SOURIAU

Stainless Steel ULC for Internal Glovebox Connections

A large range of Push-Pull stainless steel connectors dedicated to the nuclear industry

Radiation withstanding materials
- Shell → Stainless Steel
  Insulation → PEEK
  Other non-metallic parts → Viton®, Nylatron®, PEEK

Large range
- 4 shell sizes
  Multipin signal & power, thermocouple, coaxial
  Optional 90° backshell
  Large choice of receptacles

Sealed connectors
- IP55 to IP68

Quick connect
- Push-Pull coupling system

Esterline
Connection Technologies

Description

• Stainless steel version of ULC Push-Pull connectors

• 4 sizes available (3, 4, 5, 6)

Application

• Glovebox for signal and power transmission

Qualification standards

• UL1977 listed
• NQA-1 program

Technical features

Electrical

• **Contacts:**
Crimp removable, to be ordered separately
Solder fixed, mounted before delivery

• **Insulation resistance:**
5GΩ under 500 Vdc (unmated)

Mechanical

• **Endurance:**
500 mating / unmating

Accident testing

• **Shocks:**
100g – 6ms – 3 impacts in each of 3 mutually perpendicular axis

• **Vibration:**
0.35mm during 1 hour sweep,
10 to 20 000Hz / 3 axis

Environmental

• **Temperature range:**
-15 to +175°C

• **Salt spray resistance:**
500 hours

• **Sealing:**
IP 65 (mated)

• **Resistance to liquids:**
Oil, alcohol, petrol, diesel fuel, sea water
Gases (natural, butane, propane, Freon)
Acids (acetic, boric, citric)

Materials & plating	Receptacle 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 8 to 14
Plating	Passivated	/	/	/	/	

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 adresses the high level of requirements associated with nuclear fuel production, fuel reprocessing and waste management industries, as well as experimental facilities.

The new ULC Stainless Steel version represents an expansion of the ULC Series. With this new connector version comes the availability of crimped removable contacts and a new cable clamping system. A size 6 connector is also available to accommodate new power contact layouts or high density layout with signal contacts.

Approved quality assurance program

SOURIAU quality assurance program meets international & nuclear standards:
- ISO 9001/EN 9100
- ASME NQA-1 (10 CFR 50 App. B)

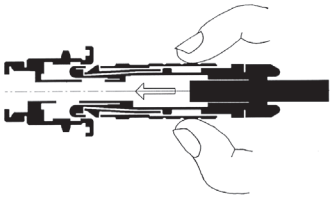
UL Certified

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).

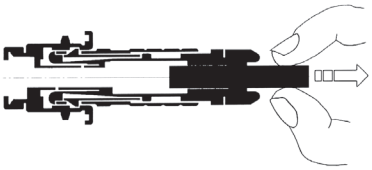
Product overview

Push-Pull coupling plugs

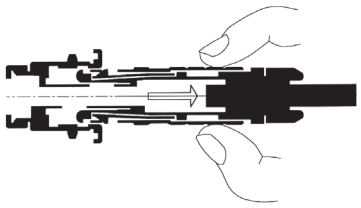
The ULC range is based on a reliable and safe Push-Pull system.



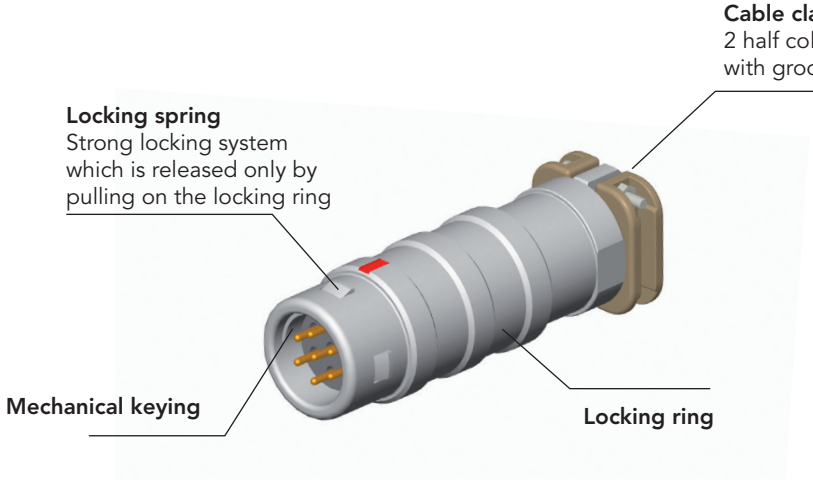
The lacthing of the plug into the receptacle is achieved by a simple axial push of the outer plug shell.



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 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

Assemblies

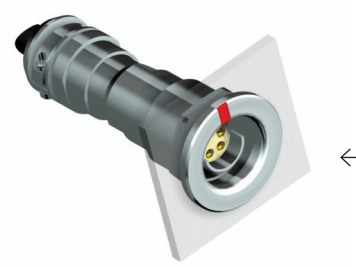
RE
Round flange receptacle, front mounting

PCE
In-line cable receptacle

REC
Square flange receptacle

RESC
Round flange receptacle with backshell, front mounting

RECSC
Square flange receptacle with backshell, front mounting



FE
Push-Pull plug with eblow backshell

FE
Push-Pull plug with straight backshell

Other receptacle types are also avaible on request.
Please contact your SOURIAU specialist for details on avaibility.

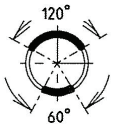
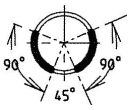
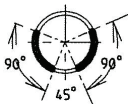
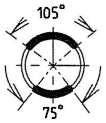
Product overview

Keying

The ULC connectors can be equipped with 8 different keying:

• One glovebox can accommodate several ULC connectors of the same size and with the same contact layouts without any risk of a wrong mating. Eight different keying options are available. Each specific pattern goes with a specific color marking on the plug and on the feedthrough. This line marking helps the operator to find the right orientation of the connector when connecting.They 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	P6	P7	P8
Plug front view								
Color	Red	Blue	White	Yellow	Green	Black	Brown	Purple

Contacts

Plug & receptacle:
• The ULC plug receives solder fixed or crimp removable contacts.
The different layouts are described from page 8 of this brochure.
• Crimp contacts shall be ordered separately, they are described on pages 8 to 10 of this brochure.
• Non-removable solder contacts are delivered mounted in the insulator, they are described on pages 11 to 14 of this brochure.

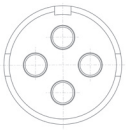
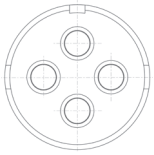
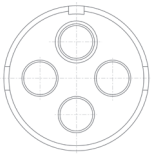
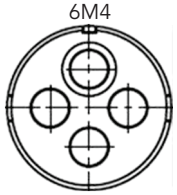
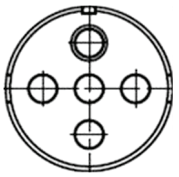
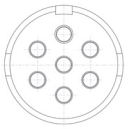
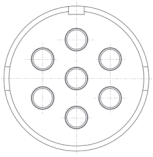
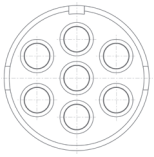
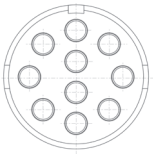
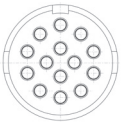
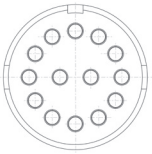
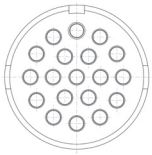
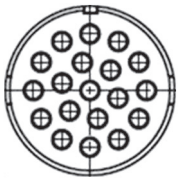
Ordering information

Basic series	FE	MC	6	M5	ULCX	N	P1
Shells **RE:** Round flange receptacle **FE:** Push-Pull plug **PCE:** In line cable receptacle **RESC*:** Round receptacle with backshell **RECSC*:** Square receptacle with backshell **REC*:** Square flange receptacle							
Contacts **MC:** Pin contacts, crimp (contacts must be ordered separately) **MS:** Pin contacts, solder fixed (thermocouple only) **FC:** Socket contacts, crimp (contacts must be ordered separately) **FS:** Socket contacts, solder fixed (thermocouple only) **M:** Pin, solder fixed (for standard contact) **F:** Socket, solder fixed (for standard contact)							
Shell Sizes **3** **4** **5** **6**							
Contact Layouts **Mxxx:** Multipin (Refer to table p. 8-12) **Kxxx:** Thermocouple (Refer to table p.13) **CTXxx:** Coaxial (Refer to table p.13)							
Shell Material **ULCX:** Stainless steel							
Insulator Material **N:** PEEK							
Keying **P1 to P8**							

*As described on page 5 of this brochure, these receptacle types are also available on request.
Please contact your SOURIAU specialist for details on availability.

Contact layouts - Crimp contacts

Multipin power & signal layouts with removable crimp contacts

Number of contacts	Contacts size #20	#16	#12	#8	#6	#2
4		3M4 	4M4 	5M4D8 	5M4D6 	6M4 
5					6M5 	
7	3M7 	4M7 	5M7 	5M7D8 		
10		4M10 	5M10 			
14	4M14 	5M14 				
19		5M19 	6M19 			
37		6M37 				

	5	M	14
Connector shell size			
Multipin			
Number of contacts			

All the layouts described in this section are available with removable crimp contacts (MC & FC).

Contact layouts - Crimp contacts

Electrical characteristics				
Contact size	Layout	Operating voltage (Vdc) UL & SOURIAU recommendation	Current rating (per contact)	
			UL recommendation	SOURIAU recommendation
#2	6M4	600V	60A	86A
#6	5M4D6		40A	51A
	6M5			40A
#8	5M4D8		29A	38A
	5M7D8			29A
#12	4M4		13A	20A
	5M7			16A
	5M10			13A
	6M19			
#16	3M4		4.5A	11A
	4M7			9A
	4M10			6.5A
	5M14			4.5A
	5M19			
	6M37			
#20	3M7		4A	5A
	4M14			4A

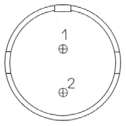
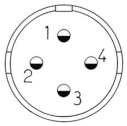
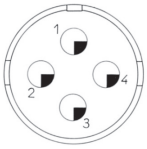
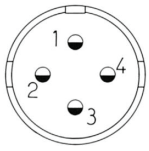
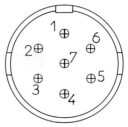
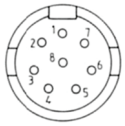
Contact details - Crimp contacts

Crimp contacts								
Kit reference	Contact			Wire		Electrical	Mechanical	Contacts quantity per kit
	#	ø	Type	AWG	Section (mm²)	Contact resistance		
KCM8ULC0204	2	9	Pin	4	22	/	Machined copper alloy Silver over Nickel	20
KCM8ULC0202				2	33	/		
KCK8ULC0204			Socket	4	22	/		
KCK8ULC0202				2	33	/		
KCM8ULC0608	6	5,5	Pin	8	10	/		
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	Machined copper alloy Gold over Nickel	
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		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 layouts - Solder contacts

Multipin power & signal layouts with solder contacts

Contacts size

Number of contacts	#20	#16	#12	Ø 5
2		3M2 		
2		4M2 		
3		3M3 		
4		3M4 	4M4 	
4				5M4D5 
4			5M4 	
5	3M5 			
7	3M7 	4M7 	5M7 	
8	3M8 	4M8 		

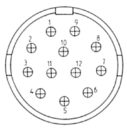
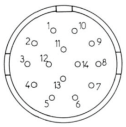
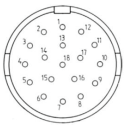
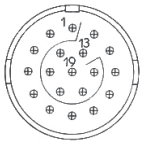
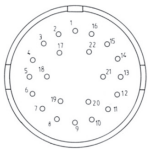
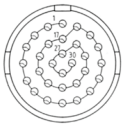
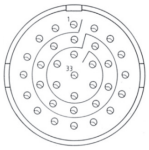
	5	M	4
Connector shell size			
Multipin			
Number of contacts			

All the layouts described in this section are available with fixed solder contacts (M & F).

Contact layouts - Solder contacts

Multipin power & signal layouts with solder contacts

Contacts size

Number of contacts	Ø0.9	#20	Ø1.3	#16
12	3M12 			4M12 
14		4M14 		5M14 
18		4M18 		
19	3M19 			5M19 
22		5M22 		
27				5M27 
30			4M30 	
33			5M33 	

	5	M	14
Connector shell size			
Multipin			
Number of contacts			

All the layouts described in this section are available with fixed solder contacts (M & F).

Contact layouts - Solder contacts

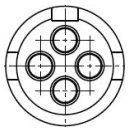
Coaxial

3CTX50
50 ohms - coaxial contact + impedance for coaxial
cable AWG16 / shell size 3
Operating Voltage Vdc =1000V
Max current rating = 6A
Contact resistance ≤5mΩ

3CTX75
75 ohms - coaxial contact + impedance for coaxial
cable AWG20 / shell size 3
Operating Voltage Vdc =1000V
Max current rating = 5A
Contact resistance ≤4mΩ

Chromel / Alumel thermocouple

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



For other arrangements, please consult us.

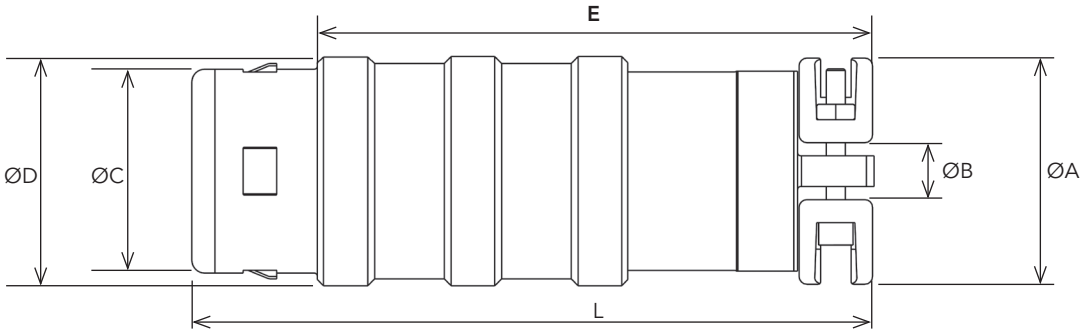
Contact details - Solder contacts

Solder contact table				
Contact size	Contact diameter (mm)	Solder bucket diameter (mm)	Current rating (per contact)	
			UL recommandation	SOURIAU recommendation
Ø5	5	5.1	40A	40A
#12	2.39	2.6	13A	26A
#16	1.59	2	4.5A	13A
Ø1,3	1.3	1	NA	10A
#20	1.02	1.3	4A	7A
Ø0,9	0.9	0.8	NA	5A

Electrical characteristics			
Contact size	Layout	Operating voltage (Vdc)	
		UL recommendation	SOURIAU recommendation
Ø5	5M4D5	600V	1500V
#12	4M4	NA	1200V
	5M4	600V	2500V
	5M7	NA	1600V
#16	3M2	600V	700V
	3M3	600V	700V
	3M4	NA	700V
	4M2	600V	1200V
	4M7	NA	1200V
	4M12	600V	700V
	5M14	NA	1000V
	5M19	NA	800V
	5M27	600V	700V
Ø1.3	4M30	NA	400V
	5M33	NA	600V
#20	3M5	600V	700V
	3M7	NA	700V
	3M8	600V	600V
	4M8	600V	1100V
	4M14	NA	900V
	4M18	500V	500V
	5M22	600V	900V
Ø0.9	3M12	NA	400V
	3M19	NA	250V

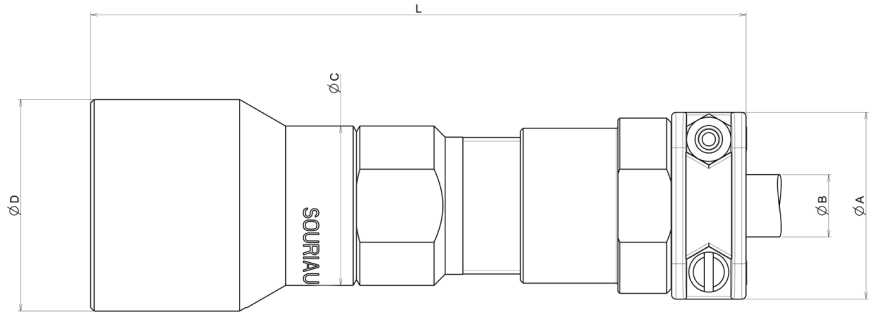
Product details

Plug - Dimensions



Shell size	ØA max (mm/inch)	ØB min (mm/inch)	ØB max (mm/inch)	ØC max (mm/inch)	ØD max (mm/inch)	L max (mm/inch)	E max (mm/inch)
3	23 / 0.906	5 / 0.197	11 / 0.433	18 / 0.709	21 / 0.827	75 / 2.953	55 / 2.165
4	29 / 1.142	7 / 0.276	15 / 0.591	27 / 1.063	30 / 1.181	90 / 3.543	70 / 2.756
5	38 / 1.496	9 / 0.354	24 / 0.945	36 / 1.417	40 / 1.575	115 / 4.528	91 / 3.583
6	50 / 1.969	12 / 0.472	28 / 1.102	46 / 1.811	50 / 1.969	140 / 5.512	98 / 3.858

In-line cable receptacle - Dimensions



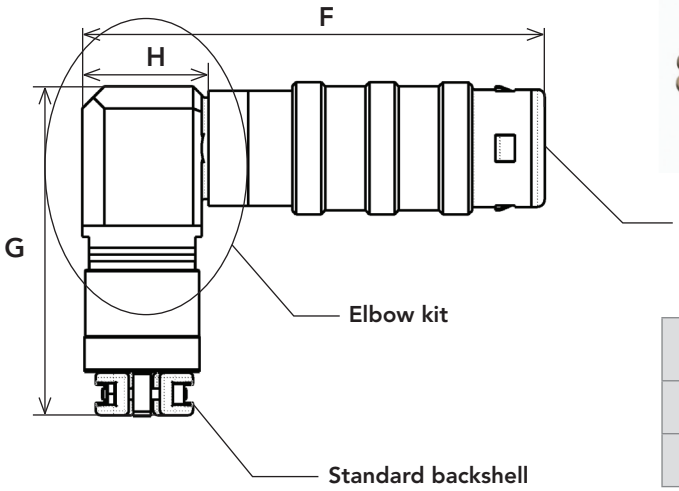
Shell size	ØA max (mm/inch)	ØB min (mm/inch)	ØB max (mm/inch)	ØC max (mm/inch)	ØD max (mm/inch)	L max (mm/inch)
3	23 / 0.906	5 / 0.197	11 / 0.433	20 / 0.787	25 / 0.984	75 / 2.953
4	29 / 1.142	7 / 0.276	15 / 0.591	30 / 1.181	34 / 1.339	90 / 3.543
5	38 / 1.496	9 / 0.354	24 / 0.945	37 / 1.457	42 / 1.654	115 / 4.528
6	50 / 1.969	12 / 0.472	28 / 1.102	46 / 1.811	52 / 2.047	140 / 5.512

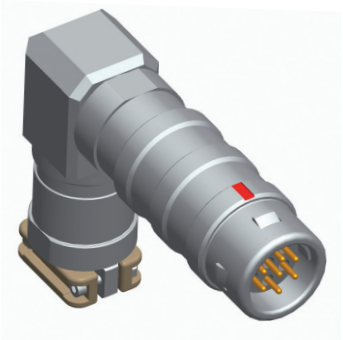
Product details

Elbow plug - Dimensions

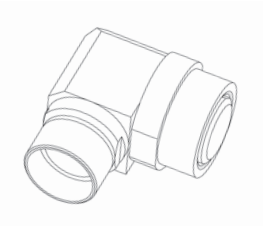
90° backshell for ULC plugs
The ULC plugs can receive an optional 90° elbow that is installed between the standard plug nose and the backshell.
The elbow kits shall be ordered separately from the plugs (refer to page 29).

Size 3 & 4 elbow



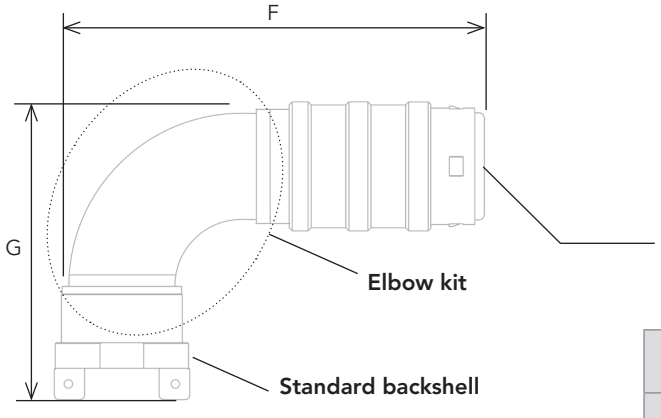


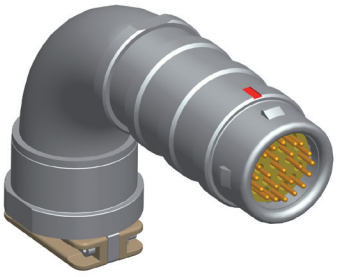
Standard plug front components



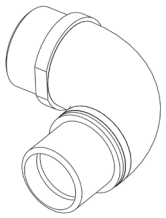
Shell size	F max (mm/inch)	G max (mm/inch)	H max (mm/inch)
3	100 / 3.937	70 / 2.756	25 / 0.984
4	120 / 4.724	85 / 3.346	35 / 1.378

Size 5 & 6 elbow





Standard plug front components

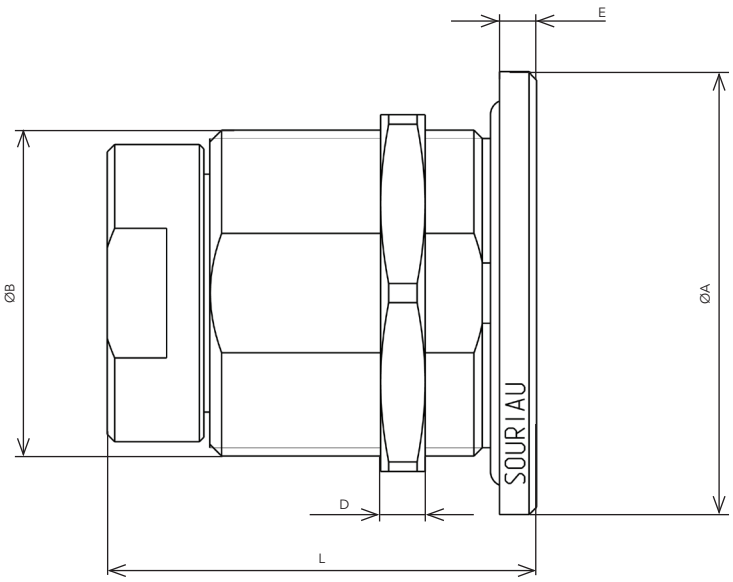


Shell size	F max (mm/inch)	G max (mm/inch)
5	150 / 5.905	110 / 4.331
6	165 / 6.496	120 / 4.724

Please refer to page 19 for elbow backshell ordering information.

Product details

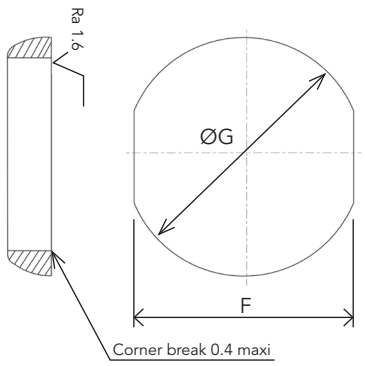
Panel mounted receptacles - Dimensions



Shell size	ØA max (mm/inch)	ØB max (mm/inch)	L max (mm/inch)	D ± 0.1 / 0.004 (mm/inch)	E max (mm/inch)
3	32 / 1.260	22 / 0.866	32 / 1.260	3 / 0.118	2.5 / 0.098
4	41 / 1.614	31 / 1.120	33 / 1.299	5 / 0.197	2.5 / 0.098
5	54 / 2.126	41 / 1.614	36 / 1.417	5 / 0.197	3 / 0.118
6	64 / 2.52	52 / 2.047	39 / 1.535	5 / 0.197	5.5 / 0.217

Panel cut-out

Shell size	ØG+0,2/0.008 (mm/inch)	F +0,2/0.008 (mm/inch)	Max panel thickness (mm/inch)
3	32.5 / 1.280	20.70 / 0.815	16 / 0.63
4	41.5 / 1.634	29.70 / 1.169	15 / 0.591
5	54.5 / 2.146	39.70 / 1.563	19 / 0.748
6	64.5 / 2.539	50.70 / 1.996	20 / 0.787

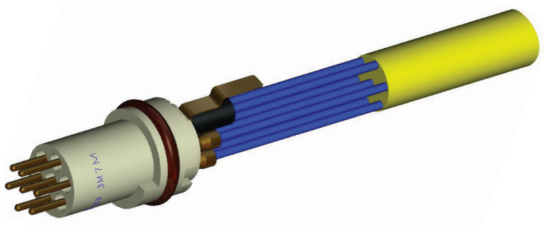


Ground contacts & shielding options

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.

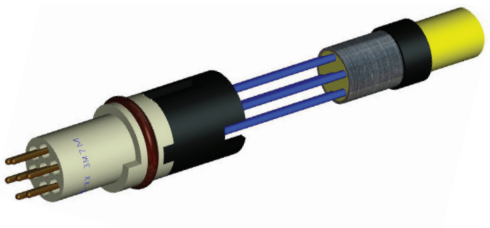
Contact size	Reference
#16	8ULCT16
#20	8ULCT20



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
6	8ULC6T3

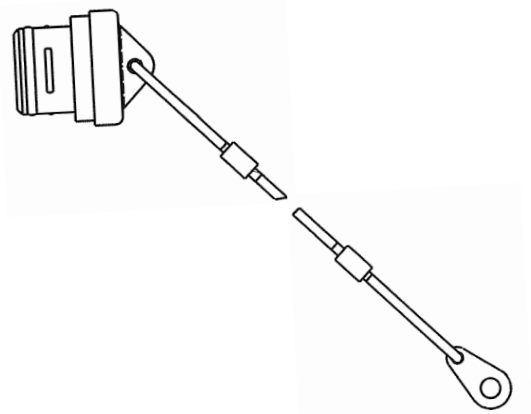


Protective caps

Receptacle & plug protective cap

EPDM cap for size 3, 4 & 5 connectors

Shell size	Plug cap	Receptacle cap (for RE, PCE & TRE)
3	ULCLBFE3C	ULCLBRE3C
4	ULCLBFE4C	ULCLBRE4C
5	ULCLBFE5C	ULCLBRE5C



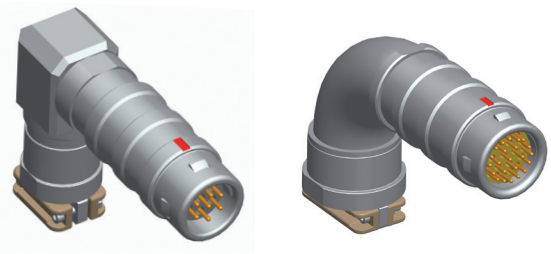
Metallic cap for size 6 connectors

Shell size	Plug cap	Receptacle cap (for RE, PCE & TRE)
6	/	ULCXBRE6

Plug accessories

Optional 90° elbow

Shell size	Reference
3	8ULCESCULCX3
4	8ULCESCULCX4
5	8ULCESCULCX5
6	8ULCESCULCX6



Tools

Crimping tool

Contact size	Description	Reference
#2 & #6	Pneumatic crimping tool for contacts #2 & #6	OUT8ULCWA23
	Die assembly, #2 contacts	OUT8ULCWA238
	Die assembly, #6 contacts	OUT8ULCWA233
	Locator, #2 contacts	OUT8ULCWA2315
	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

Insertion tool

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

Tools

Contact extraction tool

Contacts extraction one by one

Contact size	Description	Reference
#2	Extraction tool	OUT8ULCET2
#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

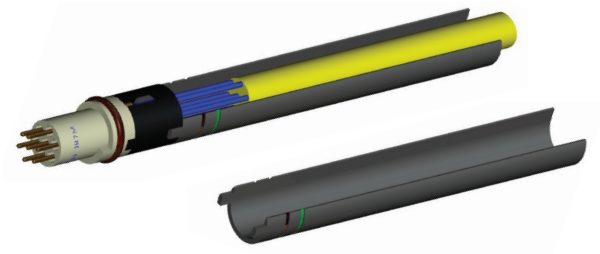
Contacts extraction all at once

Contact layout	Reference
6M4	OUT8ULCET6M4
6M5 & 5M4D6	OUT8ULCET6M5

Tools

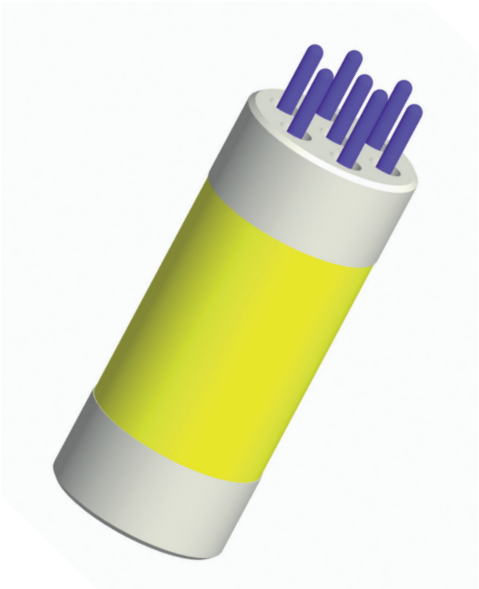
Plug assembly tool (for connector without T3 option)

Shell size	Reference
3	OUTULCXME3
4	OUTULCXME4
5	OUTULCXME5
6	OUTULCXME6



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

Contact layout	Reference
3M4	OUT8ULCAT3M4
3M7	OUT8ULCAT3M7
4M4	OUT8ULCAT4M4
4M7	OUT8ULCAT4M7
4M10	OUT8ULCAT4M10
5M7	OUT8ULCAT5M7
5M10	OUT8ULCAT5M10
5M14	OUT8ULCAT5M14
5M19	OUT8ULCAT5M19
5M4D6	OUT8ULCAT5M4D6
5M4D8	OUT8ULCAT5M4D8
5M7D8	OUT8ULCAT5M7D8
6M4	OUT8ULCAT6M4
6M5	OUT8ULCAT6M5
6M19	OUT8ULCAT6M19
6M37	OUT8ULCAT6M37



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

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