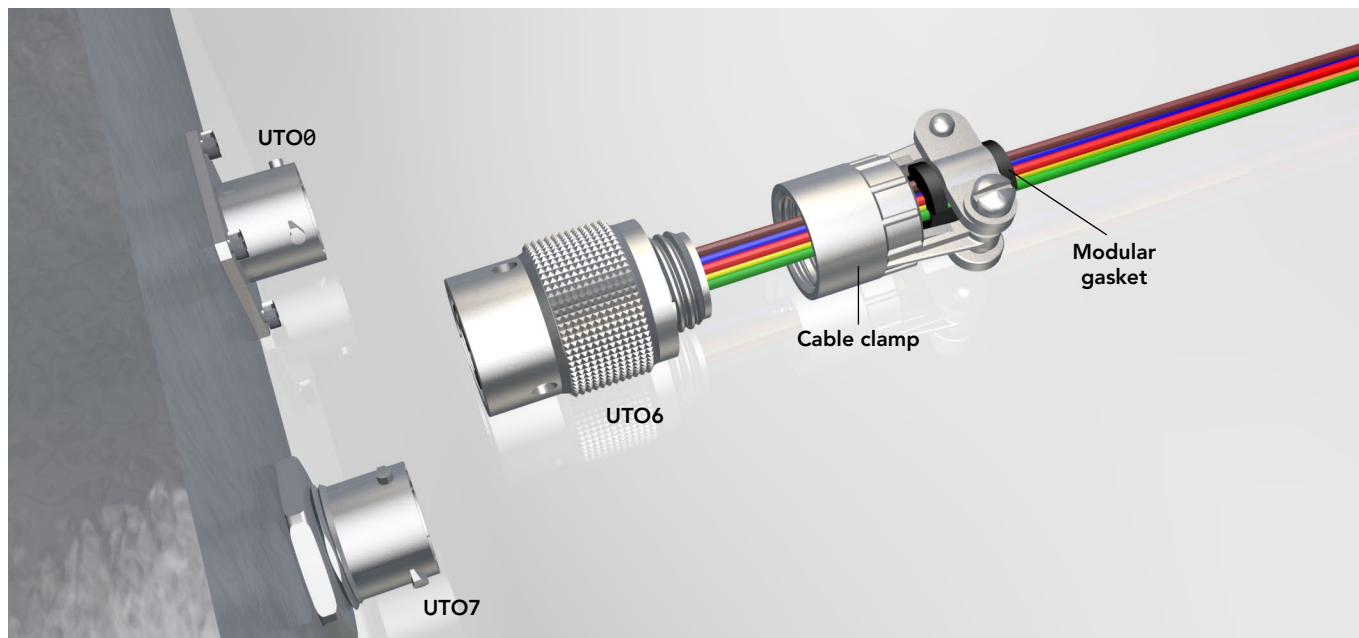
* Indicative torque, needs to be adjusted depending on the cable used

Spanner size

Shell size	JCS/JC		JCSL/JCL	
	Cable gland body	Backshell nut	Cable gland body	Backshell nut
10	0.669"	0.551"	0.669"	0.669"
12 & 14	0.866"	0.787"	0.866"	0.866"
16 & 18	1.023"	0.944"	1.181"	1.181"
20, 22 & 24	1.299"	1.181"	1.574"	1.574"

Assembly Instructions (Continued)

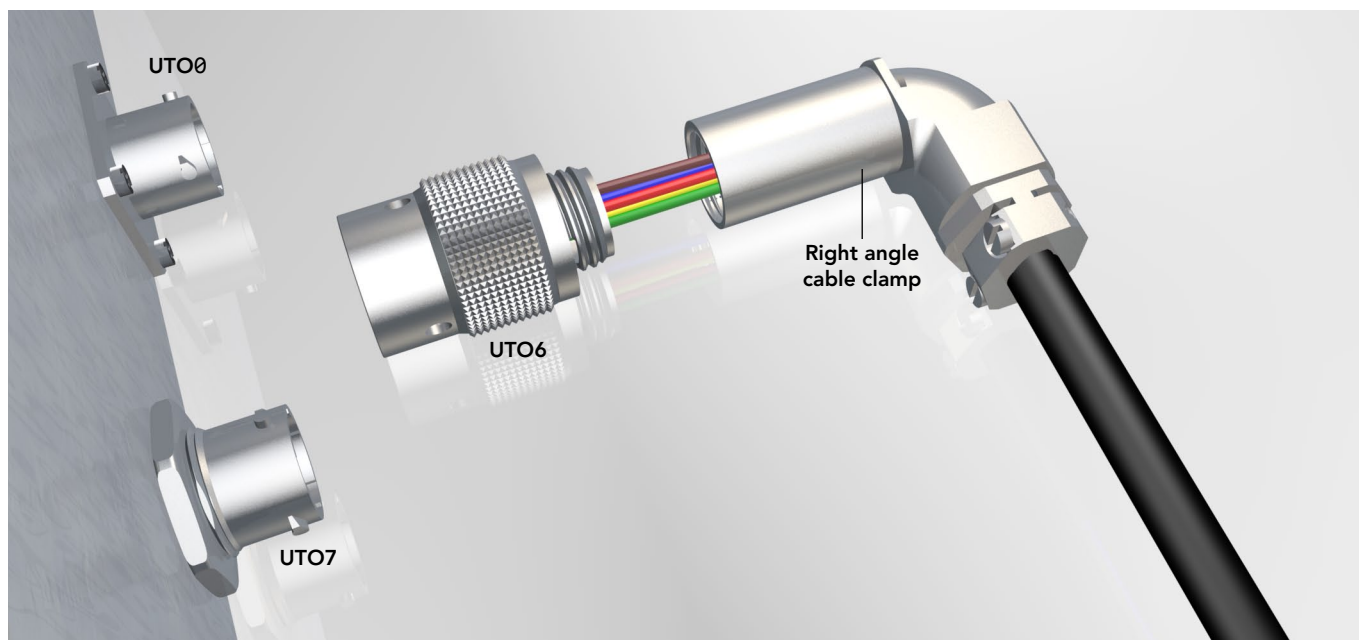
UTO0 or UTO7 with UTO6 + AC Backshell Assembly



- Slide accessories onto the cable
- Strip external cable jacket
- Strip wires and crimp contacts (see pages 140 & 141)
- Insert contacts into connector cavities (insert manually or use tool RTM205)
- Tighten backshell with plug and mate plug with a receptacle (recommended torque values to be applied according to the table below)
- Tighten backshell screws.

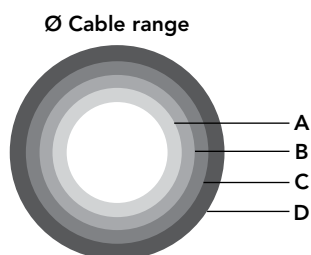
Shell size	Cable clamp tightening torque (Nm)	Clamp (inch)	
		Min	Max
10	4	0.059"	0.196"
12	5	0.118"	0.322"
14	5	0.157"	0.393"
16	9	0.236"	0.511"
18	9	0.334"	0.629"
20	11	0.393"	0.629"
22	13	0.354"	0.759"
24	15	0.433"	0.811"

UTO00 or UTO7 with UTO6 + LPGN Backshell Assembly



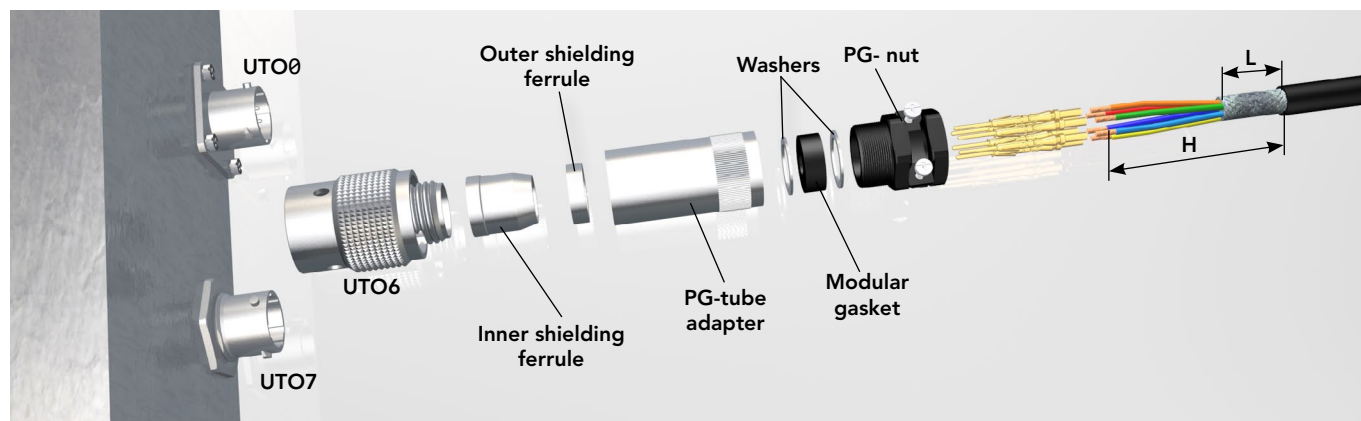
- Remove inner part of the modular gasket to adjust the internal diameter to fit the cable (see table)
- Slide accessories onto the cable
- Strip external cable jacket
- Strip wires and crimp contacts (see pages 140 & 141)
- Tighten backshell with plug and mate plug with a receptacle (recommended torque values to be applied according to the table below)
- Tighten backshell screws.

Shell size	Right angle cable clamp tightening torque (Nm)	Ø Cable range (inch)			
		A	B	C	D
10	6	0.196"	0.314"	-	-
12	10	0.275"	0.413"	0.511"	
14	10	0.275"	0.413"	0.511"	0.629"
16	14	0.314"	0.413"	0.511"	0.629"
18	14	0.314"	0.413"	0.511"	0.629"
20	24	0.433"	0.590"	0.708"	0.866"
22	24	0.433"	0.590"	0.708"	0.866"
24	24	0.748"	0.905"	1.063"	1.220"



Assembly Instructions (Continued)

UTO0 or UTO7 with UTO6 + JCPGN Backshell Assembly



- Mate UTO6 (plug) with UTO0 or UTO7 already mounted on a panel
- Slide accessories onto the cable
- Strip external cable jacket (see dimension H and L)
- Strip wires and crimp contacts (see pages 140 & 141)
- Insert contacts into connector cavities (insert manually or use RTM205 tool)

- Place cable braid shield over inner shielding ferrule (See fig. A) and slide the outer ferrule over the braid shield for UTOS-JCPGN
- Screw PG-tube adapter with plug (recommended torque: see below table)
- Tighten PG-nut with PG-tube adapter (See fig. B)
- Tighten PG-nut screws.

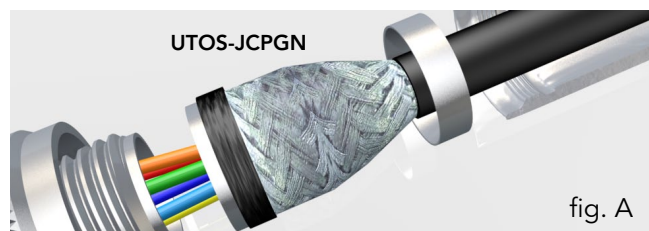


fig. A

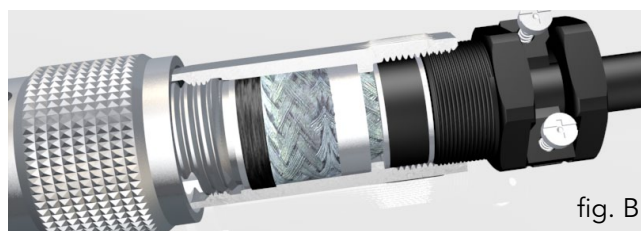
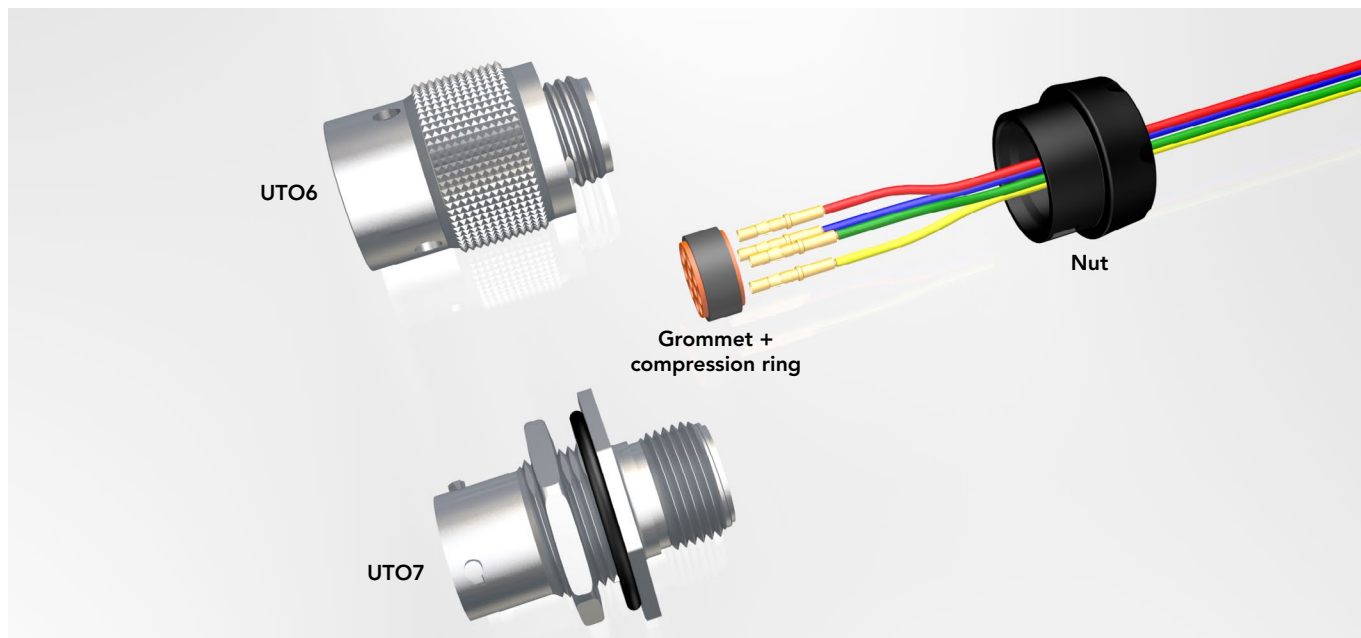


fig. B

Shell size	PG-tube tightening torque (Nm)	PG-nut tightening torque (Nm)	Ø Cable range (inch)		H min. (inch)		L min. (inch)
			UTO	UTOS	Pin contacts	Socket contacts	
10	4	1.5	0.157" to 0.393"	0.157" to 0.346"	1.043"	1.346"	0.692"
12	6	1.5	0.157" to 0.468"	0.157" to 0.468"	1.043"	1.346"	0.692"
14	10	3.5	0.255" to 0.531"	0.255" to 0.531"	1.165"	1.464"	0.811"
16	10	6.5	0.255" to 0.629"	0.255" to 0.629"	1.244"	1.543"	0.889"
18	10	6.5	0.255" to 0.629"	0.255" to 0.629"	1.452"	1.665"	1.051"
20	15	9	0.354" to 0.826"	0.354" to 0.826"	1.433"	1.645"	1.027"
22	15	9	0.354" to 0.826"	0.354" to 0.826"	1.708"	1.921"	1.307"
24	15	12	0.669" to 1.161"	0.669" to 1.161"	1.7243"	1.937"	1.322"

Ø individual braid shield conductor between 0.011" and 0.019".
Torques to be applied with the plug mated with the receptacle.

UTO6 or UTO7 with GN Backshell Assembly

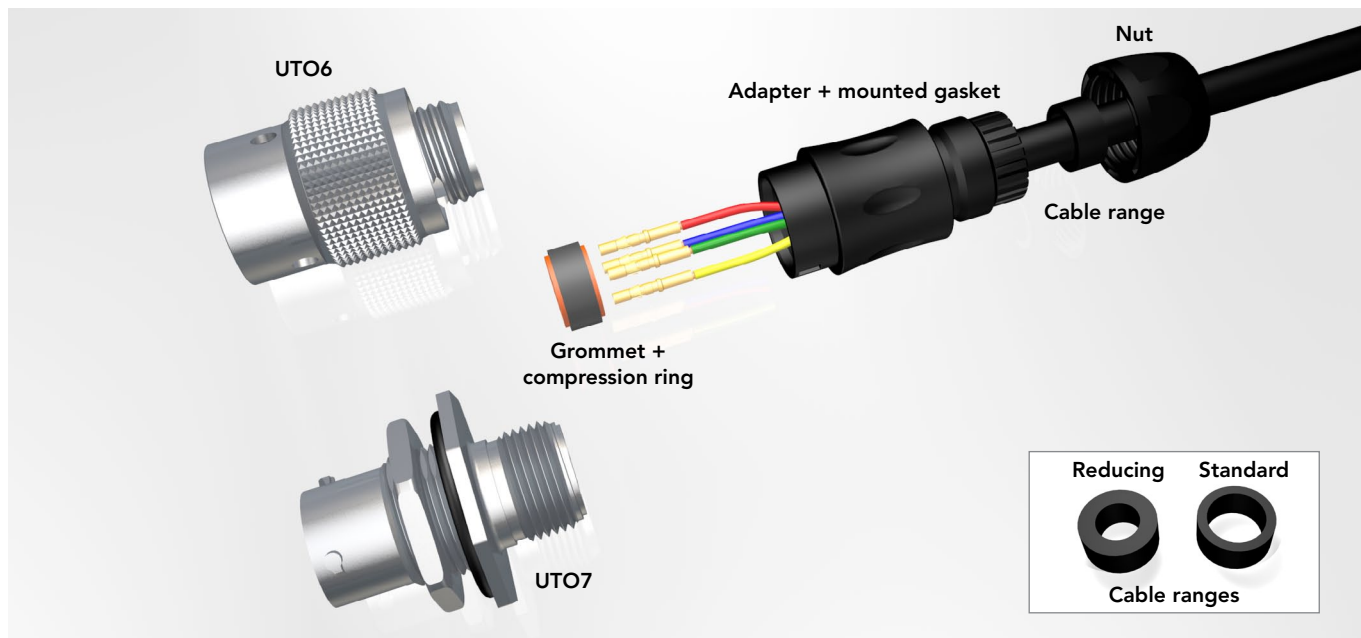


- Strip wires and crimp contacts (see pages 140 & 141)
- Insert first contact into the grommet (first contact in cavity A, no tool is required). Then insert the contact in the connector cavity A (insert manually or use tool RTM205)
- Insert the other contacts
- Tighten the nut to rear of either UTO7 or UTO6 (recommended torque values to be applied according to the table below).

Shell size	layout	Nut tightening torque (Nm)	Ø Wire (inch)
10	4	1	From 0.066" to 0.118"
12	8	1.5	
14	7	1.5	
14	12	1.5	

Assembly Instructions (Continued)

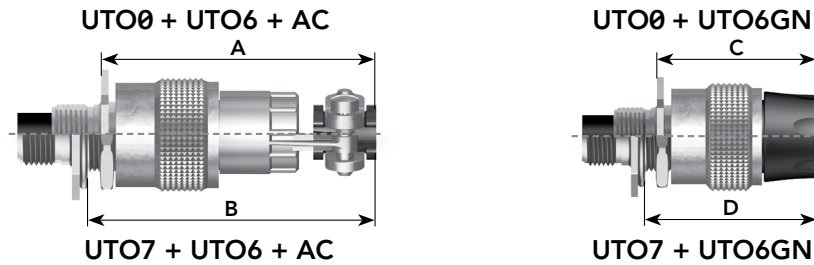
UTO6 or UTO7 with GJC Backshell Assembly



- Strip wires and crimp contacts (see pages 140 & 141)
- Insert first contact into the grommet (first contact in cavity A, no tool is required). Then insert the contact in the connector cavity A (insert manually or use tool RTM205)
- Insert the other contacts
- Tighten adapter with plug, choose right seal (waste the other seal)
- Tighten the nut to rear of either UTO7 or UTO6 (recommended torque values to be applied according to the table below).

Shell size	Layout	Recommended jacket strip length (inch)		Adapter tightening torque (Nm)	Nut tightening torque (Nm)	Ø Cable range Standard seal (inch)	Ø Cable range Reducing seal (inch)	Ø Wire (inch)
		Male	Female					
10	4	0.826"	1.141"	1.5	1	0.098"/0.314"	0.059"/0.196"	
12	8	0.984"	1.299"	2	2.5	0.196"/0.472"	0.118"/0.354"	
14	7	1.141"	1.417"	3	2.5	0.275"/0.551"	0.196"/0.472"	
14	12	1.141"	1.417"	3	2.5	0.275"/0.551"	0.196"/0.472"	

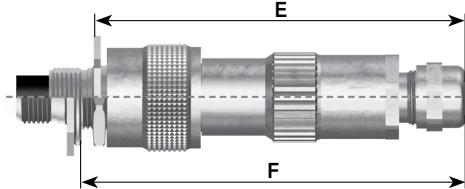
Mated Connector Length with Backshell



Shell size	UTO0 + UTO6		UTO7+ UTO6	
	+ AC backshell	+ GN backshell	+ AC backshell	+ GN backshell
	A max (inch)	C max (inch)	B max (inch)	D max (inch)
10	2.106"	1.539"	2.295"	1.728"
12	2.106"	1.531"	2.295"	1.720"
14	2.047"	1.551"	2.236"	1.740"
16	2.184"	-	2.373"	-
18	2.224"	-	2.413"	-
20	2.303"	-	2.519"	-
22	2.244"	-	2.460"	-
24	2.322"	-	2.539"	-

Backshell without shielding

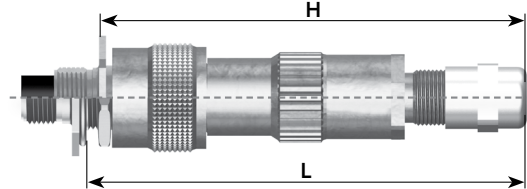
UTO0 + UTO6 + UTO with
JCS or JC or JCSL or JCL



UTO7 + UTO6 + UTO with
JCS or JC or JCSL or JCL

Backshell with shielding

UTO0 + UTO6 + UTOS with
JCS or JC or JCSL or JCL

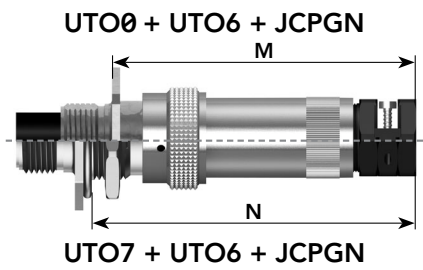


UTO7 + UTO6 + UTOS with
JCS or JC or JCSL or JCL

Shell size	UTO0 + UTO6 + UTO with				UTO7+ UTO6 + UTO with				UTO0 + UTO6 + UTOS with				UTO7+ UTO6 + UTOS with			
	JCS	JC	JCSL	JCL	JCS	JC	JCSL	JCL	JCS	JC	JCSL	JCL	JCS	JC	JCSL	JCL
	E max	E max	E max	E max	F max	F max	F max	F max	H max	H max	H max	H max	L max	L max	L max	L max
10	2.681"	3.153"	2.681"	3.153"	2.866"	3.338"	2.866"	3.338"	3.074"	3.547"	3.114"	3.586"	3.259"	3.732"	3.299"	3.771"
12	2.681"	3.192"	2.720"	3.232"	2.866"	3.377"	2.905"	3.417"	3.192"	3.704"	3.192"	3.704"	3.377"	3.889"	3.377"	3.889"
14	2.877"	3.429"	2.917"	3.468"	3.062"	3.614"	3.102"	3.653"	3.289"	3.940"	3.289"	3.940"	3.574"	4.125"	3.574"	4.114"
16	3.232"	3.665"	3.468"	3.901"	3.417"	3.850"	3.653"	103.8	3.625"	4.058"	4.019"	4.452"	3.810"	4.243"	4.204"	4.637"
18	3.350"	3.763"	3.586"	3.999"	3.535"	3.948"	3.771"	4.184"	3.744"	4.157"	4.137"	4.551"	3.929"	4.342"	4.322"	4.736"
20	3.873"	4.259"	4.149"	4.535"	4.090"	4.476"	4.366"	4.751"	4.405"	4.791"	4.759"	5.145"	4.621"	5.007"	4.976"	5.362"
22	3.964"	4.409"	4.240"	4.684"	4.180"	4.625"	4.456"	4.901"	4.495"	4.940"	4.850"	5.295"	4.712"	5.157"	5.066"	5.511"
24	4.208"	4.602"	4.484"	4.877"	4.425"	4.818"	4.700"	5.094"	4.740"	5.133"	5.094"	5.488"	4.956"	5.350"	5.310"	5.704"

Note: all dimensions are in inches

Mated Connector Length with Backshell (Continued)



Shell size	UTO0 + UTO6 + JCPGN	UTO7+ UTO6 + JCPGN
	M max (inch)	N max (inch)
10	3.244"	3.429"
12	3.330"	3.515"
14	3.527"	3.712"
16	3.740"	3.925"
18	3.901"	4.086"
20	4.374"	4.590"
22	4.653"	4.870"
24	5.232"	5.452"

Note: all dimensions are in inches

Rated Current & Working Voltage

Current Carrying Capacity

The current carrying capacity of a connector is limited by the thermal properties of materials used in its construction. The amount of current that can be handled depends on the size of cable used, the ambient temperature and the heat that is generated inside the connector. Part 3 of the IEC 60512 standard determines through a derating curve, the maximum current permissible, which varies from one layout to another (Fig.1 & Fig.2). Wire size plays an important role in dissipating heat and avoid overheating (Fig.1 & Fig.3).

Please note that the curve should be adjusted when dealing with potential hot spots, which can occur as a result of unequal loading of current across a number of contacts. As a general rule, it is best to avoid placing power handling contacts in the middle of the connector; try to locate them towards the edge where heat can be dissipated more effectively. Eventually you should find a level which represents the permissible operating range:

Fig.1: UTO 12-4 – 1.5mm² wires

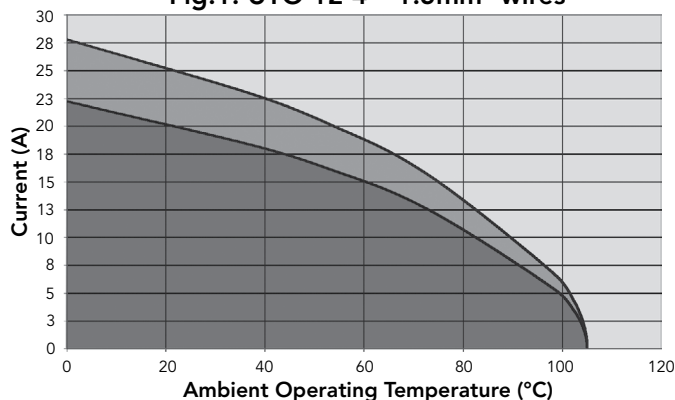


Fig.2: UTO 12-8 – 1.5mm² wires

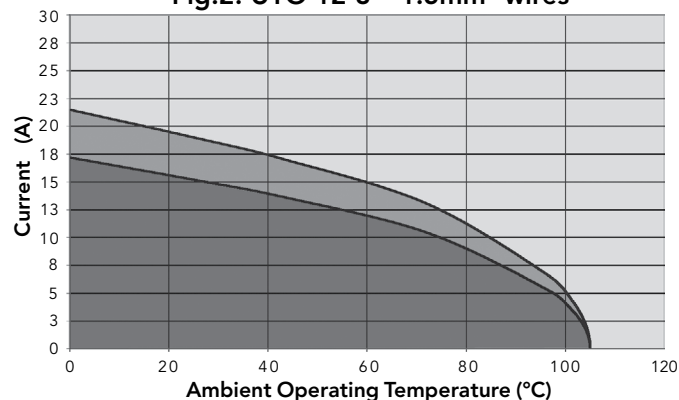
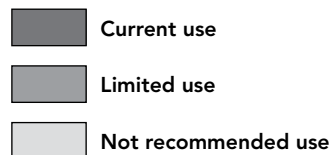
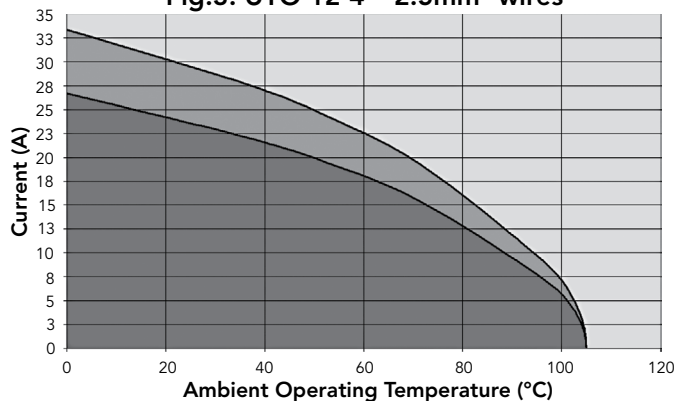


Fig.3: UTO 12-4 – 2.5mm² wires



The **rated current** is defined as uninterrupted continuous current that a connector can take when all contacts are energized simultaneously without exceeding the maximum limit of temperature. The earth contact is never loaded.

Shielding Effectiveness/Corrosion

Shielding Effectiveness

EMC (Electro-Magnetic Compatibility) means a device (e.g. a connector) can tolerate interferences and continue to work properly.
It's generally measured via the shielding effectiveness.
This value is a ratio between the power radiated inside to the maximum power interferences outside.

$$(dB)=10\log \frac{P_{in}}{P_{out}}$$

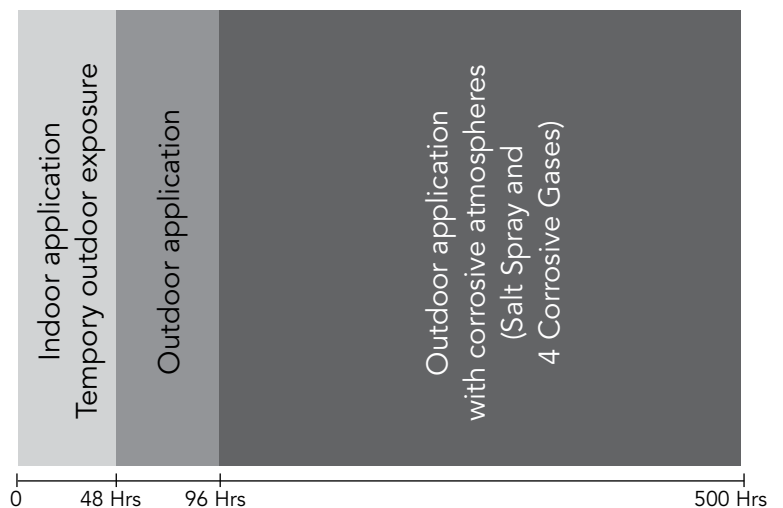
Pin: Power in
Pout: Power out



Corrosion Resistance

Control of corrosion impact on electronic devices is an important expertise. Metal connectors suitable for outdoor and indoor use should be able to withstand climate ingress, exposure to salt spray and corrosive gases while still maintaining mechanical and electrical functionality.

Over the years, many different test methods have been developed but never really captured the exact equivalence between testing scenarios and real electronic device exposure to corrosive environments. SOURIAU has been developing, manufacturing and testing connector solutions for more than 90 years and has developed a unique corrosion test based on Salt Spray exposure combined with four additional corrosive gases. Typical industrial applications may involve exposure to corrosive atmospheres equivalent to 48 or 96 hours. SOURIAU's UTO product series has been validated to withstand corrosive agent exposure at these timeframes. In addition, we can offer different solutions and plating options to withstand longer corrosion exposure times and test up to 500 hours.



UL94 + UL1977

Underwriter Laboratories



There are two main standards for industrial connectors: UL94 & UL1977

UL94

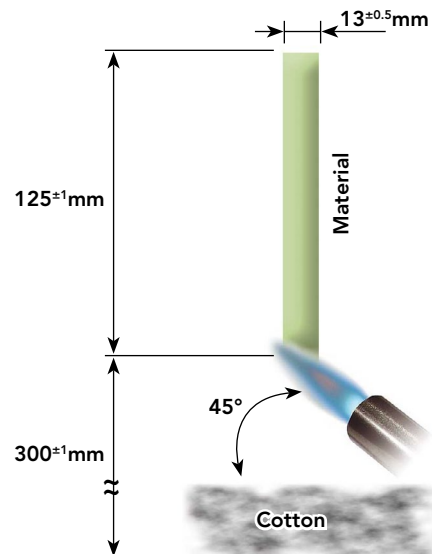
This standard is dedicated to plastics flammability. It characterizes how the material burns in various orientation and thicknesses.

The UTO series has been rated at **V-0** & **HB**.

Procedure: A specimen is supported in a vertical or horizontal position and a flame is applied to the bottom of the specimen. The flame is applied for ten seconds and then removed until flaming stops, at which time the flame is reapplied for another ten seconds and then removed. Two sets of five specimens are tested.

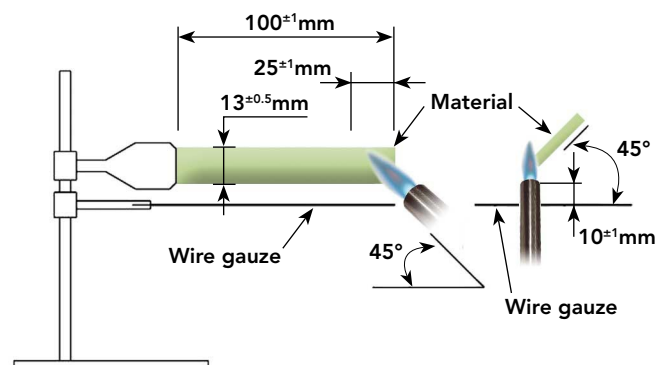
V-0 Vertical burning:

- Specimens must not burn with flaming combustion for more than 10 seconds after each test flame application
- Total flaming combustion time must not exceed 50 seconds for each set of 5 specimens
- Specimens must not burn with flaming or glowing combustion up to the specimen holding clamp
- Specimens must not drip flaming particles that ignite the cotton
- No specimen can have glowing combustion remain for longer than 30 seconds after removal of the test flame.



HB Horizontal burning:

- A material classified HB shall not have a burning rate exceeding 40 mm per minute over a 75 mm span for specimens having a thickness of 3.0 to 13 mm
- A material classified HB shall not have a burning rate exceeding 75 mm per minute over a 75 mm span for specimens having a thickness less than 3.0 mm
- A material classified HB shall cease to burn before the 100 mm reference mark.



UL94 + UL1977 (Continued)

Underwriter Laboratories 

UL1977

There are several standards which deal with plug and receptacle. Each of them is only for a small area of applications. It could be telecommunication, etc. The UL 1977 covers single and multipole connectors intended for factory assembly.

Requirements apply to devices taking into account intensity and voltage. The categories are as follows:

	0	30 V (42 V peak)	600 V
0			
	Type 0	Type 1A	
8.3 A			
	Type 1B	Type 2	
31 A			
		Type 3	
200 A			
	Type 4		
1000 A			

According to above table, the level of performance that has to be reached could be different. Most of them are explained in the following page.

Insulating materials:

Material uses for electrical insulation, as a minimum, have to comply with the characteristics shown below:

• Minimum ratings for polymeric materials

Type	Flame rating	Relative thermal index (RTI) Electrical/mechanical w/o impact */**
0	-	50/50
1A	HB	50/50
1B	HB	50/50
2	HB	50/50
3	HB	50/50
4	HB	50/50

* The RTI of the material shall not be lower than the temperature measured during the Temperature Test.

** For a thickness less than that for which a value has been established, the RTI of the minimum thickness with an established value shall be used.

Assembly:

Connector has to be keyed to prevent any mismatching that can damage the machine or hurt the user. In the same way, plugs and sockets have to be equipped to protect persons against contact with live parts.

Finally the identified grounding contact shall be located so that the corresponding electrical continuity has to be completed before any other contact.

UL1977

Spacing:

For a 250V max connector, distance through air or over material shall be 1.2mm whereas from 250V to 600V connector the spacing is 3.2mm minimum. These distances have to be taken between uninsulated live parts as shown in the matrix below:

• Applicability of spacing requirements

Type	Uninsulated live part - uninsulated live part of opposite polarity	Uninsulated live part - uninsulated grounded metal part	Uninsulated live part - exposed dead metal part
0	No	No	No
1A	Yes	Yes	Yes
1B	Yes	Yes	No
2	Yes	Yes	Yes
3	Yes	Yes	Yes
4	Yes	Yes	Yes

An alternative way to determine voltage rating is with the Dielectric-Withstand test. If during one minute there is no arc-over or breakdown the rated voltage is given as shown below:

- a) 500 volts for a type 1B device
- b) 1000 volts plus twice rated voltage for types 1A, 2, 3 and 4 devices.

Marking:

A device shall be legibly marked with the manufacturer's trade name, trade mark, or other descriptive marking by which the organization responsible for the product may be identified. (Exception: If the device is too small, or where the legibility would be difficult to attain, the manufacturer's name, trademark, or other descriptive marking may appear on the smallest unit container or carton)

The following shall be marked on the device or on the smallest unit container or carton or on a stuffer sheet in the smallest unit container or carton:

- a) The catalog number or an equivalent designation
- b) The electrical rating in both volts and amperes, if assigned
- c) Whether ac or dc, if restricted
- d) Flammability class, if identified

Example - Marking for the arrangement 10-3:

10A 500V UL94 V-0

IEC 61984 & IP Codes Explained

IEC 61984

The norm is dedicated to connectors with rated voltage above 50V and up to 1000V and rated currents up to 125A per contact. Depending on your application connectors should be compliant with another standard. This has to be double checked with the customer.

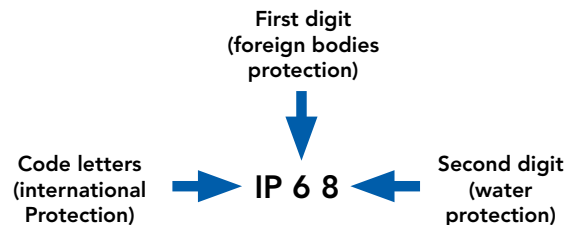
There are a lot of constructional requirements and performances specified in that standard. Most of them are illustrated in greater details hereafter.

Provisions for earthing:

The UTO connector is intended to be used on Class I or Class III (see IEC 61140) systems. Even if the purpose of our connector is not to interrupt current, there is a need to add a protective earth contact. This one shall be a "First mate, last break" style. Critically, among all of the normal assumptions we make in designing a connector, this contact has to be considered as a live part and must be protected attached to the ground wire.

IP Code:

IP is a coding system defined by the IEC 60529 to indicate the degrees of protection provided by an enclosure. The aim of this is to give information regarding the accessibility of live parts against ingress of water and other foreign bodies.



1 st digit	Degree of protection	2 nd digit	Degree of protection
0	No protection against accidental contact. No protection against solid foreign bodies.	0	No protection against water.
1	Protection against contact with any large area by hand and against large solid foreign bodies with a diameter bigger than 50 mm.	1	Drip-proof. Protection against vertical water drips.
2	Protection against contact with the fingers. Protection against solid foreign bodies with a diameter bigger than 12 mm.	2	Drip-proof. Protection against water drips up to a 15° angle.
3	Protection against tools, wires or similar objects with a diameter bigger than 2.5 mm. Protection against small solid bodies with a diameter bigger than 2.5 mm.	3	Spray-proof. Protection against diagonal water drips up to a 60° angle.
4	Same as 3 however diameter is bigger than 1 mm.	4	Splash-proof. Protection against splashed water from all directions.
5	Full protection against contact. Protection against interior injurious dust deposits.	5	Hose-proof. Protection against water (out of a nozzle) from all directions.
6	Total protection against contact. Protection against penetration of dust.	6	Protection against temporary flooding.
		7	Protection against temporary immersions.
		8	Protection against water pressure. Pressure to be specified by supplier.

UTO offers high sealing performance IP68 / 69K...
Even in dynamic situations.

In addition to the IEC 60529 we conjointly use the DIN 40050 part 9 which are dedicated to road vehicles. The main differences are:

- **First digit:** 5 replaced by 5K, 6 by 6K. In the DIN the tested equipment is not depressurized as it is in the IEC.
- **Second digit:** 5K and 6K has been added and are equivalent respectively to 5 and 6 but with higher pressure. 9K which represents the High pressure cleaning.

9K	High pressure hose-proof. Protection against high pressure water (out of a nozzle) from all directions.
----	--

IEC 61984

Overvoltage

UTO connectors are qualified to be used on systems rated at Overvoltage category III.

Per the IEC 60664-1 (formerly VDE 0110) each category is linked to the end application and where the device will be implemented:

- **Category IV** (primary overcurrent protection equipment):
Origin of the installation
- **Category III** (any fixed installation with a permanent connection)
Fixed installation and equipment and for cases where the reliability and the availability is subject to special requirements
- **Category II** (domestic appliances):
Energy consuming equipment to be supplied from the fixed installation
- **Category I** (protected electronic circuit):
For connection to circuit in which measures are taken to limit transient overvoltage.

Pollution degree

Per the IEC 60664-1 (formerly VDE 0110) the environment affects the performance of the insulation. Particles can build a bridge between two metal parts. As a rule dust mixed with water can be conductive and more generally speaking metal dust is conductive. Finally, the standard defines 4 levels of pollution:

- **Degree 1** (Air conditioned dry room):
No pollution or only dry, non conductive pollution occurs. The pollution has no influence.
- **Degree 2** (Personal computer in a residential area):
Only non conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is to be expected.
- **Degree 3** (Machine tools):
Conductive pollution occurs or dry non-conductive pollution occurs which becomes conductive due to condensation which is to be expected.
- **Degree 4** (Equipments on roof, locomotives):
Continuous conductivity occurs due to conductive dust, rain or other wet conditions.

Finally, the harsher the environment is, the longer clearance and creepage distances should be. Nonetheless, according the IEC 61984, enclosure rated at IP54 or higher can be dimensioned for a lower pollution degree. This applies to mated connectors disengaged for test and maintenance.

Marking

The marking should give enough details to the user to know what the main characteristics are and without going deep in technical documentation. Below examples identify the suitability of the connector:

- **Example 1:**
Marking of a connector with rated current 16A, rated voltage 400V, rated impulse voltage 6kV and pollution degree 3, 2 and 1 for use in any system, preferably unearthed or delta-earthed systems:

16A 400V 6kV 3

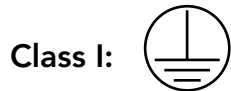
- **Example 2:**
Marking of a connector with rated current 16A, rated insulation voltages line-to-earth 250V, line-to-line 400V, rated impulse voltage 4kV and pollution degree 3, 2 and 1 for use in earthed systems:

16A 250V 400V 4kV 3

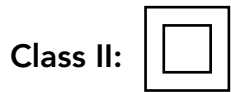
IEC 61140 Explained

IEC 61140

On a daily basis, we are using many electrical appliances, some are grounded, and some are not. The levels of grounding protection are clearly defined by the International Electrotechnical Commission standard IEC 61140, a standard that has an influence on our connectors and how they should be used; our customers therefore need to pay particular attention to the three categories defined within this standard to ensure compatibility with their system. Everything explained hereafter is valid for connectors not intended to interrupt current.

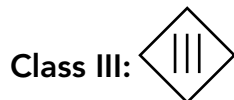


Devices which belong to this category have their chassis grounded via the ground wire (green/yellow in Europe, green in the US, Canada and Japan). A fault in the appliance might cause a live conductor to energize the casing. In this case, the current flows to the ground conductor and the circuit interrupter will cut off the power supply. In case of the UTO series, it means the envelope (coupling ring, backshell and housing) may become live, therefore, care needs to be taken to attach the connector to the ground. This is usually done via the ground conductor using a splice between the ground contact and the housing.



Products in this category have reinforced insulation, meaning that the casing does not need to be connected to ground. In this case, the possibility of electric shock has been removed. Most of the time, reinforced insulation means double insulation, i.e. the second layer will take over the first one in case the first one fails. The UTO series is not designed to comply with this standard, so we cannot recommend it for this product category.

Note: UL 1310 also defines a class II device, but in that case this is just to set the upper limit of use, like a wall charger for our cell phone.



In this category, electrical appliances are fed by a low voltage source (<48VAC or < 120VDC). In normal conditions live conductors can be accessible without any risk for the end user. No particular attention needs to be taken in regards to UTO series when it comes to a class III device.

Conclusion :

UTO series can be used in class I and class III environments, but each category affects the product performance. Throughout the catalog, current and voltage ratings have been given for class I devices keeping in mind the ground conductor needs to be attached according to recommended wiring instructions.

Note: Special applications like recreational vehicles are not under the scope of the IEC 61140.

What is NEMA Rating ?

- NEMA ratings vs IP ratings

Whereas IP ratings only consider protection against ingress of foreign bodies (first digit) and ingress of water (second digit), NEMA ratings consider these but also verify protection from external ice, corrosive materials, oil immersion, etc.

The correlation between NEMA & IP being limited only to dust and water, we can state that a NEMA type is equivalent to an IP rating but it is not possible to say the contrary.

Below a list of some NEMA standards:

Enclosure rating	IP20	IP22	IP55	IP64	IP65	IP66	IP67	IP68
Type 1	•							
Type 3				•				
Type 3R		•						
Type 3S				•				
Type 4						•		
Type 4X						•		
Type 6							•	
Type 6P								•
Type 12			•					
Type 13					•			

• indicates compliance

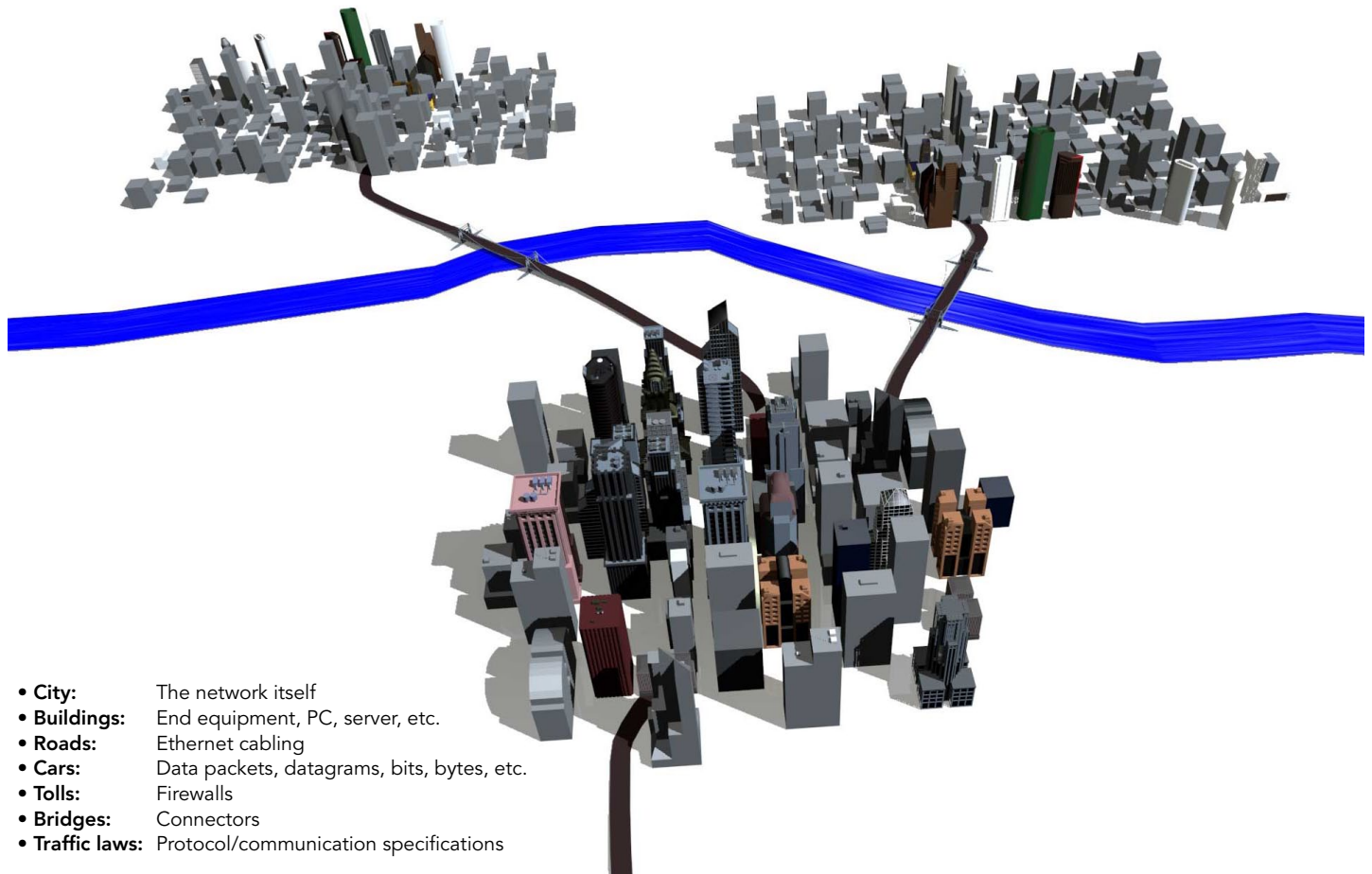
Type 6 rating can be either Type 6 or Type 6P - please see below:



6	IP67	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment, falling dirt, hose-directed water, the entry of water during occasional temporary submersion at a limited depth and damage from external ice formation.
6P	IP68	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment, falling dirt, hose-directed water, the entry of water during prolonged submersion at a limited depth and damage from external ice formation.

Ethernet for the Layman

In order to explain basic Ethernet theory, we can use a functional comparison to a busy city with highways, buildings and cars. To illustrate this, the table below provides correlation between the different components/pieces/links that encompass Ethernet network connectivity, and the larger scale infrastructure of a metropolitan city.



- **City:** The network itself
- **Buildings:** End equipment, PC, server, etc.
- **Roads:** Ethernet cabling
- **Cars:** Data packets, datagrams, bits, bytes, etc.
- **Tolls:** Firewalls
- **Bridges:** Connectors
- **Traffic laws:** Protocol/communication specifications

Ethernet Basics

Ethernet is a widely used communications protocol that is used to transmit data packets (datagrams) between network devices. Imagine a highway in a large metropolitan area six lanes wide at rush hour. The vehicles on the highway need rules to follow so that they get to their destination without crashing into each other. In an Ethernet network link, there could be 100 million bits of information transmitted in one second. In the Ethernet standard, there exist rules to govern packet structure, transmission requirements, error correction, communication with end equipment, etc.

Examining the differences between 100Mhz, 100 Base TX, Cat5e/Cat6. What does it all mean?

When discussing connectors and Ethernet, there are a few key details to be aware of:

- 100Mhz is a measurement of Frequency for the signal
 - Comparable to the Speed Limit of a highway
- 100BaseTX (or Fast Ethernet) is an Ethernet link standard and identifies available link bandwidth. The bandwidth is measured in units of Mbits/S (megabits per second)
 - Comparable to the number of cars that pass a point in one second
- Cat5e/Cat6 are an EIA/TIA standard for performance and physical characteristics for cables and connectors
 - Comparable to performance specifications of the car and highway.

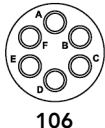
In connectors and cables, Fast Ethernet uses 2 pairs. One for transmit and one for receive. This way data traffic can flow in both directions simultaneously.

Souriau offering:

Standard solutions.

UTO size 10, 6 contacts - Cat5e
Twisted pairs

1 (Pair 1) ➔ A
2 (Pair 1) ➔ B
3 (Pair 2) ➔ E
4 (Pair 2) ➔ D

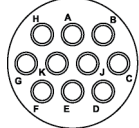


106
6 Ø 1 (#20)

Shielding continuity done in cavity C&F.
Note: Shielding can be replaced by DC power.

UTO size 12, 10 contacts - Cat5e
Twisted pairs

1 (Pair 1) ➔ C
2 (Pair 1) ➔ B
3 (Pair 2) ➔ G
4 (Pair 2) ➔ H

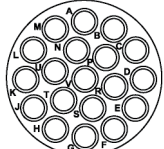


1210
10 Ø 1 (#20)

Cat6 if shielding continuity done by other contact

UTO size 16, 19 contacts -Cat5e
Twisted pairs (1Gb/s)

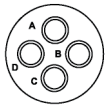
1 (Pair 1) ➔ A
2 (Pair 1) ➔ B
3 (Pair 2) ➔ D
4 (Pair 2) ➔ E
5 (Pair 3) ➔ G
6 (Pair 3) ➔ H
7 (Pair 4) ➔ K
8 (Pair 4) ➔ L



1619
19 Ø 1.6 (#16)

UTO size 10, 4 contacts - Cat6
Quad cable

1 (Pair 1) ➔ A
2 (Pair 1) ➔ B



104
4 Ø 1.6 (#16)

What about using coax contacts ?

Ethernet twisted pairs carry a symmetrical (balanced) signal. Once terminated into a coax contact, the inner core will be protected by a shield - but not the outer contact. Because of EMI issues, the signal will no longer be balanced. Conclusion - it does not work and is not recommended.

What about using Quadrax contacts ?

The Quadrax contact is used in railway applications because of the use of quad cable. In this specific market, the standard Ethernet twisted pairs wires cannot be offered, they are too thin and often solid (not stranded).

In the rest of industry, UTP (Unshielded Twisted Pairs) cables are widely used. The Quadrax contact is not designed to terminate them. And thus, are not advised for industrial applications.

Conclusion

To carry 100Mb/s data signal, 100BaseTX or Fast Ethernet recommends the use of Cat5e connectors as well as Cat5e cable with the support of a 100MHz signal. Nevertheless, a 100Mb/s signal can be transmitted in certain conditions (short distance, only one connector, lower frequency but a different code) thru many other connection materials - not necessarily Cat5e rated.

UTO SERIES

Appendices

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#16 Coaxial Contacts

Coaxial Cable - Contact Monocrimp and Multipiece

Cable type	Impe- dance	Contact type	Ø over jacket		Ø over dielectric		Inner cond size Ext. Ø mm	Ø outer braid		Male contact kit for coaxial cable	Female contact kit for coaxial cable
			inch	mm	inch	mm		inch	mm		
RG161/U	75	Multi piece	0.09"	2.29	0.057"	1.45	-	-	-	RMDXK10D28	RCDXK1D28
RG179A/U	75		0.105"	2.67	0.063"	1.6	0.3	0.084"	2.13 max		
RG179B/U	75		0.105"	2.67	0.063"	1.6	0.3	0.084"	2.13 max		
RG187/U	75		0.11"	2.79 max	0.06"	1.52	0.3				
RG188/U	50		0.11"	2.79 max	0.06"	1.52	0.51	0.078"	1.98 max		
RG174/U	50		0.11"	2.92	0.06"	1.52	0.48	0.088"	2.24 max		
AMPHENOL 21-598	50		0.105"	2.67	0.06"	1.52	0.48	-	-		
RG196/U	50		0.08"	2.03 max	0.034"	0.086	0.3	-	-		
RG178A/U	50		0.075"	1.91	0.034"	0.86	0.3	0.054"	1.37 max		
RG/188A/U	50	Mono crimp	0.110"	2.79	0.06"	1.52	0.51	0.078"	1.98 max	RMDX6036D28	RCDX6036D28
KX21TVT (europe) RG178 B/U	50		0.075"	1.91	0.034"	0.86	0.3	0.054"	1.37 max	RMDX6034D28	RCDX6034D28
RG178 / BU	50		0.075"	1.91	0.034"	0.86	0.3	0.054"	1.37 max	RMDX6050D28	RCDX6016D28
RG174/U	50		0.115"	2.92	0.06"	1.52	0.48	0.088"	2.24 max	RMDX6032D28	RCDX6032D28
RG188A/U	50		0.11"	2.79	0.06"	1.52	0.51	0.078"	1.98 max	RMDX6036D28	RCDX6036D28
RG316/U	50		0.107"	2.72	0.06"	1.52	0.51	0.078"	2.05 max	RMDX6036D28	RCDX6036D28
raychem 5024A3111	50		0.12"	3.05	0.083"	2.11	0.64	0.097"	2.46	RMDX6052D28	RCDX6052D28
raychem 5026e1614	50		0.083"	2.11	0.05"	1.27	0.48	0.067"	1.7	RMDX6036D28	RCDX6036D28
surprenant pn 8134	-	Multi piece	0.1"	2.54	0.058"	1.47	0.3	-	-	RMDXK10D28	RCDXK1D28
PRD PN 247AS- C1123-001	-	Mono crimp	0.103"	2.62	0.06"	1.52	0.51	0.078"	1.98	RMDX6018D28	RCDX6018D28
PRD PN 247AS-C1251	-		0.092"	2.34	0.05"	1.27	0.64	0.067"	1.7	RMDX6018D28	RCDX6018D28
JUDD C15013010902	-		0.087"	2.13	0.05"	1.27	0.48	0.066"	1.67	RMDX6036D28	RCDX6036D28
CDC PIN22939200	-		0.09"	2.29	0.048"	1.22	0.3	0.064"	1.63	RMDX6046D28	RCDX6016D28
CDC PIN22939200	-		0.09"	2.29	0.048"	1.22	0.3	0.064"	1.63	RMDX6050D28	RCDX6016D28
CDC PIN245670000	-		0.104"	2.64	0.067"	1.7	0.3	0.083"	2.11	RMDX6050D28	RCDX6016D28
ampex	-		0.114"	2.9	0.075"	1.91	0.38	0.09"	1.29	RMDX6032D28	RCDX6032D28
TI PN 920580	-		0.7"	1.78	0.038"	0.96	0.48	0.054v	1.37	RMDX6024D28	RCDX6024D28
Honeywell PN 58000062	-		0.12"	3.05	0.077"	1.96	0.41 solid	0.096"	2.44	RMDX6026D28	RCDX6026D28
-	-		0.104"	2.64	0.067"	1.7	0.3	-	2.11	RMDX6050D28	-
-	-		0.09"	2.29	0.048"	1.22	0.3	-	1.63	RMDX6050D28	-
-	-		0.114"	2.9	0.075"	1.91	0.38	-	1.29	RMDX6032D28	RCDX6032D28
-	-		0.07"	1.78	0.038"	0.96	0.48	-	1.37	RMDX6024D28	RCDX6024D28
-	-		0.12"	3.05	0.077"	1.96	0.41	-	2.44	RMDX6026D28	RCDX6026D28

Twisted Cable - Contact Monocrimp and Multipiece

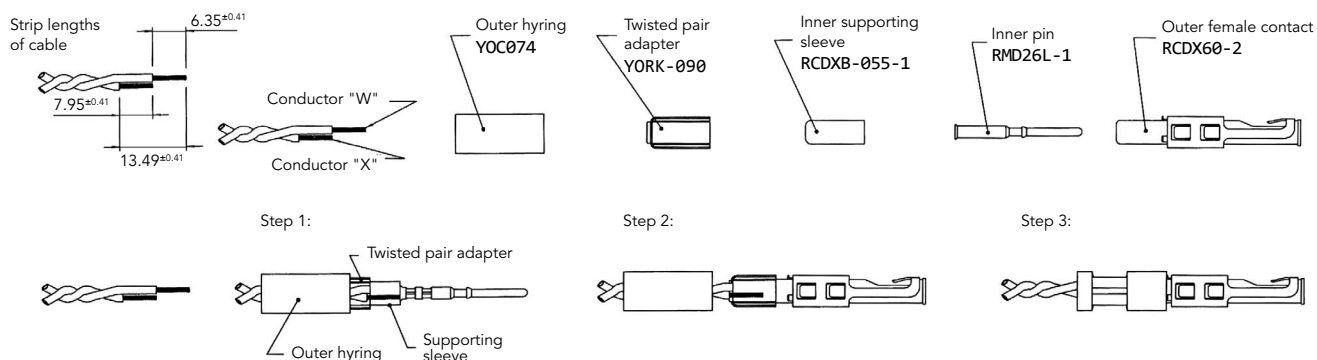
Cable type	Contact type	Inner AWG cond	Ø over jacket (single wire)		Inner cond size		Ø outer braid		Male contact kit for coaxial cable	Female contact kit for coaxial cable
			inch	mm	Stranded definition	Ext. Ø mm	inch	mm		
2#24 stranded MIL-W-16878 type B	Multi piece	24	0.049"	1.24 max	7/.008		-	-	RMDXK10D28	RCDXK1D28
2 #24 solid MIL-W-76 type LW		24	0.047"	1.12 max	1/.0201		-	-	RMDXK10D28	RCDXK1D28
2 #26 stranded MIL-W-76 type LW or MIL-W-16878 type B&E		26	0.043"	1.09 max	7/.0063	0.16	-	-	RMDXK10D28	RCDXK1D28
2 #28 solid MIL-W-81822/3		28	0.028"	0.71 max			-	-	RMDXK10D28	RCDXK1D28
Twisted pair 1/.201 solid MIL-W-76 type LW or MIL-W-16878		26	0.044"	1.12 max	1/.0201	0.511	-	-	RMDXK10D28	RCDXK1D28
Twisted pair solid MIL-W-81822/3		28	0.028"	0.71 max	1/.0126	0.32	-	-	RMDXK10D28	RCDXK1D28
#28 7/.0036 per Hitachi spec ec-711 (13-2820)	Mono crimp	-	0.046"	1.17	7/.0036	-	-	-	RMDX6031D28 + YORX090	RCDX6031D28 + YORX090
20218201		-	0.028"	0.71	-	-	-	-	RMDX6031D28 + YORX090	RCDX6031D28 + YORX090
#30 solid		-	0.025"	0.64	-	-	-	-	RMDX6015D28 + YORX090	RCDX6015D28 + YORX090
#26 7/.0063		26	0.028"	0.71	7/.063	0.16	-	-	RMDX6031D28 + YORX090	RCDX6031D28 + YORX090
#26 19/.004		26	0.049"	1.24	19/.004	-	-	-	RMDX6019D28 + YORX090	RCDX6019D28 + YORX090
#24 7/.008		24	0.049"	1.24	7/.008	-	-	-	RMDX6019D28 + YORX090	RCDX6019D28 + YORX090
#24 19/.005		24	0.057"	1.45	19/.005	-	-	-	RMDX6019D28 + YORX090	RCDX6019D28 + YORX090
-		26	-	1.25	-	-	-	19x0.1	RMDX6019D28 + YORX090	RCDX6019D28 + YORX090
-		24	-	1.25	-	-	-	7x0.2	RMDX6019D28 + YORX090	RCDX6019D28 + YORX090
-		24	-	1.45	-	-	-	19x0.13	RMDX6019D28 + YORX090	RCDX6019D28 + YORX090
-		26	-	0.7	-	-	-	7x0.16	RMDX6031D28 + YORX090	RCDX6031D28 + YORX090

#16 Coaxial Contacts (Continued)

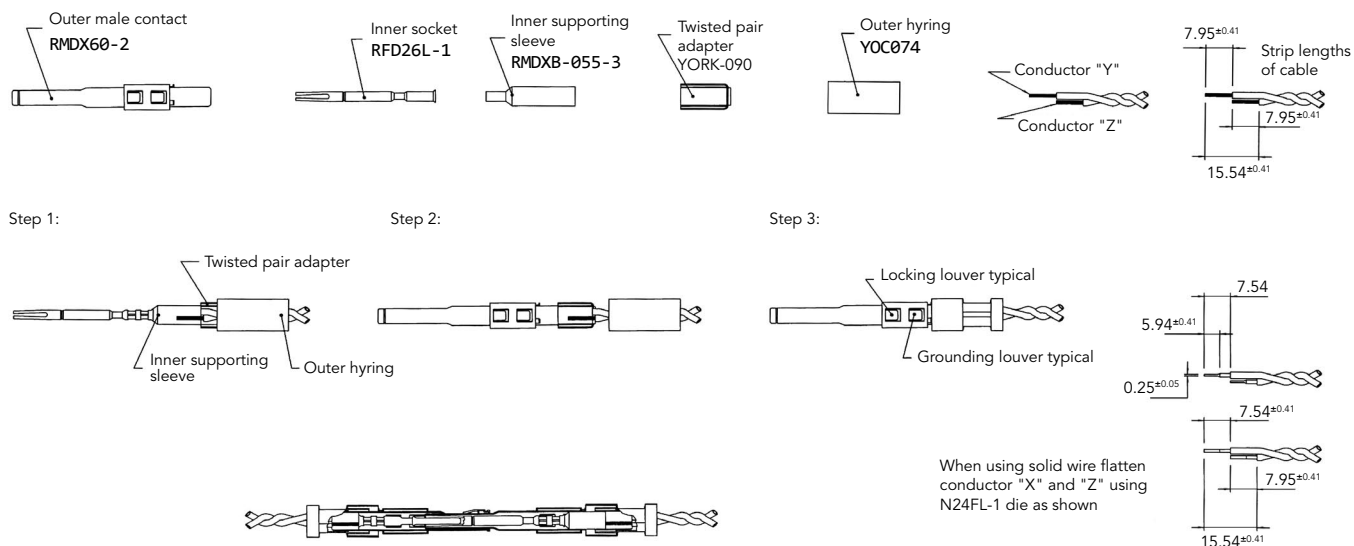
Twisted Pair Cable Multipiece Contact Cabling

Cable reference	Contact type	Male contact	Female contact	Crimp tool	Die set	Stop bushing	Cable strip length			Inner conductor crimp		Braid crimp	
							A	B	C	g dim	t dim	g dim	t dim
2#24 stranded mil w 16878 type B	Multi piece	RMDXK10D28	RCDXK1D28	M10S1J	-	-				See assembly notice			
2 #24 solid mil-w-76 type LW													
2 #26 stranded mil w 76 type LW or mil w16878 type B & E													
2 #28 solid mil-w-81822/3													
twisted pair 1/.201 solid mil w 76 type LW or mil w 16878													
twisted pair solid mil w 81822/3													

Female contact



Male contact

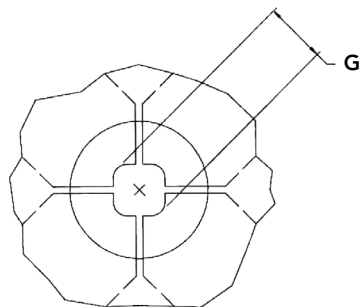
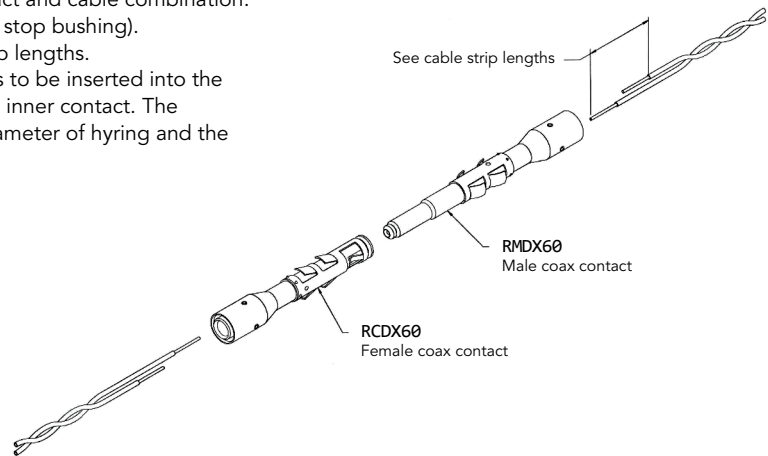
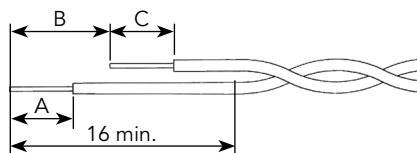


Twisted Pair Cable Monocrimp Contact Cabling

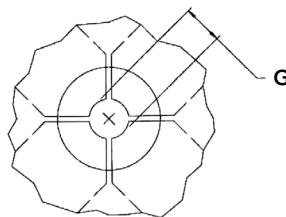
Cable reference	Contact type	Male contact	Female contact	Crimp tool	Die set	Stop bushing	Cable strip length			Inner conductor crimp		Braid crimp	
							A	B	C	g dim	t dim	g dim	t dim
#28 7/.0036 per Hitachi spec ec-711 (13-2820)	Mono crimp	RMDX6031D28 + YORX090	RCDX6031D28 + YORX090	M10S1J	S80	SL105	4.7	6.1	4.32	1.30 to 1.12	1.4 to 1.22	2.97 to 2.84	3.07 to 2.9
20218204					S80	SL105	3.94	6.1	3.16	1.30 to 1.17	1.4 to 1.22	2.97 to 2.84	3.07 to 2.79
#30 solid					S83	SL105	4.7	6.1	4.06	1.22 to 1.12	1.35 to 1.22	2.97 to 2.84	3.12 to 2.95
#26 7/.0063					S80	SL105	4.7	6.1	4.06	1.30 to 1.17	1.4 to 1.22	2.97 to 2.84	3.07 to 2.9
#26 19/.004					M10SG8 ASSY'Y TOOL DIE SET STOP BUSHING M10S1J TOOL		4.7	6.1	4.06	1.22 to 1.17	1.35 to 1.22	2.84 to 2.79	3.12 to 2.97
#24 7/.008							4.7	6.1	4.06	1.22 to 1.17	1.35 to 1.22	2.84 to 2.79	3.12 to 2.97
#24 19/.005							4.7	6.1	4.06	1.22 to 1.17	1.35 to 1.22	2.84 to 2.79	3.12 to 2.97
AWG26 (19x0.1)					M10SG8 crimping kit		4.7	6	4				
AWG24 (7x0.2)													
AWG24 (19x0.13)													
AWG26 (7x0.16)					S80	SL105							

- Select appropriate monocrimp coax twisted pair contact and cable combination.
- Select appropriate crimp tooling (hand tool, S-die set, stop bushing).
- Strip the twisted pair cable to the designated wire strip lengths.
- Insert the stripped cable into the contact. One cable is to be inserted into the inside diameter of hyring, and pushed forward into the inner contact. The second cable is to be inserted between the outside diameter of hyring and the inside diameter of the outer contact body.
- Crimp the contact.

Cable strip length



Braid crimp (G) to be measured with die set fully closed



Inner conductor crimp (G) to be measured with die set fully closed

Note : all dimensions are in mm

#16 Coaxial Contacts (Continued)

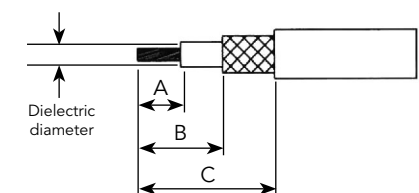
Multipiece Male Contact with Coax Cable

Cable reference	Contact	Hying complementary compoments	Outer contact crimp tool		Inner contact crimp tool		Cable strip length			
			Crimp tool M10S1J		Crimp tool M10S1J					
			Die set	Stop bushing	Die set	Stop bushing	A	B	C	
RG161U	Male: RMDXK10D28	YOC074	S221	SL471	S23D2	SL46D2	4.37	7.95	15.88	
RG179							4.37	7.95	15.88	
RG187U							4.37	7.95	15.88	
RG188/U							4.37	7.95	15.88	
RG174/U		YOC074 + RMDXB0553			S26D2		4.37	7.95	15.88	
RG178A/U					S23D2		7.54	9.12	17.53	
RG196U							7.54	9.12	17.53	
AMPHENOL 21-598					YOC074		-	4.37	7.95	15.88
surprenant pn 8134							-	4.37	7.95	15.88

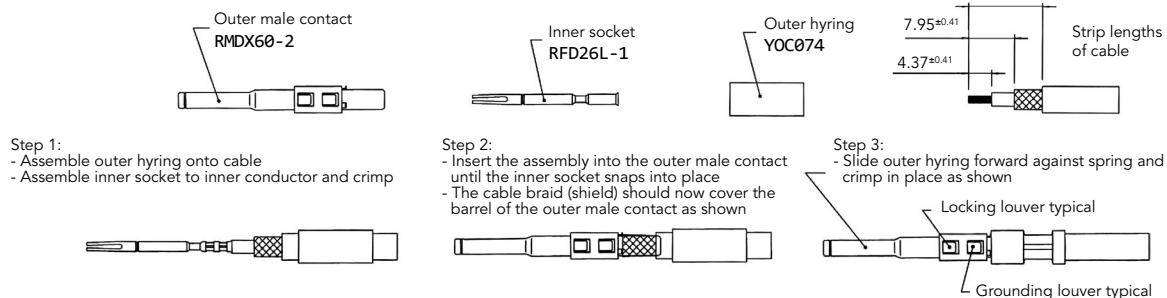
Multipiece kit details

RMDXK10D28 includes	RMDX60D28	Outer contact
	RFD26L1D28	Inner contact
	YOC074	Outer hying
	RMDXB0553	Inner supporting sleeve

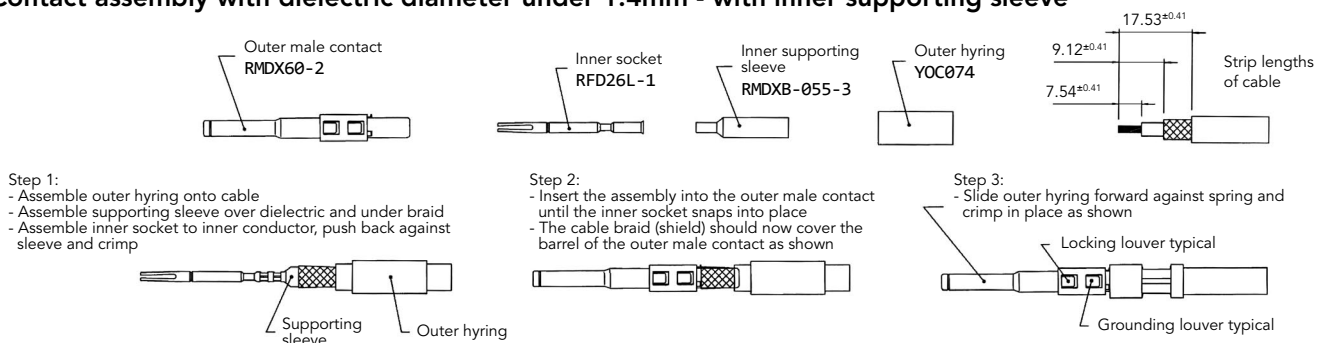
Cable strip length



Contact assembly with dielectric diameter over 1.4mm - without inner supporting sleeve



Contact assembly with dielectric diameter under 1.4mm - with inner supporting sleeve



Note : all dimensions are in mm

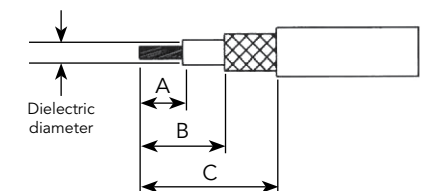
Multipiece Female Contact with Coax Cable

Cable reference	Contact	Hying complementary compoments	Outer contact crimp tool		Inner contact crimp tool		Cable strip length		
			Crimp tool M10S1J		Crimp tool M10S1J				
			Die set	Stop bushing	Die set	Stop bushing	A	B	C
RG161U	Female: RCDXK1D28	YOC074	S221	SL471	S23D2	SL46D2	4.37	-	11.13
RG179							4.37		11.13
RG187U							4.37		11.13
RG188/U					4.37		11.13		
RG174/U					S26D2		4.37		11.13
RG178A/U		YOC074 + RMDXB0553			S23D2		6.35		11.13
RG196U					6.35		11.13		
AMPHENOL 21-598		YOC074			-		4.37		11.13
surprenant pn 8134					-		4.37		11.13

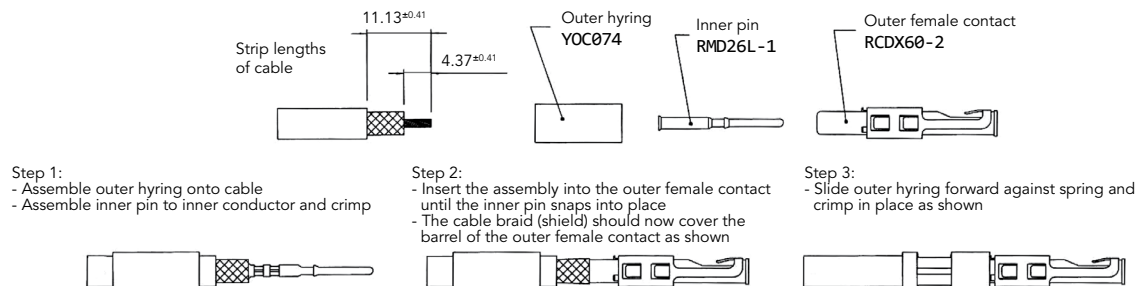
Multipiece kit details

RCDXK1D28 includes	RCDX602D28	Outer contact
	RMD26L1D28	Inner contact
	YOC074	Outer hyring
	RCDXB0553	Inner supporting sleeve

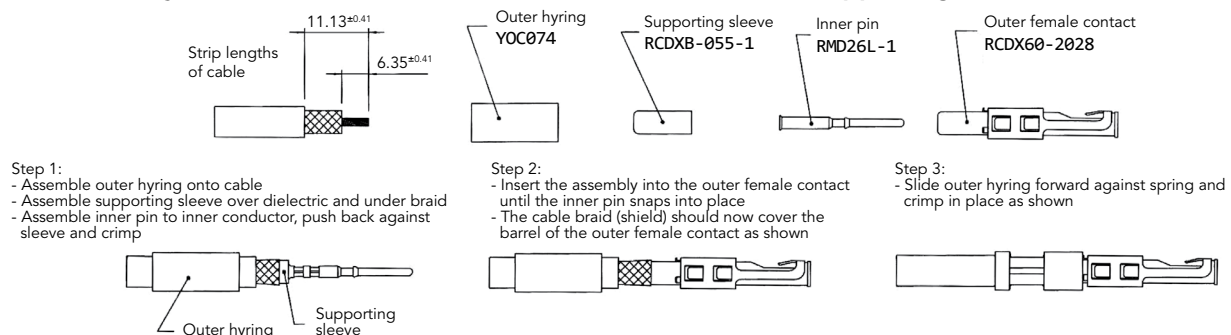
Cable strip length



Contact assembly with dielectric diameter over 1.4mm - without inner supporting sleeve



Contact assembly with dielectric diameter under 1.4mm - with inner supporting sleeve



Note : all dimensions are in mm

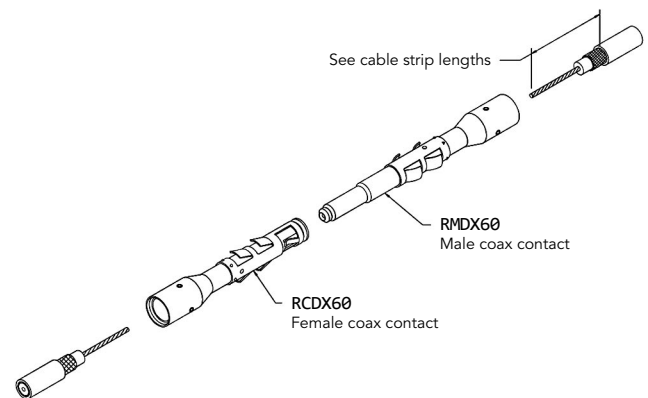
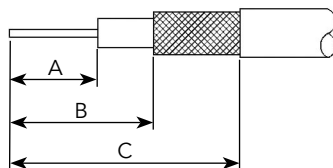
#16 Coaxial Contacts (Continued)

Coax Cable with Monocrimp Contact Cabling

Cable reference	Male contact	Female contact	Crimp tool	Die set	Stop bushing	Cable strip length			Inner conductor crimp		Braid crimp	
						A	B	C	g dim	t dim	g dim	t dim
CDC PIN22939200	RMDX6046D28	RCDX6016D28	M10S1J	S80	SL105	4.19	5.97	8.51	1.30/1.17	1.40/1.22	2.77/2.64	3.02/2.84
CDC PIN22939200	RMDX6046D28	RCDX6016D28		S87	SL105	5.08	6.35	8.89	1.30/1.17	1.40/1.22	2.77/2.64	3.02/2.84
CDC PIN245670000	RMDX6050D28	RCDX6016D28		S80	SL105	5.08	6.35	8.89	1.30/1.17	1.40/1.22	2.97/2.84	3.12/2.95
KX21TVT (europe) RG178 B/U	RMDX6034D28	RCDX6034D28		S82	SL105	5.08	6.35	8.89	1.30/1.17	1.32/1.17	2.84/2.74	3.07/2.9
RG178 / BU	RMDX6050D28	RCDX6016D28		S87	SL105	5.08	6.35	8.89	1.30/1.17	1.40/1.22	2.77/2.64	3.02/2.84
ampex	RMDX6032D28	RCDX6032D28		S80	SL105	5.08	6.35	11.68	1.30/1.17	1.40/1.22	2.97/2.84	3.12/2.95
TI PN 920580	RMDX6024D28	RCDX6024D28		S82	SL105	5.08	6.35	8.89	1.35/1.19	1.42/1.27	2.87/2.74	3.07/2.9
RG174/U	RMDX6032D28	RCDX6032D28		S80	SL105	5.08	6.35	11.68	1.30/1.17	1.40/1.22	2.97/2.84	3.12/2.95
Honeywell PN 58000062	RMDX6026D28	RCDX6026D28		S82	SL105	5.08	6.35	8.89	1.35/1.19	1.42/1.27	2.87/2.74	3.07/2.9
RG188A/U	RMDX6036D28	RCDX6036D28		S80	SL105	5.08	6.35	11.68	1.30/1.17	1.40/1.22	2.97/2.84	3.12/2.95
RG316/U	RMDX6036D28	RCDX6036D28		S80	SL105	5.08	6.35	11.68	1.30/1.17	1.40/1.22	2.97/2.84	3.12/2.95
PRD PN 247AS-C1123-001	RMDX6018D28	RCDX6018D28		M10SG8 ASSY'Y TOOL DIE SET STOP BUSHING M10S1J TOOL		5.08	6.35	8.89	1.22/1.17	1.35/1.22	2.92/2.79	3.12/2.97
PRD PN 247AS-C1251	RMDX6018D28	RCDX6018D28				5.08	6.35	8.89	1.22/1.17	1.35/1.22	2.92/2.79	3.12/2.97
raychem 5024A3111	RMDX6052D28	RCDX6052D28		S88	SL105	5.08	6.35	11.68	1.37/1.27	1.45/1.32	2.92/2.79	
raychem 5026e1614	RMDX6036D28	RCDX6036D28		M10SG8 ASSY'Y TOOL DIE SET STOP BUSHING M10S1J TOOL		5.08	6.35	8.89	1.22/1.17	1.35/1.22	2.92/2.79	3.12/2.97
JUDD C15013010902	RMDX6036D28	RCDX6036D28				5.08	6.35	8.89	1.22/1.17	1.35/1.22	2.92/2.79	3.12/2.97
inner cond. #30, braid diam 2.64	RMDX6050D28	-		S80	SL105	5.1	6.35	8.9	-	-	-	-
inner cond. #30, braid diam 2.29	RMDX6050D28	-		S87	SL105	4.2	6.35	8.5	-	-	-	-
inner cond. #28, braid diam 2.9	RMDX6032D28	RCDX6032D28		S80	SL105	5.1	6.35	11.7	-	-	-	-
inner cond. #26, braid diam 1.78	RMDX6024D28	RCDX6024D28		S82	SL105	5.1	6.35	8.9	-	-	-	-
inner cond. #26, braid diam 3.05	RMDX6026D28	RCDX6026D28		S82	SL105	5.1	6.35	8.9	-	-	-	-

- Select appropriate cable and contact combination.
- Select appropriate crimp tooling (hand tool, S-die set, stop bushing).
- Strip coax cable to the designated wire strip lengths.
- Insert the stripped coax into the rear of the contact.
- Crimp the contact.

Cable strip length



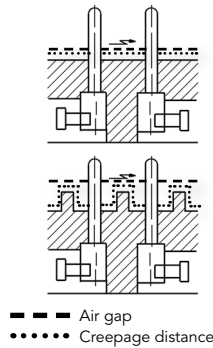
Glossary of Terms

• Clearance

Per the IEC 60664-1 it is the shortest distance between two conductive parts even over the air.

• Creepage distance

Per the IEC 60664-1 it represents the shortest distance along the surface of the insulating material between two conductive parts.



• Working voltage

Per the IEC 60664-1 it is the highest r.m.s. value of A.C. or D.C. voltage across any particular insulation which can occur when the equipment is supplied at rated voltage.

• Rated impulse voltage

Impulse withstands voltage value assigned by the manufacturer to the equipment or to a part of it characterizing the specified withstand capability of its insulation against transient overvoltage.

• Working current

It is the maximum continuous and not interrupted current able to be carried by all contacts without exceeding the maximum temperature of the insulating material.

• Transient voltage

Extract from the IEC 60664-1: Short duration overvoltage of a few millisecond or less, oscillatory or non-oscillatory, usually highly damped.

• CTI (Comparative Tracking Index)

The CTI value is commonly used to characterize the electrical breakdown properties of an insulating material. It allows users to know the tendency to create creepage paths. This value represents the maximum voltage after 50 drops of ammonium chloride solution without any breakdown.

• RTI (Relative temperature Index):

Extract from ULs website:

Maximum service temperature for a material, where a class of critical property will not be unacceptably compromised through chemical thermal degradation, over the reasonable life of an electrical product, relative to a reference material having a confirmed, acceptable corresponding performance defined RTI.

- **RTI Elec:** Electrical RTI, associated with critical electrical insulating properties.
- **RTI Mech Imp:** Mechanical Impact RTI, associated with critical impact resistance, resilience and flexibility properties.
- **RTI Mech Str:** Mechanical Strength (Mechanical without Impact) RTI, associated with critical mechanical strength where impact resistance, resilience and flexibility are not essential.

Drilling Pattern

Hole sizes: #20=0.9mm, #16=1.3mm, #8=3.8mm

Shell Size	Dimensions (mm)				
10	103	104	106	102W2	103W3
12	124	128	1210		
14	142G1	147	148		
	1412	1492	1419		

Hole sizes: #20=0.9mm, #16=1.3mm, #8=3.8mm

Shell Size	Dimensions (mm)
16	1619
	1626
18	1823
	1832

Drilling Pattern (Continued)

Hole sizes: #20=0.9mm, #16=1.3mm, #8=3.8mm

Shell Size	Dimensions (mm)	
20	2028	
	2030	
	2041	
22	2235	
	2238	

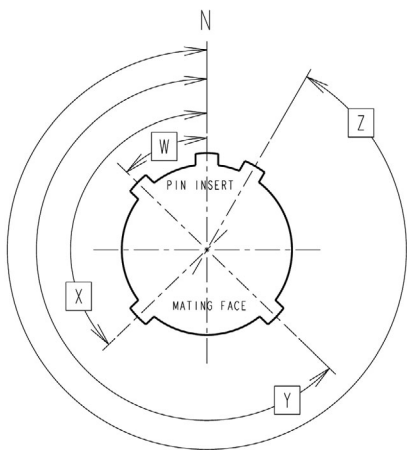
Hole sizes: #20=0.9mm, #16=1.3mm, #8=3.8mm

Shell Size	Dimensions (mm)
22	2255
24	2448 2461

Discrimination/Keying Methods

In applications where similar connectors are used next to each other, mismatching can cause disturbances, system failure or even danger to operating personnel.

To eliminate mismatching, all Trim Trio® connectors are offered with discrimination keys to avoid interconnection system errors. In addition, the connector insert can also be rotated inside the shell to create custom keying options.



Connectors with rotated inserts can be ordered by adding the suffix W, X, Y or Z to the standard part number.

e.g. **UT0W0106PH** (standard key) → **UT0W0106PWH** (W key)

Consult us for overmolded harnesses.

Shell size	Layout	Discrimination key degrees			
		W	X	Y	Z
10	103	-	-	-	-
	102W2	-	-	-	-
	104	45°	-	-	-
	103W3	-	-	-	-
	106	90°	-	-	-
12	124	-	-	-	-
	128	26°	-	-	-
	1210	60°	155°	270°	295°
14	142G1	-	-	-	-
	147	-	-	-	-
	148	-	-	-	-
	1412	60°	-	-	-
	1492	49°	71°	145°	-
	1419	30°	165°	315°	-
16	1619	30°	165°	-	315°
	1626	60°	-	275°	338°
18	1823	-	158°	-	270°
	1832	85°	138°	222°	265°
20	2028	79°	-	259°	-
	2030	34°	90°	123°	259°
	2041	45°	126°	225°	-
22	2235	13°	162°	198°	265°
	2238	15°	47°	150°	331°
	2255	30°	142°	226°	314°
24	2448	60°	120°	189°	351°
	2461	90°	180°	270°	324°

SMSPE0 (only for UTO layouts using #16 contacts)

When one of these dummy contacts is used, the UTO connector will only mate with a connector which has a vacant cavity at the corresponding position.

The material used is polyamide 6.6.



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