

Class 1E LOCA Cabled Connectors

8NA cabled field plugs are designed according to RCC-E 2005 and IEEE LOCA requirements and are suitable for safety equipments in the reactor building.

- LOCA resistant** ■ Steam condition during LOCA: 2 peaks at 156°C (313°F); 5.6bars (81 psig).
Post accident conditions: 100°C during 240 hrs
- Part of 8NA product line** ■ Intermateable with existing 8NA receptacles
- Shielded connector** ■ Enhanced shielding efficiency over a wide frequency range. Reduced shell to shell resistance to less than 20mΩ
- Qualification standards** ■ EDF HM63/ 7195, Class 1E K1,
RCC-E 2005 (pending)
IEEE 323, 344,382,572 (pending)



Description

- Class 1E LOCA connectors
- Quick connect hexagonal nut screw coupling
- Intermateable with existing 8NA receptacles
- **Qualification standards:**
 - RCC-E 2005
 - I-EEE 323, 344, 382, 572 (pending)

Applications

- Power Plant Safety equipment
- Instrumentation, sensors, probes
- Control systems

Technical features

Electrical

- **Contacts:** #16 & #20
- **Wires section:** 0.93mm² max
- **Wires insulation:** PEEK
- **Current rating:** 6 A
- **Test Voltage rating:**
1500 Vrms, 50Hz, 1min
- **Insulation Resistance:**
≥ 1000 M under 500 Vdc
- **Contact resistance:** ≤ 3 m
- **Shell sizes & Contact Layouts:**
12-03; 12-12; 16-10

Mechanical

- **Coupling nut tightening torque:**
5 daN.m
- **Endurance:** 50 mating/unmating

Environmental

- **Temperature range:**
- 40°C to +85°C (-40°F to +185°F)
- **Temperature peak:** +160°C (+320°F)
- **Radiation:**
85 MRads "gamma" at +70°C (+158°F)

Accident testing

- **Shocks:**
Operating Basis Earthquake (OBE): 3g ZPA
Safe Shutdown Earthquake (SSE): 6g ZPA
- **Vibration (Sine):** 3g, 58 to 500Hz, 3 axes, 20 cycles

Materials & plating	Connector part			
	Shells	Insulator	Seals	Contacts
Material	Stainless steel	Thermoset or Fused glass	Stainless steel	Copper alloy
Plating	Passivated	-	-	Gold over nickel

Features & benefits

Class 1E LOCA connector

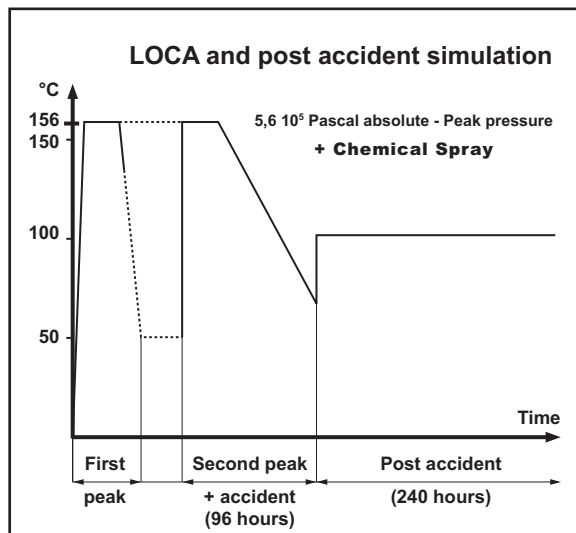
LOCA resistant

8NA cabled field plugs are designed according to Class 1E LOCA equipment requirements (K1 according to RCC-E 2005) and suitable for safety equipments in reactor buildings. Thanks to robust stainless steel shells and high sealing performances, 8NA is designed to operate during normal, accidental and post accidental conditions.

- **Steam condition during LOCA:** 2 peaks at 156°C (313°F); 5,6bars (81psig)
- **Post accident conditions:** 100°C (212°F) during 240hrs

High radiation resistant

A special choice of insulator material (thermo set and elastomer) allow the 8NA range to withstand 85MRads cumulative radiation and accelerated aging tests.



Approved quality assurance program

SOURIAU quality assurance program meets international & Nuclear standards :

- ISO 9001:2000/EN 9100
- ISO 17025
- SGAQ DIN-DPN 2004-04
- FRA/N/100, FRA/N/200, FRA/N/300
- KTA 3507
- ISO NQA-1-1994 & NQA-1a-1995
- 10CFR50 Appendix B
- 10CFR 21 en cours

Field proven

Used in main power plants

The 8NA cabled field plugs come from the 8NA interconnection systems that have been extensively used in more than 60 PWR plants (all types including 900, 1300, 1450 MW reactors).

40 years experience

With 40 years of successful usage without any failure experienced in the field, the 8NA guarantees a safe and reliable connection in the reactor containment building.

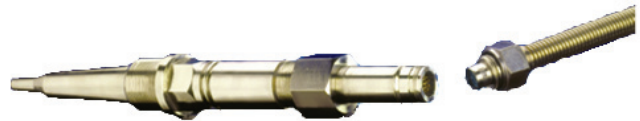


Features & benefits

Applications

SOURIAU 8NA series connectors are used for various applications in the reactor building:

- Measurement, Control and Monitoring systems
- Class 1E Safety equipments
- Pressure transmitters, Temperature sensors
- Solenoid Valves, Motors, Actuators, Switches
- RC Pumps controls

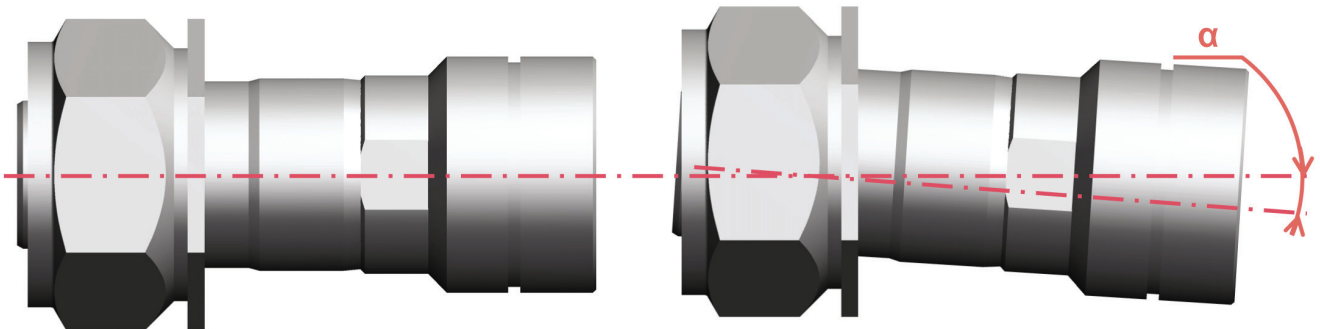


Applications

An easy mating with heavy weight cables!

The 8NA cabled field plug offers an easy mating with no risk to seize up. Thanks to a self alignment hexagonal nut, the few degrees of freedom (α) allowed to the nut compared to the plug position can compensate the misalignment encountered when mating heavy cables. Once the nut is engaged on the receptacle thread the system acts as a traditional screwed connector.

Thus, the operator can mate the connectors easily without any risk of damaging the contacts or the coupling screw.



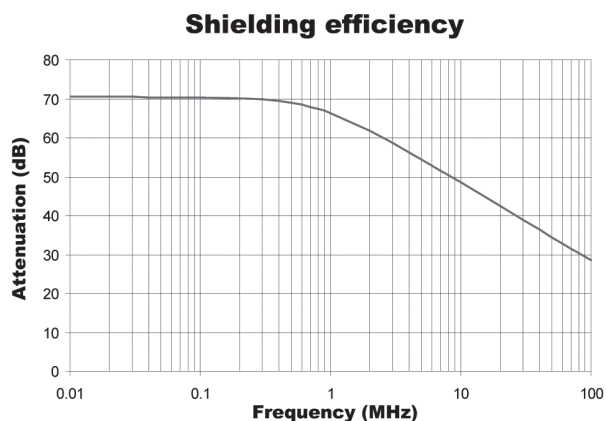
Features & benefits

Cabled field plug - Shielded connector

Shielded connector

The 8NA cabled field plug answers the shielding continuity required for the new EPR projects. It is equipped with a shielding collet that clamps the cable braid and ensures a 360° continuity. Thus high performances are achieved:

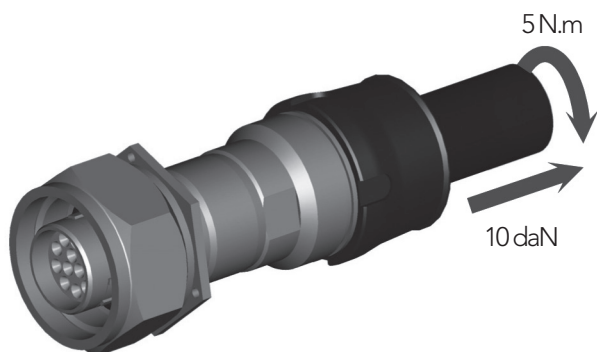
- Enhanced shielding efficiency over a wide frequency range.
- Reduced shell to shell resistance to less than 20mΩ.



Cabled field plug - A robust cable clamp

Robust cable clamp:

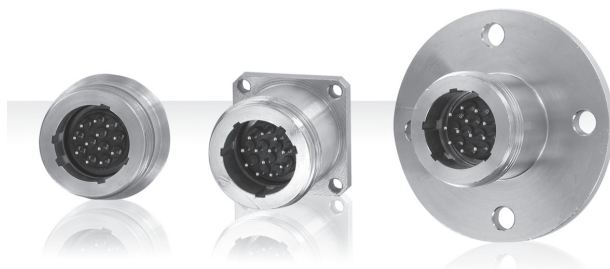
The plug is also equipped with a robust cable clamp. A ring covers the clamp to ensure the operator safety. This system guarantees an outstanding reliability of the cable to plug connection. It can withstand a 10daN pulling force and 5N.m torsion load.



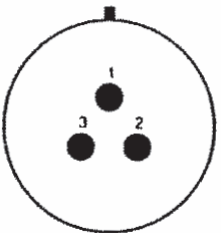
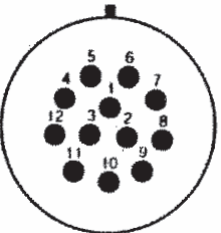
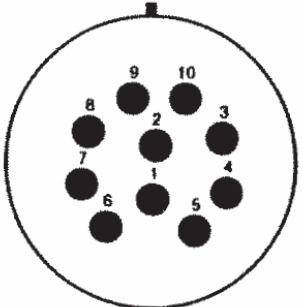
Intermateable with existing 8NA receptacles

One single coupling pattern for the whole 8NA range!

For maintenance purposes, this new 8NA cable field plugs are 100% inter-matable with existing 8NA receptacles. When required a cable field plug can replace an interconnection system made of a 2 plug jumper and a junction box.



Contact layouts

8NA 12-03*	8NA 12-12	8NA 16-10*
		
03 contacts # 16	12 contacts # 20	10 contacts # 16

* 8NA 12-03 and 8NA 16-10 layouts are designed according to Class 1E LOCA equipment requirements. Qualification pending

Receptacle details

Receptacles overview

In order to match every type of applications, SOURIAU offers 4 different receptacle versions:

Receptacle type	Sealing/Hermeticity	Assembly	Application	Contacts layouts
2G	Sealed (compounded)	screwed	On sensor or actuator	12-03; 12-12; 16-10
4G		screwed		
1Y	Hermetic (Fused glass)	brazed	On sensor or actuator	12-03*; 12-12
2Y		screwed		

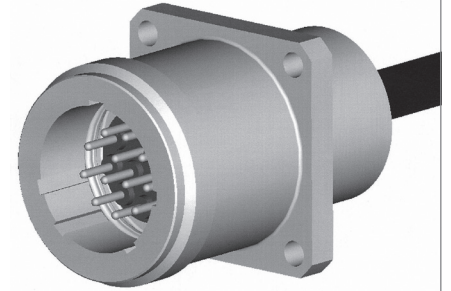
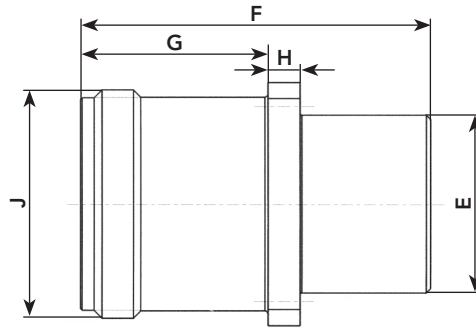
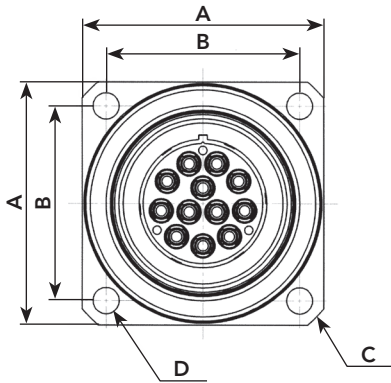
* 8NA 12-03 hermetic receptacle is designed according to Class 1E LOCA equipment requirements. Not qualified

Contact layout	Standard cable length in cm
12-03	30
12-12	50
16-10	100

Note: receptacles are delivered with metal protection caps

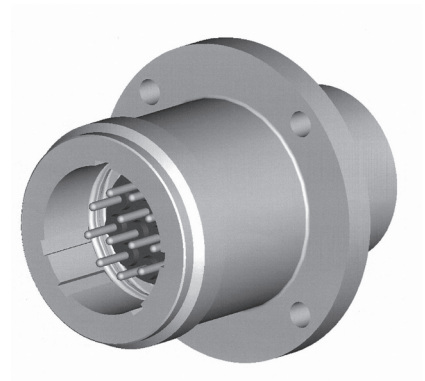
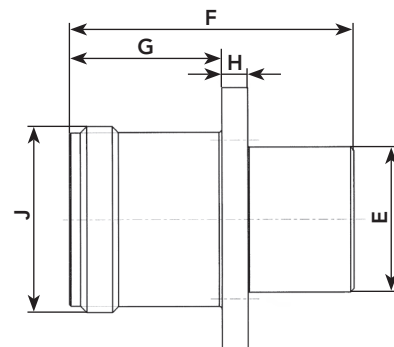
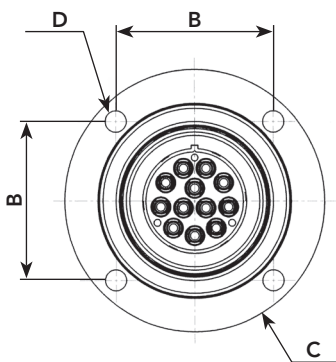
Receptacle details

2G type receptacle



Contact layout	A ±0.3	B	C 0/-0.3	4 holes Ø D 0/+0.1	Ø E ±0.2	F ±0.2	G ±0.2	H ±0.1	Ø J max.
12-03 12-12	28.70	23.00	38.00	3.10	21.00	41.60	22.30	3.80	26.98
16-10 16-24	40.00	31.75	52.00	3.35	30.00	43.10	23.80	3.80	36.50

4G type receptacle

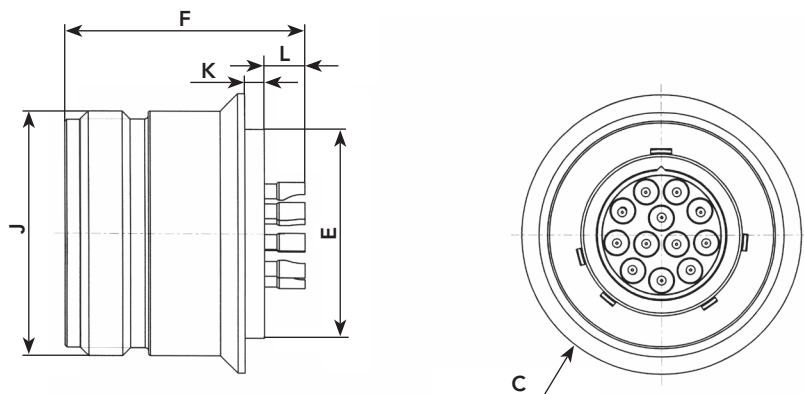


Contact layout	B	C 0/-0.3	4 holes Ø D 0/+0.1	Ø E ±0.2	F ±0.2	G ±0.2	H ±0.1	Ø J max.
12-03 12-12	23.00	38.00	3.10	21.00	41.60	22.30	3.80	26.98

Note: all dimensions are in mm

Receptacle details

1Y type receptacle (Fused glass insulator)

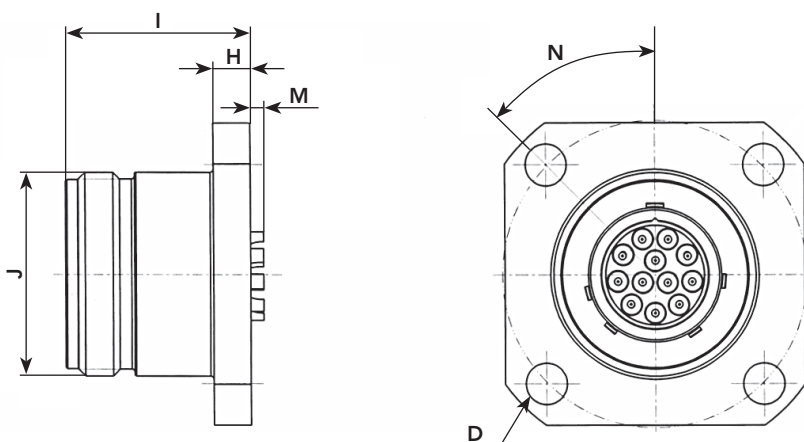


Applies to pressure transmitter, RTD, probes which require a high degree of hermeticity (10^{-8} atm.cm³/s)

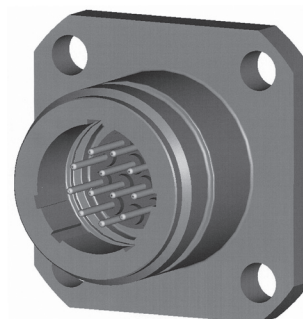


Contact layout	C ± 0.12	$\varnothing E \pm 0.1$	F max.	$\varnothing J$ max.	K ± 0.15	L ± 0.45
12-03 12-12	30.80	22.90	26	26.98	2.20	4.00

2Y type receptacle (Fused glass insulator)



Applies to pressure transmitter, RTD, probes which require a high degree of hermeticity (10^{-8} atm.cm³/s)

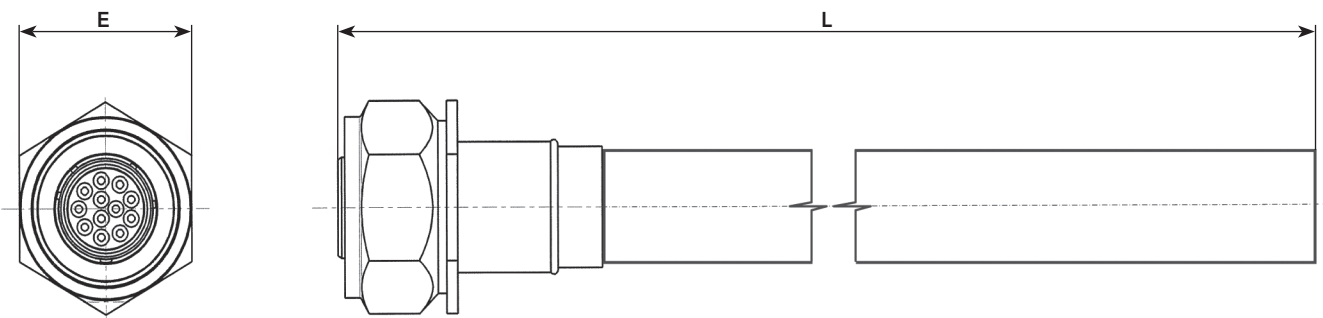


Contact layout	4 holes $\varnothing D$ at 90° on $\varnothing 41$	N	I $+0.1$	$\varnothing J$ max.	H ± 0.1	M -0.85
12-03 12-12	5.5	45°	24.75	26.98	5.00	1.70

Note: all dimensions are in mm


Cabled field plug details

Cable plug



Contact layout	E ± 0.3 (mm)	L
12-03 12-12	32.00	To be specified from x to Xcm (refer to table hereunder for standard length)
16-10	41.00	

Contact layout	Standard cable length (L) in cm
12-03 12-12 16-10	100
	200
	300
	500
	1000



Cable details:

The 8NA cabled field plugs are factory equipped with PRYSMIAN or NEXANS cables answering the CST 74 C 068 00 requirements.

Cables main specifications:

- Conductor:
 - Plain copper
 - Circular
 - Temperatures: +90°C in continuous duty and +250°C in short duty
- Insulation: XLPE
- Cores identified from 1 to X

Note: plugs are delivered with metal protection caps

Ordering information

Receptacles

Basic Series	8NA	1Y	12-12	P	N	04	A	50	S	A	02
Receptacle type:											
1Y: Hermetic, Round Flange, to be welded											
2Y: Hermetic, Square Flange, screw mounted											
2G: Sealed, Square Flange, screw mounted											
4G: Sealed, Round Flange, screw mounted											
Contact layout:											
12-03: Shell size 12 - 03 contacts #16											
12-12: Shell size 12 - 12 contacts #20											
16-10: Shell size 16 - 10 contacts #16											
Contact type:											
P: Pin											
S: Socket											
Orientation:											
N: Normal											
Wiring code:											
: Not wired											
XX: refer to table page 12											
Wire type:											
: Not wired											
A: EPR or PK4CZ(qualification pending)											
Wire length:											
00: Not wired											
XX: length in cm – refer to table page 6											
Specifications:											
A: not compounded											
C: compounded											
S: hermetic											
Qualification file: A											
Additional specifications:											
02: for type 2Y only											

Ordering information

Plug & cable

Basic Series	8NA6G	12-12	S	N	04	04	S	18	2	A
Shell size & Contact Layout:										
12-03: Shell size 12 - 03 contacts #16										
12-12: Shell size 12 - 12 contacts #20										
16-10: Shell size 16 - 10 contacts #16										
Contact type:										
P: Pin										
S: Socket										
Orientation:										
N: Normal										
Wiring code:										
XX: refer to table page 12										
Number of wires in the cable:										
XX: refer to table page 12										
Cable type:										
S: Shielded										
Wire gage:										
14*: AWG #14 (Shell size 12-03 & 16-10)										
16*: AWG #16 (Shell size 12-03 & 16-10)										
18: AWG #18 (All shell sizes)										
20: AWG #20 (Shell size 12-12)										
Cable plug length:										
XX: length in m										
Qualification file: A										

*For these wire gage, qualification pending

Wiring tables

8NA 12-03

The cable plugs will be wired from contact 1 to 3, depending on how many wires is required

8NA 12-12

Please follow the proposed wiring tables to ensure continuity between receptacles and cable plugs.

		N° of pins wired											
		1	2	3	4	5	6	7	8	9	10	11	12
Wiring number	02				■					■			
	03				■			■					
	Z3				■					■		■	
	Y3	■							■				■
	04	■							■				■
	05	■							■				■
	06	■							■				■
	07				■	■	■	■	■	■		■	■
	08				■	■	■	■	■	■		■	■
	09				■	■	■	■	■	■	■	■	■
	12	■	■	■	■	■	■	■	■	■	■	■	■

] If possible, type of wiring to avoid

Standard offer	
02	Wired with a 2 wire cable
03	
Z3	Wired with a 3 wire cable
Y3	
04	Wired with a 4 wire cable
9	Wired with a 9 wire cable
12	Wired with a 12 wire cable

Note: For spare connection links, the 12 wires version (wiring N°12) allows interchangeability

8NA 16-10

Please follow the proposed wiring tables to ensure continuity between receptacles and cable plugs.

		N° of pins wired										
		1	2	3	4	5	6	7	8	9	10	
Wiring number	01		■									
	02		■									
	03		■			■			■			
	04		■			■			■			
	05		■	■					■			
	06		■	■	■				■			
	07		■	■	■	■			■			
	08		■	■	■	■	■		■			
	09		■	■	■	■	■	■	■			
	10	■	■	■	■	■	■	■	■	■	■	■

Standard offer	
02	Wired with a 2 wire cable
03	Wired with a 3 wire cable
04	Wired with a 4 wire cable
09	Wired with a 9 wire cable
12	Wired with a 12 wire cable

For specific cable requirements, please consult us

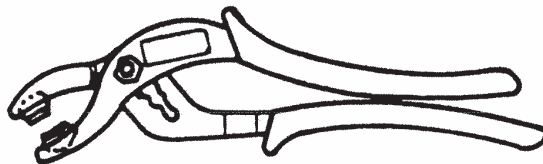
Tools

Extraction pliers for metal seals

Pliers equipped with plastic jaws for metal seal extraction.

Each time the connector is unmated, the metal seal between plug and receptacles must be changed to ensure a perfect sealing when mating again. This tool allows the operator to extract the metal seals easily and without damaging the connector.

Contact layout	Pliers P/N	Spare plastic jaws P/N
12-03 12-12	8341-91 EL	8341-94 EL
16-10 16-24		

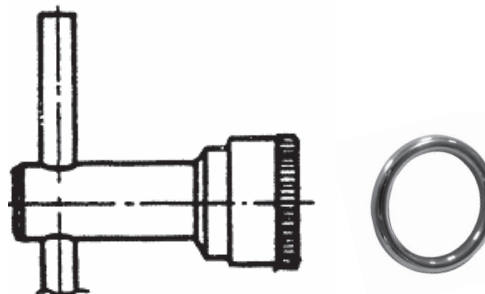


Metal seal mounting tool

Metal seal mounting tool

Each time the connector is unmated, the metal seal must be changed to ensure a perfect sealing when mating again. This tool allows the operator to mount the new metal seals easily and position it correctly on the connector plug.

Contact layout	Mounting tool	Spare metal seals
12-03 12-12	8341-5300 EL	3390 533 A EL
16-10 16-24	8341-5305 EL	3391 017 A EL



Spare parts

Metal caps

Spare metal caps for plugs and receptacles:

To protect the connectors faces when unmated

Contact layout	Spare metal cap for receptacle	Spare metal cap for plug
12-03 12-12	8341-5310 EL	8341-5311 EL
16-10 16-24	8341-5316 EL	8341-5317 EL



