



Glovebox Hermetic Feedthrough with Replaceable Core

The ULC feedthrough with replaceable core ensures the glovebox remains hermetically sealed whatever its life phase, during normal usage and maintenance

- Replaceable core** ■ For maintenance
To allow for connector configuration changes
To simplify the design of complex gloveboxes
- Hermetic** ■ Leakage rate $\leq 10^{-6}$ atm.cm³/s (pushthrough)
- Large range** ■ 3 shell sizes
Multipin signal & power, thermocouple, coaxial
- Quick connect** ■ Push-Pull coupling system



Description

- New generation of ULC feedthrough connector with an exclusive safe maintenance system
- 3 sizes available (3, 4, 5)

Application

- Gloveboxes where signal and power transmission through the box wall is required

Certification & Quality program

- UL1977 listed
- NQA-1 program

Technical features

Electrical

- **Plug contacts:**
Signal & Power: Crimp removable/
optional solder fixed
Thermocouple: Solder fixed
Coaxial
- **Insulation resistance:**
5GΩ under 500 Vdc (unmated)

Mechanical

- **Endurance:**
500 mating / unmating of plug on
feedthrough
50 core replacements

Environmental

- **Temperature range:**
-15 to + 90°C
- **Salt spray resistance:**
500 hours
- **Plug sealing:**
Crimp contacts: IP55 (unmated),
IP68 Immersion resistance to 2 bars
(mated)
Solder contacts: IP68 (unmated and
mated)
- **Feedthrough hermeticity:**
Helium leakage rate
≤ 10⁻⁶ atm cm³/s under 1 bar of
differential pressure
100% controlled before shipment

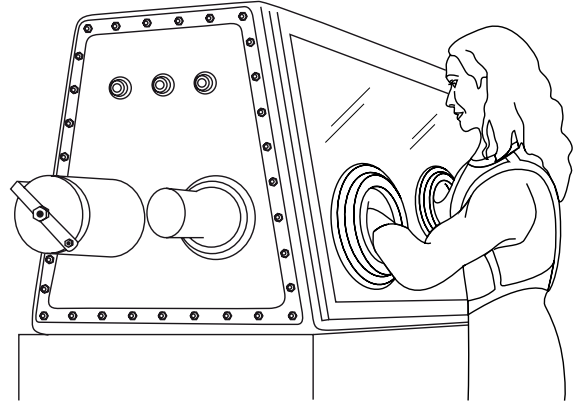
Materials & plating	Feedthrough and plug component					
	Shells	Insulator	Seals	Cable clamp	Other non-metallic internal materials	Contacts
Material	Stainless steel	PEEK	Viton®	PEEK	Nylatron®	Refer to details on page 9 to 12
Plating	Passivated	/	/	/	/	

SOURIAU in the nuclear industry

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
- ASME NQA-1 (10 CFR 50 App. B)

UL certified

ULC connectors

The range of feedthrough with replaceable core is part of the SOURIAU ULC Series connectors that are recognized by Underwriters Laboratory Inc.® as compliant with the UL 1977 standard (Component Connectors for Use in Data, Signal, Control and Power Applications).



Product overview

General principle

A complete feedthrough system is composed of the feedthrough itself and two quick connect push-pull plugs.

The feedthrough features an easy and safe replaceable core that allows :

- Easier design of complex gloveboxes.

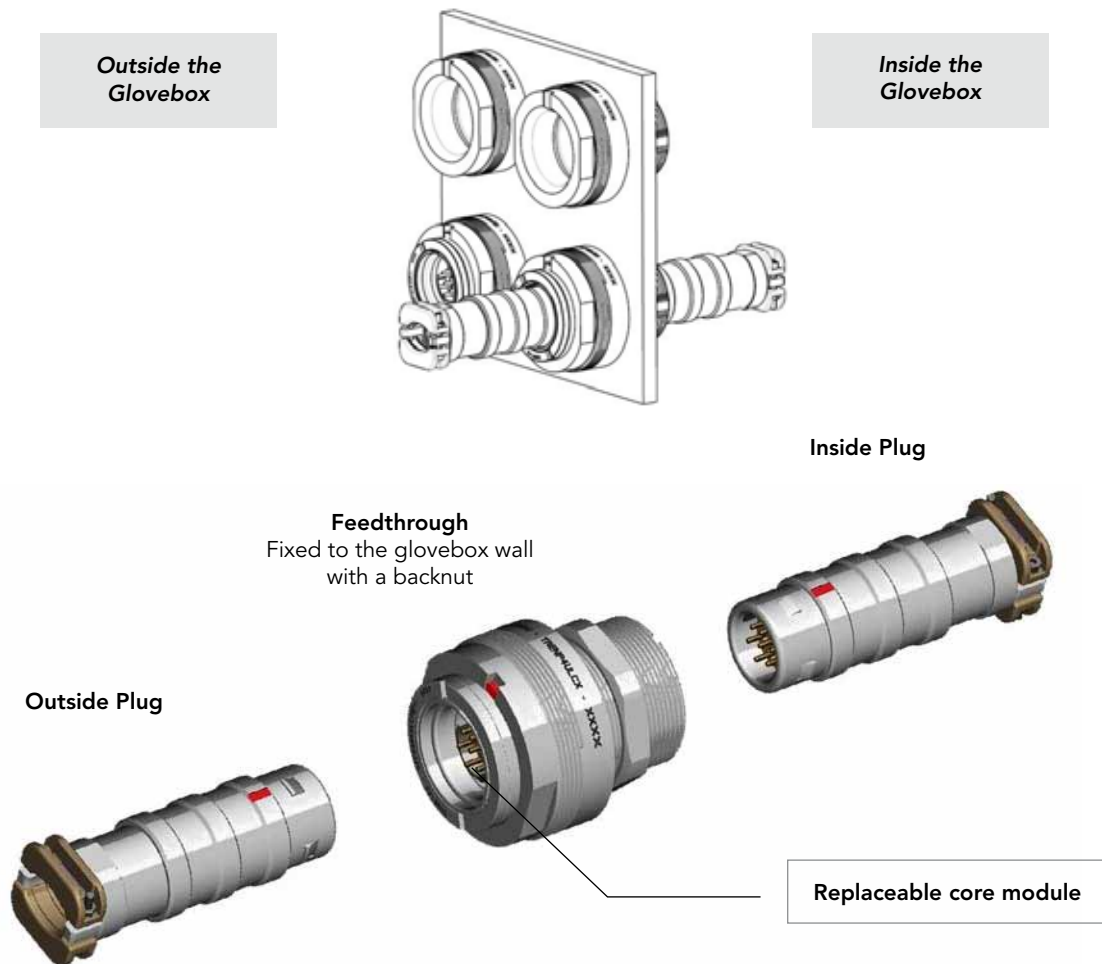
At an early stage of the design, the connector size can be determined leaving the specification of the contact layout for a later phase. If spare feedthroughs are installed they will feature a dummy core (plug). The required contact layout will be mounted when needed by simply replacing the dummy shuttle.

- Layout adaptation to suit new needs.

Should the need in term of sizes and number of contacts change, a new core with the adequate contact layout (within a same shell size) can be quickly installed.

- Easy maintenance of the system when insulator and/or contacts need to be replaced.

Maximize the availability of your installation by reducing the service time.

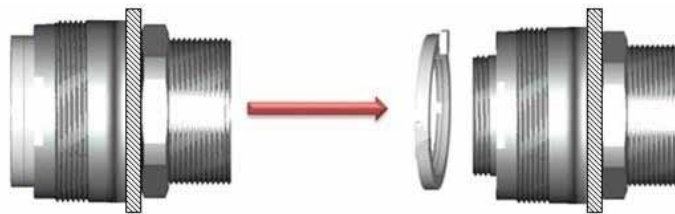


Product overview

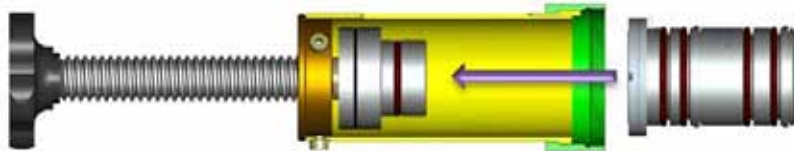
Shuttle replacement process

Smooth replacement of the core module, by maintaining a high hermetic level
(Leakage rate $\leq 10^{-6}$ atm cm^3/s)

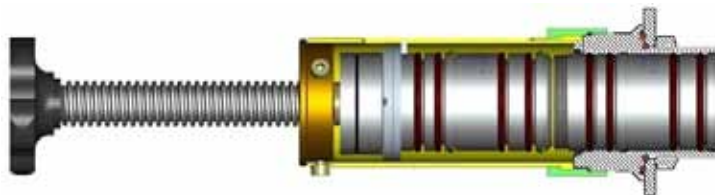
- 1) Unscrew the abutment nut



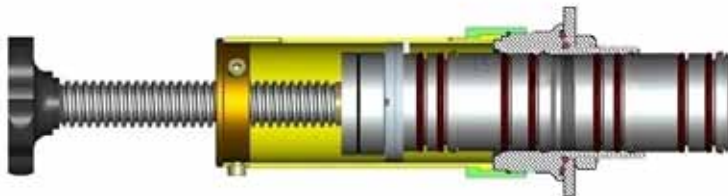
- 2) Install the new core in the tool



- 3) Screw the tool onto the feedthrough using the locking ring



- 4) There are four O rings on each shuttle to ensure that at least two are engaged at any point during the shuttle replacement process. This safety feature guarantees that the feedthrough remains hermetically sealed at all times

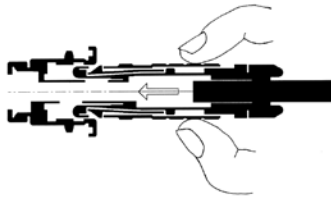


A patented locking system allows the shuttle to move only in one direction and two O-rings maintain the high hermetic level at any time of the replacement process.

Product overview

Push-Pull coupling plugs

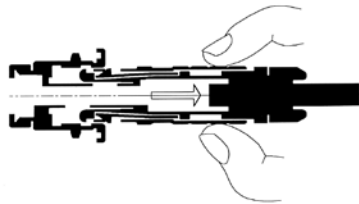
The ULC range is based on a reliable and safe Push-Pull system.



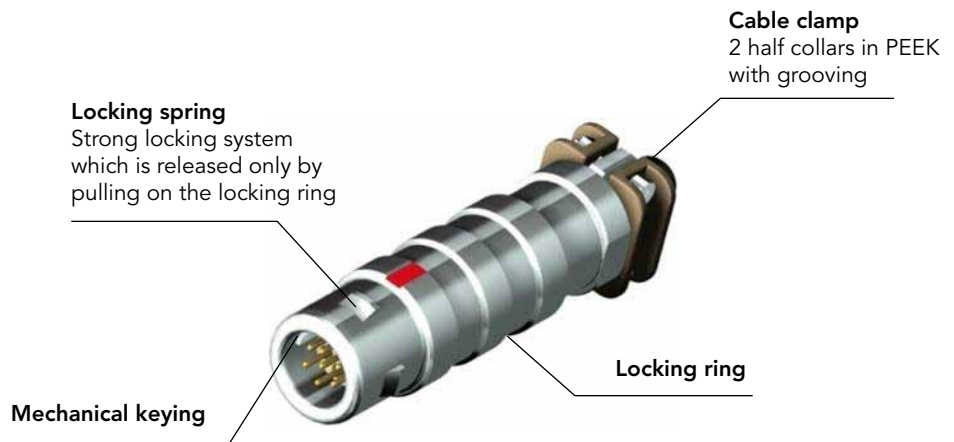
The latching of the plug into the receptacle is achieved by a simple axial push of the outer plug shell.



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.



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

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

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



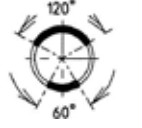



Product overview

Keying

The ULC feedthrough and plugs can be equipped with 6 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. Six different keying options are available. Each specific pattern goes with a specific color marking on the plug and on the feedthrough. This line marking allows 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

- Patterns available (feedthrough front view):

Keying code	P1	P2	P3	P4	P5	P6
Keying sector view						
Color code	Red	Blue	White	Yellow	Green	Black

Note : If more patterns (up to 9) are needed, please contact SOURIAU

The color code is not painted on the feedthrough body but on the replaceable core washer. Hence the keying can also be changed during maintenance.



Contacts

Feedthrough:

- For coaxial, feedthroughs receive a male contact on each side. Thus plugs will be equipped with female contacts.
- For thermocouple signal and power, feedthroughs receive female contacts on the inside of the glovebox and male contacts on the outside of the glovebox as standard. A reverse solution can be available on request.

Plug:














- ULC plugs receive solder fixed or crimped removable contacts. The different layouts are described on page 9 of this brochure.
- Crimp contacts shall be ordered separately to the plugs.

Ordering information

Basic series	FE	MC	5	M5	ULCX	N	P1
Shells							
FE: Push-Pull plug with backshell							
TREN: Feedthrough							
NP: Spare replaceable shuttle							
Contacts							
MC*: Plug pin contact, crimp (for standard contact)							
MS: Plug pin contact, solder (coax & thermocouple contact)							
FC*: Plug socket contact, crimp (for standard contact)							
FS: Plug socket contact, solder (coax & thermocouple contact)							
FM: Penetrator pin/socket contacts (for standard, power & thermocouple contacts) female contact on mounting nut side							
MM: Penetrator pin/pin contact (for coaxial)							
Shell							
Sizes							
3							
4							
5							
Contact Layouts							
Mxxx: Multipin							
Kxxx: Thermocouple							
CTXxx: Coaxial							
Shell Material							
ULCX: Stainless steel							
Insulator Material							
N: PEEK							
Keying							
P1 to P6							



Important note: MC* & FC* Crimp contacts must be ordered separately.


Contact layouts - Crimp or solder contacts

		Multipin power & signal layouts with removable crimp or solder contacts for plugs																				
		Contacts size																				
		#20	#16	#12	#8	#6																
Number of contacts	4		3M4 	4M4 	5M4D8 	5M4D6 																
	7	3M7 	4M7 	5M7 	5M7D8 																	
	10		4M10 	5M10 																		
	14	4M14 	5M14 	<table border="1"> <tr> <td></td> <td>5</td> <td>M</td> <td>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>				5	M	14	Connector shell size				Multipin				Number of contacts			
		5	M	14																		
Connector shell size																						
Multipin																						
Number of contacts																						
19		5M19 																				

All the layouts described in this section are available with removable crimp contacts (MC & FC) or solder fixed contacts (M & F)
 * Only available with crimp removable contacts

Contact layouts - Solder contacts

Coaxial	
 <p>3CTX50 50 Ohms - coaxial contact + impedance for coaxial cable AWG18 / shell size 3 Max current rating = 3A Contact resistance $\leq 5\text{m}\Omega$</p>	 <p>3CTX75 75 Ohms - coaxial contact + impedance for coaxial cable AWG12 / shell size 3 Max current rating = 8A Contact resistance $\leq 4\text{m}\Omega$</p>

Chromel / Alumel thermocouple	
<p>3K3 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>	

Contact details - Crimp contacts

Electrical characteristics				
Contact size	Layout	Operating voltage (Vdc)	Current rating (per contact)	
			UL recommendation	SOURIAU recommendation
#6	5M4D6	VDC \geq 600V	40A	51A
#8	5M4D8		29A	38A
	5M7D8			29A
#12	4M4		13A	20A
	5M7			16A
	5M10			13A
#16	3M4		4.5A	11A
	4M7			9A
	4M10			6.5A
	5M14			4.5A
	5M19			4.5A
#20	3M7		4A	5A
	4M14			4A

Contact details - Crimp contacts

Crimp contacts (for plug)								
Kit reference	Contact			Wire		Electrical	Mechanical	Contacts quantity per kit
	#	Ø	Type	AWG	Section (mm ²)	Contact resistance		
KCM8ULC0608	6	5.5	Pin	8	10	/	Machined copper alloy Silver over Nickel	20
KCM8ULC0606				6	13.5	/		
KCK8ULC0608			Socket	8	10	/		
KCK8ULC0606				6	13.5	/		
KCM8ULC0812	8	3.6	Pin	12	4	≤5 mΩ		100
KCM8ULC0810				10	6			
KCM8ULC0808				8	10			
KCK8ULC0812			Socket	12	4			
KCK8ULC0810				10	6			
KCK8ULC0808				8	10			
KCM8ULC1216	12	2.4	Pin	14-16	1.5	≤5 mΩ		
KCM8ULC1214				12-14	2.5			
KCK8ULC1216			Socket	14-16	1.5			
KCK8ULC1214				12-14	2.5			
KCM8ULC1628	16	1.6	Pin	30-28	0.05-0.08	≤3 mΩ	Machined copper alloy Gold over Nickel	500
KCM8ULC1624				26-24	0.13-0.20			
KCM8ULC1620				22-20	0.32-0.52			
KCM8ULC1616				20-16	0.52-1.5			
KCK8ULC1628			Socket	30-28	0.05-0.08			
KCK8ULC1624				26-24	0.13-0.20			
KCK8ULC1620				22-20	0.32-0.52			
KCK8ULC1616				20-16	0.52-1.5			
KCM8ULC2024	20	1	Pin	26-24	0.13-0.20	≤6 mΩ		
KCM8ULC2020				22-20	0.32-0.52			
KCK8ULC2024			Socket	26-24	0.13-0.20			
KCK8ULC2020				22-20	0.32-0.52			

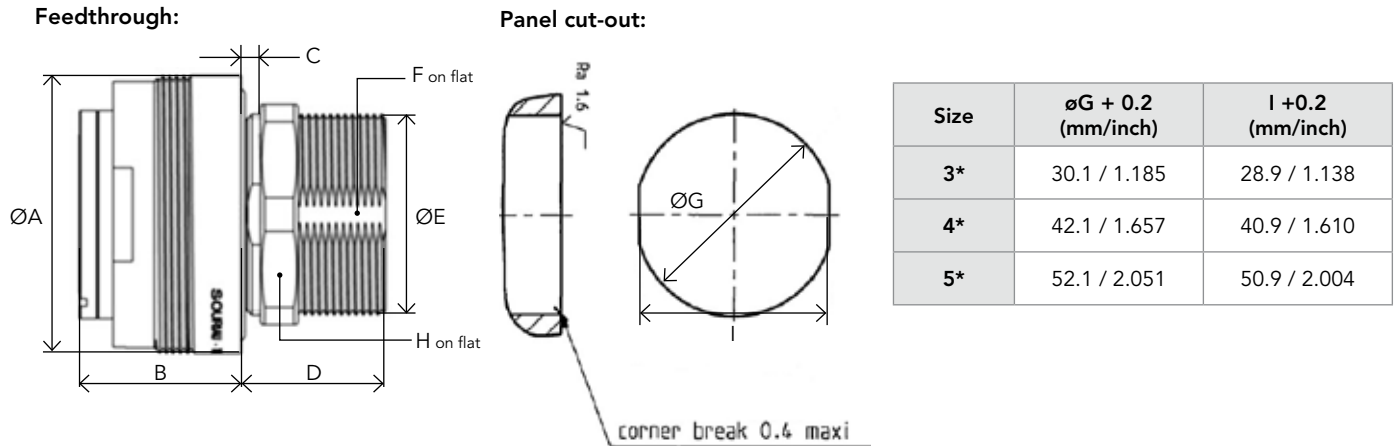
Contact details - Solder contacts

Solder contact table					
Contact size	Contact diameter (mm)	Solder bucket diameter (mm)	Max wire section (mm ²)	Indicative max AWG	Max current rating per contact
#12	2.39	2.6	4.5	12	26A
#16	1.59	2	2.54	14	13A
#20	1.02	1.3	1.13	18	7A

Electrical characteristics - Solder contacts					
Contact size	Layout	Operating voltage (Vdc)		Current rating (per contact)	
		UL recommendation	SOURIAU recommendation	UL recommendation	SOURIAU recommendation
#12	4M4	NA	1200V	13A	20A
	5M7	NA	1600V		16A
	5M10	NA	1600V		13A
#16	3M4	NA	700V	4.5A	11A
	4M7	NA	1200V		9A
	4M10	NA	1000V		6.5A
	5M14	NA	1000V		6.5A
	5M19	NA	800V		4.5A
	6M37	NA	800V		4.5A
#20	3M7	NA	700V	4A	5A
	4M14	NA	900V		4A

Products details

Feedthrough - Dimensions

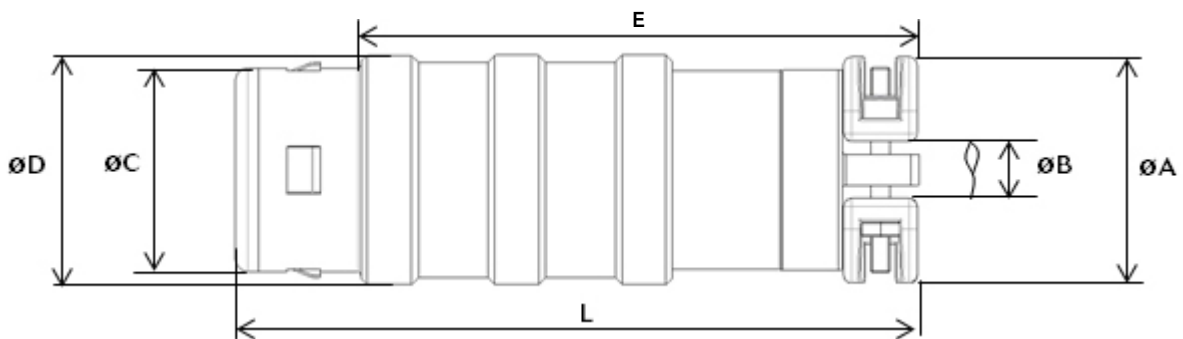


Size	ØG + 0.2 (mm/inch)	I + 0.2 (mm/inch)
3*	30.1 / 1.185	28.9 / 1.138
4*	42.1 / 1.657	40.9 / 1.610
5*	52.1 / 2.051	50.9 / 2.004

Shell size	ØA Max (mm/inch)	ØE max (mm/inch)	B max (mm/inch)	C min (mm/inch)	C max (mm/inch)	D max (mm/inch)	F - 0.2 on flat (mm/inch)	H on flat (mm/inch)
3*	50 / 1.969	30 / 1.181	35 / 1.378	4 / 0.157	21 / 0.827	31 / 1.220	28 / 1.102	33 / 1.299
4*	60 / 2.362	42 / 1.654					40 / 1.575	46 / 1.811
5*	70 / 2.756	52 / 2.047			17 / 0.669		50 / 1.969	58 / 2.283

* Indicative dimensions. Please contact your SOURIAU representative for full external dimensions drawing.

Straight plug - Dimensions



Shell size	L max (mm/inch)	ØA max (mm/inch)	ØB min (mm/inch)	ØB max (mm/inch)	ØD max (mm/inch)	ØC max (mm/inch)	E max (mm/inch)
3	75 / 2.953	22 / 0.866	5 / 0.197	11 / 0.433	21 / 0.827	18 / 0.709	55 / 2.165
4	90 / 3.543	30 / 1.181	7 / 0.276	17 / 0.669	30 / 1.181	27 / 1.063	70 / 2.756
5	115 / 4.528	36 / 1.417	10 / 0.394	21 / 0.827	40 / 1.575	36 / 1.417	91 / 3.583

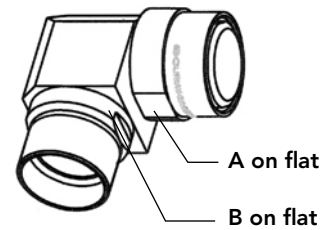
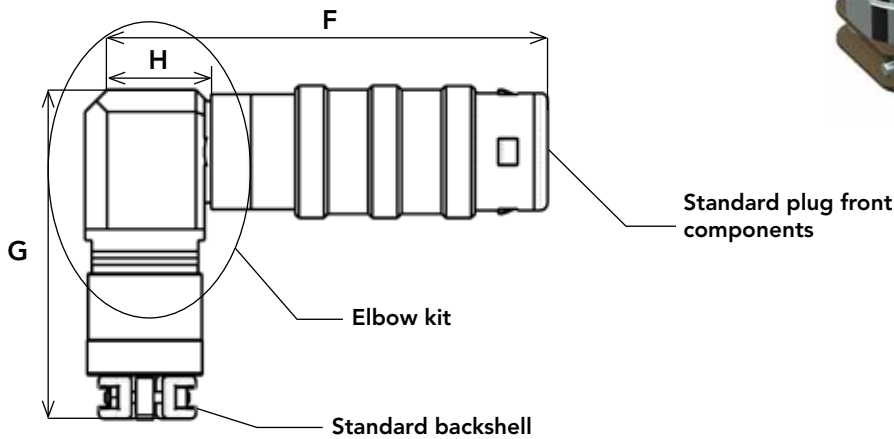
Products details

Elbow plug - Dimensions

90° backshell for ULC plugs

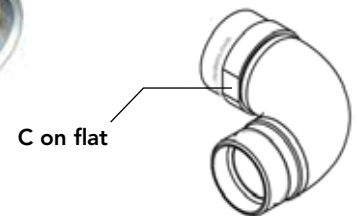
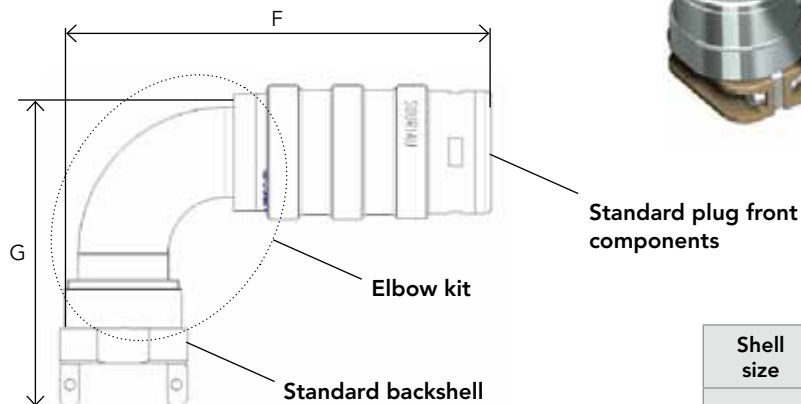
The ULC plugs can receive an optional 90° elbow that is installed between the standard plug nose and the backshell. The elbow kits shall be ordered separately from the plugs (refer to page 17)

Size 3 & 4 elbow



Shell size	F max (mm/inch)	G max (mm/inch)	H max (mm/inch)	A on flat (mm/inch)	B on flat (mm/inch)
3	90 / 3.543	60 / 2.362	25 / 0.984	18 / 0.709	16 / 0.63
4	115 / 4.528	85 / 3.346	35 / 1.378	26 / 1.024	24 / 0.945

Size 5 - 90° backshell

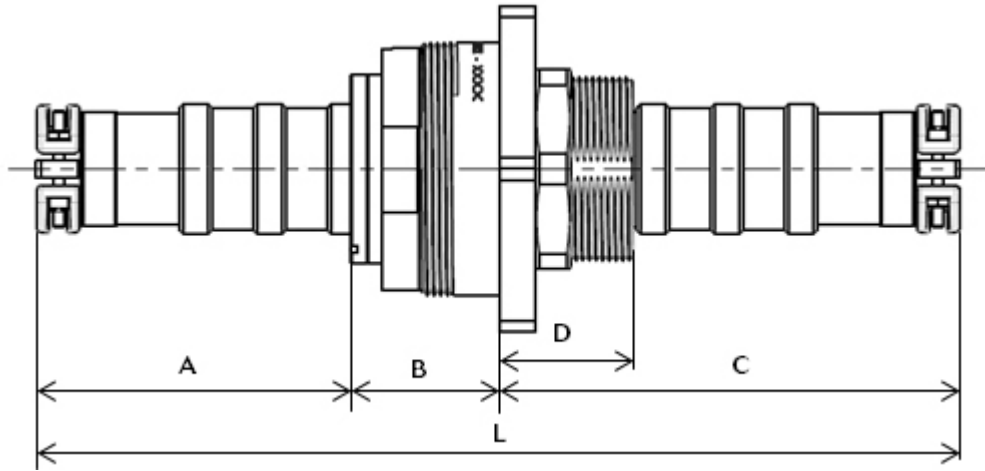


Shell size	F max (mm/inch)	G max (mm/inch)	C on flat (mm/inch)
5	155 / 6.102	120 / 4.724	34 / 1.339

Please, refer to page 17 for elbow backshell ordering information.

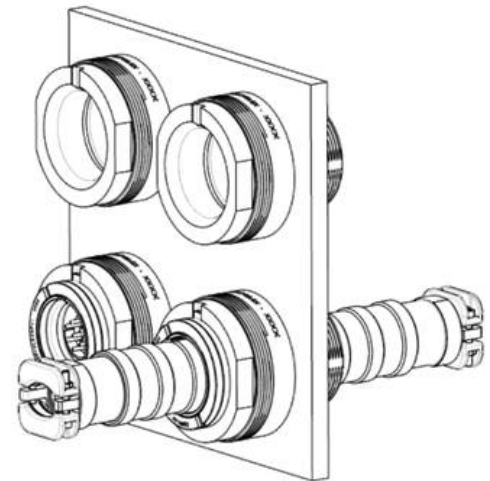
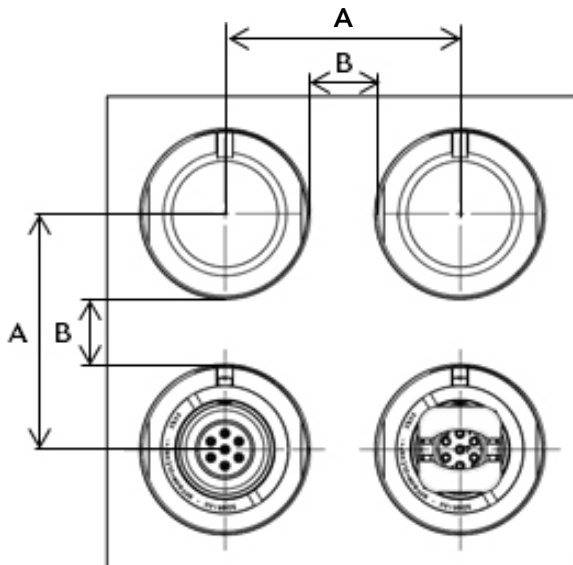
Products details

Assembly - Dimensions



Shell size	A max (mm/inch)	B max (mm/inch)	C max (mm/inch)	D max (mm/inch)	L max (mm/inch)
3*	58.00 / 2.283	35 / 1.378	83 / 3.268	31 / 1.220	189 / 7.441
4*	75.00 / 2.952		100 / 3.937		222 / 8.74
5*	95 / 3.74		128 / 5.039		264 / 10.394

The minimal spacing between connectors indicated hereunder are recommended to optimize the number of feedthroughs mounted on a same panel (in case of straight backshells only).



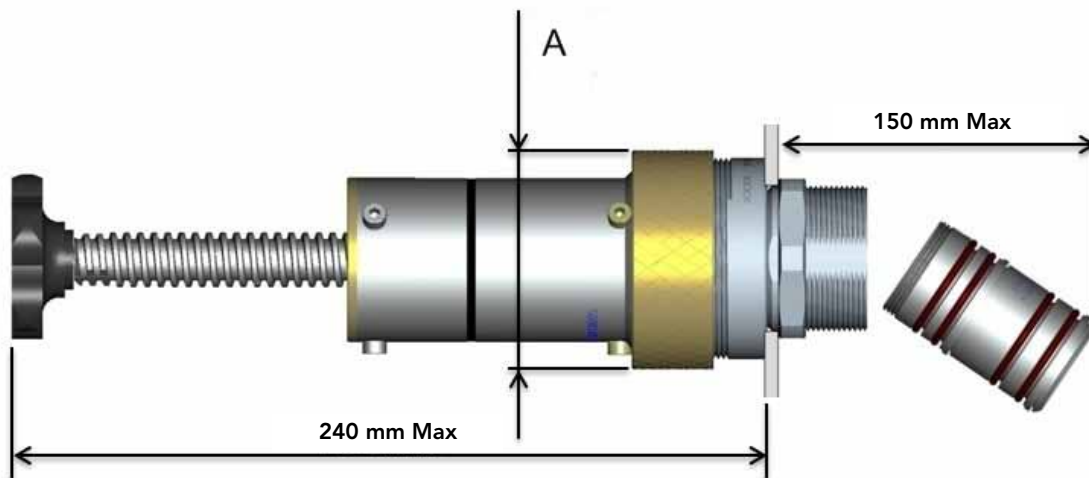
Shell size	A min (mm/inch)	B min (mm/inch)
3*	65 / 2.559	25.00 / 1.004
4*	80.00 / 3.150	
5*	90.00 / 3.543	

* Indicative dimensions. Please contact your SOURIAU representative for full external dimensions drawing.

Products details

Shuttle replacement tool - Dimensions

Recommended available room for shuttle replacement:



Shell size	A max (mm/inch)
3*	55 / 2.165
4*	65 / 2.559
5*	75 / 2.953

* Indicative dimensions. Please contact your SOURIAU representative for full external dimensions drawing.

Feedthrough options & accessories

Feedthrough with dummy core module

As long as the glovebox design is not fully defined regarding feedthrough configuration, a feedthrough with a dummy core without electrical contacts can be mounted. When needed, the dummy core can be replaced by a core with the required layout.

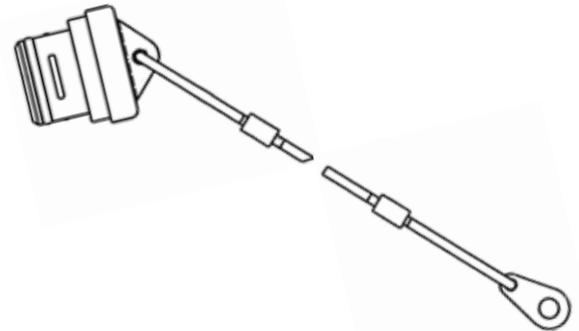
Shell size	Reference
3	TREN3ULCX
4	TREN4ULCX
5	TREN5ULCX



EPDM protective cap

When the feedthrough is not connected with the plugs it can be protected and sealed with EPDM caps.

Shell size	Reference
3	ULCLBRE3C
4	ULCLBRE4C
5	ULCLBRE5C



Plug accesories

Optional 90° elbow

Shell size	Reference
3	8ULCESCULCX3
4	8ULCESCULCX4
5	8ULCESCULCX5



Ground contacts & shielding options

T1 option

Connection of ground contact to the connector body by a ground spring soldered on contact n°1. The shell to shell resistance with the T1 option is 10mΩ.

Contact size	Reference
#16	8ULCT16
#20	8ULCT20



T3 option

Cable shield connected to the connector shell at 360° (for cables with shielding braid).

Shell size	Reference
3	8ULC3T3
4	8ULC4T3
5	8ULC5T3



Tools

Crimping tool

Contact size	Description	Reference
#6	Pneumatic crimping tool for #6 contacts	OUT8ULCWA23
	Die assembly, #6 contacts	OUT8ULCWA233
	Locator, #6 contacts	OUT8ULCWA2310
#8 & #12	Crimping tool for power contacts (without locator)	OUT8ULCM317
	Locator for #8 contacts	OUT8ULCVGE10078A
	Locator for #12 contacts	OUT8ULCVGE10077A
#16 & #20	Crimping tool with locator for #16 & #20 contacts	OUT8ULCMH860
	Locator for #16 contacts	OUT8ULCMH86164G
	Locator for #20 contacts	OUT8ULCMH86301

Tools

Shuttle replacement tool

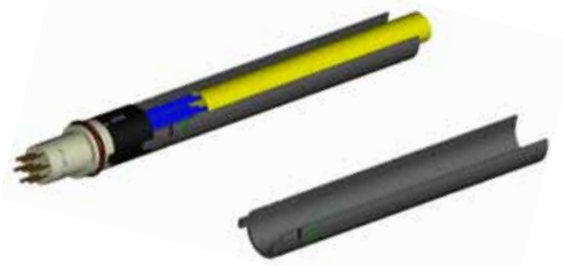
The extraction tool is made of stainless steel. The locking ring is made of bronze.

Shell size	Reference
3	OUT8ULCSRT3
4	OUT8ULCSRT4
5	OUT8ULCSRT5



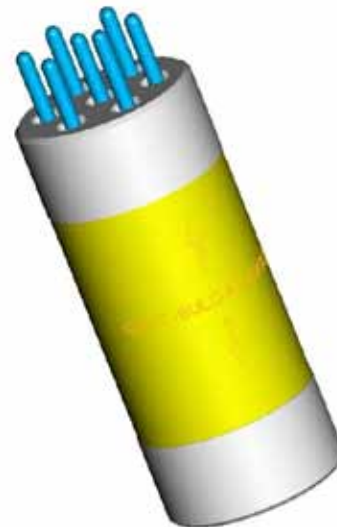
Plug assembly tool (for connector without T3 option)

Shell size	Reference
3	OUTULCXME3
4	OUTULCXME4
5	OUTULCXME5



Plug assembly tool (for plug with female contacts and T3 option)

Contact layout	Reference
3M4	OUT8ULCAT3M4
3M7	OUT8ULCAT3M7
4M4	OUT8ULCAT4M4
4M10	OUT8ULCAT4M10
5M7	OUT8ULCAT5M7
5M10	OUT8ULCAT5M10
5M14	OUT8ULCAT5M14
5M19	OUT8ULCAT5M19
5M4D6	OUT8ULCAT5M4D6
5M4D8	OUT8ULCAT5M4D8
5M7D8	OUT8ULCAT5M7D8



Important note: This tool can also be used for electrical checking during connector assembly operations

Tools

Contact extraction tool		
Contact size	Description	Reference
#6	Extraction tool	OUT8ULCET6
#8	Extraction tool with extraction tip	OUT8ULC51060210936
	Spare extraction tip	OUT8ULC51060213436
#12	Extraction tool with extraction tip	OUT8ULC51060210924
	Spare extraction tip	OUT8ULC51060213424
#16	Extraction tool	OUT8ULCRX2025GE1
#20	Extraction tool	OUT8ULCRX20D44

Insertion tool	
Description	Reference
Insertion plier for contacts #12, #16 & #20	OUT8ULC850029B
Insertion tool for contacts #16 & #20	OUT8ULCRTM205

For further information contact us at contactnuclear@souriau.com
 or visit our web site www.souriau.com/nuclear