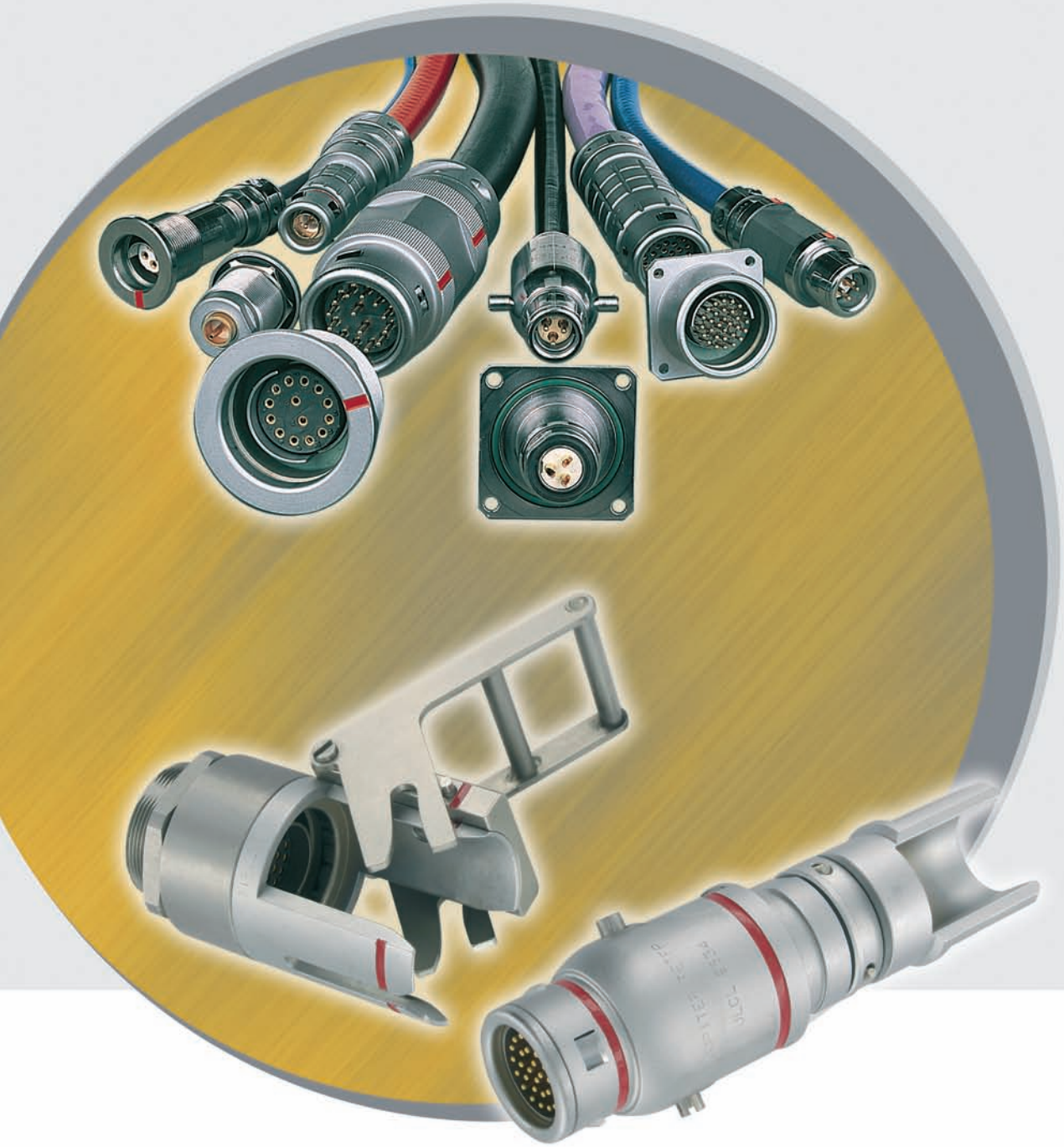


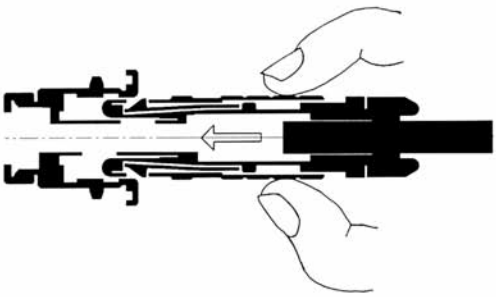
ULC Series

Push-Pull Connectors for Nuclear Industry

SOURIAU
Connection Technology

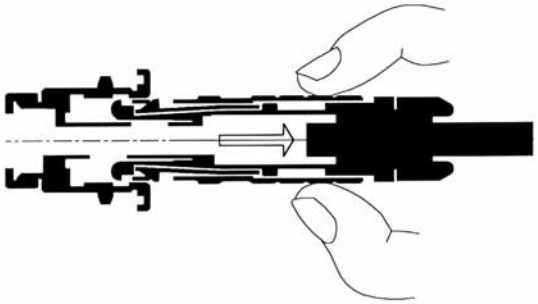
Summary

Push-pull system



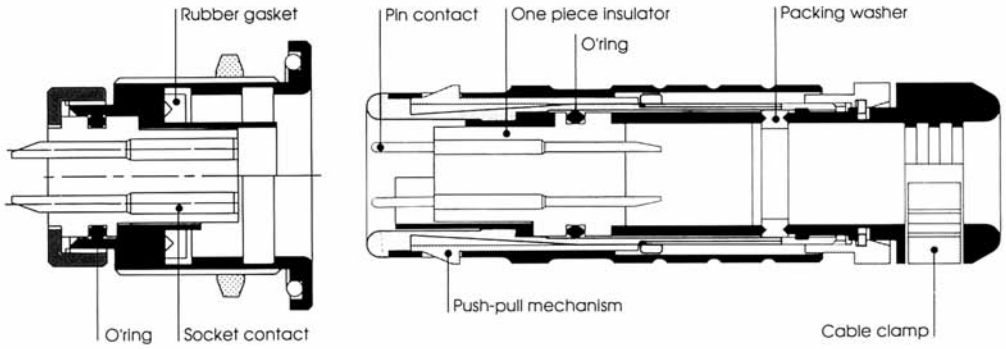
The latching of plug into the receptacle is achieved by a simple axial pushing on the outer shell.

Connection cannot 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.

Receptacle and plug sections



General description

Shells

- Easy to use : "PUSH-PULL" latching
- Watertight to 2 bars, mated connectors
- Brass shells with Nickel + Chrome plating, or stainless steel for special applications : nuclear, corrosive fields etc... (Stainless steel shells for remote manipulation)
- Alternative insulators to suit conditions (temperature, radiation, etc...)
- Gold and nickel plated contact, to solder
- Mechanical keying
- Pre-guiding available on remote manipulation versions
- Four shell sizes (I, III, IV, V) for multipin connectors
- O'ring :
  . standard; nitrile for brass shell, epdm for stainless steel shell
  . on request; silicon, neoprene, viton
- Shell to shell conductivity available on all multipin connectors.

CONSULT US FOR ANY SPECIFIC APPLICATIONS.

Insulators

Series	Insulator material	Ref.	Temperature range °C	Dielectric withstanding voltage kV/mm	Radiation withstanding Rad	Dielectric constant	M	C	TCX
Standard	NYLATRON GS * *	S	-20 +90	12	1.10^8	3,4	X	X	X
	TEFLON * *	TF	-50 +170	60	1.10^4	2,6	X	X	X
	KELANEX *	K	-50 +170	18	1.10^6	3,8	X		
Special	TEFZEL	TZ	-50 +170	60	5.10^7	2,6	X	X	X
	PEEK * *	N	-50 +250	35	1.10^9	2,6	X		
	POLYETHYLENE	P	-40 +100	33	1.10^8	3,2	X		
	POLYPROPYLENE	PP	-10 +100	60	5.10^4	2,5	X		
	VESPEL	V	-60 +260	22	4.10^9	3,6	X		

M : Multipin **C** : Coaxial **TCX** : Triaxial.
* *Size I only*
* * *Recommended materials*

	Shell sizes	I	III	IV	V
Outer diameter of cable (mm)	min.	2,2	3,5	8,2	10
	max.	7,2	11	18	24
Force (N)	mating	30 ± 5	30 ± 5	50 ± 5	100 ± 10
	unmating	30 ± 5	30 ± 5	50 ± 5	100 ± 10

How to order

Reference example :
Remote manipulated straight plug, socket contacts, size III, 4 contacts, brass ULC series standard insulator, cable outer diameter = 10,6 mm, P1 Keying.

Shells : (see pages 7 and 8)	**FET**	**F**	**III**	**M4**		**ULCL**	**S**	**106**	**P1**

FE : Straight plug
FET : Remote manipulated straight plug
RE : Round receptacle, front mounting
REC : Square receptacle
RECSC : Square receptacle with cable clamp
RES : Round sallent receptacle, rear mounting
RESC : Round receptacle with cable clamp, front mounting
RESSC : Round receptacle with cable clamp, rear mounting
PCE : Cable receptacle
TRE : Feed through bulkhead
RME : Double receptacle
FETFP : Remote manipulated straight plug with pre-guiding spurs
REFP : Round receptacle with pre-guiding fork
RECFP : Square receptacle with pre-guiding fork

Contacts * :
M : Pin contacts
F : Socket contacts

Shell sizes :
I III IV V

Contact layouts : (see pages 9, 10 and 11)
Mxxx : Multipin + contact layout reference
Cxx : Coaxial + impedance (50Ω or 75Ω)
TCXxx : Triaxial + impedance (50Ω or 75Ω)

Shell to shell conductivity ** :
T : Contact n°1 connected to shell ground (multipins only, except feed through)

Series :
ULCL : ULC series, brass shell
ULCT : ULC series, titanium shell

Insulator material : (see table page 5)
S : Nylatron G.S.
TF : Teflon
K : Kelanex
TZ : Tefzel
N : PEEK
P : Polyethylene
PP : Polypropylene
V : Vespel (consult us)

Cable outer diameter :
xxx : Mention cable outer diameter in 1/10e of mm
A, B or C : For 75Ω triaxial, state the letter in accordance with the cable used (see page 19).

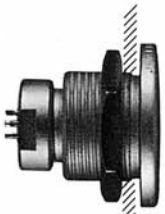
Keying : P1, P2, P3, P4, P5 (see table page 21)

* *For the feed through bulkhead (TRE) and double receptacle (RME) : DO NOT MENTION ANYTHING*
TRE are delivered : Pin/socket in multipin versions
Socket/socket in coaxial and triaxial versions
RME are delivered : Socket/socket
** *No shell to shell conductivity wanted : DO NOT WRITE ANYTHING.*

ULC shells • size I

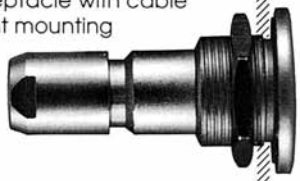
Without pre-guiding
Multipin, coaxial connectors

RE
Round flange receptacle, front mounting

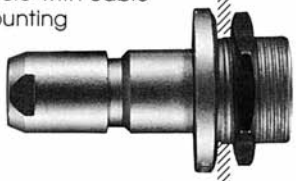


RES
Round flange receptacle, rear mounting

RESC
Round receptacle with cable clamp, front mounting



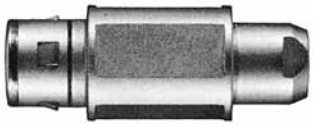
RESSC
Round receptacle with cable clamp, rear mounting



PCE
Cable receptacle

FE
Straight plug (brass only)

FET
Remote manipulated straight plug



ULC shells • size III, IV and V

Without pre-guiding
Multipin, coaxial and triaxial connectors

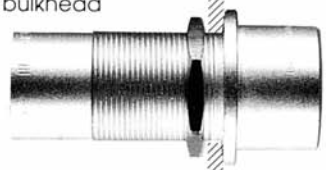
RE
Round flange receptacle, front mounting

REC
Square flange receptacle

RESC
Round receptacle with cable clamp, front mounting

RECSC
Square flange receptacle with cable clamp

TRE
Feed through bulkhead

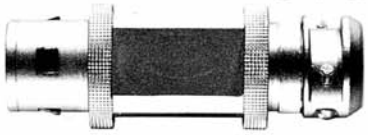


PCE
Cable receptacle

RME
Double receptacle (only for coaxial and triaxial brass connectors)

FE
Straight plug (brass only)

FET
Remote manipulated straight plug



Contact layouts

Shell sizes I and III (operating voltage Vdc and description)

ULC shells size 1

Insulator view from pin side

C50 1 Coax. 50Ω Kx 23	**C75** 1 Coax. 75Ω	**M1** 1 contact Ø2 1200V
M2 2 contacts Ø1,3 700V	**M3** 3 contacts Ø0,9 900V	**M4** 4 contacts Ø0,9 600V
M8 8 contacts Ø0,7 250V		

ULC shells size 3

M2 2 contacts Gage 16 700V	**M3** 3 contacts Gage 16 700V	**M4** 4 contacts Gage 16 700V
M5 5 contacts Gage 20 700V	**M7** 7 contacts Gage 20 700V	**M8** 8 contacts Gage 20 600V
M12 12 contacts Ø0,9 400V	**M19** 19 contacts Ø0,9 250V	**C50** 1 Coax. 50Ω Kx 23 1500V
C75 1 Coax. 75Ω 1500V	**TCX50** 1 Triax. 50Ω 1000V	**TCX75** 1 Triax. 75Ω 1000V

Contact table

Symbol	Description	Ø (mm)	Ø solder bucket (mm)	Max current rating (A)	Contact resistance (mΩ)
	Contact **Ø0,7**	0,7	0,7	4	≤ 8
	Contact **Ø0,9**	0,9	0,8	5	≤ 5
	Contact **Cal. 20**	1,02	1,3	7	≤ 4
	Contact **Ø1,3**	1,3	1	10	≤ 4
	Contact **Cal. 16**	1,59	2	13	≤ 3
	Contact **Ø2**	2	1,8	18	≤ 3
	Contact **Cal. 12**	2,39	2,6	26	≤ 3
	Contact **Ø4**	4	4	33	≤ 3
	Contact **Ø5**	5	5,1	40	≤ 3
	Contact **Ø7**	7	9	115	≤ 0,6
	Contact **HV**		1,3	7	≤ 4
	Coax **C 50 Kx23**		for cable Kx23	3	≤ 5
	Coax **C 50 Kx15**		for cable Kx15	4	≤ 5
	Coax **C 75**		1,4	8	≤ 4
	Triax **Tcx 50**		1,4	6	≤ 3
	Triax **Tcx 75**		1	5	≤ 4

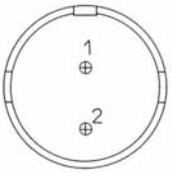
Contact layouts

Shell size IV (operating voltage Vdc and description)

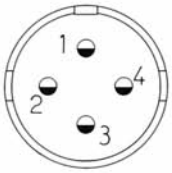
ULC shells size 4

Insulator view from pin side

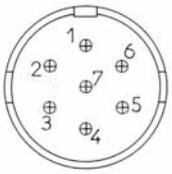
M2
2 contacts
Gage 16
1200V



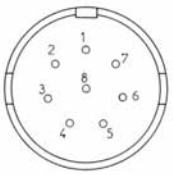
M4
4 contacts
Gage 12
1200V



M7
7 contacts
Gage16
1200V

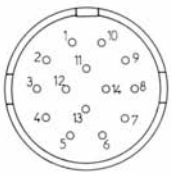


M8
8 contacts
Gage 20
1100V

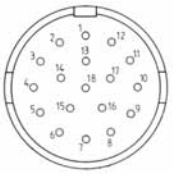


M8+2
8 cont. Ga.20
2 cont. Ga.16
1100V

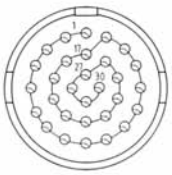
M14
14 contacts
Gage 20
900V



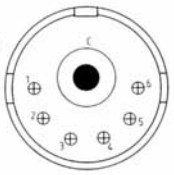
M18
18 contacts
Gage 20
500V



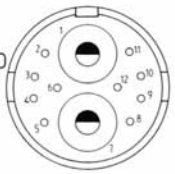
M30
30 contacts
Ø1,3
400V



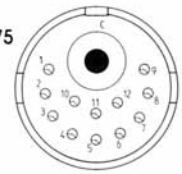
M6+1C50/1C75
6 cont. Ga.16
1 Coax. 50Ω
Kx 23/Kx 6
1000V



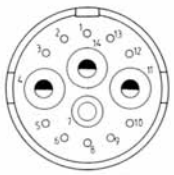
M10+2C50
10 cont. Ga.20
2 Coax. 50Ω
Kx 15
800V



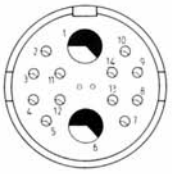
M12+1C50/1C75
12 cont. Ø1,3
1 Coax.
50Ω/75Ω
Kx 23/Kx 6
500V



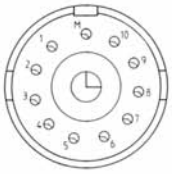
M10+3C50
+1HV
10 cont. Ga.20
3 Coax. 50Ω
Kx 3 + 1 HV
Ø1,02 - 800V



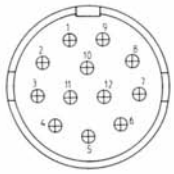
M12+2
12 cont. Ø1,3
2 cont. Ø4
500V



M11+1HV
11 contacts
Ø1,3 + 1 HV
500V/7000V



M12
12 cont. Ga.16
700V



U35
1 contact
35mm²
1000V

Insulation resistance size I, III, IV and V : ≥ 5000 Megohms under 500 Vdc
(Unmated connectors)

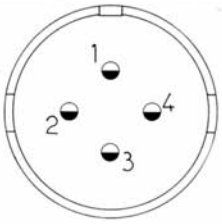
Contact layouts

Shell size V (operating voltage Vdc and description)

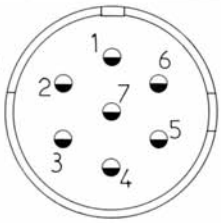
ULC shells size 5

Insulator view from pin side

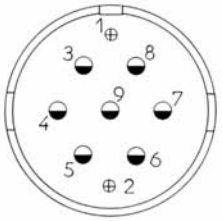
M4
4 contacts
Gage 12
2500V



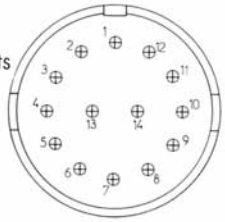
M7
7 contacts
Gage 12
1600V



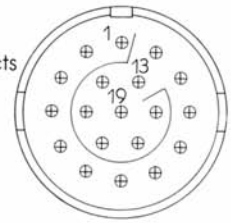
M7+2
7 contacts
Gage 12
2 contacts
Gage 16
1500V



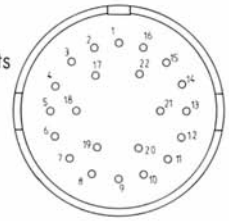
M14
14 contacts
Gage 16
1000V



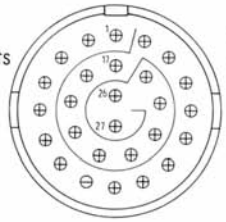
M19
19 contacts
Gage 16
800V



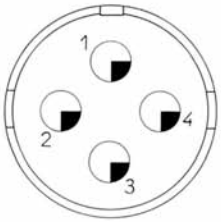
M22
22 contacts
Gage 20
900V



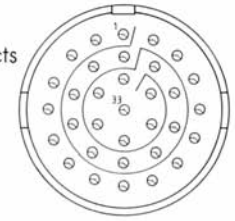
M27
27 contacts
Gage 16
700V



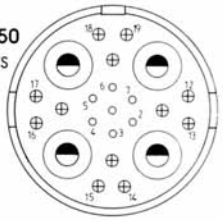
M4 Ø5
4 contacts
Ø5
1500V



M33
33 contacts
Ø1,3
600V



M12+7+4C50
12 contacts
Gage 16
7 contacts
Gage 20
500V
4 Coax.
50Ω
Kx 15
250V

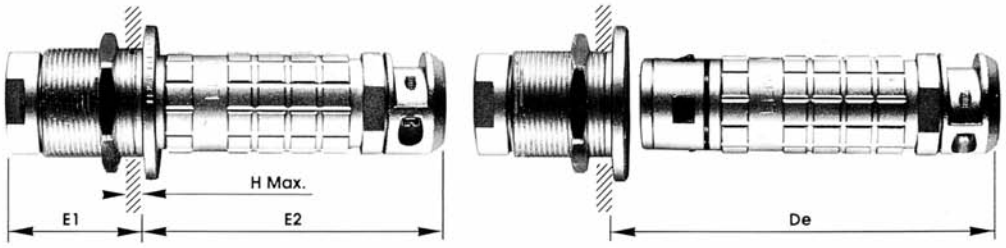


Electrical performance

	Operating voltage Vdc	Test voltage Vdc	Operating voltage Vrms 50Hz	Test voltage Vrms 50Hz
Standard contacts	250	500	150	400
	400	800	250	600
	500	1000	350	700
	600	1200	400	800
	700	1500	500	1000
	800	1600	500	1000
	900	1800	600	1200
	1000	2000	700	1500
	1100	2200	700	1500
	1200	2500	800	1600
	1500	3000	1000	2000
	1600	3200	1000	2000
	2500	5000	1500	3000
HV contact	2500	3500	1500	2000

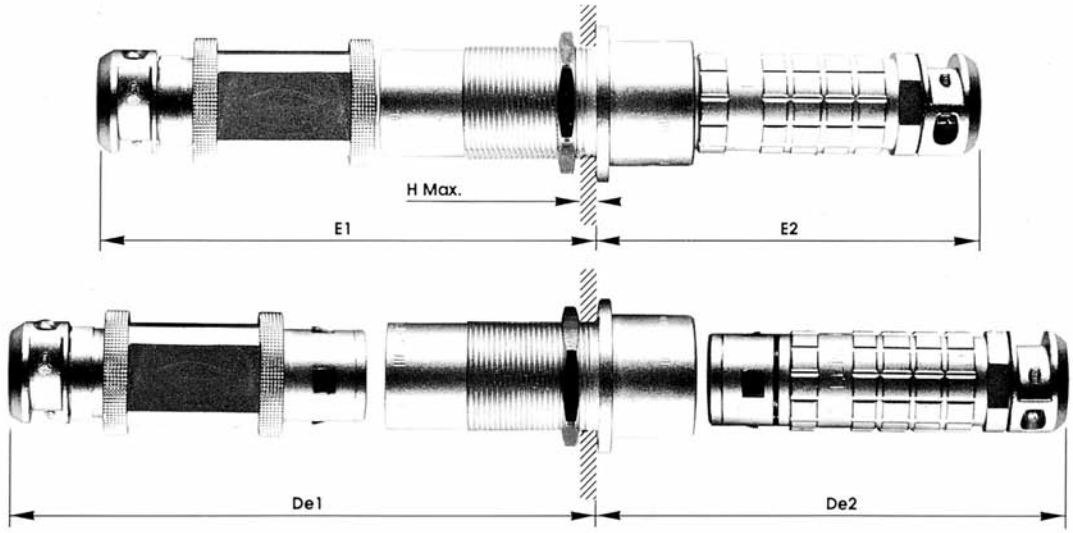
Overall dimensions • Size I, III, IV et V

Mated sets



		SIZE I				SIZE III				SIZE IV				SIZE V			
		E1	E2	De	H Max.	E1	E2	De	H Max.	E1	E2	De	H Max.	E1	E2	De	H Max.
FE Mounted or **FET** with	RE	17,5	36	48	7	26	62	75	16	29	73	90	16	31	91	109	20
	RESC	17,5	36	48	7	69	62	75	16	84	73	90	16	105	91	109	20
	REC					10	74	91		20	90	107		18	112	135	
	RECSC					53	74	91		67	90	107		84	112	135	
	RES	9	44	56	7												
	RESSC	9	44	56	7												
	PCE*	75		88		125		143		154		173		191		214	

** Dimensions mentioned for cable receptacle are : mated length/unmated length*



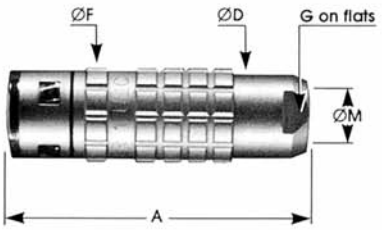
		SIZE III					SIZE IV					SIZE V				
		E1	E2	De1	De2	H Max.	E1	E2	De1	De2	H Max.	E1	E2	De1	De2	H Max.
FE Mounted or **FET** with	TRE	96	74	113	91	21	109	88	128	107	21	129	109	152	135	21
	RME	160		72	72											

Overall dimensions • Size I

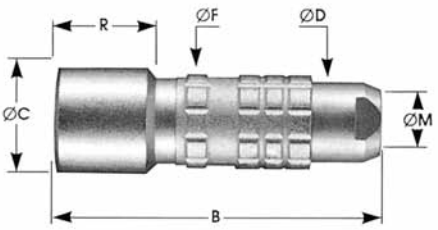
(multipin and coaxial connectors)
Plugs FE, FET, cable receptacle PCE

Size	A	B	ØC	ØD	ØE	ØF	G	□K	H	M Max.	R
I	45	59	15	11,6	16	13,2	10	14	18	7	14

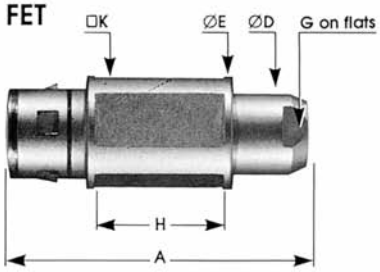
FE



PCE

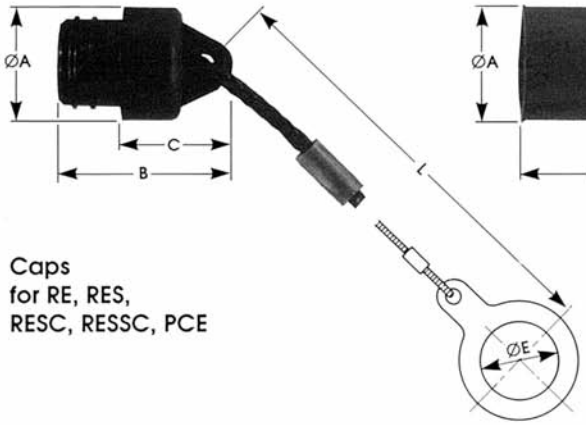


FET



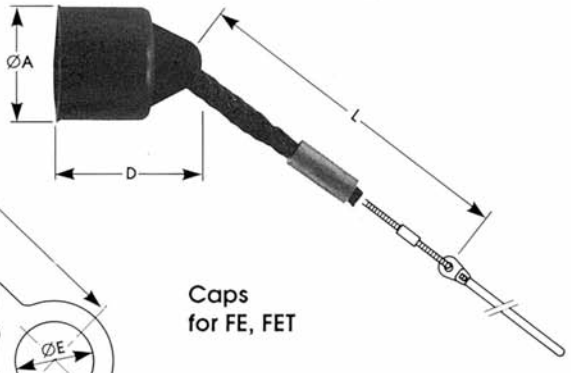
Plug and receptacle caps

BRE. I. 802



Caps
for RE, RES,
RESC, RESSC, PCE

BFE. I. 802



Caps
for FE, FET

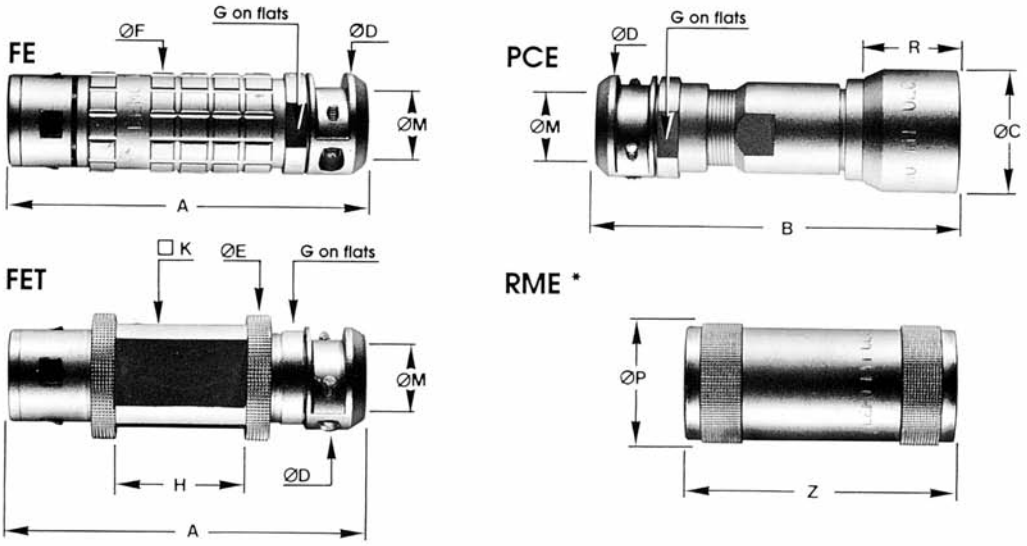
Size	ØA	B	C	D	ØE	L
I	16	24	15	19,5	16	100

Material : EPDM

Overall dimensions • Size III, IV and V

(multipin and coaxial connectors)
Plugs FE, FET, cable receptacle PCE, double receptacle RME

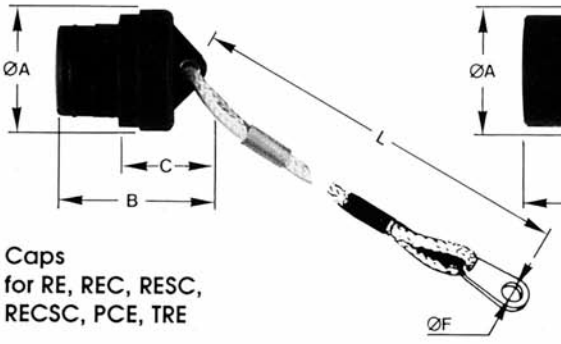
Size	A	B	ØC	ØD	ØE	ØF	G	H	□K	M Max.	ØP	R	Z
III	70	71	24	20	24	19,5	18	25	19	11	23	18,5	52
IV	85	86	32	28	32	28,3	26	25	27	18		20	
V	104	107	41	36	42	38	34	25	36	24		24,5	



** RME are available in coaxial version and fitted with Socket/Socket contacts.*

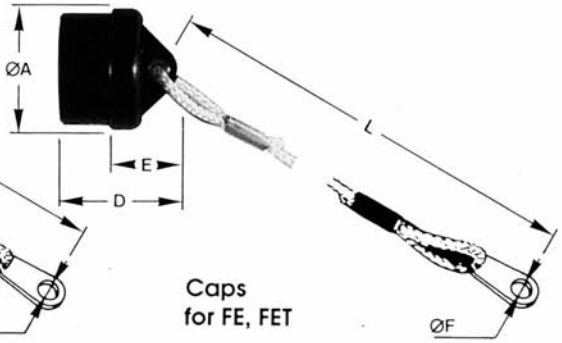
Plug and receptacle caps

BRE *... 802



Caps
for RE, REC, RESC,
RECSC, PCE, TRE

BFE *... 802



Caps
for FE, FET

Size	ØA	B	C	D	E	ØF	L
III	24	29	17	23	13	4,2	240
IV	34	31	17	25	13	4,2	300
V	45	34	17	45	13	4,2	300

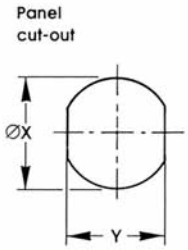
Material : EPD

** To order, mention shell size.*

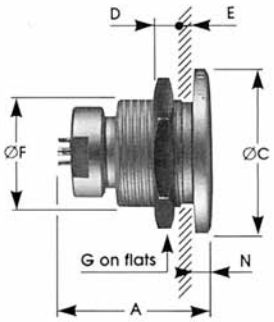
Overall dimensions • Size I

Receptacles (multipin and coaxial)

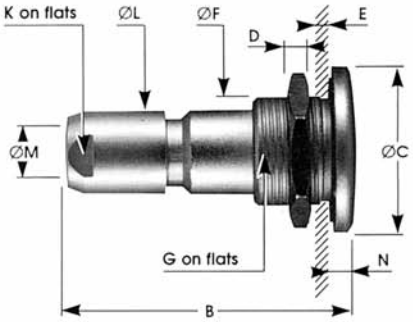
Round



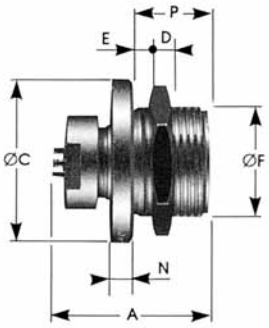
RE



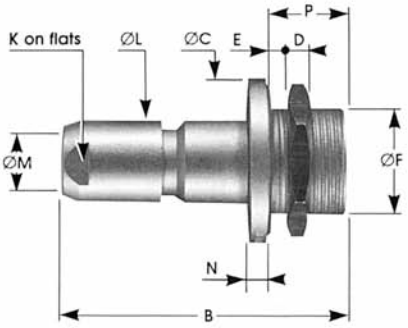
RESC



RES



RESSC

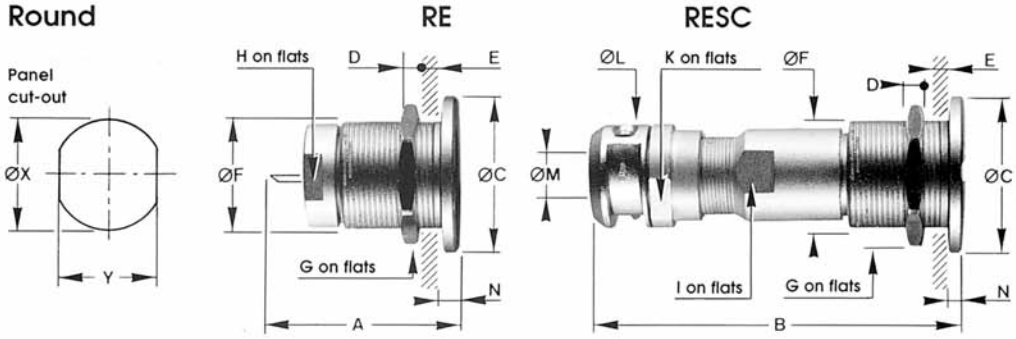


Size	A	B	ØC	D	E Max.	ØF	G	K	ØL	ØM Max.	N	P	ØX +0,2 -0	Y +0,2 -0
I	23	42	23	3	7	M16x1	19	10	11,6	7	2,5	11	16,1	15,1

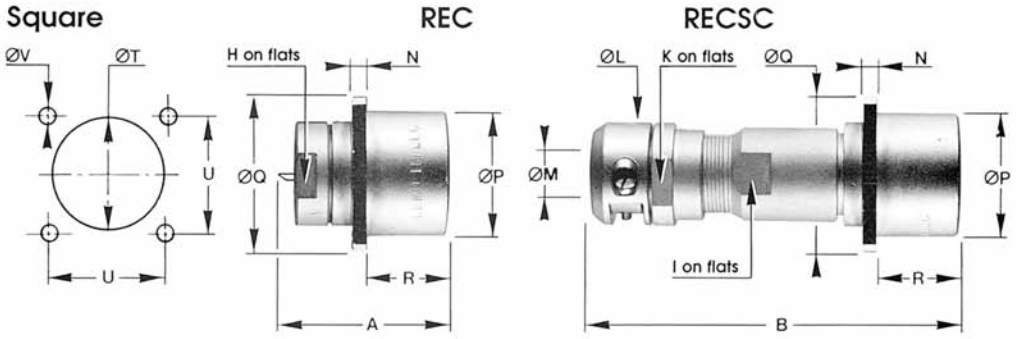
Overall dimensions • Size III, IV and V

Receptacles (multipin and coaxial)

Round



Square



Size	A	B	ØC	D	E Max.	ØF	G	H	I	K	ØL	ØM Max.	N	ØP	Q	R	ØT +0,2 -0	U ±0,1	ØV +0,3 -0	ØX +0,2 -0	Y +0,2 -0
III	34	71	30	3	16	M22x1	24	18	16	18	20	11	2,5	24	29	16,4	20,5	23	3,2	22,1	20,9
IV	34	86	39	5	16	M31x1	36	27	25	26	28	18	2,5	32	37	17	29,5	29,4	3,2	31,1	29,7
V	42	108	52	5	20	M41x1	46	33	32	34	36	24	3	41	43,5	21,5	35,5	34,9	4,2	41,1	39,7

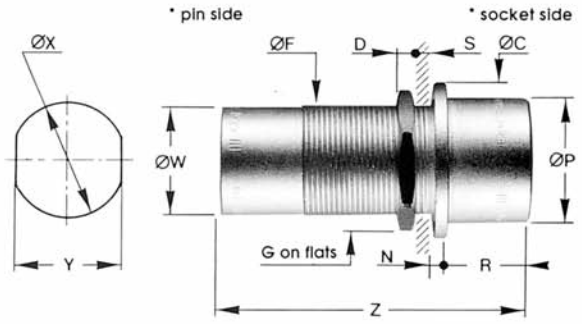
Feed through

Possibility of pre-guiding fork, please consult us.

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

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

TRE



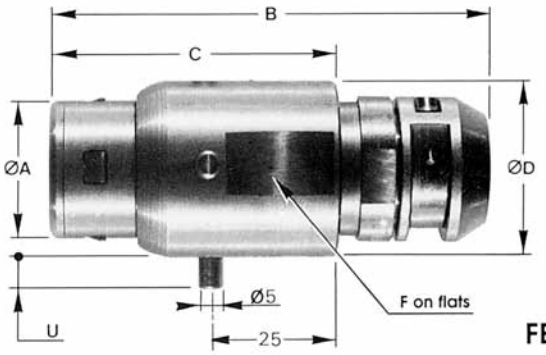
Size	ØC	D	ØF	G	N	ØP	R	S Max.	ØW	ØX +0,2 -0	Y +0,2 -0	Z
III	30	3	M22x1	24	2,5	24	16	21	20,7	22,1	20,9	59
IV	39	5	M31x1	36	2,5	32	17	21	29,5	31,1	29,7	59,8
V	52	5	M41x1	46	3	41	21,5	21	39,4	41,1	39,7	69,4

Overall dimensions

Remote manipulated plugs and receptacles with spurs and pre-guiding forks • size III and IV ULC

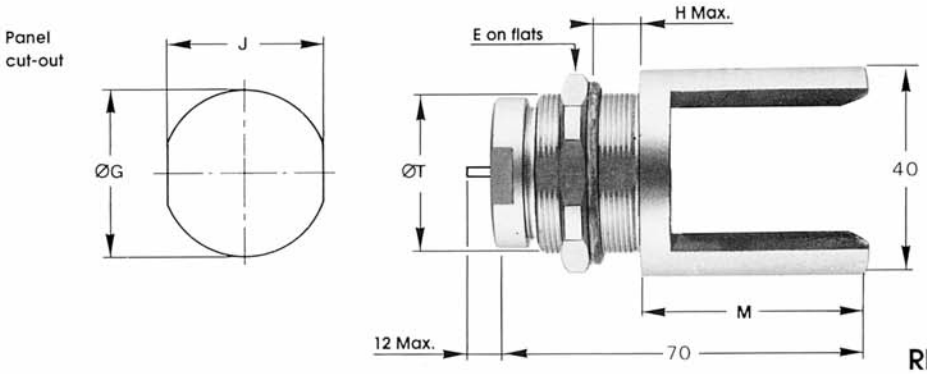
Size	ØA	B	C	ØD	E	F	ØG +0,2 -0	H Max.	J +0,2 -0	M	ØP	ØR +0,2 -0	ØS +0,2 -0	U	ØT
III	18	71,5	52,5	27	24	25	22,2	16	20,7	43,5	22	22,5	4,2	6	M22x1
IV	26,5	84,5	54,5	34	36	32	31,2	15	29,7	43	31	31,5	4,2	3	M31x1

Size	Force (N)	
	mating	unmating
III	40 ± 5	50 ± 5
IV	40 ± 5	50 ± 5



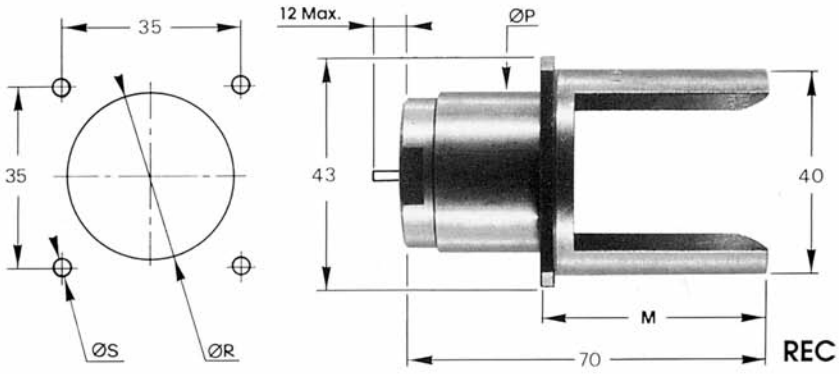
FET - FP

Round receptacles



RE - FP

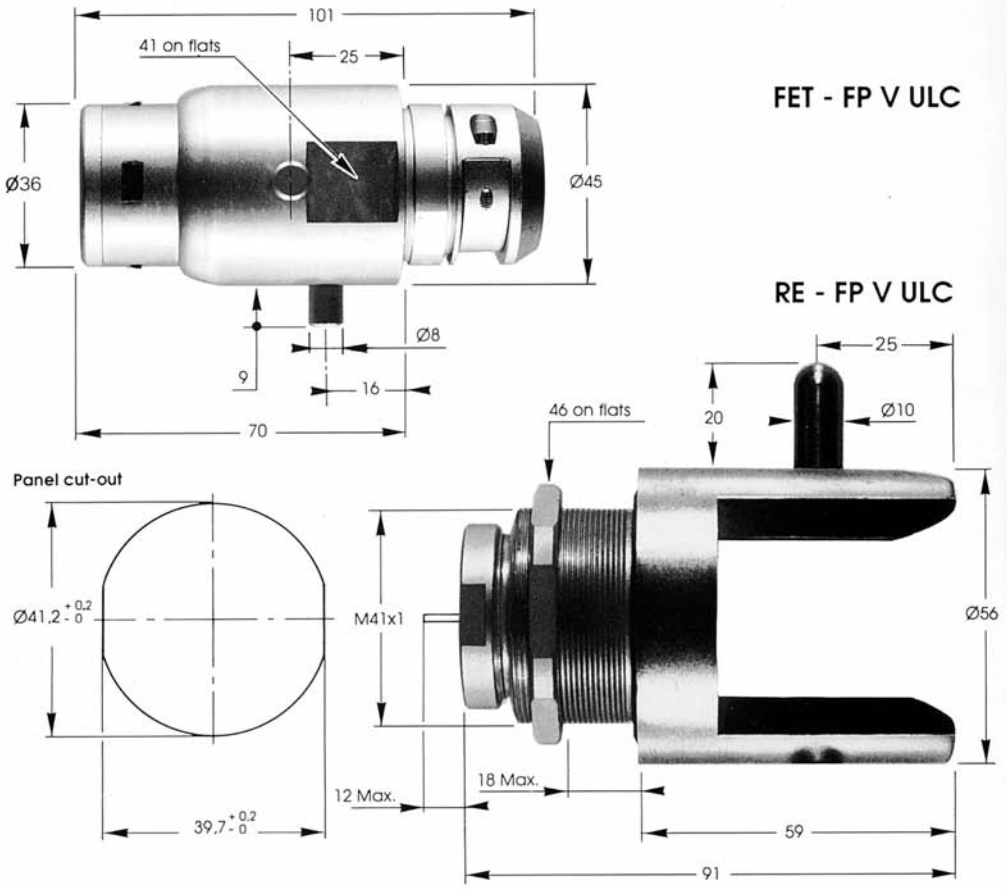
Square receptacles



REC - FP

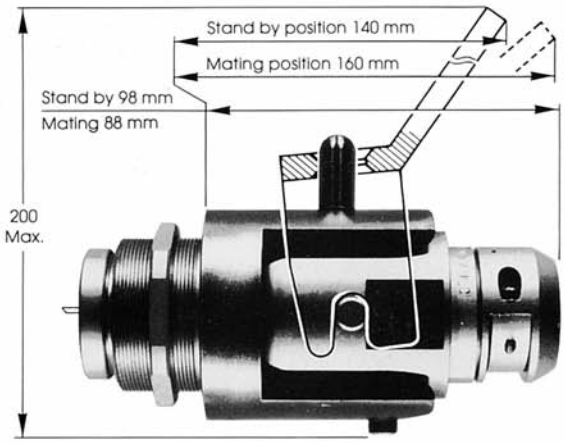
Overall dimensions

Remote manipulated plugs and receptacles with spurs and pre-guiding forks • size V ULC



Size IV on request

Assembly with coupling lever



	Force
Mating	150 N ± 15
Unmating	150 N ± 15

Gearing down lever

Ref. : **OUT FE GVP GC ULC**

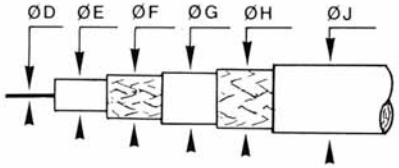
Lever gear ratio : 1/3.

Watertight triaxial connectors

Available in size III for three types of 75Ω cable (A - B or C) For any other 75Ω or 50Ω, state the cable type at the end of the part number

Cable type description :

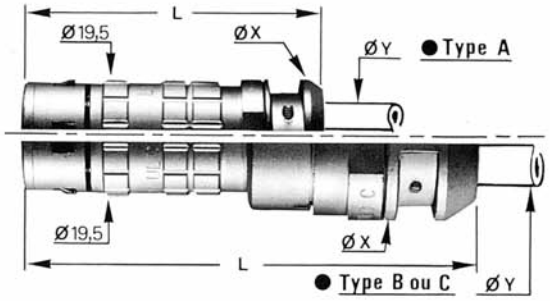
	ØD	ØE	ØF	ØG	ØH	ØJ
Type A	1 ± 0,03	4,4 ± 0,13	5,1 max.	6,5 ± 0,2	7,3 max.	9 ± 0,25
Type B	1,78 ± 0,03	8 ± 0,2	8,9 max.	10,2 max.	11,1 max.	13 ± 0,4
Type C	2,5 ± 0,03	11 ± 0,2	12,3 max.	13,7 ± 0,2	14,8 ± 0,5	17,4 ± 0,5



Plug overall dimensions

	L	ØX	ØY Max.
Type A	60	20	9,3
Type B	88	28	13,4
Type C	88	28	17,9

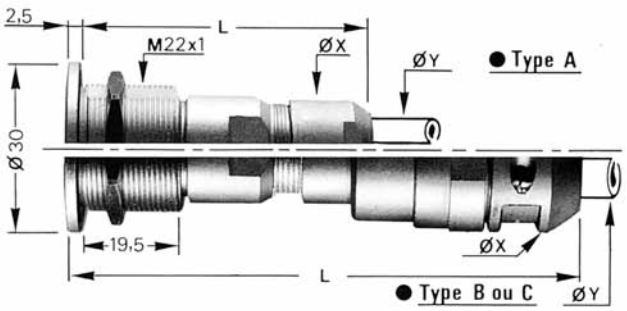
Reference :
FE III TCX75 A, B or C



Receptacle RESC overall dimensions

	L	ØX	ØY Max.
Type A	58	18	9,3
Type B	94	28	13,4
Type C	94	28	17,9

Reference :
RESC III TCX75 A, B or C



RE, REC, RME and TRE overall dimensions

Overall dimensions of these shells are standard, refer to tables on pages 14 and 16 (size III).

Nuclear specific products

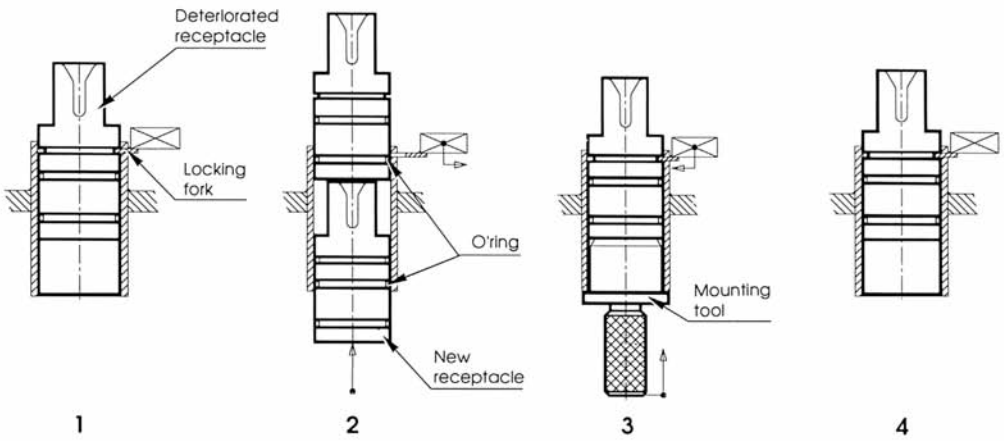
Nuclear feed through with pre-guiding fork, quick replacement by remote manipulator • Size IV and V ULC

- The replacement of a deteriorated feed through can be fully undertaken by remote manipulator.
- No leak from contaminated area to the outside during replacement due to special design.
- The deteriorated feed through remains in the contaminated area
- Positive clamping by a locking fork.

Ref : TRE FP

Feed through replacement process

CONTAMINATED AREA



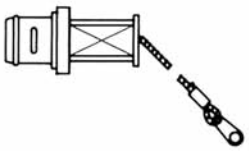
COLD SIDE

Remote manipulated caps for plugs and receptacles • Size III, IV and V ULC

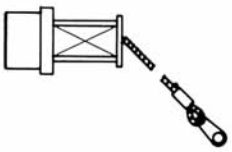
P/N : BERT*...802 for RE, REC, RESC, RECSC, PCE and TRE.
BEFT*...802 for FE, FT

** : shell size*

Caps for RE, REC, RESC, RECSC, PCE, TRE



Caps for FE, FET

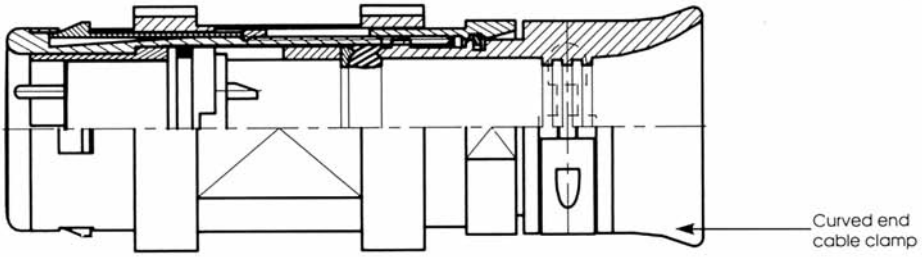


For futher details : consult us

Other products

Curved end cable clamp

The curved shape at the cable clamp end reduces the mechanical strains in the cable

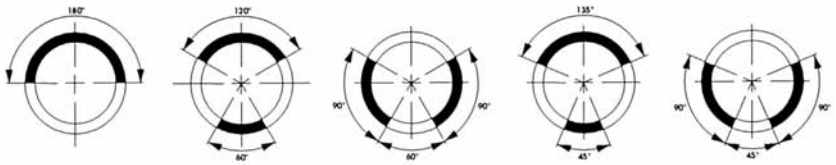
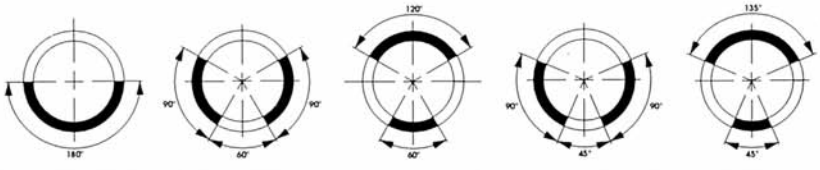


Conductive seals

The copper-silver charged rubber gasket and receptacle O'ring improve the shell to shell conductivity.

Keying

5 different polarizations available.

Position	P1 = standard	P2	P3	P4	P5
Color code	RED	BLUE	WHITE	YELLOW	GREEN
PLUG					
RECEPTACLE AND FEEDTHROUGH					

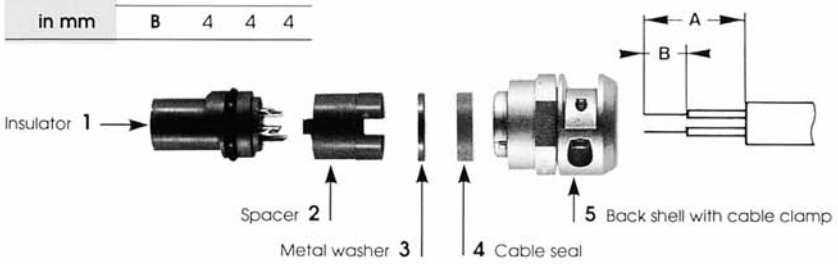
Note : only P1 keying for size 1.

For any developments or further details : please consult us.

Wiring instructions

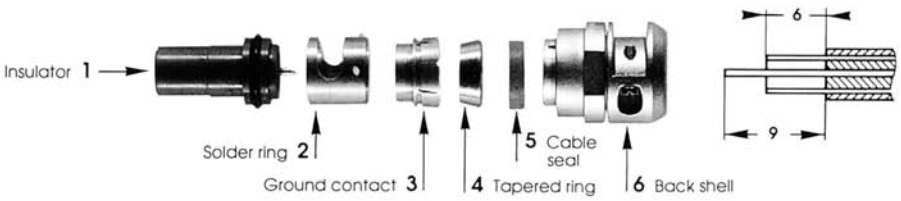
Multipin connectors

	Size	III	IV	V
Lenghts	A	13	14	27
in mm	B	4	4	4



A Strip the cable in accordance with the diagram above
Note : The wires have to be cut to the position of the solder buckets
B Slide the parts 5, 4, 3 and 2 over the cable in order
C Slip a heat strink tube on each conductor
D Soft solder wires into contacts, starting at the center of insulator
E Slide the heat shrink tubes against insulator and heat them
F Mount the spacer n°2 on the insulator. Grease slightly the insulator O' ring
Use the mounting tools to mount and to rotate the set into the shell in order to find the correct polarization
G Remove the tool, slide forward the metal washer, the cable seal and tighten the back-shell n°5, the connector being mated on a suitable receptacle

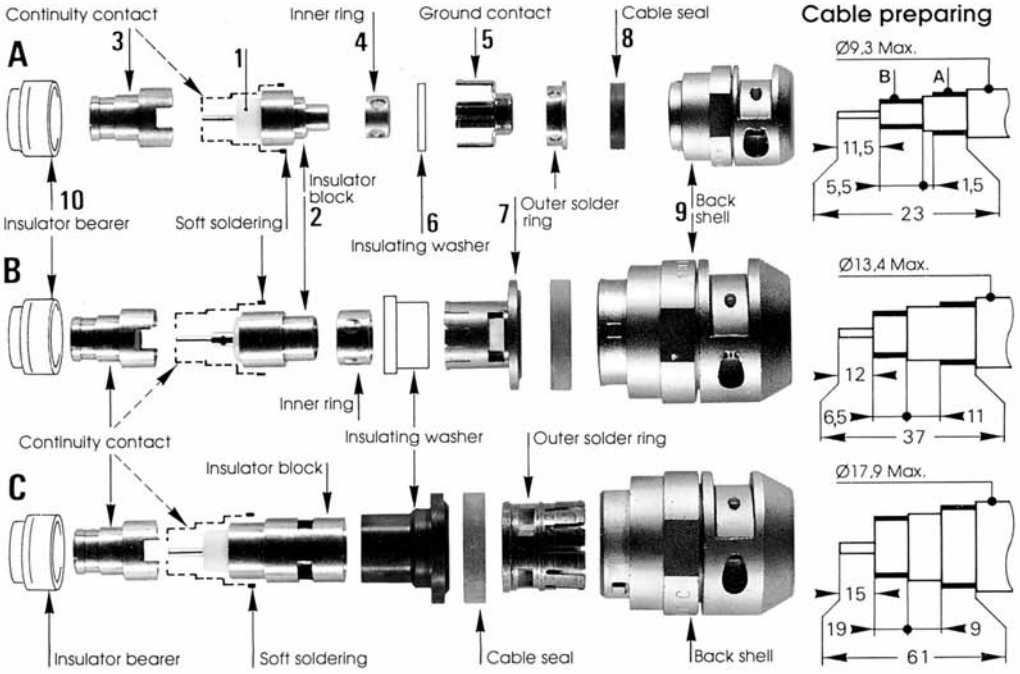
Coaxial connectors



A Mount the parts 6, 5, 4 and 3 over the cable
B Strip the cable end in accordance with the diagram above
C Comb out the braid, slide the part 3 up to edge of cable sheath and fold braid over it
D Slide the part 2 over the braid, soft solder it in 4 spots
E Insert the coaxial core into the contact and locate insulator in ring n°2 to soft solder the contact through the access window
F Slide the tapered ring n°4 and the cable seal n°5 to come into contact with part 3
G Engage the assembly into the connector shell and rotate to find the right polarization. Then, tighten the back-shell n°6, the connector being mated on a suitable receptacle

Wiring instructions

Triaxial connectors for cables A - B and C



1° Mount the parts 9, 8 and 7 over the cable in the correct order
2° Strip the cable end at Max. dimensions indicated above
3° Insert the ground contact n° 5 fitted with the insulating washer n°6 under the outer braid A, slide back the ring n°7 into contact with part 5, then soft solder both parts in 4 spots
4° Slide the part 4 over the inner braid B, separate the insulator n°1 from the block n°2, then slide this block over the braid B, taking care to correctly insert the coaxial core into the contact
5° Replace the insulator n°1 and the continuity contact n°3
Soft solder the contact n°3 and the block through the two access windows
6° Mount the insulator bearer onto the contact n°3 and slide back parts 8 and 9 into contact with ring n°7
7° Insert the assembly cable into the shell
8° Tighten the back-shell n°9 with a flat wrench, the connector being mated on a suitable receptacle

Note : When operations 3 and 4 are completed, check the quality of the solders by testing the insulation resistance under 500 Vdc.

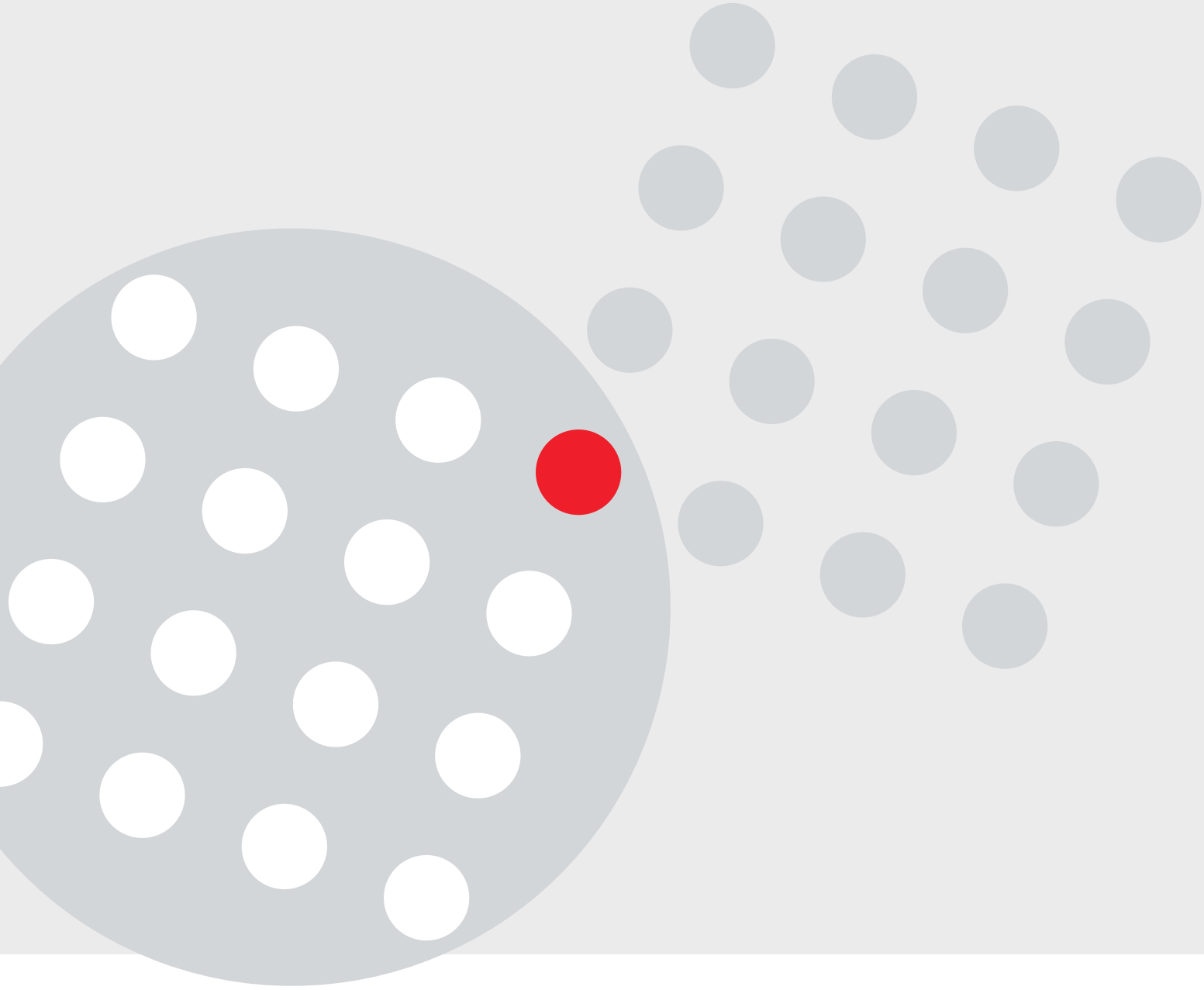
Max. torque :

• **Receptacle nut :**

Size	III	IV	V
Torque N.m	10 ± 0,5	20 ± 1	35 ± 2

• **Back-shell :**

Size	III	IV	V
Torque N.m	4,5 ± 0,3	15 ± 1	35 ± 2



www.souriau.com

SOURIAU
Connection Technology