

# ULC Series Push-pull Brass & Titanium Connectors

**SOURIAU**



## Standard Push-pull Connectors

A large Push-Pull Brass & Titanium connectors range for glovebox applications

- Radiation withstanding materials** ■ Shell → Brass or Titanium  
Insulation → PEEK or Nylatron®  
Other non-metallic parts → Viton®/EPDM
- Sealing ability** ■ IP68
- Large range** ■ 4 shell sizes  
Multipin signal & power, coaxial, triaxial  
Large choice of receptacles
- Quick connect** ■ Push-Pull coupling system



## Description

- Brass & Titanium version of ULC push-pull connectors
- 4 sizes available (1, 3, 4, 5)

## Application

- Gloveboxes and hot-cells for signal and power transmission

## Qualification standards

- UL1977 listed

## Technical features

### Electrical

- **Contacts:**  
Solder contacts  
Gold and Nickel plated contacts  
Shielding continuity option available
- **Standard contacts operating voltage:**  
250 to 2500 Vdc  
150 to 1500 Vrms with 50Hz

### Mechanical

- **Endurance:**  
500 mating / unmating

### Environmental

- **Temperature range:**  
-50 to +200°C (392°F)
- **Sealing ability:**  
IP 68 (open face) except for triax
- **Insulator radiation withstanding:**  
Nylatron®: 10<sup>8</sup> Rad  
Tefzel: 5x10<sup>7</sup> Rad  
Peek: 10<sup>9</sup> Rad  
Vespel: 4x10<sup>9</sup> Rad (please consult us)
- **Seals radiation withstanding:**  
EPDM: 8x10<sup>7</sup> Rad  
Viton®: 6x10<sup>6</sup> Rad

Materials & plating	Receptacle and plug components						
	Shells		Insulator	Seals	Cable clamp	Other non-metallic internal materials	Contacts
Material	Brass	Titanium	PEEK, Nylatron®, Tefzel	EPDM/Viton®	Brass/ Titanium	Nylatron®	Refer to details on page 9 to 13
Plating	Nickel	/	/	/	/	/	

## Features & benefits

### Field proven

**A connector range dedicated to the nuclear industry**

The ULC range has been installed in gloveboxes and hot cells around the world for decades. With standard and remote manipulated versions, this range addresses the high level of requirements associated with nuclear fuel production, fuel reprocessing and waste management industries, as well as experimental facilities.



### Approved quality assurance program

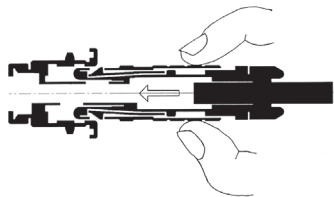
**SOURIAU quality assurance program meets international & nuclear standards:**

- ISO 9001/EN 9100

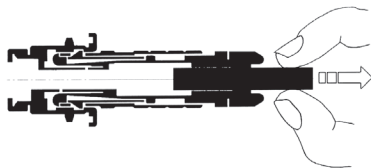
## Product overview

### Push-pull coupling plugs

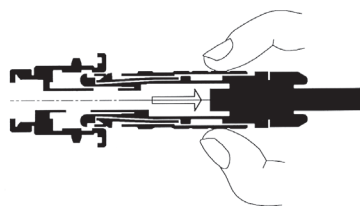
The ULC range is based on a reliable and safe push-pull system.



The latching of the plug into the receptacle is achieved by a simple axial push of the outer plug shell in the receptacle.



Connection can not be broken by pulling the cable or any other parts of the plug than the outer shell.



To unmate the plug from the receptacle, just pull the outer shell axially.

Cable clamp

Locking spring

Strong locking system which is released only by pulling on the locking ring

Locking ring

Mechanical keying

#### Easy to use

- Even with two pairs of gloves
- Self-locking mechanism

#### Quick to connect and disconnect

- A simple axial push/pull

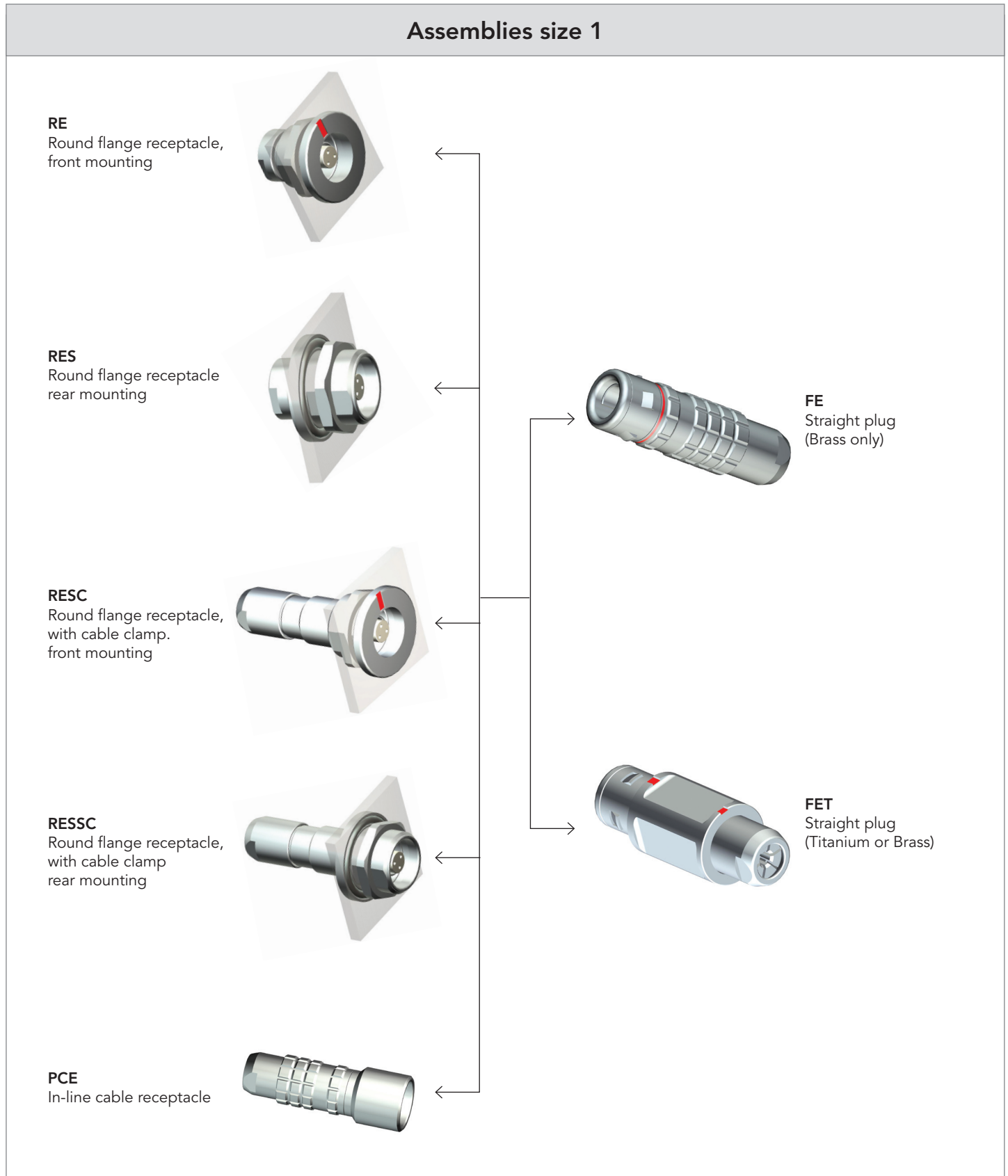
#### Signal integrity ensured

- Secured against accidental disconnections «by pulling on cable»

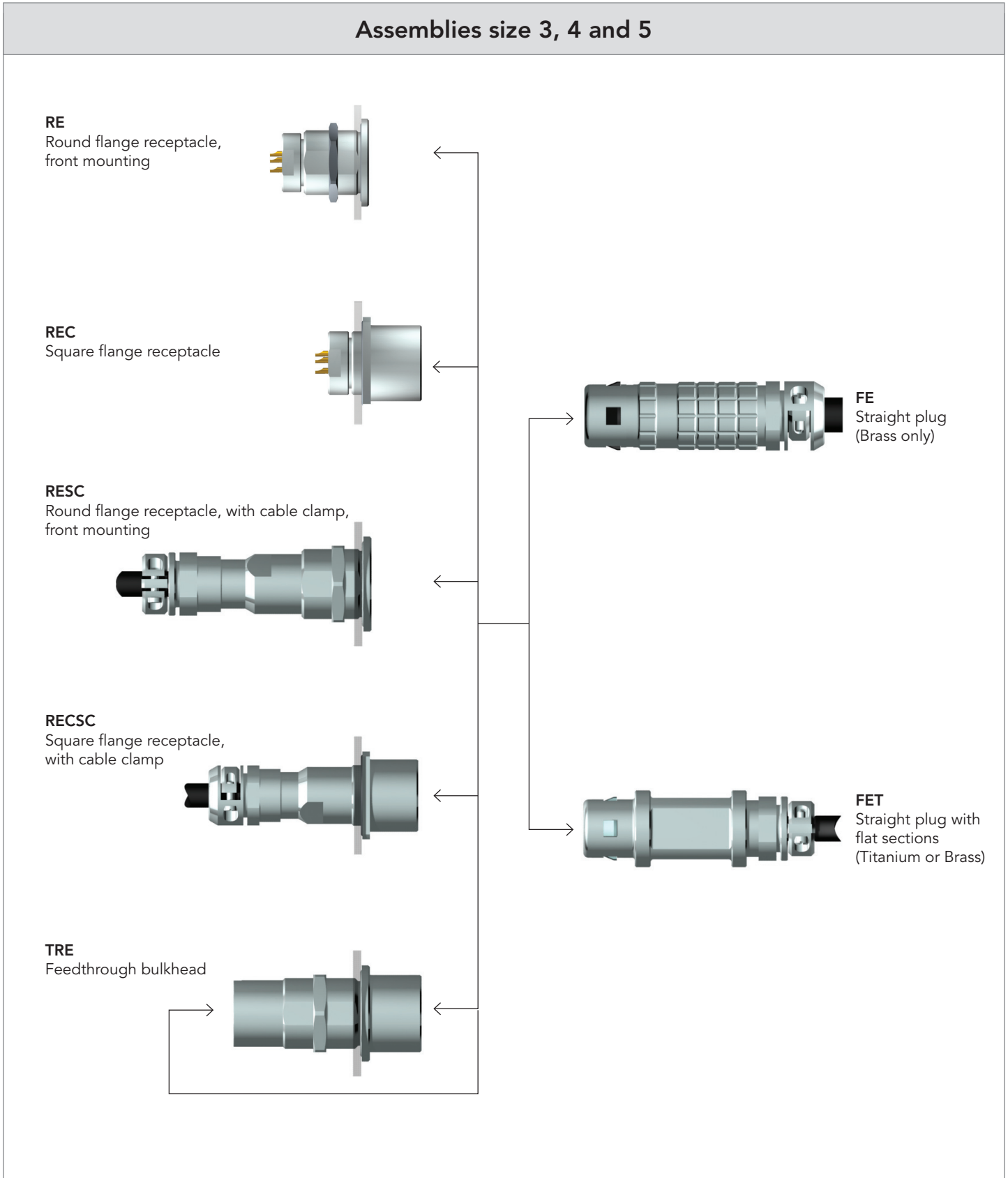
The outer shells are specially machined to ensure an easy catching and handling with gloves while ensuring the glove will not be damaged by sharp edges.

During the connection, contacts are mechanically protected by the connector housing.

## Product overview



## Product overview



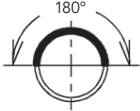
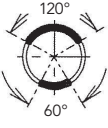
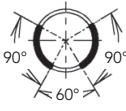
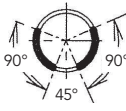
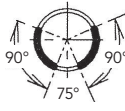
## Product overview

### Keying

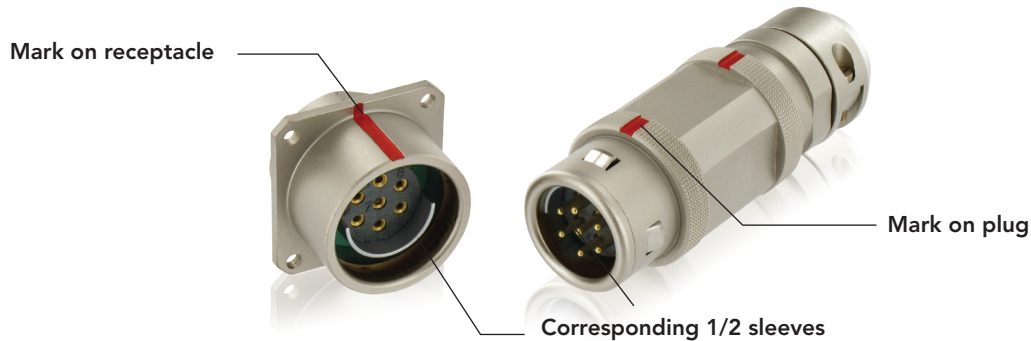
The ULC connectors can be equipped with 5 different keyings:

- One glovebox can accommodate several ULC connectors of the same size and with the same contact layouts without any risk of a wrong mating. Five different keying options are available. Each specific pattern goes with a specific color marking on the plug and on the receptacle. This line marking helps the operator to find the right orientation of the connector when connecting. The keying system uses a rigid sleeve that also protects the contacts during the mating process.

- Layouts available (receptacle view):

Keying code	P1	P2	P3	P4	P5
Plug front view					
Color	Red	Blue	White	Yellow	Green

Note : if more patterns ( up to 8) are needed, please contact SOURIAU



### Contacts

**Plug & receptacle:**

- The ULC range accommodates solder contacts from  $\varnothing 0.7$  to  $\varnothing 7$ . The different layouts are described on pages 9 to 12. The electrical characteristics are detailed on page 13.

## Ordering information

Basic series	FE	F	5	M4		ULCL	S	105	P1
<b>Shells</b>									
FE: Straight plug (Brass only)									
FET: Remote manipulated straight plug									
RE: Round receptacle, front mounting									
RESC: Round receptacle with cable clamp, front mounting									
REC: Square receptacle (sizes 3,4,5)									
RECSC: Square receptacle with cable clamp (sizes 3,4,5)									
RES: Round receptacle, rear mounting (size1)									
RESSC: Round receptacle with cable clamp, rear mounting (size1)									
PCE: In line receptacle									
TRE: Feedthrough (sizes 3,4, 5)									
<b>Contacts*</b>									
M: Pin contacts									
F: Socket contacts									
<b>Shell sizes</b>									
1									
3									
4									
5									
<b>Contact layouts</b>									
Mxxx: Multipin (Refer to table p.10, 11 and 12)									
Cxx: Coaxial + impedance (50Ω or 75Ω)									
TCXxx: Triaxial + impedance (50 Ω or 75 Ω)									
Kxxx: Thermocouple (Refer to table p.13)									
<b>Shell to shell conductivity** :</b>									
T: Contact n°1 connected to shell ground (multipin only, except feedthrough)									
<b>Series:</b>									
ULCL: Brass shell									
ULCT: Titanium shell									
<b>Insulator material</b>									
S: Nylatron®									
TZ: Tefzel (coaxial only)									
N: PEEK									
<b>Cable outer diameter:</b>									
XXX: Mention cable outer diameter in 1/10° of mm									
<b>Keying</b>									
P1 to P5									

\*For the feedthrough (TRE): do not mention anything

TRE are delivered: Pin/socket in multipin version

Socket/socket in coaxial and triaxial versions

\*\*No shell to shell conductivity wanted: do not mention anything



## Contact layouts

		Multipin power & signal layouts																						
		Contacts size																						
		Ø0.7	Ø0.9	#20	Ø1.3	#16	Ø2	#12	Other															
Number of contacts	1						1M1*		4U35 (35mm²)* 5U50 (50mm²)* 															
	2				1M2*	3M2*	4M2(#16)																	
	3		1M3*			3M3																		
	4		1M4*			3M4		4M4/5M4	5M4D5 															
	5			3M5																				
	7			3M7		4M7		5M7	5M7D8** 															
	8	1M8*		3M8		4M8																		
									<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <table border="1"> <tr> <td style="width: 100px;"></td> <td style="text-align: center;">5</td> <td style="text-align: center;">M</td> <td style="text-align: center;">14</td> </tr> <tr> <td>Connector shell size</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Multipin</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Number of contacts</td> <td></td> <td></td> <td></td> </tr> </table> </div>		5	M	14	Connector shell size				Multipin				Number of contacts		
	5	M	14																					
Connector shell size																								
Multipin																								
Number of contacts																								

\*Nylatron version isn't suitable with n° 1 contact connected to the shell ground  
 \*\* Only available with crimp removable contacts

Contact layouts

Multipin power & signal layouts						
Contacts size						
		Ø0.9	#20	Ø1.3	#16	
Number of contacts	12	<p>3M12*</p>			<p>4M12*</p>	
	14		<p>4M14</p>		<p>5M14</p>	
	18		<p>4M18</p>			
	19	<p>3M19</p>			<p>5M19</p>	
	22		<p>5M22</p>			
	27	<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p><b>5 M 14</b></p> <p>Connector shell size</p> <p>Multipin</p> <p>Number of contacts</p> </div>				<p>5M27</p>
	30			<p>4M30</p>		
	33			<p>5M33</p>		

\*Nylatron version isn't suitable with n° 1 contact connected to the shell ground



## Contact layouts


		Hybrid layouts																		
		Contacts size																		
		#20	#20	Ø1.3	Ø1.3	#16	#12													
Number of contacts	6					4M6+1C50/1C75 														
	7						5M7+2(#16) 													
	8		M8+2(#16) 					<table border="1"> <tr> <td>Connector shell size</td> <td>5</td> <td>M</td> <td>14</td> </tr> <tr> <td>Multipin</td> <td colspan="3"></td> </tr> <tr> <td>Number of contacts</td> <td colspan="3"></td> </tr> </table>	Connector shell size	5	M	14	Multipin				Number of contacts			
	Connector shell size	5	M	14																
	Multipin																			
	Number of contacts																			
9																				
10	4M10+3C50+1HV 	4M10+2C50* 																		
12			4M12+1C50/1C75* 	4M12+2(Ø4)* 																

For other arrangements, please consult us.

\* Version not suitable with n°1 contact connected to shell ground.

## Contact layouts - Solder contacts

Coaxial	
 <p><b>1C50 or 1C75</b>  <b>Size 1</b> - Coaxial contact + impedance for coaxial cable Kx23 or Kx15 /                      Max current rating = 3A for Kx 23; 4A for Kx15                      Contact resistance <math>\leq 5m\Omega</math></p>	 <p><b>3C50 or 3C75</b>  <b>Size 3</b> - Coaxial contact + impedance for coaxial                      Contact us for cable diameter /                      Max current rating = 8A                      Contact resistance <math>\leq 4m\Omega</math></p>
Triaxial, please consult us	

Chromel / Alumel thermocouple	
<p><b>3K4</b>                      2 thermocouple contacts type K (1 Chromel and 1 Alumel) for wire #16 (Solder fixed)                      + 2 standard copper contacts #16 (Solder fixed)                      Shell Size 3</p>	
For other arrangements/materials, please consult us.	

Electrical Characteristics				
Contact size	Contact diameter (mm)	Solder bucket diameter (mm)	Current rating (per contact)	
			UL recommendation	SOURIAU recommendation
HV	1.02	1.3	NA	7A
Ø7	7	9		115A
Ø5	5	5.1		40A
Ø4	4	4		33A
#12	2.39	2.6	13A	26A
Ø2	2	1.8	NA	18A
#16	1.59	2	4.5A	13A
Ø1.3	1.3	1	NA	10A
#20	1.02	1.3		7A
Ø0.9	0.9	0.8		5A
Ø0.7	0.7	0.7		4A

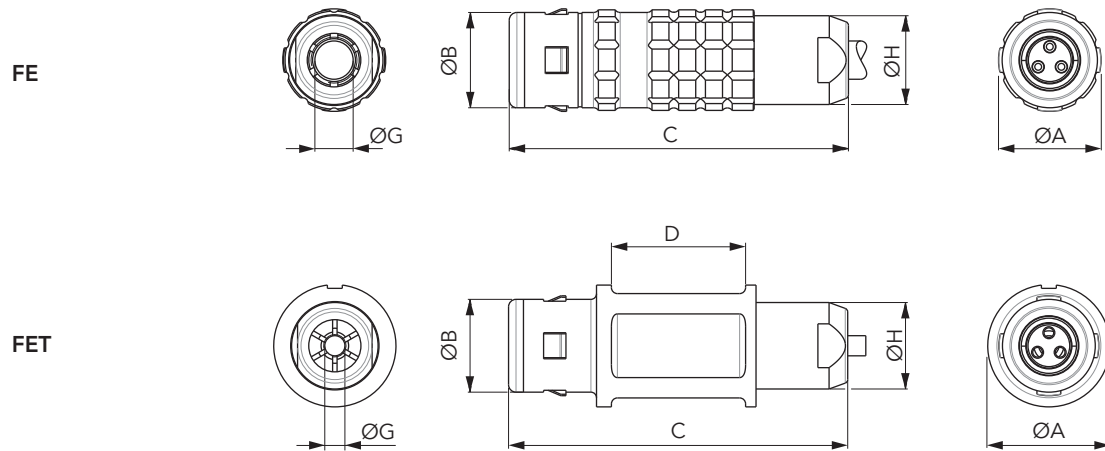
## Contact layouts

Electrical characteristics			
Contact size	Layout	Operating Voltage (Vdc) UL	Operating Voltage (Vdc) SOURIAU
		Recommendation	
#12	4M4	600V	1200V
	5M4		2500V
	5M7		1600V
	5M7+2	NA	1500V
Ø2	1200V		
#16	3M2	600V	700V
	3M3		
	3M4		
	4M2		1200V
	4M7		
	4M8		1100V
	4M8+2		
	4M6+1C50/1C75		
	4M12		1000V
	5M14		700V
	5M19		1000V
	5M22		800V
	5M27		900V
	5M4D5	700V	
5M12+7+4C50	1500V		
Ø1.3	1M2	NA	500V/250V (Coax)
	4M30		700V
	4M12+1C50/1C75		400V
	4M12+2		500V
	4M11+1HV		500V / 7000V (HV)
	5M33		600V
#20	3M5	600V	700V
	3M7		
	3M8		600V
	4M14		900V
	4M18		500V
	4M10+2C50	NA	800V
	4M10+3C50+1HV		
Ø0.9	1M3	NA	900V
	1M4		600V
	3M12		400V
	3M19		250V
Ø0.7	1M8	NA	

## Product details

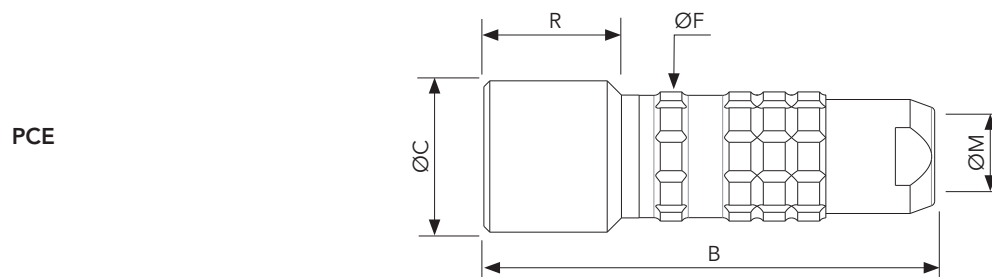
### Plug - Size 1 dimensions

Straight plugs



Shell	Size	ØA max (mm/inch)	ØB min (mm/inch)	C max (mm/inch)	D (mm/inch)	ØG min (mm/inch)	ØG max (mm/inch)	ØH max (mm/inch)
FE	1	13.2/0.531	11.6/0.490	45/1.772	NA	2.2/0.866	7.2/0.283	12/0.472
FET		16/0.629	11.6/0.490	45/1.772	18/0.709	2.2/0.866	7.2/0.283	11.6/0.456

### In-line receptacle - Size 1 dimensions



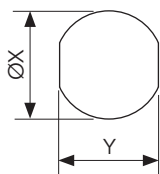
Shell	Size	B (mm/inch)	ØC (mm/inch)	ØF (mm/inch)	ØM max (mm/inch)	R (mm/inch)
PCE	1	59/2.323	15/0.590	13.2/0.519	7/0.275	14/0.551

## Product details

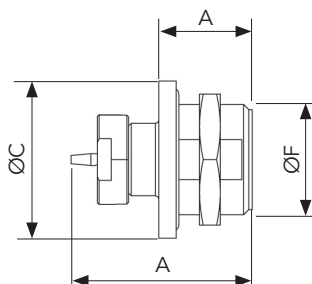
### Receptacles - Size 1 dimensions

Panel mounted

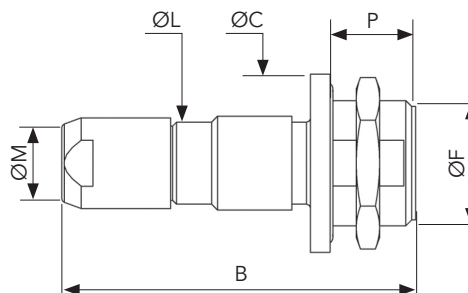
Panel cut-out



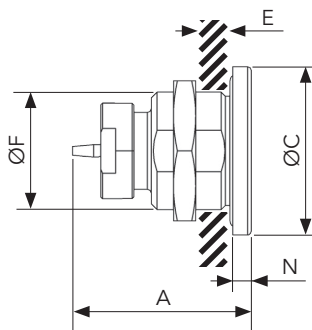
RES



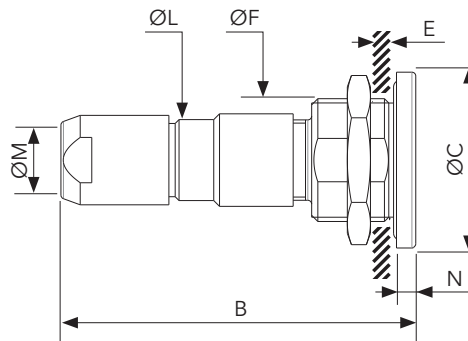
RESSC



RE



RESC

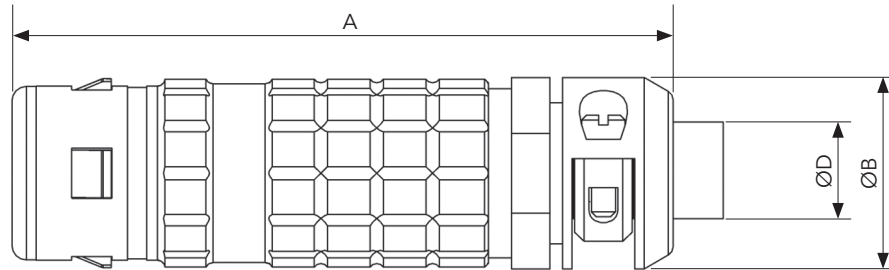


Shell	Size	A max (mm/inch)	B (mm/inch)	$\text{ØC}$ (mm/inch)	$\text{ØD}$ (mm/inch)	E max (mm/inch)	$\text{ØF}$ (mm/inch)	$\text{ØL}$ (mm/inch)	$\text{ØM max}$ (mm/inch)	P (mm/inch)
RE RES RESC RESSC	1	23/0.905	42/1.654	23/0.905	3/0.118	7/0.275	M16x1	11.6/0.457	7/0.275	11/0.433

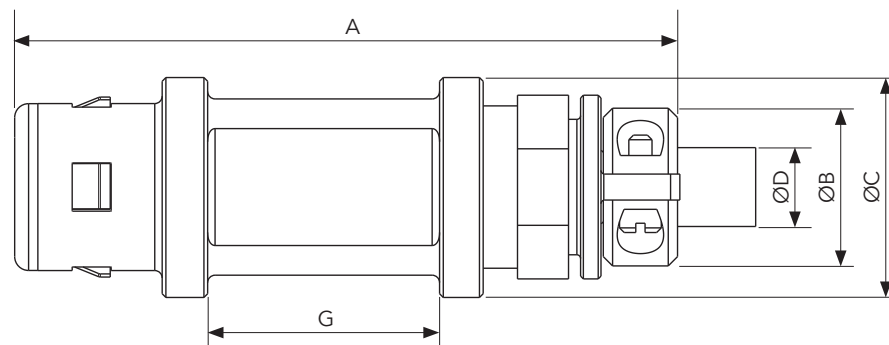
## Product details

### Plug - Size 3, 4 & 5 dimensions

Straight plugs



Shell	Size	A max (mm/inch)	ØB max (mm/inch)	ØD min (mm/inch)	ØD max (mm/inch)
FE	3	71/2.795	20/0.79	3.5/0.137	11/0.433
	4	88/3.46	29/1.141	8.2/0.322	18/0.708
	5	105/4.133	37/1.456	10/0.393	24/0.944



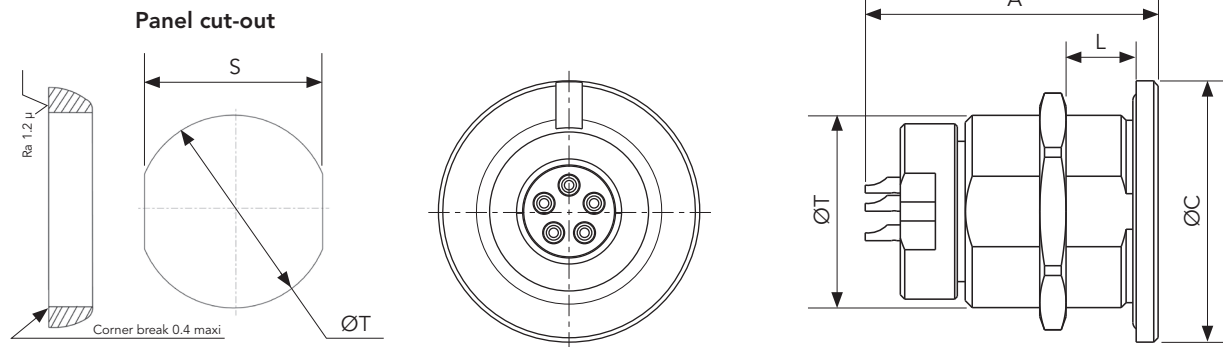
Shell	Size	A max (mm/inch)	ØB max (mm/inch)	ØC max (mm/inch)	ØD min (mm/inch)	ØD max (mm/inch)	G max (mm/inch)
FET	3	72/2.834	20/0.79	24/0.944	3.5/0.137	11/0.433	25/0.964
	4	88/3.503	28/1.102	32/1.259	8.2/0.322	18/0.708	25/0.964
	5	108/4.251	36/1.417	42/1.653	10/0.393	24/0.944	25/0.964



## Product details

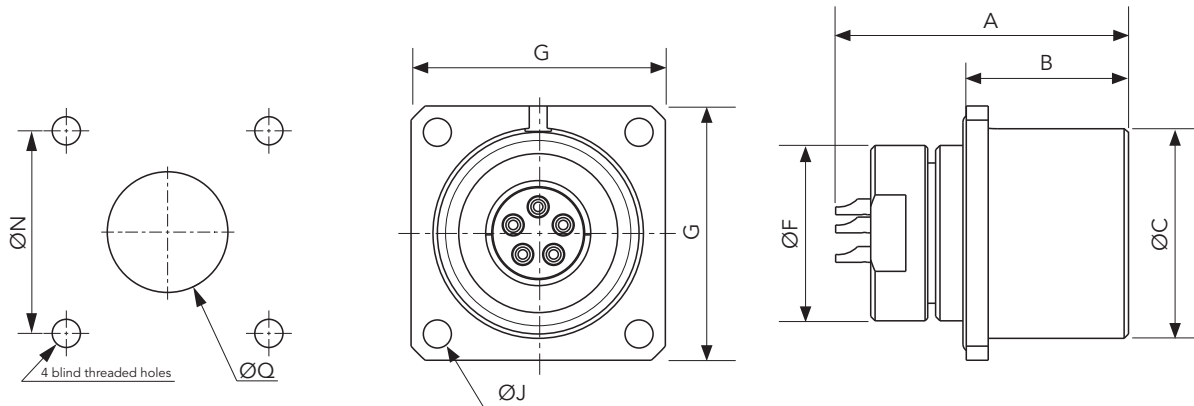
### Receptacles – Size 3, 4 & 5 dimensions

#### Round receptacles



Shell	Size	A max (mm/inch)	ØC (mm/inch)	L (mm/inch)	S (mm/inch)	ØT +0.2 -0 (mm/inch)
RE	3	36/1.417	30/1.181	16/0.630	20.1/0.791	22.1/0.870
	4	36.5/1.437	40/1.575	15/0.591	29.7/1.169	31.1/1.224
	5	42/1.654	52/2.047	20/0.787	39.7/1.563	41.1/1.618

#### Square receptacles

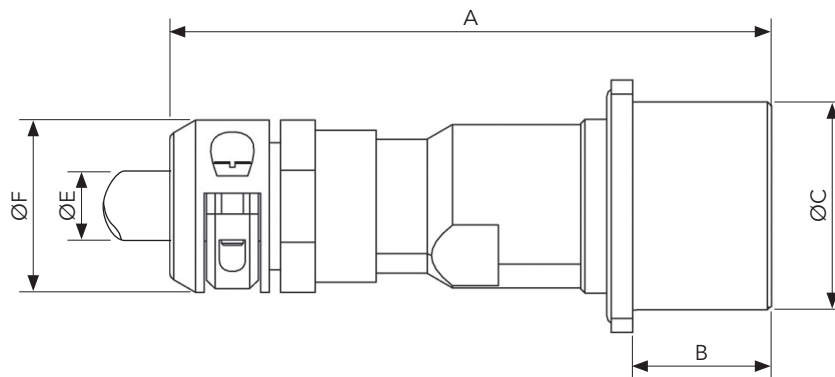


Shell	Size	A max (mm/inch)	B min (mm/inch)	ØC (mm/inch)	ØF (mm/inch)	G (mm/inch)	ØJ (mm/inch)	N (mm/inch)	ØQ min (mm/inch)
REC	3	36/1.417	18.5/0.728	24/0.945	20/0.787	29/1.142	3.2/0.126	23/0.906	20.5/0.807
	4	36.5/1.437	19.5/0.768	32/1.260	28.9/1.137	36.9/1.453	3.2/0.126	29.4/1.157	29.5/1.161
	5	42/1.654	24.5/0.965	41/1.614	35/1.378	43.3/1.705	4.2/0.165	34.9/1.374	35.5/1.398

## Product details

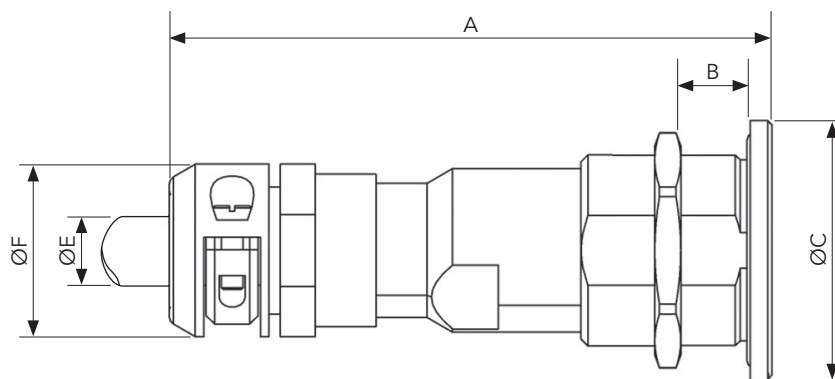
### Receptacles – Size 3, 4 & 5 dimensions

Square receptacles



Shell	Size	A max (mm/inch)	B (mm/inch)	ØC max (mm/inch)	ØE min (mm/inch)	ØE max (mm/inch)	ØF max (mm/inch)
RECSC	3	72 / 2.835	18.5 / 0.728	24 / 0.945	3.5 / 0.138	11 / 0.433	20 / 0.787
	4	92 / 3.3622	19.5 / 0.768	32 / 1.260	8.2 / 0.323	18 / 0.709	27.8 / 1.094
	5	115 / 4.528	24.5 / 0.965	41 / 1.614	10 / 0.394	24 / 0.945	35.8 / 1.409

Round receptacles

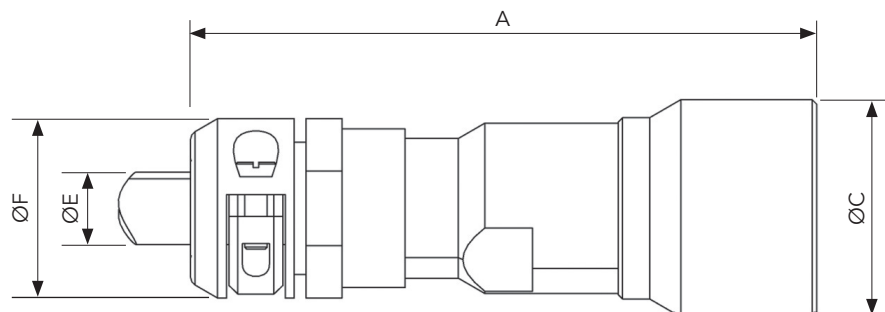


Shell	Size	A max (mm/inch)	B max (mm/inch)	ØC max (mm/inch)	ØE min (mm/inch)	ØE max (mm/inch)	ØF max (mm/inch)
RESC	3	72 / 2.835	16/0.630	29.8 / 1.173	3.5 / 0.138	11 / 0.433	20 / 0.787
	4	92 / 3.622	15/0.591	40 / 1.575	8.2 / 0.323	18 / 0.709	27.8 / 1.094
	5	115 / 4.528	20/0.787	51.8 / 2.039	10 / 0.394	24 / 0.945	35.8 / 1.409

## Product details

### Receptacles – Size 3, 4 & 5 dimensions

In-line receptacle



Shell	Size	A max (mm/inch)	ØC max (mm/inch)	ØE min (mm/inch)	ØE max (mm/inch)	ØF max (mm/inch)
PCE	3	75 / 2.95	24 / 0.945	3.5 / 0.138	11 / 0.433	20 / 0.787
	4	95 / 3.740	32 / 1.260	8.2 / 0.323	18 / 0.709	27.8 / 1.094
	5	114 / 4.488	41 / 1.614	10 / 0.394	24 / 0.945	35.8 / 1.409

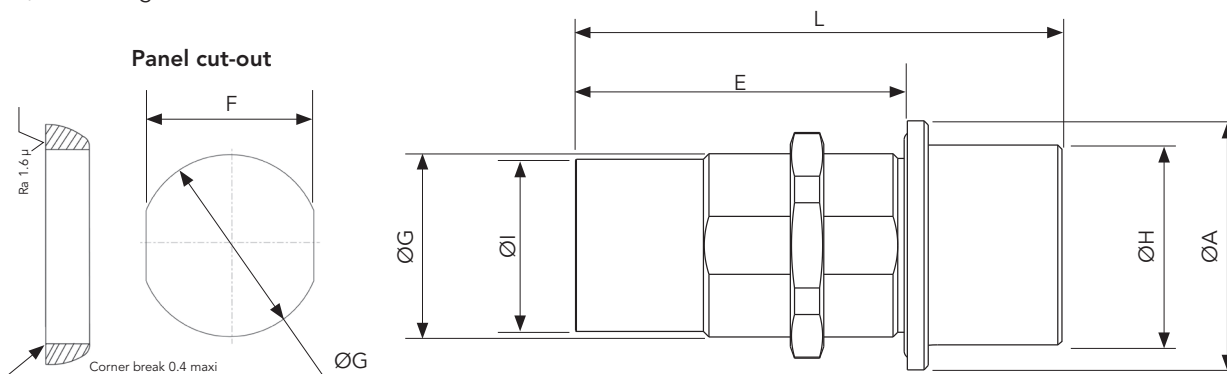
### Feedthrough – Size 3, 4 & 5 dimensions

#### Feedthrough

Possibility of pre-guiding fork, Please consult us.

For multipin, feedthrough are fitted with socket contacts on a side and pin contact on the other one.

For coaxial, feedthrough are fitted with socket contacts on both sides.

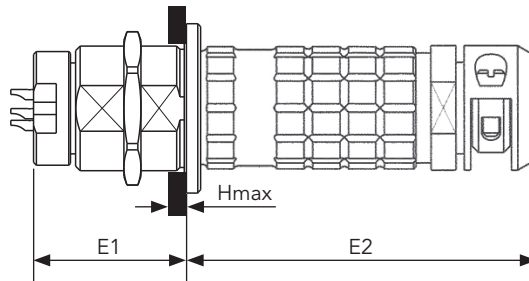
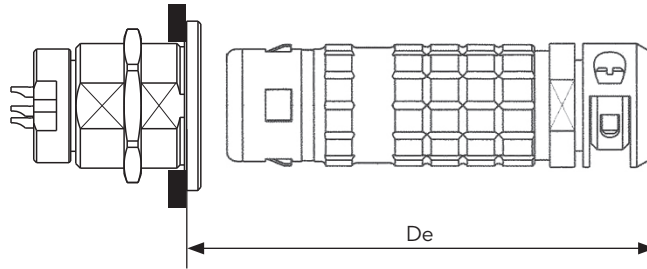


Shell	Size	ØA (mm/inch)	E Max (mm/inch)	F +0,2 (mm/inch)	ØG +0,2 (mm/inch)	ØH (mm/inch)	ØI (mm/inch)	L Max (mm/inch)
TRE	3	30 / 1.181	40 / 1.574	20.7 / 0.814	22.1 / 0.87	24 / 0.945	21 / 0.827	60 / 2.362
	4	39 / 1.535	40 / 1.574	29.7 / 1.169	31.1 / 1.224	32 / 1.26	30 / 1.181	60 / 2.362
	5	52 / 2.047	40 / 1.574	39.7 / 1.563	41.1 / 1.618	41 / 1.614	40 / 1.575	70 / 2.756

## Product details

### Assembly – Dimensions

#### Receptacles



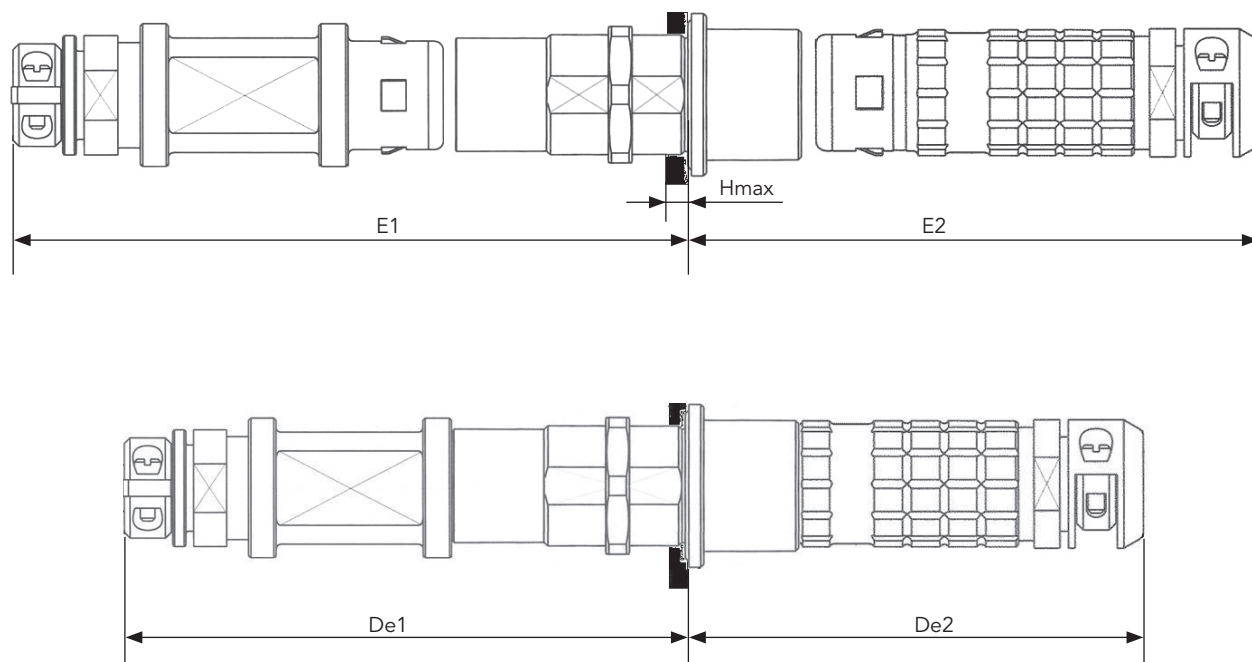
Shell	Size 1				Size 3				Size 4				Size 5			
Receptacle	E1 (mm)	E2 (mm)	Hmax (mm)	De (mm)	E1 (mm)	E2 (mm)	Hmax (mm)	De (mm)	E1 (mm)	E2 (mm)	Hmax (mm)	De (mm)	E1 (mm)	E2 (mm)	Hmax (mm)	De (mm)
RE	17.5	36	7	48	26	62	16	75	29	73	16	90	31	91	20	109
REC					10	74		91	20	90		107	18	112		135
RECSC					53	74		91	67	90		107	84	112		135
RES	9	44	7	56												
RESC	17.5	36	7	48	69	62	16	75	84	73	16	90	105	91	20	109
RESSC	9	44	7	56												
PCE*	75			88	125			143	154			173	191			214

\*These dimensions mentioned for cable receptacle are: mated length / unmated length  
 These dimension concern both plugs FE & FET

## Product details

### Assembly – Dimensions

Feedthrough



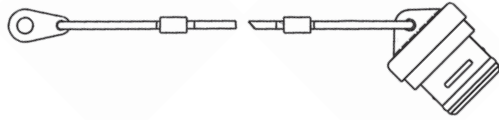
Shell	Size 3					Size 4					Size 5				
	E1 (mm)	E2 (mm)	De1 (mm)	De2 (mm)	Hmax. (mm)	E1 (mm)	E2 (mm)	De1 (mm)	De2 (mm)	Hmax. (mm)	E1 (mm)	E2 (mm)	De1 (mm)	De2 (mm)	Hmax. (mm)
Feedthrough															
TRE	96	74	113	91	21	109	88	128	107	21	129	109	152	135	21

These dimension concern both plugs FE & FET

## Accessories

### EPDM protective cap

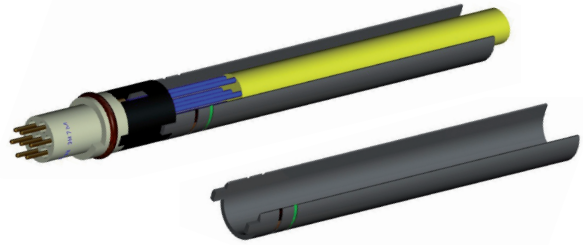
EPDM cap for size 1, 3, 4 & 5 connectors



Simple EPDM cap	ULC	L	B	**	-	*	C	-
				FE = Plug RE = Receptacle		Size		
EPDM cap with FET body	ULC	*	BE	*	T	*	*	802
		L = Brass T = Titanium		F = Plug R = Receptacle		Size	C = Eyelet fixing T = Collar fixing"	

### Plug assembly tool (for connector)

Shell size	Reference
3	OUTULCXME3
4	OUTULCXME4
5	OUTULCXME5



## Other products from the same series

### Remote Manipulated Connectors

Specially designed connectors to be handled with master-slave manipulators or with power manipulators.

**Guiding system:**

- . Guiding forks on the receptacle
- . Plug design allowing misalignment

**Mating help:**

- . Guiding forks allowing a two-step connection
- . Lever available

**Large Range :**

- . Same layout range as the standard ULC Series



### Junction Boxes

Essential elements to optimize the cabling inside gloveboxes.

**Sealed:**

- . IP55

**Optimize the cabling:**

- . Up to 8 connectors on one box
- . For sizes 3 & 4 ULC connectors

**Custom built:**

- . make your junction boxes according to your specifications with 4 sets of components



## Other products from the same series

### Feedthrough with Replaceable Core

A Feedthrough solution allowing an easy maintenance.

**Hermetic :**

- . Leakage rate  $\leq 10^{-6}$  atm.cm<sup>3</sup>/s

**Replaceable core:**

- . For a quick and reliable maintenance
- . Maintains the high hermetic level at any time of the replacement process.

**Simplify the design of gloveboxes:**

- . Quick change of layouts if needed
- . Dummy core without electrical contacts available for when the design is not fully defined



See «ULC Series Remote Manipulated Connectors» datasheet on [www.esterline-connection-technologies.com](http://www.esterline-connection-technologies.com)

For further information contact us at [technical-emea-ect@esterline.com](mailto:technical-emea-ect@esterline.com) or visit our web site [esterline-connection-technologies.com/applications/energy/nuclear](http://esterline-connection-technologies.com/applications/energy/nuclear)