



## Power Generation

### Connection Solutions for Nuclear Power Plants

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**Курган** (3522)50-90-47  
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### Presentation

SOURIAU safety-related nuclear solutions include "Loss Of Coolant Accident" (LOCA) and Mild environment (non-LOCA) qualified connectors for use inside and outside reactor buildings of nuclear power generating stations. SOURIAU nuclear connectors are able to withstand the most severe radiation, temperature and pressure operating conditions. They are qualified according to RCC-E standards.

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## Nuclear Power Generation

# Overview

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### Typical Applications



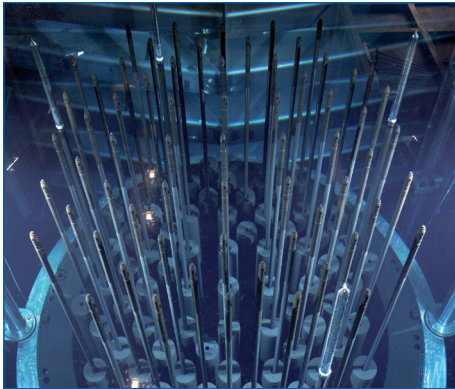
Pressure Transmitters,  
Temperature Sensors



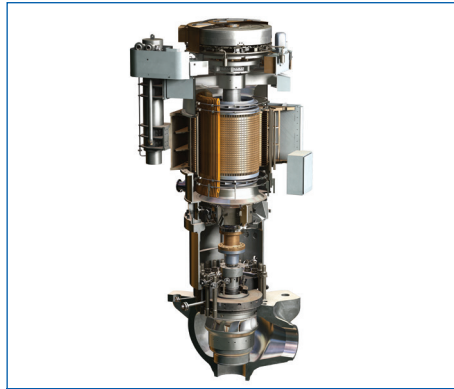
Solenoid Valves, Motors,  
Actuators, Switches



Measurement, Control &  
Monitoring Systems



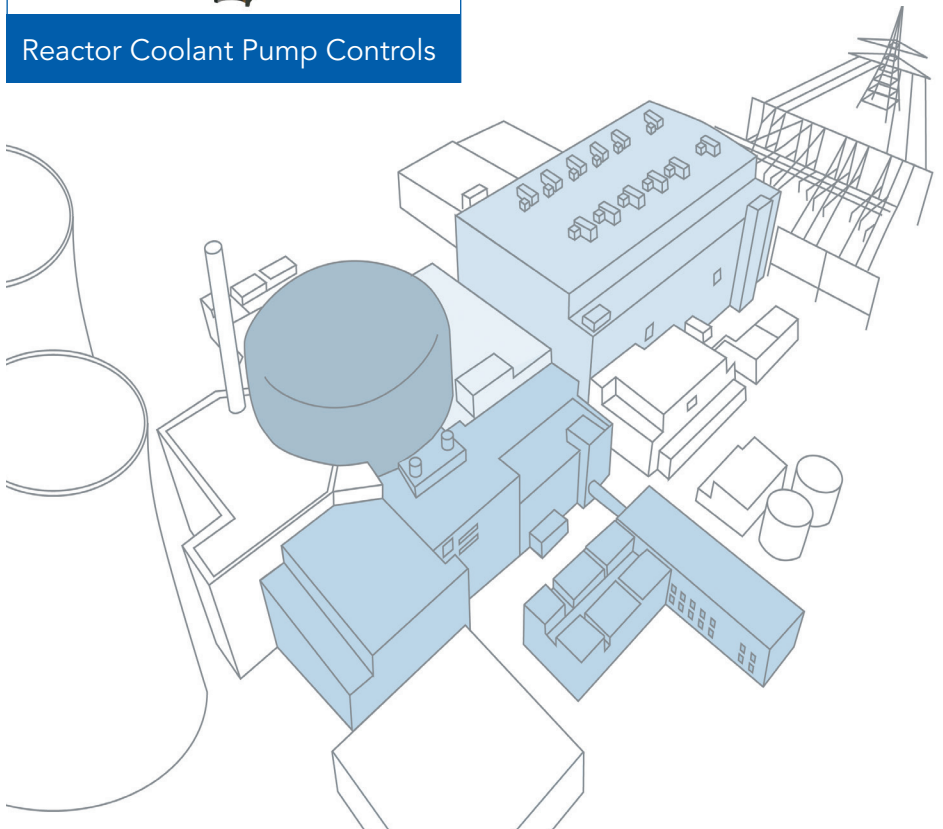
Control Rod Drive Mechanism



Reactor Coolant Pump Controls



Class 1E Safety Equipment





## Nuclear range key features

### EXTENSIVE RANGE

#### LOCA, Mild Environment and Non-classified Series

From reactor monitoring to the reactor shut down in a controlled way, SOURIAU provides LOCA, non-LOCA and non-classified connection solutions.

### PROVEN DESIGN

#### Over 40 Years of Field Experience

Used in more than 60 PWR Nuclear Power plants over the world (all types including 900, 1300, 1450 MW reactors).

### QUALITY

#### Approved Quality Assurance Program

SOURIAU quality assurance program meets international industrial and nuclear standards.

### LOCA QUALIFIED

#### K1 Qualified/RCC-E 2005

8NA Series are qualified for use on safety related equipment inside reactor building, under normal, accidental and post-accidental conditions.

### SIGNAL INTEGRITY

#### Compliant with EPR Wiring Specifications

Shielded 8NA Junction Boxes and 8N45S Series have an integrated 360° shielding mechanism. These series are compliant with the EPR wiring specification CST 74C030.02.

## Detailed features & benefits

### EXTENSIVE RANGE

In order to match the large variety of existing applications (sensors, probes, valves, control and regulation systems) in power generating stations, SOURIAU has developed and qualified several connector series.

Depending on the requirements, SOURIAU offers solutions from complete interconnections to field wired equipment connectors.

8NA Series	8N45(S) Series	8N35/36 Series	8NS Series	MEN Series
RCC-E K1	RCC-E K2/K3ad	RCC-E K2/K3	RCC-E K2/K3	RCC-E K2/K3
LOCA	Mild environment	Mild environment	Mild environment	Mild environment

### PROVEN DESIGN

In 1952, SOURIAU conceived its first connectors for three reactors: G1, G2 ad G3 based at Marcoule (France), notably by supplying hermetic penetrators placed in the heart of the reactors and on safety devices.

Today, SOURIAU supplies more than one hundred reactors in service worldwide (France, UK, Germany, USA, South Africa, Japan and China) with qualified products.

### QUALITY

SOURIAU quality assurance meets international industrial and nuclear standards:

**Nuclear standards, codes and accreditation:**

- RCC-E code
- IEEE 323, 344, 382 and 572
- ASME NQA-1 (10 CFR 50 App. B)
- 10 CFR 21
- HAF604 (Design & Manufacturing)

**Other Certifications:**

- ISO 9001/EN 9100



## Detailed features & benefits

### LOCA QUALIFIED

8NA connectors are LOCA qualified (K1 according to RCC-E) and suitable for safety related equipment 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.

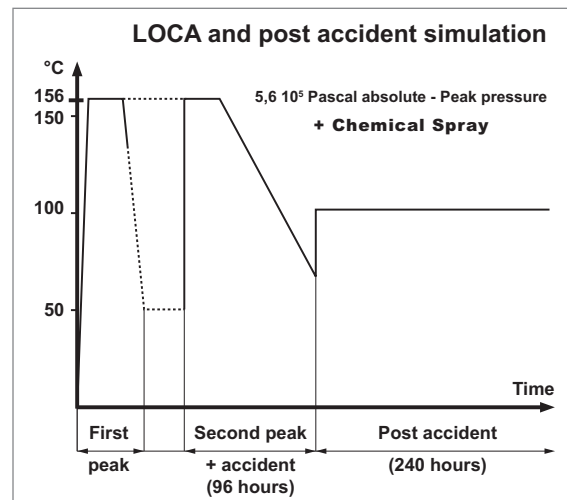
Key qualification parameters:

- Steam condition during LOCA:

- 2 peaks at +156°C (+313°F)
- 5.6 bars (81psig).

- Post-accident conditions: +100°C (+212°F) during 240hrs

A special choice of insulator material (thermoset and elastomer) allows the 8NA range to withstand 85MRads (total integrated dose) and accelerated aging tests.



### SIGNAL INTEGRITY

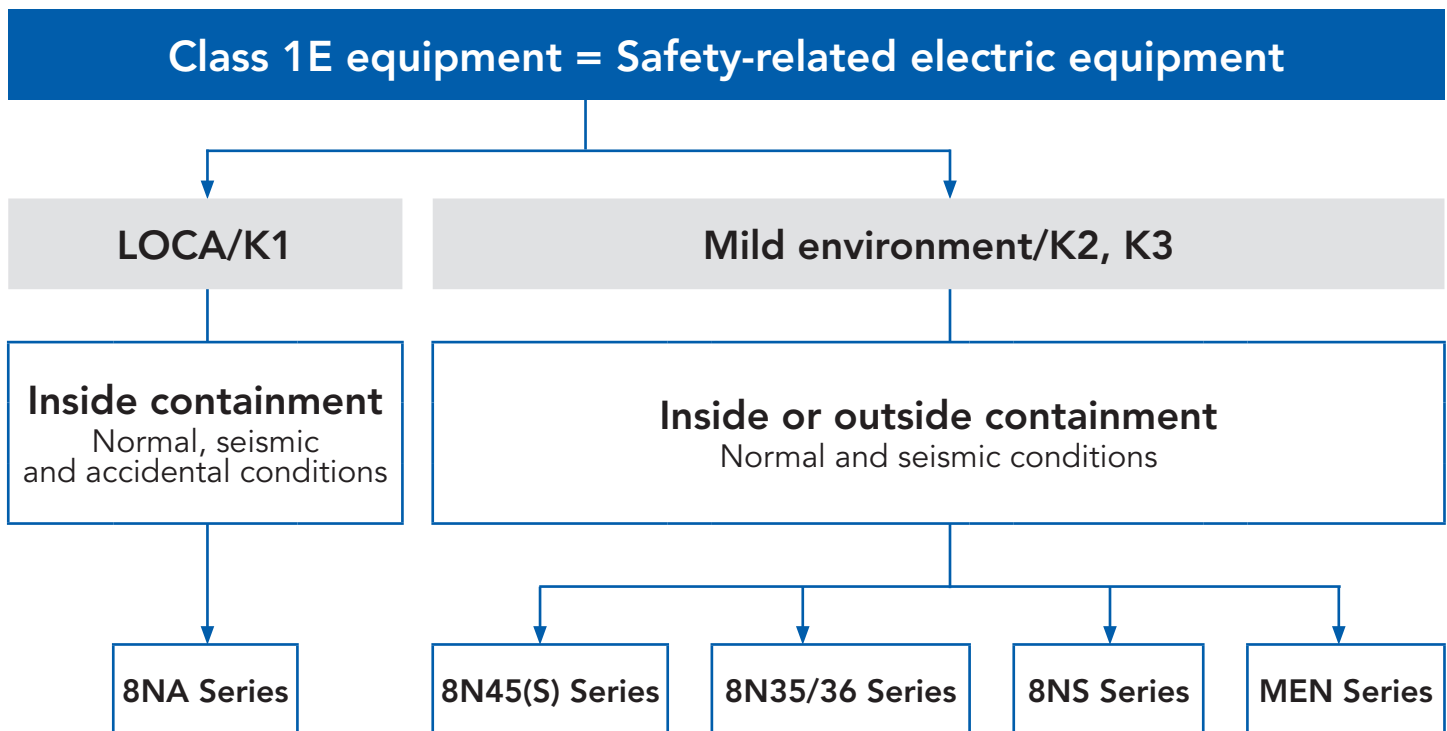
SOURIAU has re-designed and qualified new versions of the 8N45 and 8NA Series to offer enhanced shielding performances.

Thanks to the new 8N45S plug backshell and the new 8NA Junction Box cable gland, the shell to shell resistance is reduced ( $\leq 20 \text{ m}\Omega$ ) and the EMI/RFI protection is achieved over a wide frequency range.

## Selection guide

Nuclear power plants are controlled by means of equipment, designed and qualified to withstand all hypothetical conditions which could occur during the plant lifetime. Depending on their location, connectors are exposed to high temperature, high pressure and radiation.

SOURIAU offers a comprehensive range to answer class 1E equipment (safety-related electric equipment) requirements. According to international nuclear standards the SOURIAU portfolio can be described as follows:



RCC-E class 1E system, classification of safety-related electric equipment:

- **K1 category:** equipment required to perform its function under normal service conditions, earthquake, normal service radiation and accidental and post-accidental conditions.
- **K2 category:** equipment required to perform its function under normal service conditions, normal service radiation and earthquake.
- **K3 category:** equipment required to perform its function under normal conditions and earthquake.

LOCA (Loss Of Coolant Accident): safety related equipment qualified to LOCA, must continue to operate under harsh environment resulting from this design basis accident.

Mild environment: normal service radiation and seismic conditions.

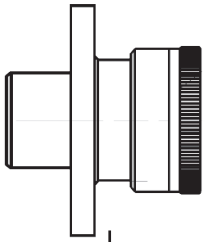


## Selection guide

	8NA Series	8N45(S) Series	8N35/36 Series	8NS Series	MEN Series
					
<b>Classification</b>	Class 1E LOCA	Class 1E Non-LOCA	Class 1E Non-LOCA	Class 1E Non-LOCA	Class 1E Non-LOCA
<b>Qualification</b>	RCC-E K1	RCC-E K2/ K3ad	RCC-E K2/K3	RCC-E K2/K3	RCC-E K2/K3
<b>Housing</b>	Passivated stainless steel	Passivated stainless steel	Passivated stainless steel	Protected aluminum/ Passivated stainless steel	Protected aluminum
<b>Locking system</b>	Screw	Bayonet	Screw	Screw	Screw
<b>Insulator</b>	Fused glass or Thermoset	Silicone	Silicone	Thermoset	EPDM & Noryl
<b>Contacts</b>	Crimp & solder	Crimp	Crimp	Crimp & solder	Crimp
<b>Seals</b>	Metal/EPDM	Silicone	Silicone	EPDM	EPDM
<b>Selection guide</b>	Pages 12-13	Page 14	Page 15	Page 16	Page 17
<b>Detailed information</b>	Pages 19-63	Page 65	Page 83	Page 93	Page 105

## Sealed or hermetic receptacle

See page 21



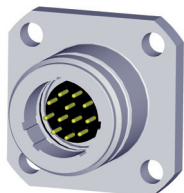
8NA 2G sealed receptacle



8NA 4G sealed receptacle



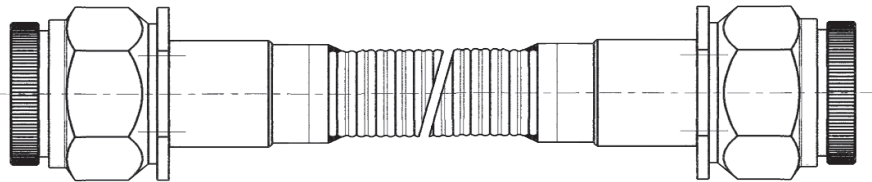
8NA 1Y hermetic receptacle  
(Fused glass insulator)



8NA 2Y hermetic receptacle  
(Fused glass insulator)

## Interconnect cable plug

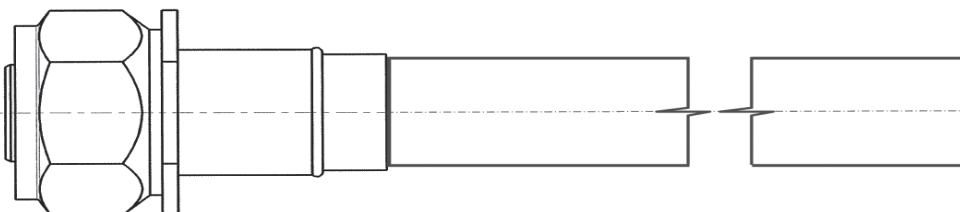
See page 24



8NA66G interconnect cable plug

## Cabled field plug

See page 53



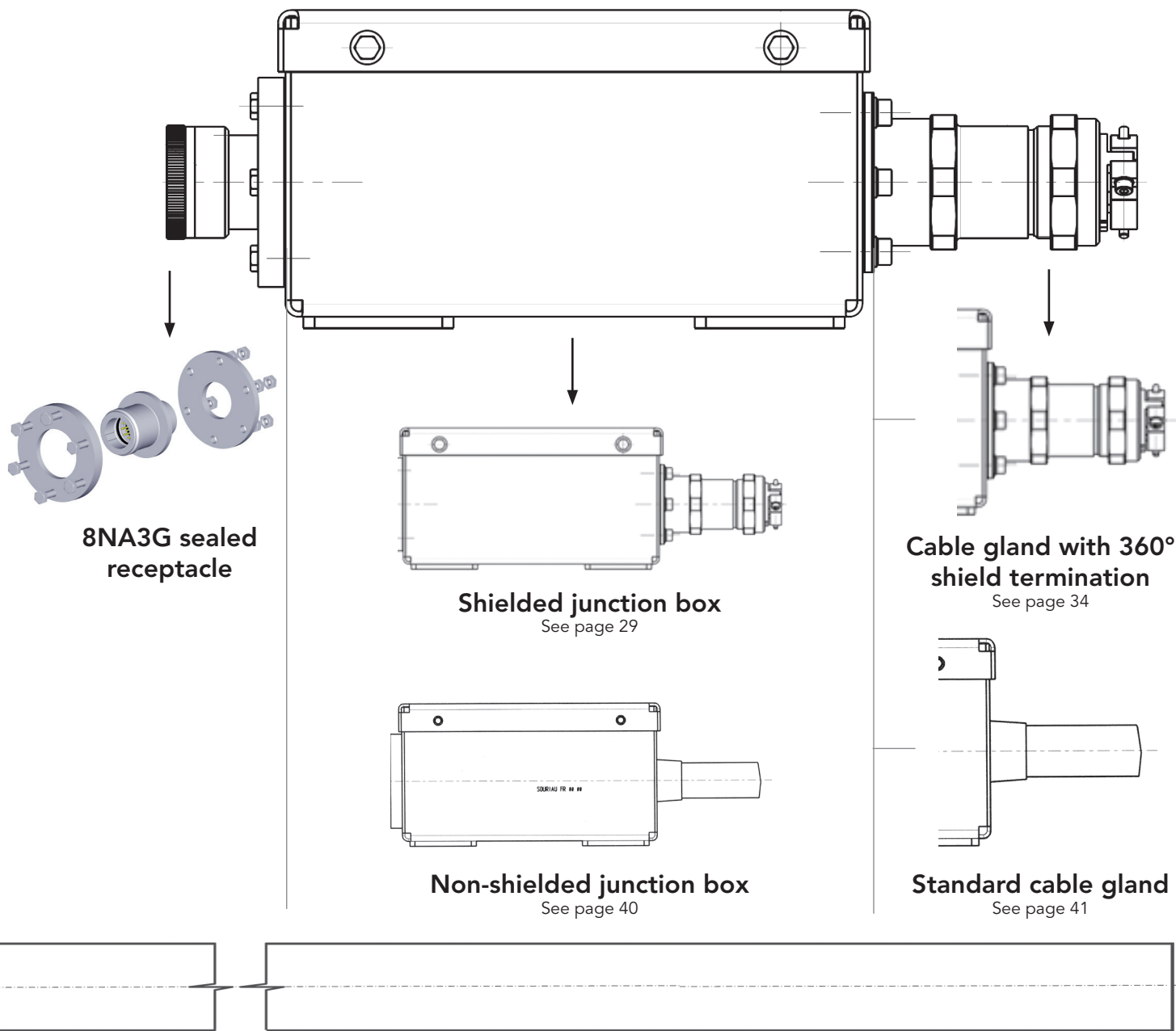
8NA6G cabled field plug



qualified connectors

Flange mounted  
sealed receptacle

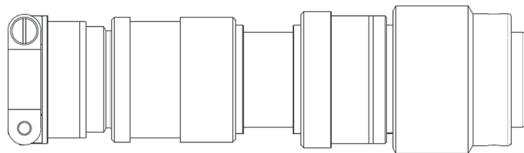
Junction box with  
cable gland



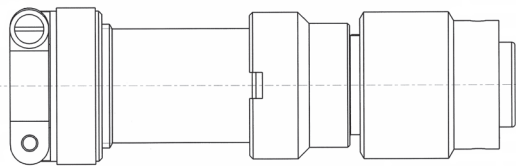
Non-LOCA, K2 qualified connectors

**8N45(S) Series  
Field plug**

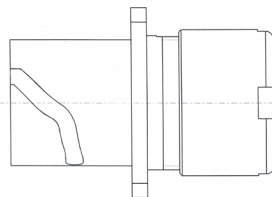
**8N45(S) Series  
Receptacle**



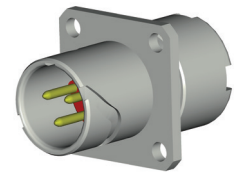
**Shielded 8N45S plugs**  
See page 69 for available sizes



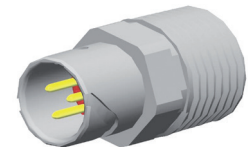
**Non-shielded 8N45 plugs**  
See page 80 for available sizes



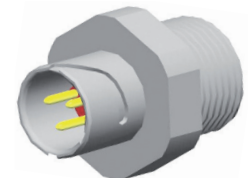
**8N45(S) receptacles**



**8N45(S) Square flange  
receptacle**



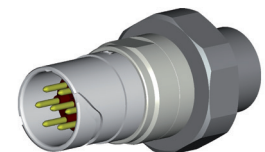
**8N45S 1/2" NPT  
receptacle**



**8N45S M20  
receptacle**



**8N45S 1/2" NPT  
adapter receptacle**



**8N45S M20  
adapter receptacle**

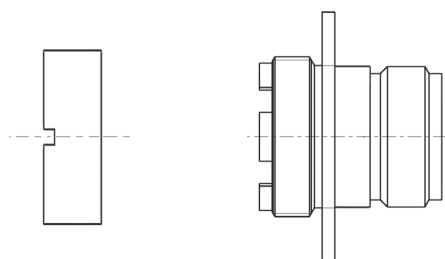


**8N45S 3/4" NPT  
receptacle**

## Non-LOCA, K2 qualified connectors

### 8N35 Series sealed Receptacle

(Silicone insulators) See page 87

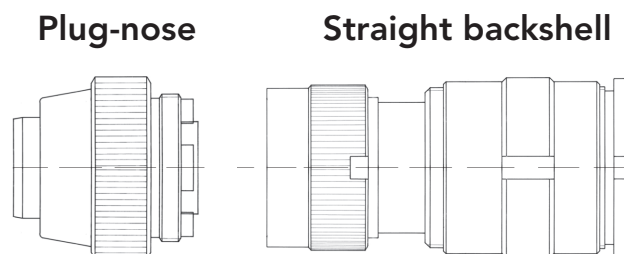


**Simple  
back-nut**

**Round-flange/  
screw-mounted**

### 8N35 Series Plugs with backshell

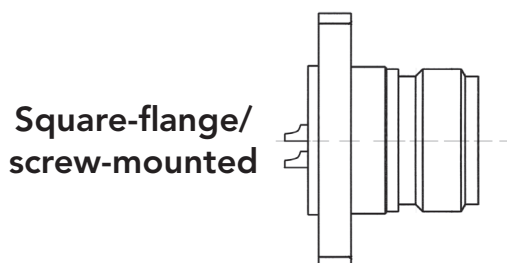
See page 85



**Integrated sealing-gland and  
cable retention mechanism**

### 8N36 Series hermetic Receptacles

(Fused glass insulator) See page 87

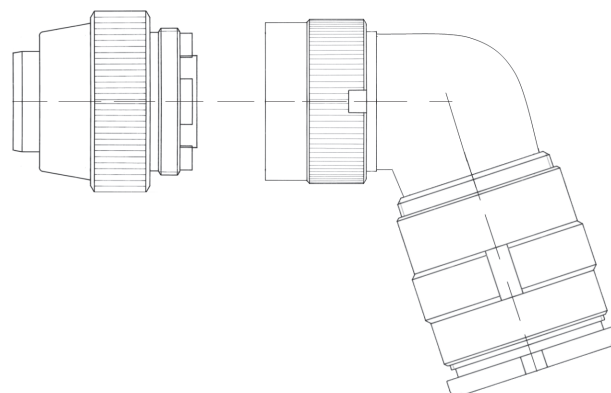


**Square-flange/  
screw-mounted**



**Round-flange/  
welded**

### Plug-nose Elbow backshell



**Integrated sealing-gland and  
cable retention mechanism**

Non-LOCA, K2-K3 qualified connectors

**8NS Series  
Receptacle**

See page 96

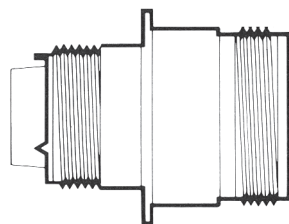
**8NS Series  
Plug**

See page 95

**8NS Series  
Backshell**

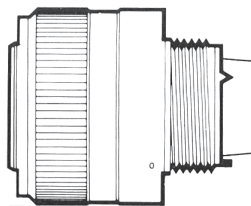
See page 98

Nickel plated aluminum

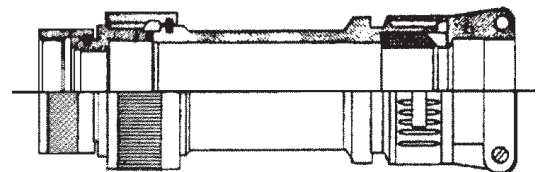


Square flange

+

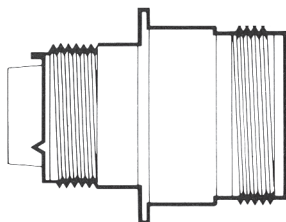


+



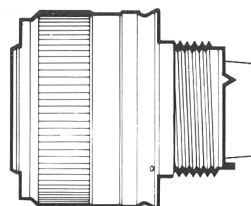
Straight with cable clamp  
and sealing gland

Passivated stainless steel

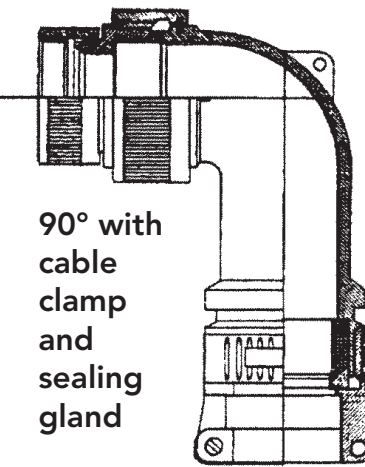


Square flange

+



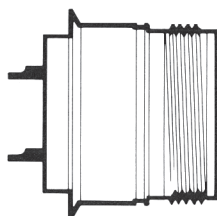
+



90° with  
cable  
clamp  
and  
sealing  
gland

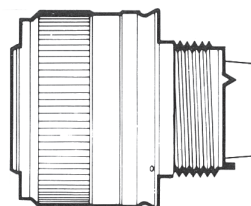


Backnut

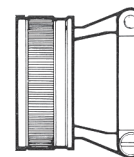


Hermetic round flange  
(Fused glass insulator)

+



+

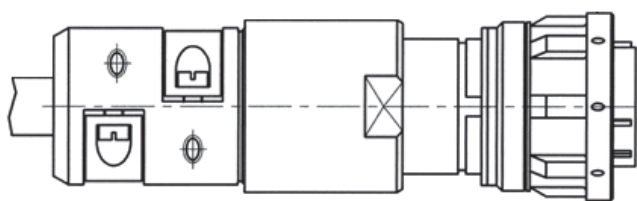


Straight backshell with  
cable clamp



## Non-LOCA, K2 Qualified Connectors

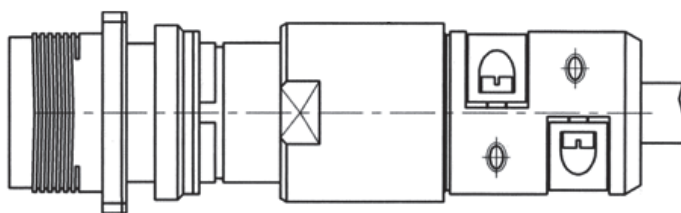
### MEN Series Plug



#### MEN 2012 plugs

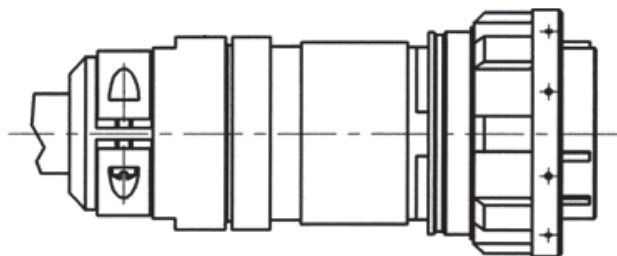
See page 108 for details and cable diameter information.

### MEN Series Receptacle



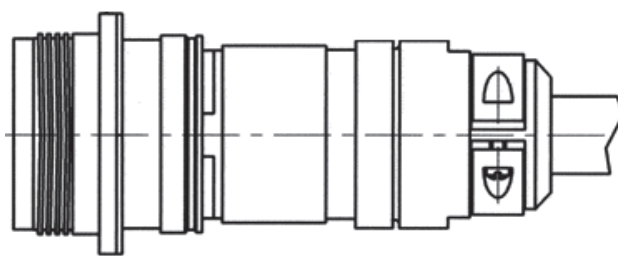
#### MEN 2012 receptacles

See page 108 for details and cable diameter information.



#### MEN 2612 plugs

Designed according to RCC-E requirements  
See page 110 for details and cable diameter information.



#### MEN 2612 receptacles

Designed according to RCC-E requirements  
See page 110 for details and cable diameter information.

Nuclear Power Generation

# 8NA Series Interconnect System - K1

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## Description

- Class 1E LOCA qualified
- Quick connect hexagonal nut screw coupling
- **Qualification standards:**
  - EDF HM63/7195, Class 1E K1
  - RCC-E 2005

## Applications

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

## Technical features

### Electrical

- **Contacts:** #16 & #20
- **Wires section:** 0.93mm<sup>2</sup> max.
- **Wires insulation:** PEEK
- **Current rating:** 6 A
- **Test Voltage rating:**  
1500 Vrms, 50Hz, 1min
- **Insulation Resistance:**  
≥ 1000 MΩ under 500 Vdc
- **Contact resistance:** ≤ 3 mΩ
- **Shell sizes & Contact Layouts:**  
12-03; 12-12; 16-10 or 16-24

### 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): 2g ZPA  
Safe Shutdown Earthquake (SSE): 4g ZPA
- **Vibration (Sine):** 10g, 58 to 500Hz, 3x2 hrs

Materials & Plating	Connector Part			
	Shells	Insulator	Seals	Contacts
<b>Material</b>	Stainless steel	Thermoset or Fused glass	EPDM elastomer & Stainless steel	Copper alloy
<b>Plating</b>	Passivated	-	-	Gold over nickel

## Receptacle details

### Receptacles overview

In order to match every type of applications, SOURIAU offers 5 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*; 16-24
3G		mounted	On junction Box	
4G		screwed	On sensor or actuator	12-03**; 12-12
1Y	Hermetic (Fused glass)	brazed		
2Y		screwed		

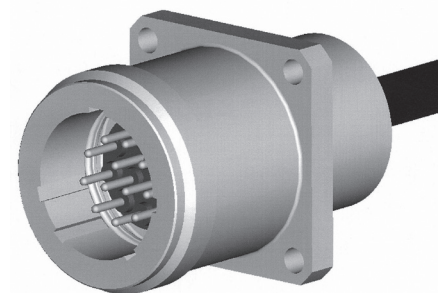
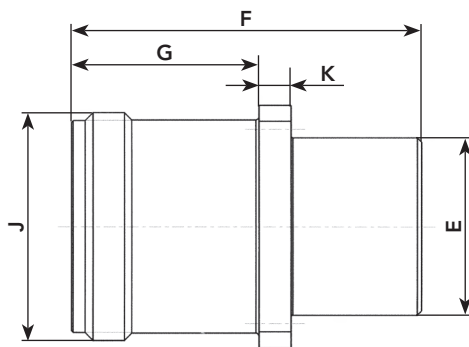
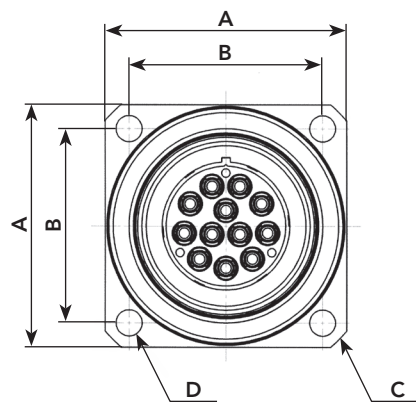
\* 8NA 12-03 and 8NA 16-10 sealed receptacles are designed according to Class 1E LOCA equipment requirements. Qualification pending.

\*\* 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 12-12	30 50
16-10 16-24	30 50

**Note:** receptacles are delivered with metal protection caps

### 2G Type receptacle



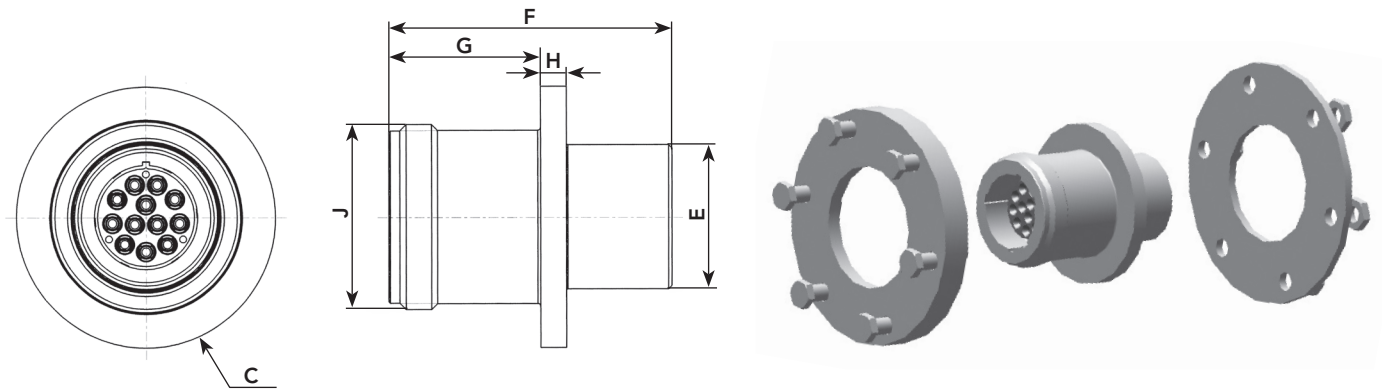
Contact layout	A ± 0.3	B	C 0/- 0.3	4 holes Ø D 0/+ 0.1	Ø E ± 0.2	F ± 0.2	G ± 0.2	H ± 0.1	Ø J max..
12-03 12-12	28.70	23.00	38.00	3.10	21.00	41.60	22.30	3.80	26.98
16-10 16-24	40.00	31.75	52.00	3.35	30.00	43.10	23.80	3.80	36.50

Note: all dimensions are in mm



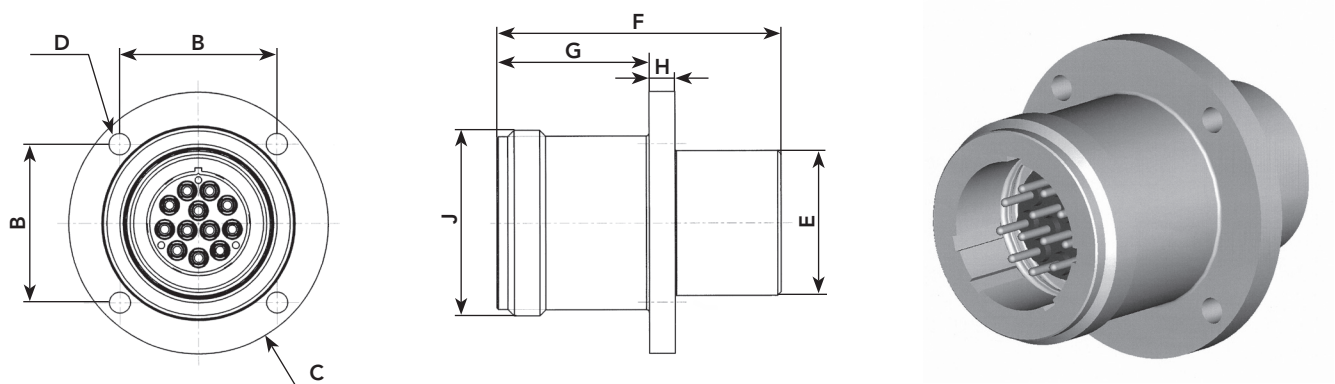
## Receptacle details

### 3G Type receptacle



Contact layout	$\varnothing C_{0/-0.3}$	$\varnothing E_{\pm 0.2}$	$F_{\pm 0.2}$	$G_{\pm 0.2}$	$H_{\pm 0.1}$	$\varnothing J_{\text{max.}}$
12-03 12-12	38.00	21.00	41.60	22.30	3.80	26.98
16-10 16-24	52.00	30.00	43.10	23.80	3.80	36.50

### 4G Type receptacle

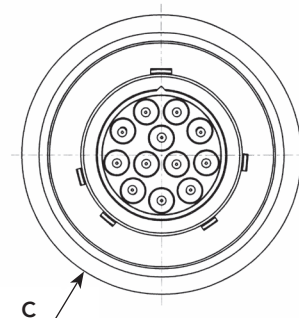
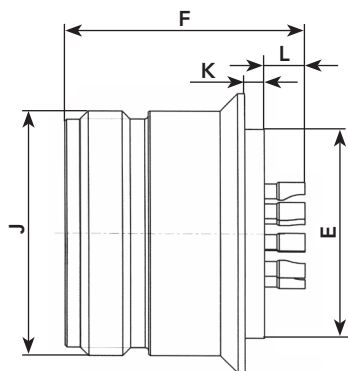


Contact layout	B	$\varnothing C_{0/-0.3}$	4 holes $\varnothing D_{0/+0.1}$	$\varnothing E_{\pm 0.2}$	$F_{\pm 0.2}$	$G_{\pm 0.2}$	$H_{\pm 0.1}$	$\varnothing J_{\text{max.}}$
12-03 12-12	23.00	38.00	3.10	21.00	41.60	22.30	3.80	26.98

Note: all dimensions are in mm

## Receptacle details

### 1Y Type receptacle (Fused glass insulator)

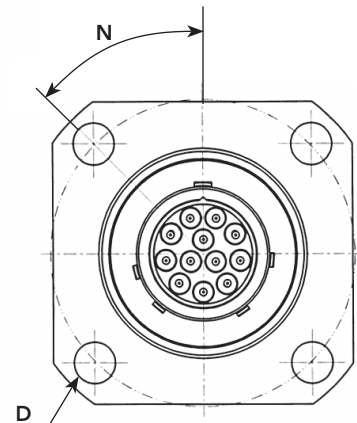
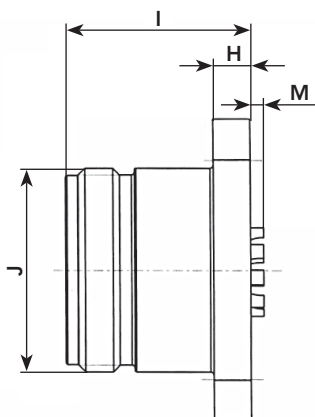


Applies to pressure transmitter, RTD, probes which require a high degree of hermeticity ( $10^{-8}$  atm.cm<sup>3</sup>/s)

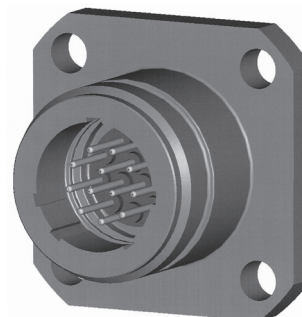


Contact layout	Ø C $\pm 0.12$	Ø E $\pm 0.1$	F max.	Ø J max.	K $\pm 0.15$	L $\pm 0.45$
12-03 12-12	30.80	22.90	26.5	26.98	2.20	4.00

### 2Y Type receptacle (Fused glass insulator)



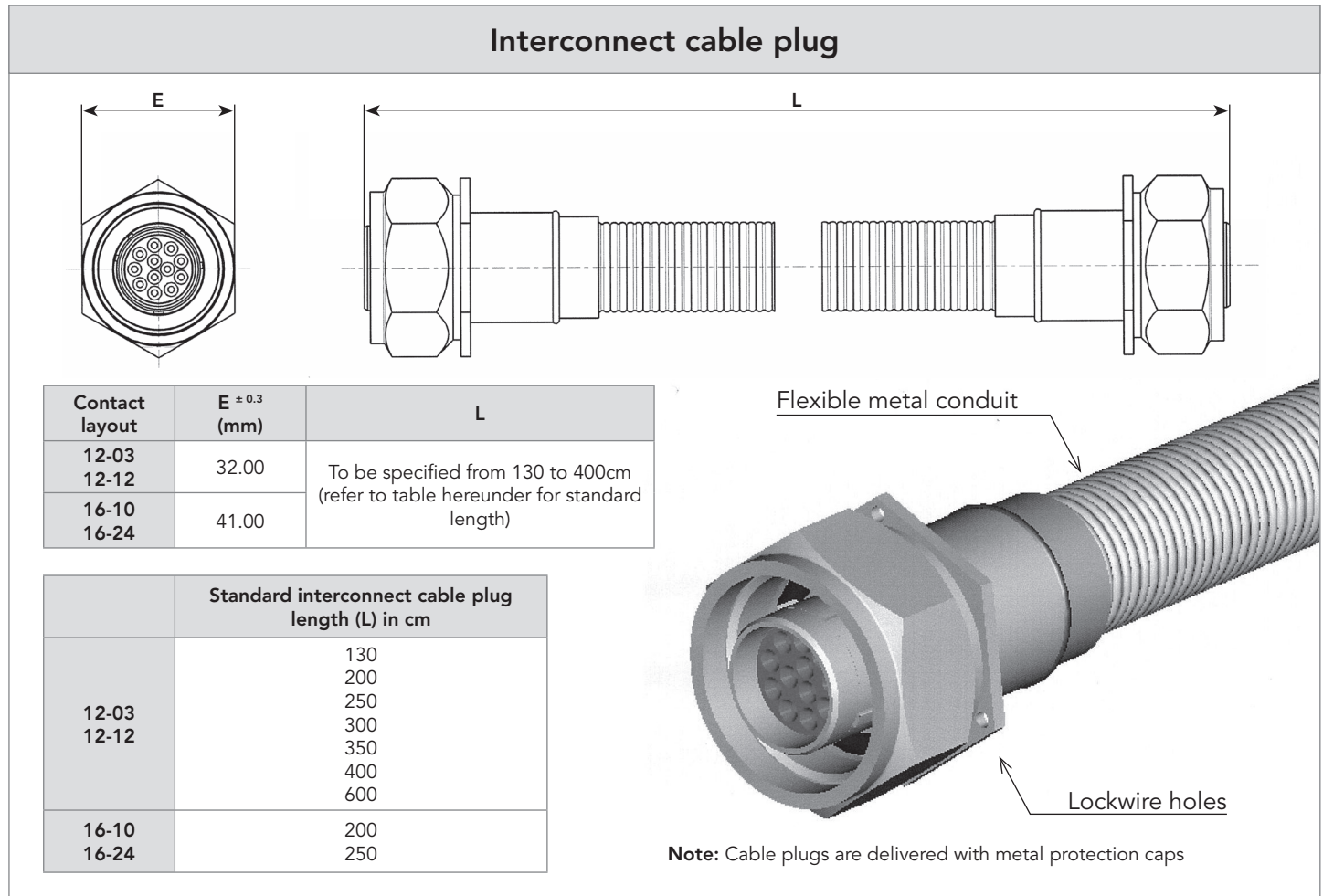
Applies to pressure transmitter, RTD, probes which require a high degree of hermeticity ( $10^{-8}$  atm.cm<sup>3</sup>/s)



Contact layout	4 holes Ø D at 90° on Ø 41	N	I $\pm 0.1$	Ø J max.	H $\pm 0.1$	M $\pm 0.85$
12-03 12-12	5.5	45°	24.75	26.98	5	1.70

Note: all dimensions are in mm

## Interconnect cable plug details



## Contact layouts

8NA 12-03 *	8NA 12-12	8NA 16-10 *	8NA 16-24
03 contacts # 16	12 contacts # 20	10 contacts # 16	24 contacts # 20

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

## Ordering information

### Receptacle

Basic Series	8NA	1Y	12-12	P	N	-	-	00	S		A
<b>Receptacle type:</b> 1Y: Hermetic, Round Flange, to be welded 2Y: Hermetic, Square Flange, screw mounted 2G: Sealed, Square Flange, screw mounted 3G: Sealed, Round Flanged 4G: Sealed, Round Flange, screw mounted											
<b>Contact layout:</b> 12-03: Shell size 12 - 03 contacts #16 12-12: Shell size 12 - 12 contacts #20 16-10: Shell size 16 - 10 contacts #16 16-24: Shell size 16 - 24 contacts #20											
<b>Contact type:</b> P: Pin S: Socket											
<b>Orientation:</b> N: Normal											
<b>Wiring code:</b> : Not wired XX: refer to table page 26											
<b>Wire type:</b> : Not wired A: EPR or PK4CZ (qualification pending)											
<b>Wire length:</b> 00: Not wired XX: length in cm – refer to table page 21											
<b>Specifications:</b> A: not compounded C: compounded S: hermetic											
<b>Additional specifications:</b> 02: for 2Y type only											
Qualification file: A											

### Interconnect cable plug

Basic Series	8NA	66	G	12-12	PS	N	4	B	200	A	
<b>Connector type:</b> 66: 2 plugs jumper with flexible metal conduit											
<b>Sealing:</b> G: Sealed											
<b>Shell size &amp; Contact Layout:</b> 12-03: Shell size 12 - 03 contacts #16 12-12: Shell size 12 - 12 contacts #20 16-10: Shell size 16 - 10 contacts #16 16-24: Shell size 16 - 24 contacts #20											
<b>Contact type:</b> PS: Male - Female interconnect cable plug											
<b>Orientation:</b> N: Normal											
<b>Wiring code:</b> XX: refer to table page 26											
<b>Wire type:</b> B: PEEK											
<b>Cable plug length:</b> XX: length in cm – refer to table page 24											
Qualification file: A											
Special specification: Please consult us											



## Wiring tables

## 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	01												
	02												
	03												
	Z3												
	Y3												
	04												
	05												
	06												
	07												
	08												

 Connected pins

] If possible, type of wiring to avoid

**Note:** For spare connection links, the 8 wires version (wiring N°08) allows interchangeability (except for Y3)

## 8NA 16-24

		N° of pins wired																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WIRING NUMBER	08																								
	09																								
	10																								
	11																								
	12																								
	13																								
	14																								
	15																								
	16																								
	17																								
	18																								
	19																								
	20																								
	21																								
	22																								
	23																								
	24																								
	N4																								

**Note:** For spare connection links, the 24 wires version (wiring N°24) allows interchangeability

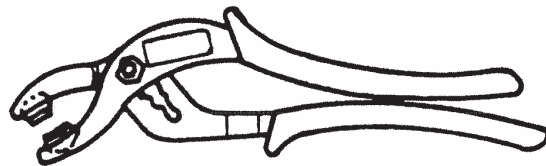
## Tools

### 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 (Delivered with 2 pairs of spare plastic jaws)	Spare plastic jaws
12-03 12-12	8341-91 EL	8341-94 EL
16-10 16-24		

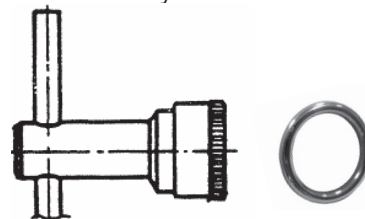


### Metal seal mounting tool

#### 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		3391 017 A EL



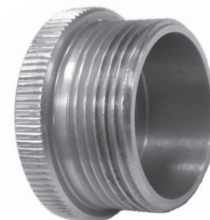
## Spare parts

### Metal caps & Fastening collars

#### 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		8341-5317 EL



#### Fastening collar for flexible conduit.

To maintain flexible conduits.

Contact layout	Fastening collar for flexible conduit
12-03 12-12	83415320EL
16-10 16-24	
	8NAEZ0504A

## Nuclear Power Generation

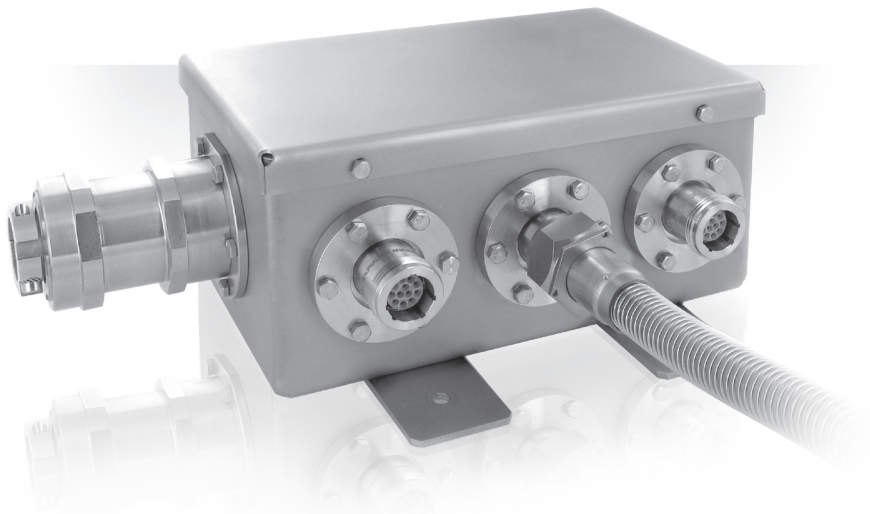
# 8NA Series Junction Box - K1

### Shielded K1 Qualified Junction Box

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### Non-shielded K1 Qualified Junction Box

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## Description

- Class 1E LOCA qualified
- Junction boxes with EMI/RFI cable glands
- For use with 8NA Series connectors
- Qualification standard: RCC-E 2005
- Up to 6 connections per Junction Box

## Applications

- Power plant safety equipment
- Instrumentation, sensors, probes
- Control systems

## Technical features

### Materials & plating

- **Junction box:**
  - Passivated stainless steel
- **Cable gland:**
  - Mechanical parts: passivated stainless steel
  - Seal: elastomer
  - Sealing glands: EPDM

### Electrical

- **Shielding continuity resistance between junction box and cable braid taken at the output of the cable feedthrough :**
  - $R_c < 20 \text{ m}\Omega$

### Environmental performances

- **Operating temperature:**
  - $-40^\circ\text{C}$  to  $+85^\circ\text{C}$  ( $-40^\circ\text{F}$  to  $+185^\circ\text{F}$ )
- **Cumulated radiation dose:**
  - 85 MRads Gamma at  $+70^\circ\text{C}$  ( $+158^\circ\text{F}$ )
- **Vibrations (sinus):**
  - 5g

### Accident testing

- **Seismic tests:**
  - OBE (Operating Basis Earthquake): 3g ZPA
  - SSE (Safe Shutdown Earthquake): 6g ZPA
- **Loss of Coolant Accident (LOCA):**
  - Temperature envelope:  $+156^\circ\text{C}$  ( $+313^\circ\text{F}$ ) max.
  - Pressure envelope: 5,6 bars (81 psig) max.
- **Post accidental conditions:**
  - $+100^\circ\text{C}$  ( $+212^\circ\text{F}$ ) during 240 hrs



## Features & benefits

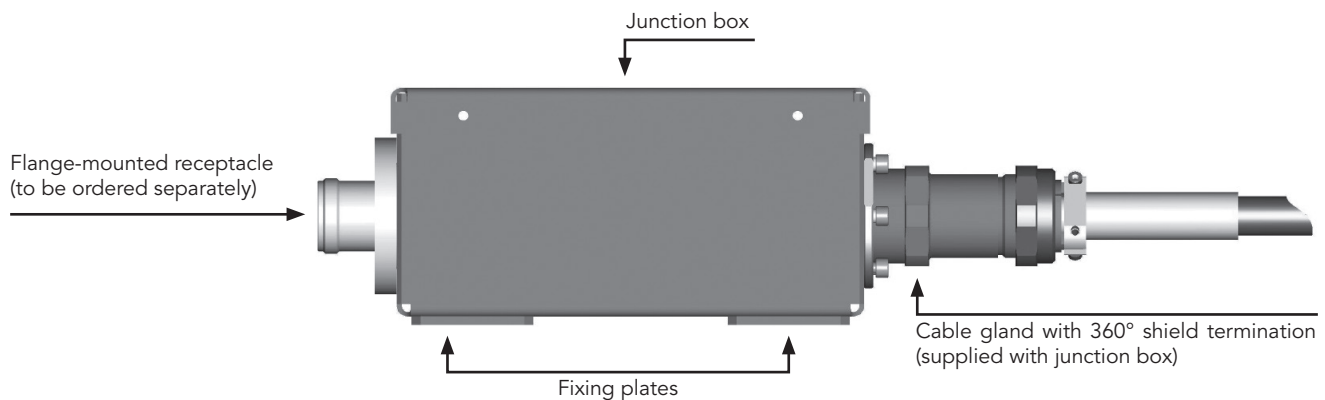
### Shielded junction boxes overview

8NA Series junction boxes for EPR are delivered as kits comprising:

- a stainless steel box with two fixing plates
- one or more cable glands with 360° shield termination mechanism

Connection to the equipment is made through flange-mounted receptacles, to be ordered separately (see receptacles details on page 37).

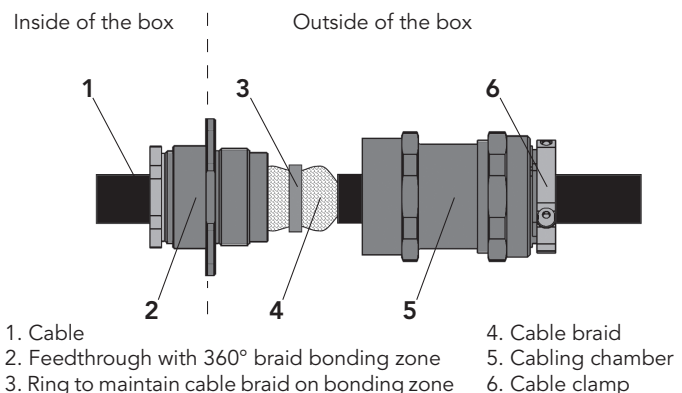
Junction boxes faces are machined to allow the mounting of the desired number of receptacles and cable glands according to chosen configuration (see available configurations pages 32 and 33).



### Compliant with EPR wiring specifications CST 74C030.02

To meet the new EMC requirements of EPR program, SOURIAU has developed high-performances, LOCA resistant cable glands with 360° shield termination mechanism, to be mounted on 8NA Series Junction Boxes instead of basic cable clamps.

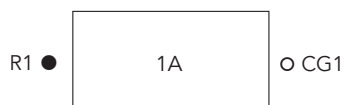
- **360° Shield termination**
- **High shielding performances**  
over a wide frequency range
- **Total resistance  $\leq 20 \text{ m}\Omega$**
- **Perfect sealing of braid bonding zone**



## Available configurations

### Type 02 junction boxes for 8NA 12.12/12.03 connectors

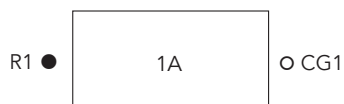
R = Receptacle CG = Cable Gland



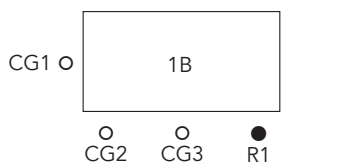
Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
1	1	CG1	1 to 4	9 to 22mm	8NA02BSx0001AA

### Type 04 junction boxes for 8NA 12.12/12.03 connectors

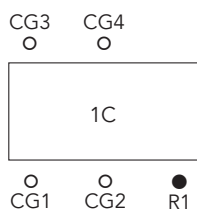
R = Receptacle CG = Cable Gland



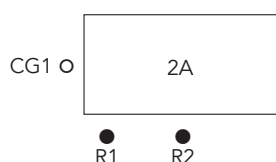
Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
1	1	CG1	1 to 7	9 to 29mm	8NA04BSx0001AA



Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
1	3	CG1 CG2 CG3	5 to 7 1 to 2 1 to 2	20 to 29mm 9 to 17mm 9 to 17mm	8NA04BSxxx01BA



Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
1	4	CG1 CG2 CG3 CG4	1 to 2 1 to 2 3 to 4 3 to 4	9 to 17mm 9 to 17mm 15 to 22mm 15 to 22mm	8NA04BSxxx1CA



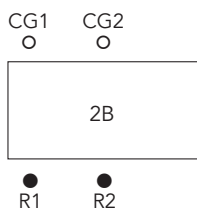
Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
2	1	CG1	5 to 7	20 to 29mm	8NA04BSx0002AA

\* Refer to table page 34

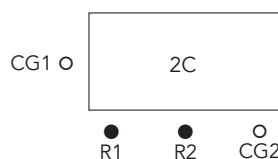
# Available configurations

## Type 04 junction boxes for 8NA 12.12/12.03 connectors (continued)

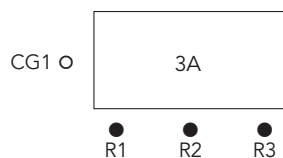
R = Receptacle CG = Cable Gland



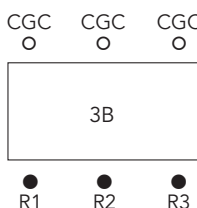
Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
2	2	CG1 CG2	3 to 4 3 to 4	15 to 22mm 15 to 22mm	8NA04BSxx002BA



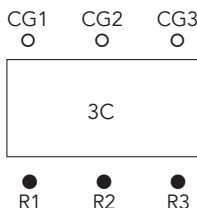
Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
2	2	CG1 CG2	5 to 7 5 to 7	20 to 29mm 20 to 29mm	8NA04BSxx002CA



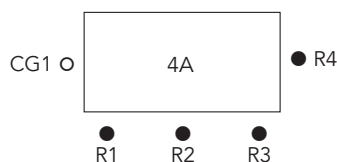
Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
3	1	CG1	5 to 7	20 to 29mm	8NA04BSx0003AA



Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
3	0	-	-	-	8NA04BS00003BA



Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
3	3	CG1 CG2 CG3	1 to 2 1 to 2 1 to 2	9 to 17mm 9 to 17mm 9 to 17mm	8NA04BSxxx03CA



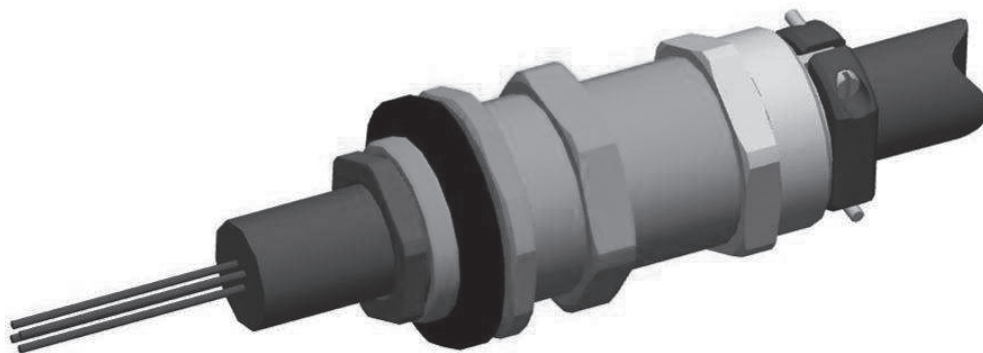
Number of receptacle	Number of cable glands	Cable gland	Admissible cable gland code*	Admissible cable diameter	Part number
4	1	CG1	5 to 7	20 to 29mm	8NA04BSx0004AA

\* Refer to table page 34

## Cable glands with shield termination

### Cable gland types and admissible cable diameters

SOURIAU has developed a complete range of cable glands, comprising 3 sizes and a total of seven references for shielded cables of diameters ranging from 9 to 29mm.

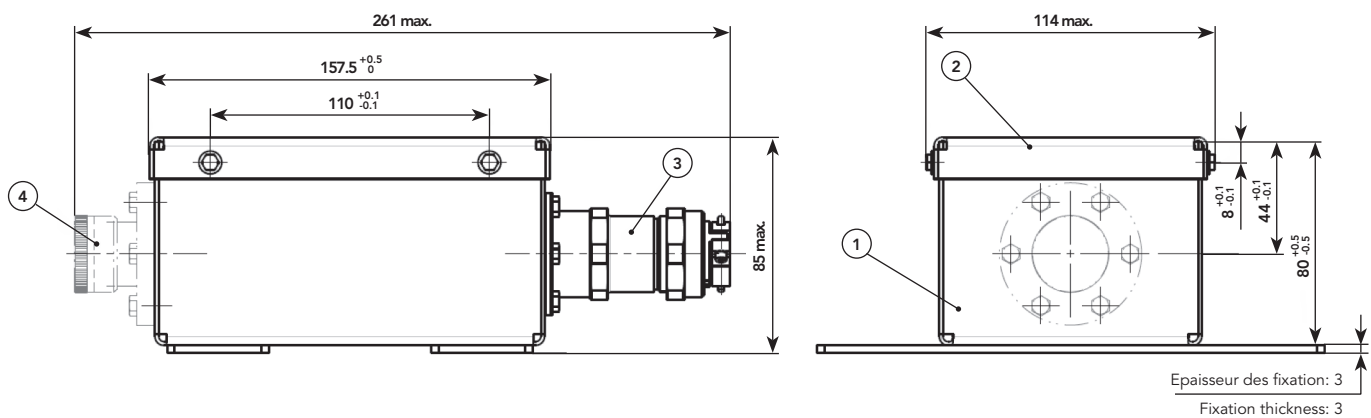


Cable gland codes	Size	Admissible cable diameter (mm)		Sealing glands diameter* (mm)		1mm² EPR or PK4CZ (qualification pending) cable
		min.	max.	min.	max.	
1	1	9	14	9	11	3x1, 4x1, 5x1, 7x1
				10.5	12.5	
				12	14	
2	1	12	17	12	14	9x1
				13.5	15.5	
				15	17	
3	2	15	20	15	17	12x1, 14x1
				16.5	18.5	
				18	20	
4	2	17	22	17	19	19x1
				18.5	20.5	
				20	22	
5	3	20	25	20	22	27x1
				21.5	23.5	
				23	25	
6	3	23	28	23	25	37x1
				24.5	26.5	
				26	28	
7	3	26	29	26	28	48x1
				27.5	29	

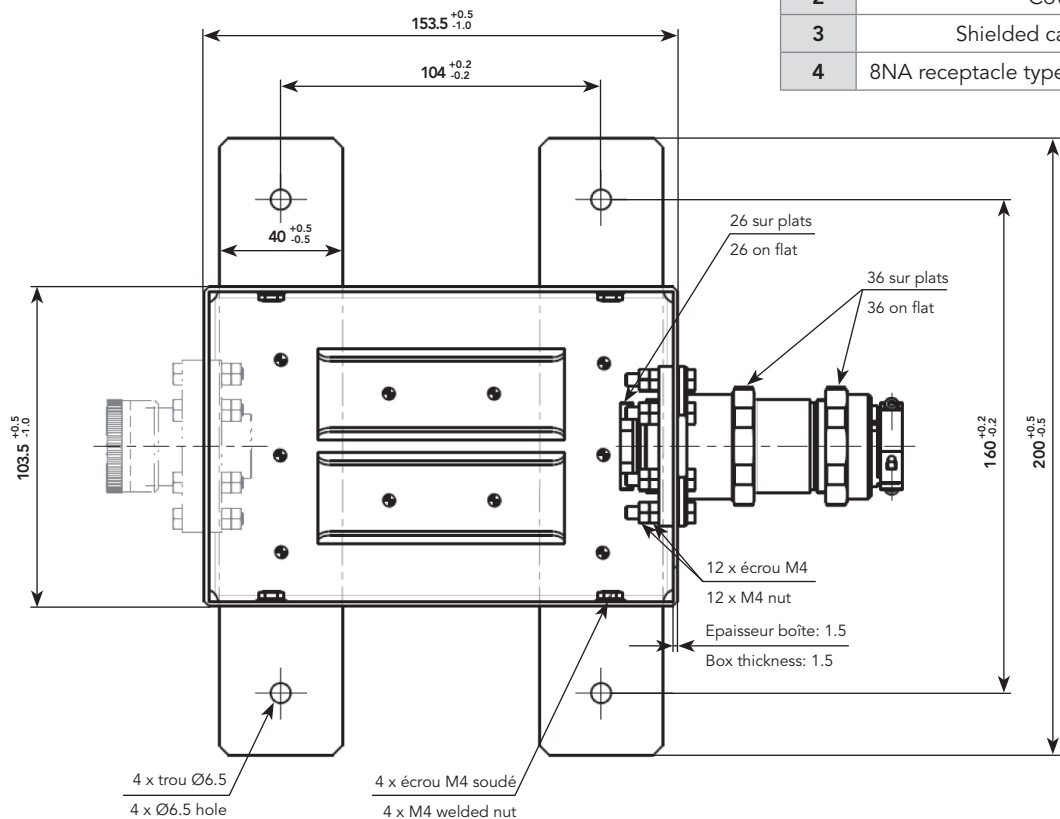
\* Cable glands are delivered with a set of 3 seals

## Dimensions

### Type 02 box dimensions



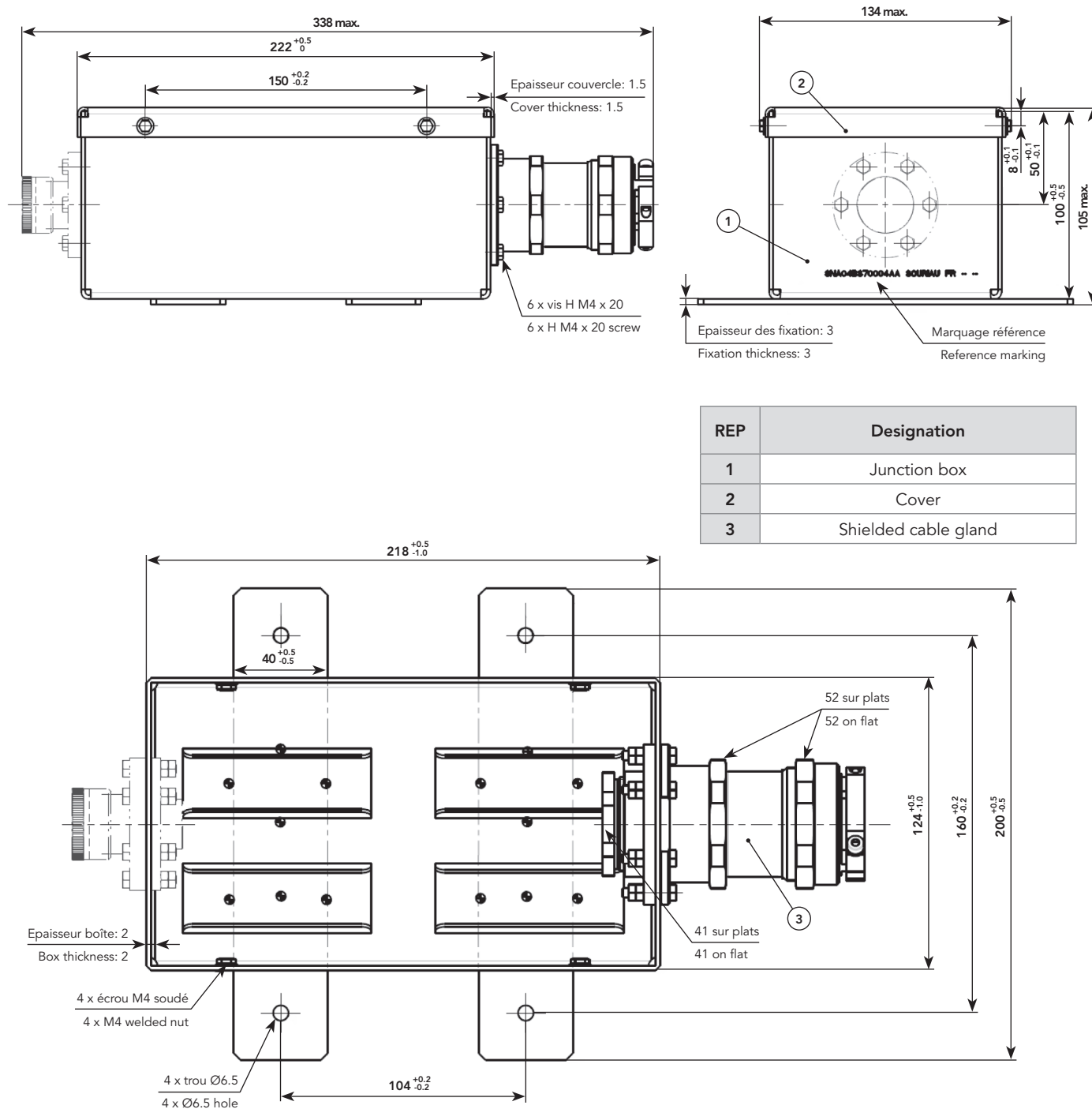
REP	Designation
1	Junction box
2	Cover
3	Shielded cable gland
4	8NA receptacle type 3G (not delivered)



Note: all dimensions are in mm

## Dimensions

### Type 04 box dimensions

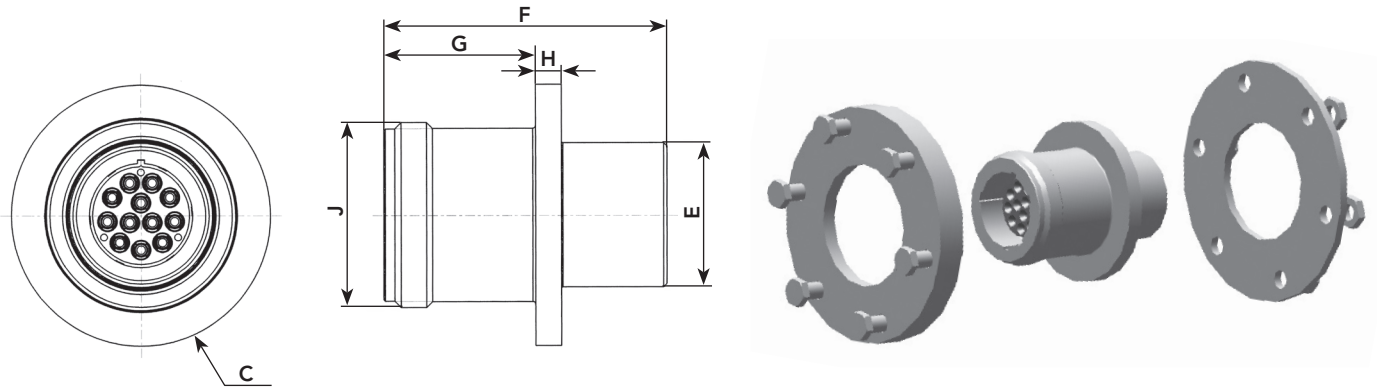


Note: all dimensions are in mm



## Receptacle details

### 3G type receptacle



Contact layout	$\varnothing C \pm 0.3$	$\varnothing E \pm 0.2$	$F \pm 0.2$	$G \pm 0.2$	$H \pm 0.1$	$\varnothing J \text{ max.}$
12-03 12-12	38.00	21.00	41.60	22.30	3.80	26.98
16-10 16-24	52.00	30.00	43.10	23.80	3.80	36.50

3G receptacles are to be ordered separately from the junction box. They are assembled (refer to opposite picture) with 6 bolts using the flange(s) supplied with the receptacles.

Note: all dimensions are in mm

## Contact layouts

8NA 12-03 *	8NA 12-12	8NA 16-10 *	8NA 16-24
03 contacts # 16	12 contacts # 20	10 contacts # 16	24 contacts # 20

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

## Ordering information

### Junction boxes with shielded cable glands

Basic Series	Junction Box 8NA	04	B	S	1	0	0	0	1A	A
<b>Junction Box Type:</b>										
02: Junction Box Size 1 for 8NA 12-12 and 12-03										
04: Junction Box Size 2 for 8NA 12-12 and 12-03										
<b>Fixed character:</b>										
<b>Cable Entry Type:</b>										
S: Cable gland with 360° shield termination										
<b>Cable gland N°1 code:</b>										
0: No cable gland										
1-7: See admissible cable diameters p. 34										
<b>Cable gland N°2 code:</b>										
0: No cable gland										
1-7: See admissible cable diameters p. 34										
<b>Cable gland N°3 code:</b>										
0: No cable gland										
1-7: See admissible cable diameters p. 34										
<b>Cable gland N°4 code:</b>										
0: No cable gland										
1-7: See admissible cable diameters p. 34										
<b>Inputs/Outputs configurations:</b>										
See available configurations p. 32 - 33										
<b>Qualification file</b>										

### Receptacles to be mounted on junction boxes

Basic Series	8NA	3G	12-12	S	N	08	A	30	C	A
<b>Receptacle type:</b>										
3G: Sealed, Round Flanged										
<b>Contact layout:</b>										
12-03: Shell size 12 - 03 contacts #16										
12-12: Shell size 12 - 12 contacts #20										
16-10: Shell size 16 - 10 contacts #16										
16-24: Shell size 16 - 24 contacts #20										
<b>Contact type:</b>										
S: Socket (only Female contacts on junction box receptacles)										
<b>Orientation:</b>										
N: Normal										
<b>Wiring code:</b>										
XX: Refer to table p. 39										
<b>Wiring type:</b>										
A: EPR or PK4CZ(qualification pending)										
<b>Wiring length:</b>										
XX: in cm, refer to p. 21										
<b>Specification:</b>										
C: Compounded										
<b>Qualification file:</b> A										

## Wiring tables

## 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	01												
	02												
	03												
	Z3												
	Y3												
	04												
	05												
	06												
	07												
	08												

Connected pins

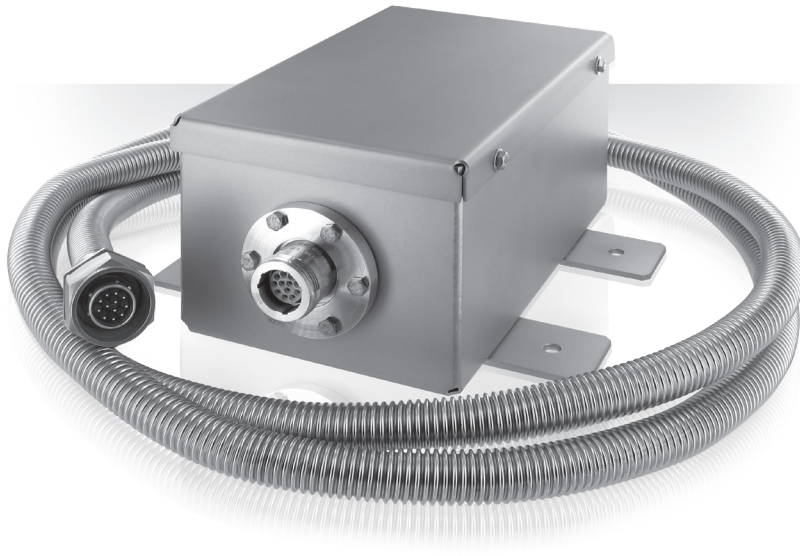
If possible, type of wiring to avoid

**Note:** For spare connection links, the 8 wires version (wiring N°08) allows interchangeability (except for Y3)

## 8NA 16-24

		N° of pins wired																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Wiring Number	08																								
	09																								
	10																								
	11																								
	12																								
	13																								
	14																								
	15																								
	16																								
	17																								
	18																								
	19																								
	20																								
	21																								
	22																								
	23																								
	24																								
	N4																								

**Note:** For spare connection links, the 24 wires version (wiring N°24) allows interchangeability



### Description

- Class 1E LOCA qualified
- For use with 8NA Series connectors
- Up to 6 connections on one box to distribute signals
- **Qualification standards:**
  - RCC-E 1993 & 2002

### Applications

- Power plant safety equipment
- Instrumentation, sensors, probes
- Control systems

## Technical features

### Materials & plating

- **Materials:** Stainless steel, Passivated

### 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)

### Sizes & configurations

- **3 Sizes available:**
  - Sizes 2 & 4:
    - Compatible with 8NA 12-12 connectors
  - Size 3:
    - Compatible with 8NA 16-24 connectors
- **Configurations:**
  - A total of 14 different boxes references with input and output made of 8NA 3G receptacles and cable clamps.
  - 2 optional cable clamps:
    - Standard
    - With bonding and shielding continuity

### Accident testing

- **Shocks:**
  - Operating Basis Earthquake (OBE): 2g ZPA
  - Safe Shutdown Earthquake (SSE): 4g ZP
- **Vibration (Sine):** 10g, 58 to 500Hz, 3x2 hrs

## Cable clamp details

### Standard cable clamps

#### Junction boxes are delivered with standard cable clamps

The cable clamps maintain the cables into position.

The various boxes available can receive up to 5 K1 cables mounted with standard cable clamps.

- Maximal admissible cable diameters vary from 15 to 29mm.
- Minimal admissible cable diameters vary from 7 to 20mm.

Refer to the next pages for more details.

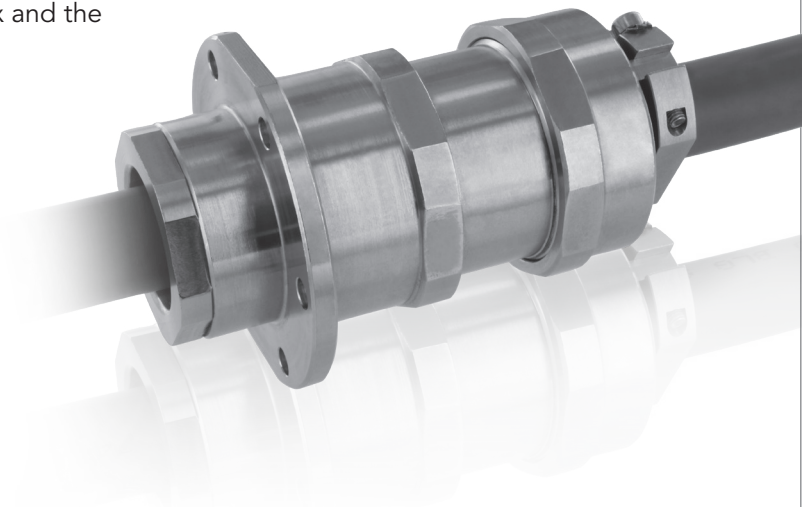


### Cable clamp with bonding and shielding continuity

#### Optional premium cable clamp

These cable clamp ensures 360° bonding and shielding continuity between the K1 cables entering the box and the box itself. It also maintains the cable into position.

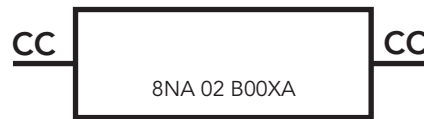
Mandatory for new EPR projects.  
Compliant with CST cabling 74C030.02



LOCA, K1 qualified according to RCC-E 2005

## Available configuration & cable diameters

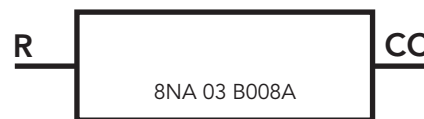
### Size 2 box details - 8NA 12-12 & 12-03 connectors



R = Receptacle  
CC = Cable clamp

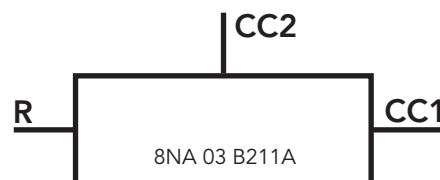
Box reference	Cable Clamp - Cable diameters range	
	Ø min.	Ø max.
8NA 02 B007A	7.00	15.00
8NA 02 B006A	14.00	20.00
8NA 02 B008A	20.00	27.00

### Size 3 box details - 8NA 16-10 & 16-24 connectors



R = Receptacle  
CC = Cable clamp

Box reference	Cable Clamp - Cable diameters range	
	Ø min.	Ø max.
8NA 03 B008A	20.00	27.00



Box reference	Cable Clamp - Cable diameters range			
	CC1		CC2	
	Ø min.	Ø max.	Ø min.	Ø max.
8NA 03 B211A	14.00	20.00	20.00	27.00

Note: all dimensions are in mm



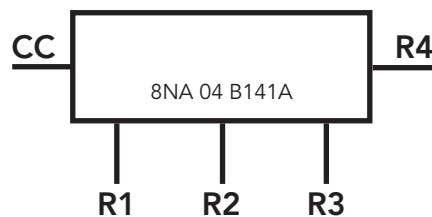
Available configuration & cable diameters

Size 4 box details - 8NA 12-12 & 12-03 connectors				
<div><div><div><div>CC1</div><div>8NA 04 B018A</div><div><div>CC2</div><div>CC3</div><div>R</div></div></div><div><div>R = Receptacle</div><div>CC = Cable clamp</div></div></div></div>				
Box reference	Cable Clamp - Cable diameters range			
	CC1		CC2/CC3	
	Ø min.	Ø max.	Ø min.	Ø max.
8NA 04 B018A	20.00	27.00	7.00	15.00
<div><div><div><div>CC</div><div>8NA 04 B028A</div><div><div>R1</div><div>R2</div></div></div></div><div><div><div>CC</div><div>8NA 04 B038A</div><div><div>R1</div><div>R2</div><div>R3</div></div></div></div></div>				
Box reference	Cable Clamp - Cable diameters range			
	Ø min.		Ø max.	
	20.00		27.00	
8NA 04 B028A				
8NA 04 B038A				

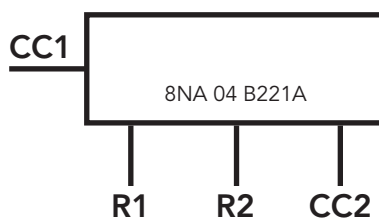
Note: all dimensions are in mm

## Available configuration & cable diameters

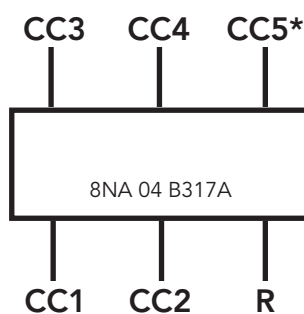
### Size 4 box details - 8NA 12-12 & 12-03 connectors



R = Receptacle  
CC = Cable clamp



Box reference	Cable clamp - cable diameters range (CC1/CC2)	
	Ø min.	Ø max.
8NA 04 B141A	20.00	29.00
8NA 04 B221A		



\*CC5 supplied with  
cable clamp cap

Box reference	Cable clamp - cable diameters range			
	CC1/CC2		CC3/CC4/CC5	
	Ø min.	Ø max.	Ø min.	Ø max.
8NA 04 B317A	7.00	15.00	14.00	20.00

Note: all dimensions are in mm

Available configuration & cable diameters

Size 4 box details - 8NA 12-12 & 12-03 connectors

CC1CC2CC3\*

8NA 04 B327A

R1R2

CC1\*CC2\*CC3\*

8NA 04 B337A

RR2R3

R

8NA 04 B006A

CC1

R = Receptacle  
CC = Cable clamp

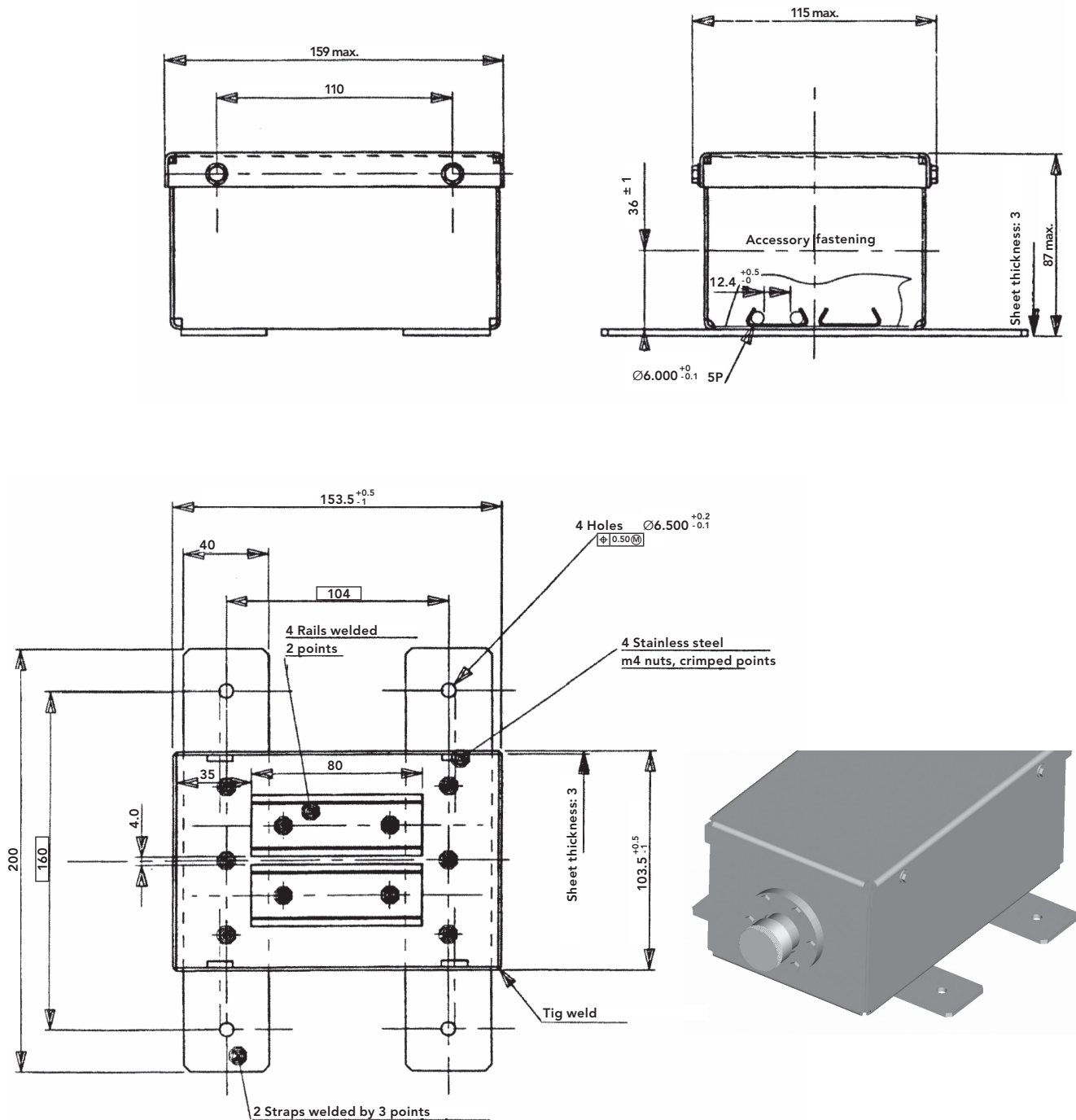
\* supplied with cable clamp cap

Box reference	CC1/CC2/CC3 - Cable clamp - cable diameters range	
	Ø min.	Ø max.
8NA 04 B327A	14.00	20.00
8NA 04 B337A		
8NA 04 B006A		

Note: all dimensions are in mm

## Junction boxes dimensions

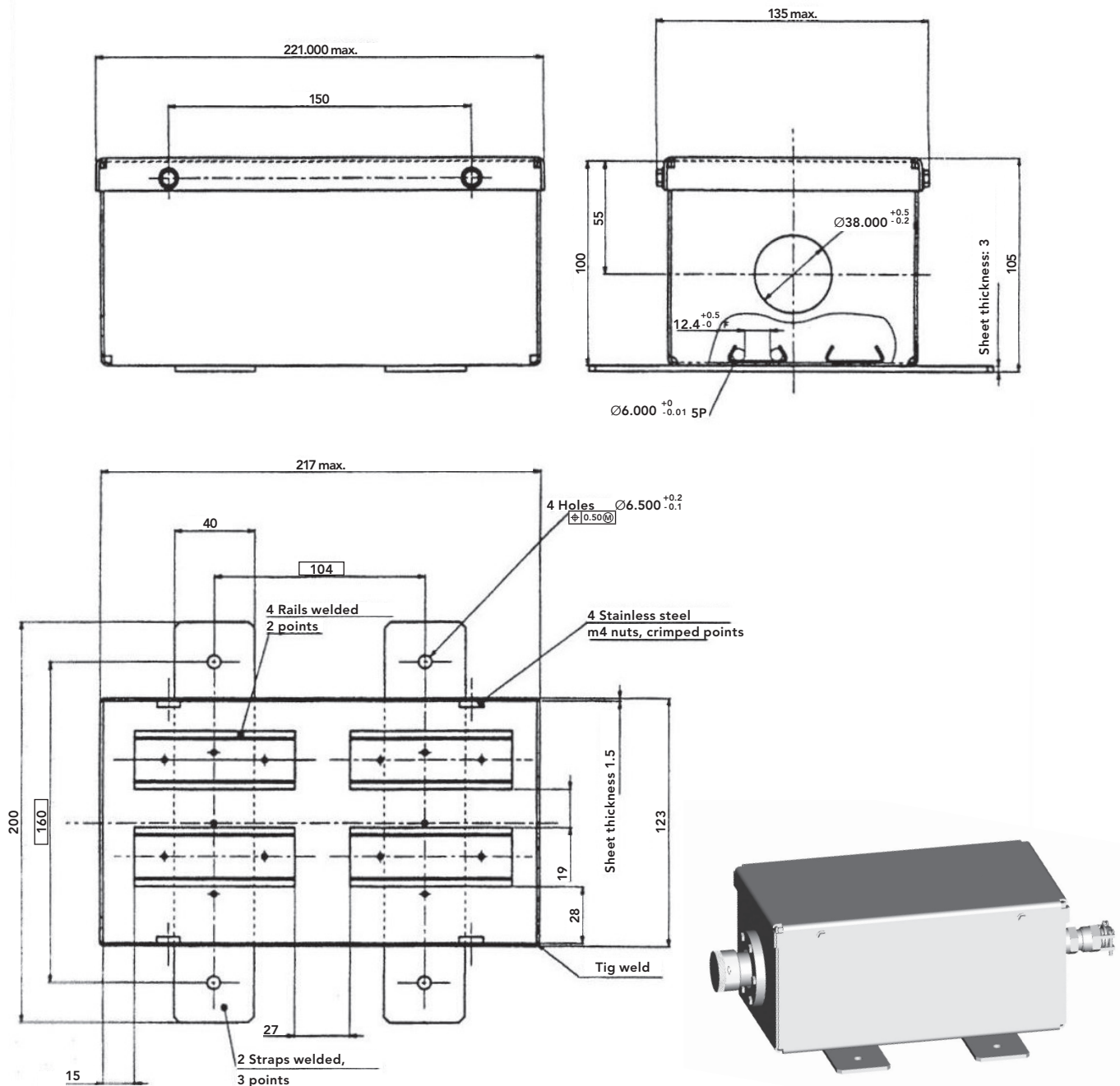
## Size 2 box dimensions



Note: all dimensions are in mm

## Junction boxes dimensions

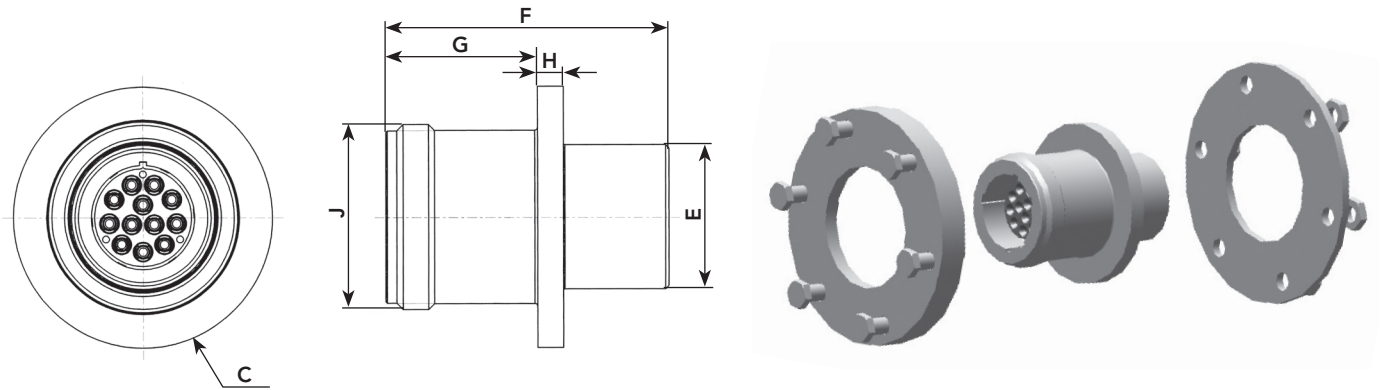
### Size 3 & 4 box dimensions



Note: all dimensions are in mm

## Receptacle details

### 3G type receptacle



Contact layout	$\varnothing C \pm 0.3$	$\varnothing E \pm 0.2$	$F \pm 0.2$	$G \pm 0.2$	$H \pm 0.1$	$\varnothing J \text{ max.}$
12-03 12-12	38.00	21.00	41.60	22.30	3.80	26.98
16-10 16-24	52.00	30.00	43.10	23.80	3.80	36.50

3G receptacles are to be ordered separately from the junction box. They are assembled (refer to picture above) with 6 bolts using the flange(s) supplied with the receptacles.

Note: all dimensions are in mm

## Contact layouts

8NA 12-03 *	8NA 12-12	8NA 16-10 *	8NA 16-24
03 contacts # 16	12 contacts # 20	10 contacts # 16	24 contacts # 20

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



## Ordering information

### Receptacles to be mounted on junction boxes

<b>BASIC SERIES</b>	<b>8NA</b>	<b>3G</b>	<b>12-12</b>	<b>S</b>	<b>N</b>	<b>08</b>	<b>A</b>	<b>30</b>	<b>C</b>	<b>A</b>
<b>Receptacle type:</b>										
3G: Sealed, Round Flanged (See page 48)										
<b>Contact layout:</b>										
12-03: Shell size 12 - 03 contacts #16										
12-12: Shell size 12 - 12 contacts #20										
16-10: Shell size 16 - 10 contacts #16										
16-24: Shell size 16 - 24 contacts #20										
<b>Contact type:</b>										
S: Socket (only Female contacts on junction box receptacles)										
<b>Orientation:</b>										
N: Normal										
<b>Wiring code:</b>										
XX: refer to table page 50										
<b>Wiring type:</b>										
A: EPR or PK4CZ(qualification pending)										
<b>Wiring length:</b>										
XX: in cm, refer to page 21										
<b>Specification:</b>										
C: compounded										
<b>Qualification file:</b> A										

## Junction boxes

Box sizes	Box ref.	Number of 3G receptacles positions available	Number of cable clamps available	For 8NA 12-03 & 12-12 connectors	For 8NA 16-10 & 16-24 connectors
Size 2	8NA 02 B007A	1	1	YES	-
	8NA 02 B006A	1	1	YES	-
	8NA 02 B008A	1	1	YES	-
Size 3	8NA 03 B008A	1	1	-	YES
	8NA 03 B211A	1	2	-	YES
Size 4	8NA 04 B018A	1	3	YES	-
	8NA 04 B028A	2	1	YES	-
	8NA 04 B038A	3	1	YES	-
	8NA 04 B141A	4	1	YES	-
	8NA 04 B221A	2	2	YES	-
	8NA 04 B317A	1	5	YES	-
	8NA 04 B327A	2	3	YES	-
	8NA 04 B337A	3	3	YES	-
	8NA 04 B006A	1	1	YES	-

## Wiring tables

### 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	01												
	02												
	03												
	Z3												
	Y3												
	04												
	05												
	06												
	07												
	08												

Connected pins

If possible, type of wiring to avoid

**Note:** For spare connection links, the 8 wires version (wiring N°08) allows interchangeability (except for Y3)

### 8NA 16-24

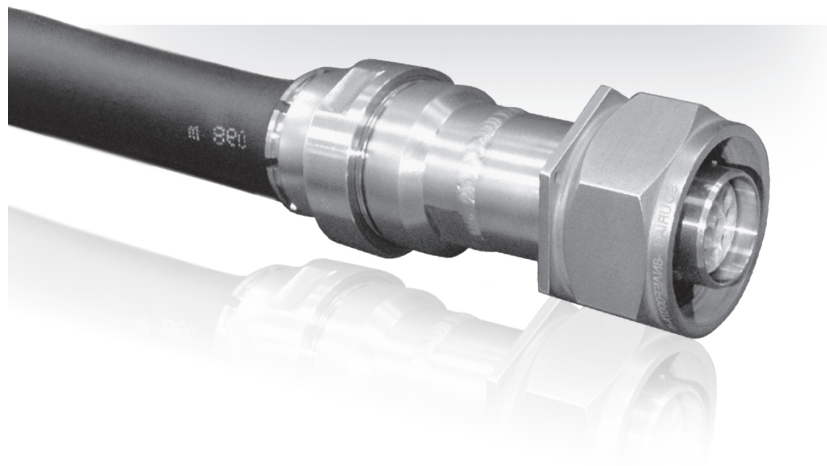
		N° of pins wired																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Wiring Number	08																								
	09																								
	10																								
	11																								
	12																								
	13																								
	14																								
	15																								
	16																								
	17																								
	18																								
	19																								
	20																								
	21																								
	22																								
	23																								
	24																								
	N4																								

**Note:** For spare connection links, the 24 wires version (wiring N°24) allows interchangeability

## Nuclear Power Generation

# 8NA Series Cabled Field Plugs

■ Technical features .....	53
■ Features & benefits .....	54
■ Contact layouts.....	55
■ Receptacle & cabled field plug details.....	56
■ Ordering information .....	62
■ Wiring tables .....	64
■ Tools & spare parts .....	65



## 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:** 0.93mm<sup>2</sup> 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
<b>Material</b>	Stainless steel	Thermoset or Fused glass	Stainless steel	Copper alloy
<b>Plating</b>	Passivated	-	-	Gold over nickel

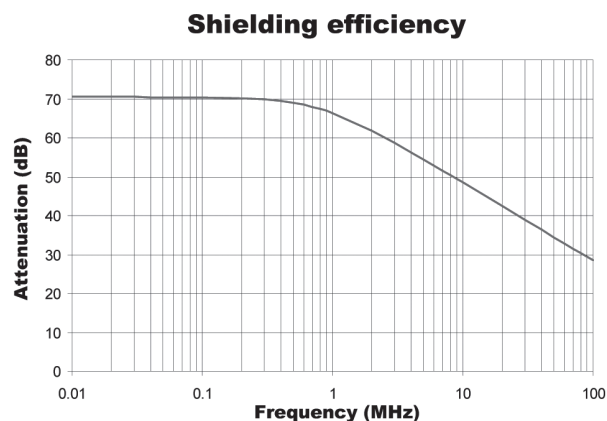
## Features & benefits

### 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:

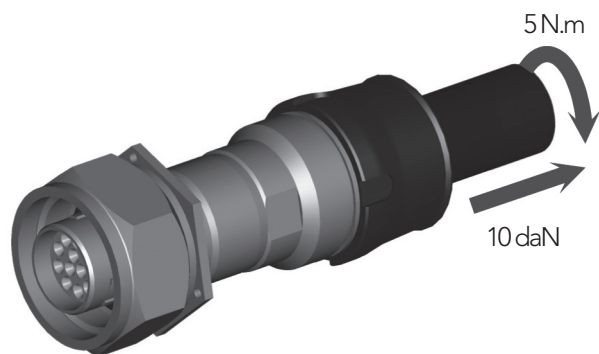
- Enhanced shielding efficiency over a wide frequency range.
- Reduced shell to shell resistance to less than 20mΩ.



### 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.



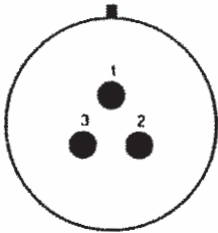
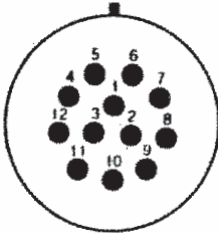
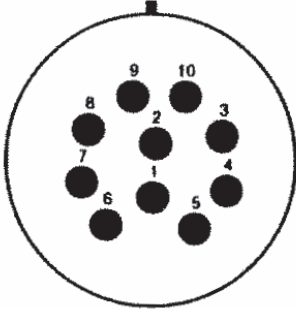
### Intermateable with existing 8NA receptacles

#### 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	On sensor or actuator	12-03*; 12-12
1Y	Hermetic (Fused glass)	brazed		
2Y		screwed		

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

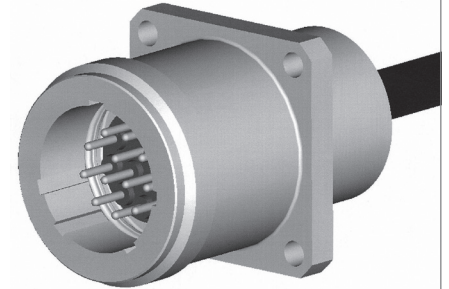
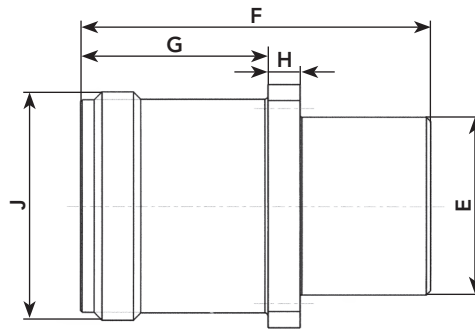
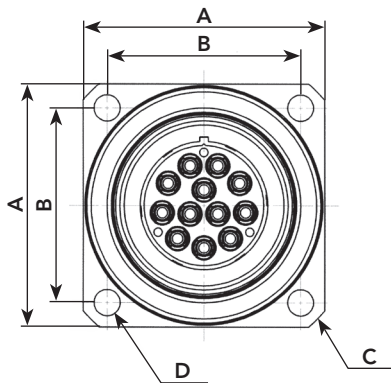
Contact layout	Standard cable length in cm
12-03	30
12-12	50
16-10	100

Note: receptacles are delivered with metal protection caps



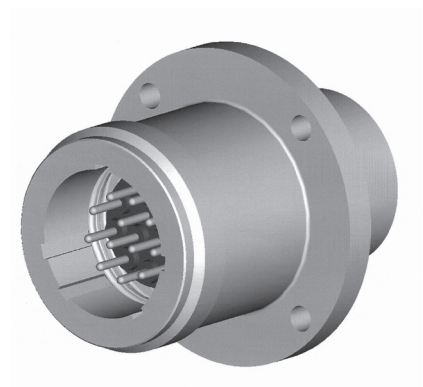
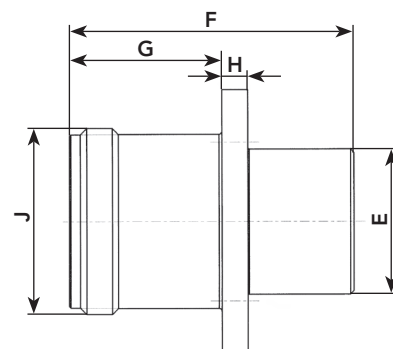
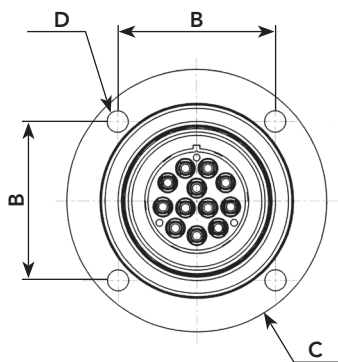
## Receptacle details

### 2G type receptacle



Contact layout	A $\pm 0.3$	B	C $0/-0.3$	4 holes $\varnothing D$ $0/+0.1$	$\varnothing E \pm 0.2$	F $\pm 0.2$	G $\pm 0.2$	H $\pm 0.1$	$\varnothing J$ 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

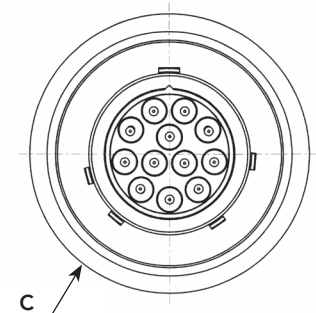
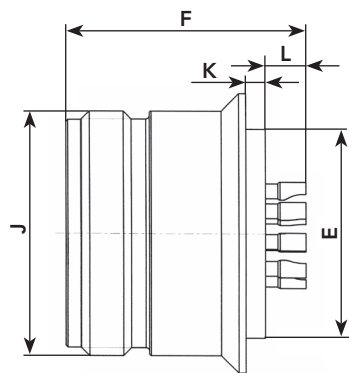


Contact layout	B	C $0/-0.3$	4 holes $\varnothing D$ $0/+0.1$	$\varnothing E \pm 0.2$	F $\pm 0.2$	G $\pm 0.2$	H $\pm 0.1$	$\varnothing J$ max.
12-03 12-12	23.00	38.00	3.10	21.00	41.60	22.30	3.80	26.98

Note: all dimensions are in mm

## Receptacle details

### 1Y type receptacle (Fused glass insulator)

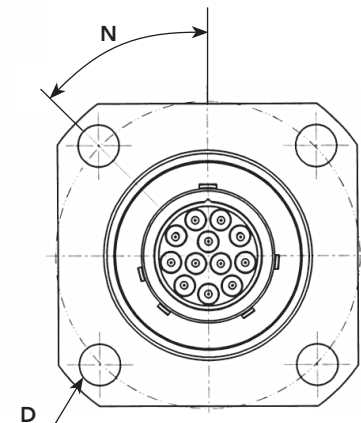
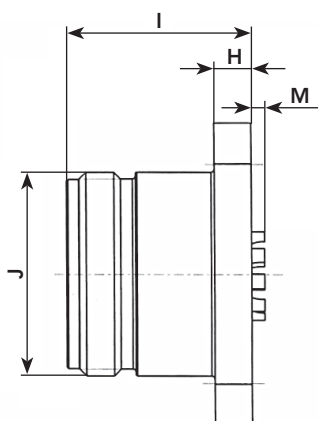


Applies to pressure transmitter, RTD, probes which require a high degree of hermeticity ( $10^{-8}$  atm.cm<sup>3</sup>/s)

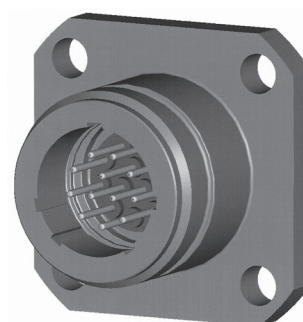


Contact layout	Ø C $\pm 0.12$	Ø E $\pm 0.1$	F max.	Ø J max.	K $\pm 0.15$	L $\pm 0.45$
12-03 12-12	30.80	22.90	26	26.98	2.20	4.00

### 2Y type receptacle (Fused glass insulator)



Applies to pressure transmitter, RTD, probes which require a high degree of hermeticity ( $10^{-8}$  atm.cm<sup>3</sup>/s)

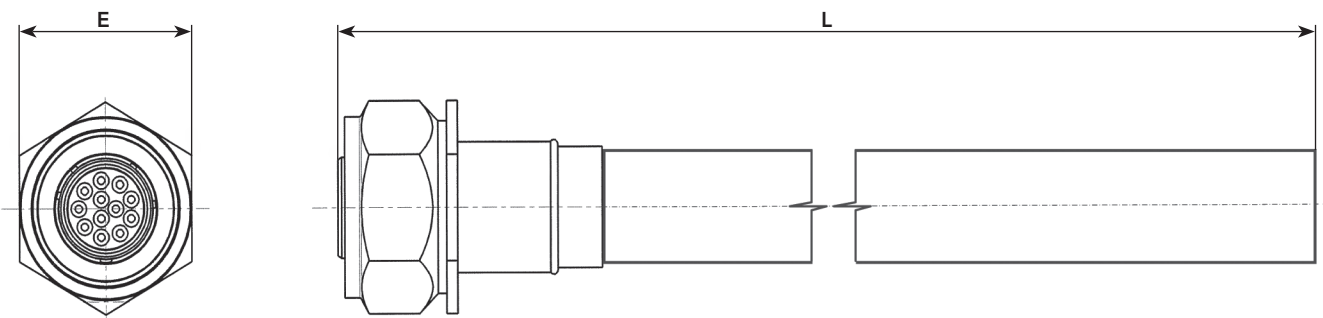


Contact layout	4 holes Ø D at 90° on Ø 41	N	I $\pm 0.1$	Ø J max.	H $\pm 0.1$	M $\pm 0.85$
12-03 12-12	5.5	45°	24.75	26.98	5.00	1.70

Note: all dimensions are in mm

Cabled field plug details


Cable plug



Technical drawing of a cable plug. The left view shows the front of the plug with a hexagonal base and a circular contact area containing 12 pins. The dimension 'E' indicates the width of the hexagonal base. The right view shows the side of the plug, including the hexagonal base, a locking collar, and a long cable. The dimension 'L' indicates the total length of the cable from the base to the end.

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



3D rendering of a cable plug, showing the hexagonal base, the locking collar, and the cable. The plug is shown from a perspective view, highlighting its robust design and the arrangement of the pins on the front face.

**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
<b>Receptacle type:</b> <b>1Y:</b> Hermetic, Round Flange, to be welded <b>2Y:</b> Hermetic, Square Flange, screw mounted <b>2G:</b> Sealed, Square Flange, screw mounted <b>4G:</b> Sealed, Round Flange, screw mounted											
<b>Contact layout:</b> <b>12-03:</b> Shell size 12 - 03 contacts #16 <b>12-12:</b> Shell size 12 - 12 contacts #20 <b>16-10:</b> Shell size 16 - 10 contacts #16											
<b>Contact type:</b> <b>P:</b> Pin <b>S:</b> Socket											
<b>Orientation:</b> <b>N:</b> Normal											
<b>Wiring code:</b> : Not wired <b>XX:</b> refer to table page 62											
<b>Wire type:</b> : Not wired <b>A:</b> EPR or PK4CZ(qualification pending)											
<b>Wire length:</b> <b>00:</b> Not wired <b>XX:</b> length in cm – refer to table page 59											
<b>Specifications:</b> <b>A:</b> not compounded <b>C:</b> compounded <b>S:</b> hermetic											
<b>Qualification file:</b> A											
<b>Additional specifications:</b> <b>02:</b> for type 2Y only											

## Ordering information

### Plug & cable

Basic Series	8NA6G	12-12	S	N	04	04	S	18	2	A
<b>Shell size &amp; Contact Layout:</b>										
12-03: Shell size 12 - 03 contacts #16										
12-12: Shell size 12 - 12 contacts #20										
16-10: Shell size 16 - 10 contacts #16										
<b>Contact type:</b>										
P: Pin										
S: Socket										
<b>Orientation:</b>										
N: Normal										
<b>Wiring code:</b>										
XX: refer to table page 62										
<b>Number of wires in the cable:</b>										
XX: refer to table page 62										
<b>Cable type:</b>										
S: Shielded										
<b>Wire gage:</b>										
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)										
<b>Cable plug length:</b>										
XX: length in m										
<b>Qualification file:</b> 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

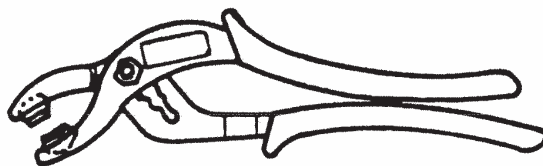
## Tools

### 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		

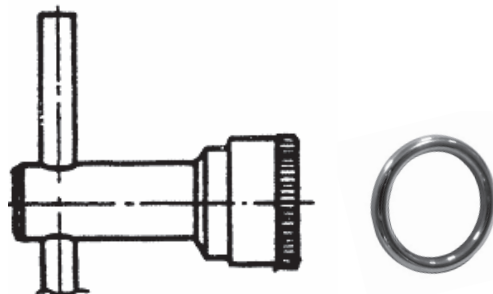


### Metal seal mounting tool

#### 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





## Nuclear Power Generation

# 8N45(S) Series - K2 Qualified Connectors

### Shielded K2 qualified connectors

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### Non-Shielded K2 qualified connectors

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## Description

- Class 1E qualified connectors
- Quick connect ¼ turn bayonet coupling
- High shielding performances
- **Qualification standards:**
  - H-M2A-2007-01218-FR
  - RCC-E 2005

## Applications

- Instrumentation, sensors, probes
- Mandatory for new EPR programs

## Technical features

### Electrical

- **Current rating:** 11 A max
- **Peak current:** 50A/30ms
- **Test voltage rating:** 2000 Vrms
- **Insulation resistance:** ≥ 5000 MΩ under 500 Vdc
- **Contact resistance:** 5 mΩ
- **Shielding resistance:** ≤ 20 mΩ

### Mechanical

- **Mating/Unmating effort:** 0.12 daN.m
- **Endurance:** 500 mating/unmating
- **Cable clamp resistance:** Traction 100 N/  
Torsion 0.5 Nm

### Seism/Vibration

- **Seism:**
  - Operating Basis Earthquake (OBE): 3g ZPA
  - Safe Shutdown Earthquake (SSE): 6g ZPA
- **Vibration (Sine):** 10 to 500Hz

### Environmental

- **Ambient temperature:**
  - 35°C to +70°C (-31°F to +140°F)
- **Ambient humidity:** 75% max.
- **Steam test:** +100°C (+212°F)/1bar/  
100% HR/100h (with Raychem sheath)
- **Cumulated radiation:** 250 kGy (25 MRads)/  
+70°C (+158°F)
- **Dry heat test:** +40°C (+104°F)/93% HR/504h
- **Salt spray resistance:** 168h
- **Protection against water penetration:**
  - IP X6
  - IP 68

Materials & plating	Connector part			
	Shells	Insulator & grommet	Seals	Contacts
<b>Material</b>	Stainless steel	Silicon	Silicon	Copper alloy (Zinc/Lead)
<b>Plating</b>	Nickel (locally)	-	-	Gold over nickel

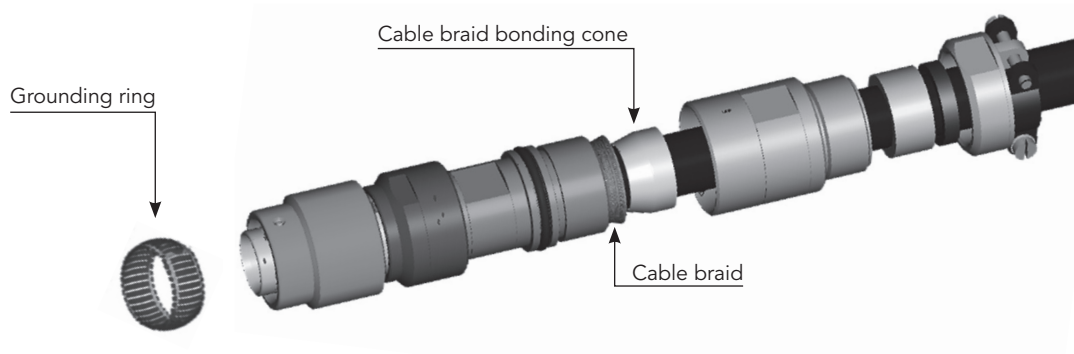
## Features & benefits

### Compliant with EPR wiring specification CST 74C030.02

Wiring specifications applicable for EPR program (CST 74C030.02) state new requirements for 360° shielding continuity at connector level.

8N45S Series meets these new requirements thanks to:

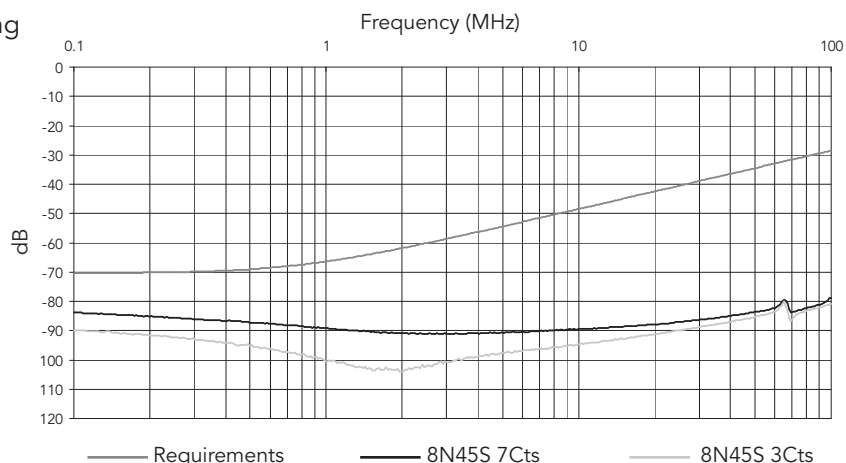
- **Bonding cone** integrated to the plug's backshell, that ensures perfect continuity between cable braid and connector shell.
- **Grounding ring** integrated into the plug's nose, that ensures perfect shell to shell continuity between plug and receptacle over 360°.



### High performance shielding and ground continuity

Thanks to these new features, high shielding performances are achieved:

- **EMI/RFI protection** over a large frequency range
- **Reduced shell to shell resistance** to less than 20mΩ
- **Nickel plating** on receptacles ensures that those performances are maintained over time.

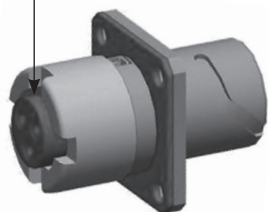


## Features & benefits

### High performance sealing and mechanical retention

- **True sealing on wires** is achieved thanks to grommets with sealing lips located at the rear of the insulators on both receptacle and plug nose.
- **Perfect sealing on cable jacket** is achieved thanks to compression of a pressure gland integrated into the plug's backshell.
- **True mechanical retention of cable** is achieved thanks to robust cable clamp located at the rear of the plug's backshell.

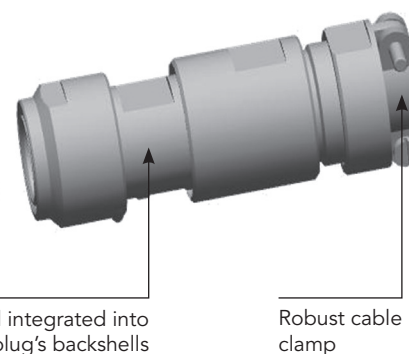
Receptacle grommet with sealing lips



Plug grommet with sealing lips



Sealing gland integrated into the plug's backshells



Robust cable clamp

### Easy wiring and installation

- **Safe contacts technology:** to avoid any risk of damaging the insulators when inserting the contacts.
- **Dismountable insulators:** to allow an easy replacement in case of bad wiring operation.
- **Smart backshell design with flats:** mounting without need for specific tooling nor dummy receptacles.
- **No need to install shrinkable sheath:** with dedicated equipment (thermogun), except for use in steam conditions.

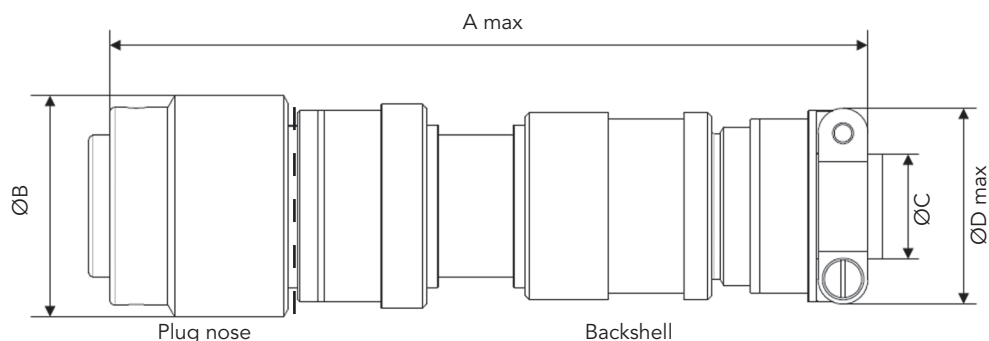
## Field plug characteristics

### Dimensions and admissible cable diameters

8N45S Series field plugs have been especially designed for use with nuclear qualified shielded cables from Nexans and Prysmian used on EPR program.

The plugs comprise two separate elements: the plug nose that contains the insulator and the contacts, and the backshell that contains the cabling chamber with shielding continuity mechanism.

Several backshell sizes are available to fit all cable sizes, as show in the table below:



Shell size	Backshell type	Ø C		Max. number of wired contacts	A max.	Ø B	Ø D max.
		min.	max.				
1	30	7.50	9.00	3	95	23.00	23.20
	31	9.00	10.40				
	301*	7.50	9.00				
		9.00	10.40				
	32	10.50	12.20				
2	30	7.50	9.00	4		27.00	24.70
	31	9.00	10.40				
	301*	7.50	9.00				
		9.00	10.40				
	32	10.50	12.20				
	70	8.50	11.00	7			N/A
	71	11.00	12.30				
	72	12.40	14.00				
	712*	11.00	12.30				
		12.40	14.00				
	73**	13.40	15.00				
	74**	14.80	16.40				

\* P/N delivered with a set of two sealing glands and compression rings.

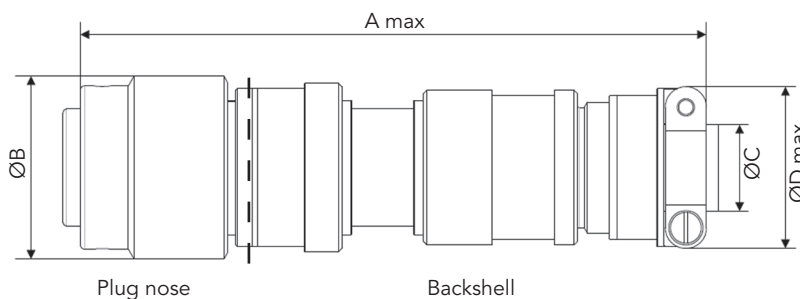
\*\* New backshell sizes. Qualification pending.

Note: all dimensions are in mm

## Field plug characteristics

### Dimensions and admissible cable diameters

Several backshell sizes are available to fit all cable sizes, as show in the table below:



Shell size	Ø C <sup>1/10</sup>		Max. number of wired contacts	A max.	Ø B	Ø C
	min	max				
3	110	125	12	129	37	34
	125	140				
	140	155				
	155	170				
	170	185				
4	115	130	7	129	42	34
	130	145				
	145	160				
	160	175				
	175	190				
	190	205				
5	205	220	37	129	54	50
	220	235				
	235	255*				
	255	270				
	270	285				
	285	300				
	300	315				
	315	330				
6	210	225	31	129	68	47
	225	240				
	240	255				
	255	270				

Example part number:

If you have a cable with 8 wires, Ø from 13.1 to 15.4mm, choose:

8N45S 31 85 B 125 155

Product Series  
Shell size & Contact layout (see p.77)  
Plug  
Contact type (see p.78)  
Backshell  
Max. diameter required, choose from ØC max. (table above)  
Min. diameter required, choose from ØC min. (table above)

\* 2 Sealing glands

**Note:** For other shell sizes backshell, please consult us

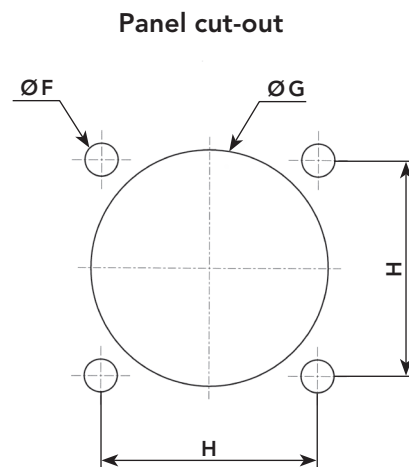
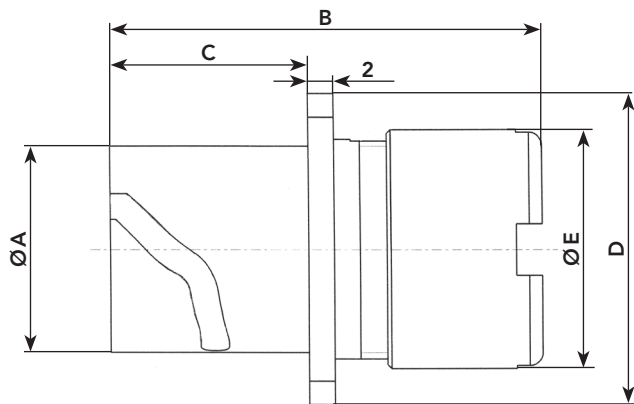
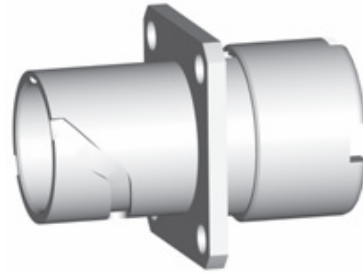
Note: all dimensions are in mm

## Receptacle characteristics

### Square flange receptacle

2 types of receptacle backshells are available:

- Simple backnut (represented & described hereunder)
- Straight with cable clamp and sealing gland (refer to plug description on p. 69)

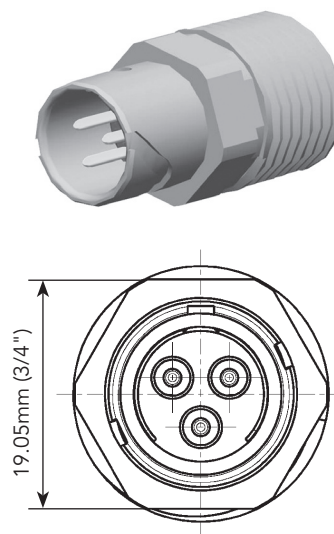
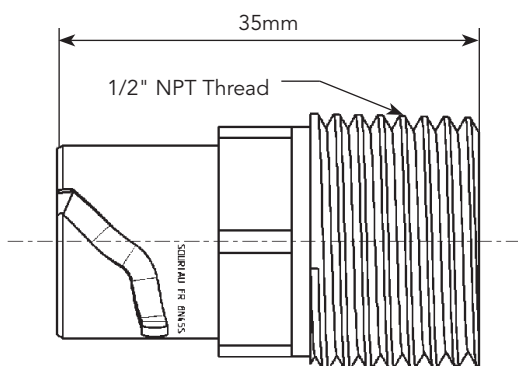


Shell size	Ø A	B	C	D	Ø E	Ø F	Ø G	H
1	16.00	33.50	15.40	24.00	18.60	3.2	19.00	18.00
2	20.00	33.50	15.40	27.00	22.60	3.2	23.00	21.00
3	26.00	33.5	16.00	31.00	27.50	3.2	28.00	25.00
4	31.00	33.50	15.50	44.00	33.50	4.5	34.00	35.00
5	43.00	46.5	16.50	54.00	45.00	5.5	45.50	43.00
6	57.00	46.5	15.50	66.00	59.00	5.5	59.50	53.00

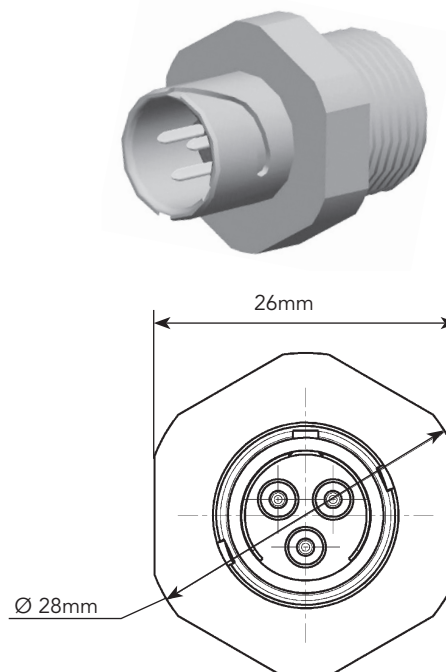
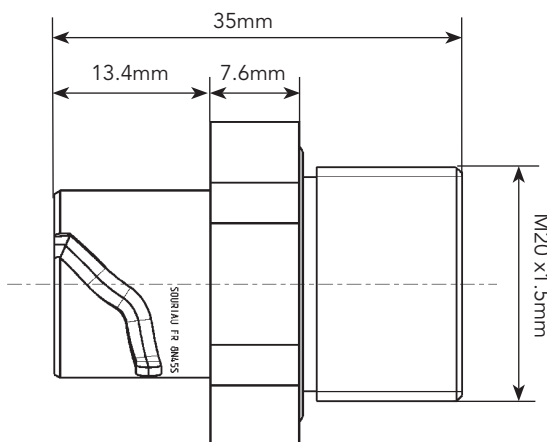
Note: all dimensions are in mm

## Receptacle characteristics

### 1/2" NPT receptacle (shell size 1 only)



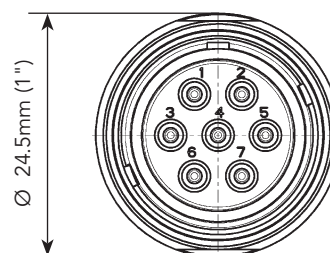
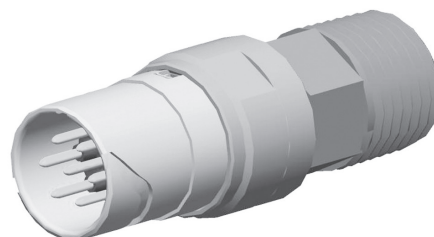
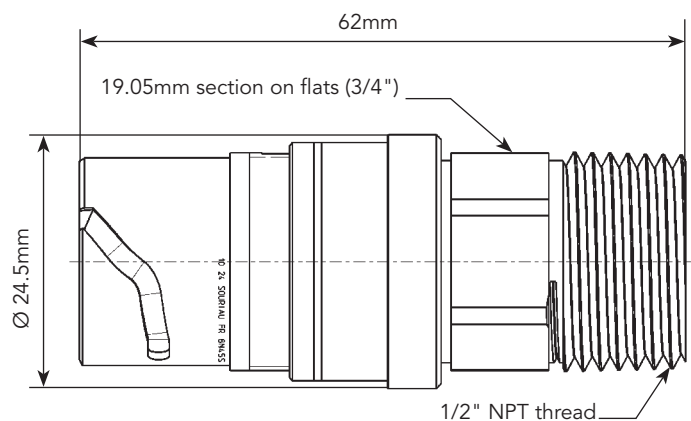
### M20 receptacle (shell size 1 only)



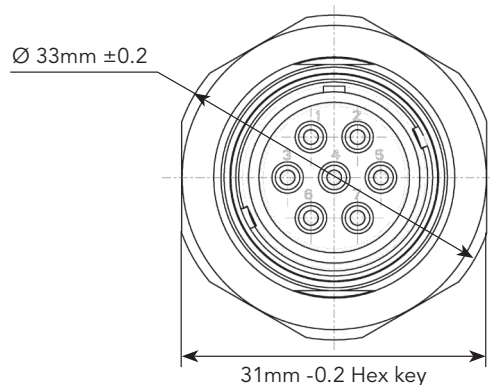
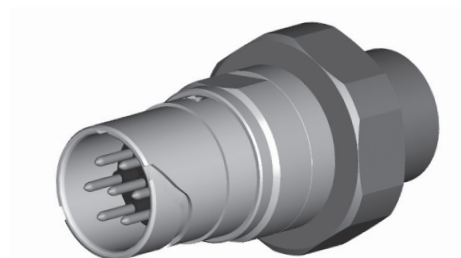
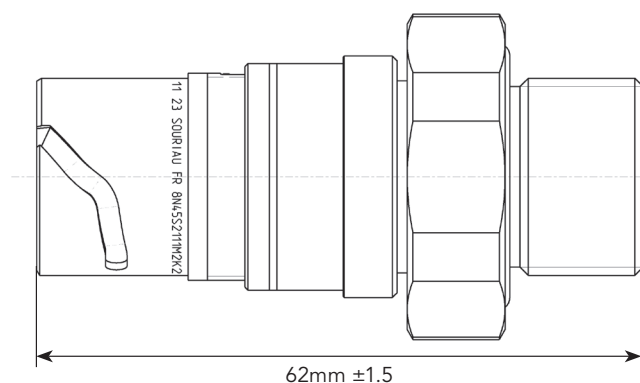


## Receptacle characteristics

### 1/2" NPT adaptor receptacle (shell size 2 only)

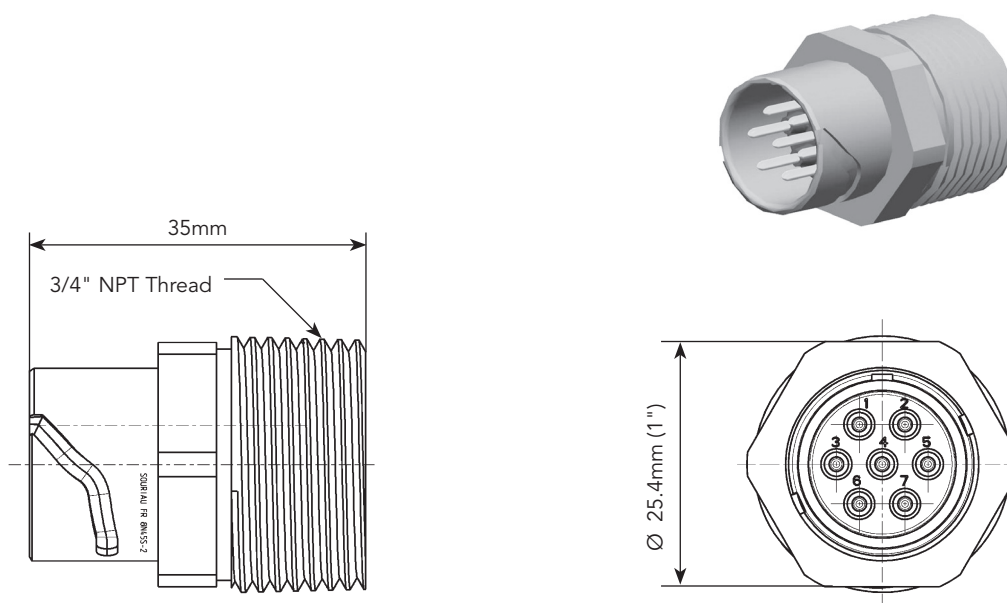


### M 20 adaptor (shell size 2 only)

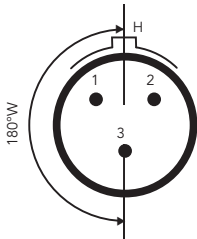
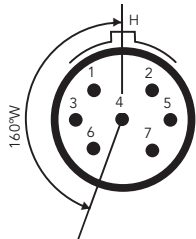
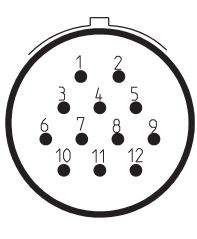
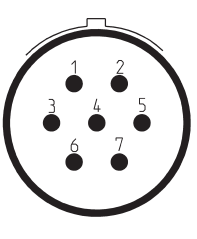
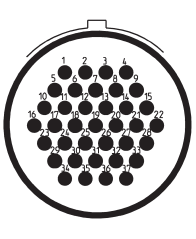
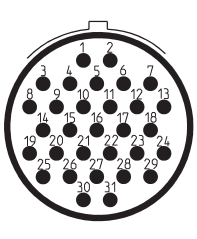


## Receptacle characteristics

### $\frac{3}{4}$ " NPT receptacle (shell size 2 only)



Contact layouts

Shell sizes and contact layouts					
Shell size 1	Shell size 2	Shell size 3	Shell size 4	Shell size 5	Shell size 6
					
3 contacts Ø 1.5mm	7 contacts Ø 1.5mm	12 contacts Ø 1.5mm	7 contacts Ø 2.4mm	37 contacts Ø 1.5mm	31 contacts Ø 2.4mm

Contact characteristics

Admissible wire sections and sleeving diameters			
Shell size	Contact type	Admissible wire section min./max. (mm²)	Admissible sleeving diameters (mm)
1, 2, 3 & 5	Ø 1.5mm small barrel	0.38/0.93	1.9/3.3
	Ø 1.5mm Large barrel	0.93/1.91	1.9/3.3
4 & 6	Ø 2.4mm	1.91/3.18	2.7/3.7

## Ordering informations

Basic Series	8N45S	11	1	1	25	-	-	-	-	K2
<b>Shell size/Contact layout</b> 11: Shell Size 1, 3 contacts Ø1.5mm 21: Shell Size 2, 7 contacts Ø1.5mm 31* : Shell size 3, 12 contacts Ø 1.5mm 47** : Shell size 4, 7 contacts Ø 2.4mm 51* : Shell size 5, 37 contacts Ø 1.5mm 65** : Shell size 6, 31 contacts Ø 2.4mm										
<b>Shell type:</b> 1: Receptacle 8: Plug										
<b>Contact type:</b> 1: Male, Large Barrel 2: Male, Small Barrel 5: Female, Large Barrel 6: Female, Small Barrel										
<b>Backshell/Interface type:</b> 25: Simple backnut (receptacles only) M2: M20 Interface (receptacle size 1 only or M20 adaptor (receptacle size 2 only) 05: 1/2" NPT Interface (receptacle size 1 only) or 1/2" NPT adaptor (receptacle size 2 only) 07: 3/4" NPT Interface (receptacle size 2 only) 15: Cable clamp Ø12mm (receptacle size 2 only) XX: Straight backshell (shell size 1 & 2 only) see definition table p.69 B XXX XXX: Straight backshell (shell size 3 to 6) see definition table p.70										
<b>Wiring code:</b> Blank: not wired XX: egal to the maximum number of contacts in the layout (e.g.: 03 for size 1, 07 for size 2...)										
<b>Wire type:</b> Blank: not wired A: PK4CZ For other wire type, please consult us.										
<b>Wire gage:</b> Blank: not wired 18: AWG #18 For other wire gage, please consult us										
<b>Wire lentgh:</b> Blank: not wired XXX: lenght in cm (030 for 30 cm or 050 for 50 cm)										
<b>Classification***:</b> K2: K2 qualified connectors according to RCC-E 2005 NC : Non-classified connectors										

\*8N45S31 and 8N45S51 are designed according to RCC-E 2005 K2 requirements. Qualification pending.

\*\*8N45S47 and 8N45S65 are designed according to RCC-E 2005 K2 requirements.

\*\*\* K2 connectors are manufactured with specific traceability and delivered with End of Manufacturing Report, according to RCC-E 2005. NC connectors are manufactured with standard traceability and delivered with Certificate of Conformity only.

## Tools

### Crimping, insertion & extraction tools

**SOURIAU offers a large range of tools to prepare the connectors for use.**

The tools listed hereunder perfectly suit the 8N45 Series connectors.



Shell size	Crimping tool	Locators	Insertion tools for pin & socket contacts	Extraction tools - pin contacts	Extraction tools - socket contacts
1 & 2	8365EL	8365-02EL	8400-1475EL	8400-448EL	8400-446EL

**Note:** Please consult us for other tools.

## Spare parts

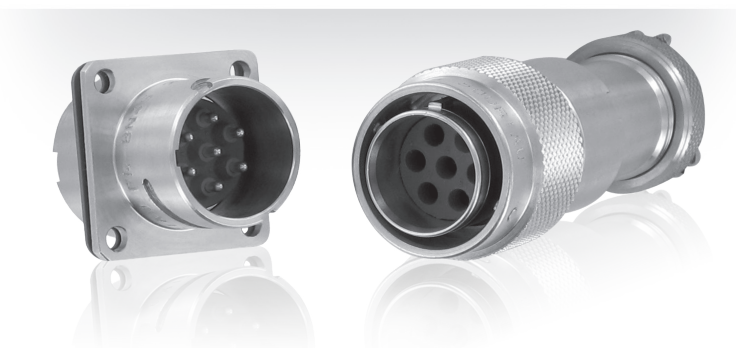
### Panel gaskets

**Panel gaskets to seal receptacle on panel.**

Shell size	1	2	3	4	5	6
Part numbers	8N45SPJ0303AEL	8N45SPJ0304AEL	8N45SPJ0545AEL	8N45SPJ0616AEL	8N45SPJ0540AEL	8N45SPJ0513AEL

### Contacts for re-ordering (sets of 10 contacts)

Shell size	Contact type	Set of 10 male contacts P/N	Set of 10 female contacts P/N
1, 2, 3	Ø1.5mm crimp Small barrel	8400-307 AKMEL	8400-9019-900EL
	Ø1.5mm crimp Large barrel	8400-144 AKMEL	8400-9018-900EL
4	Ø2.4mm crimp	8N45SEC0530AEL	8N45SEC0531AEL
5	Ø1.5mm crimp Large barrel	8400-242AKMEL	8400-9020-900EL
6	Ø2.4mm crimp	8N45SEC0532AEL	8N45SEC0533AEL



## Description

- Class 1E qualified connectors
- Quick connect ¼ turn bayonet coupling
- **Qualification standards:**
  - EDF HM63/7195
  - RCC-E 1993 & 2002

## Applications

- Instrumentation, sensors, probes

## Technical features

### Electrical

- **Current rating:** 11 A max
- **Peak current:** 50A/30ms
- **Test voltage rating:** 2000 Vrms
- **Insulation resistance:** ≥ 5000 MΩ under 500 Vdc
- **Contact resistance:** 5 mΩ
- **Shielding resistance:** ≤ 20 mΩ

### Mechanical

- **Mating/Unmating effort:** 0.12 daN.m
- **Endurance:** 500 mating/unmating
- **Cable clamp resistance:**
  - Traction 50 N/Torsion 0.5 Nm

### Seism/Vibration

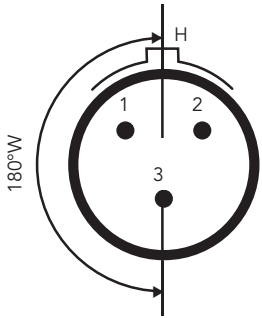
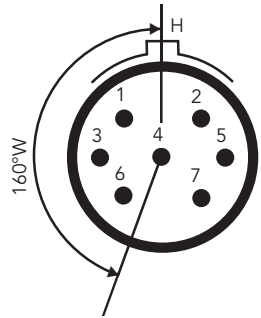
- **Seism:**
  - Operating Basis Earthquake (OBE): 3g ZPA
  - Safe Shutdown Earthquake (SSE): 6g ZPA
- **Vibration (Sine):** 10 to 2000Hz; 0.35mm; 5g

### Environmental

- **Ambient temperature:**
  - 10°C to +70°C (+14°F to +158°F)
- **Max temperature:** +85°C (+185°F)
- **Ambient humidity:** 75% max.
- **Cumulated radiation:** 250 kGy (25 MRads)/+70°C (+158°F)
- **Dry heat test:** +40°C (+104°F)/93% HR/504h
- **Salt spray resistance:** 168h
- **Protection against water penetration:**
  - IP X6
  - IP 68

Materials & plating	Connector part			
	Shells	Insulator & grommet	Seals	Contacts
<b>Material</b>	Stainless steel	Silicon	Silicon	Copper alloy (Zinc/Lead)
<b>Plating</b>	Nickel (locally)	-	-	Gold over nickel

## Contact layouts

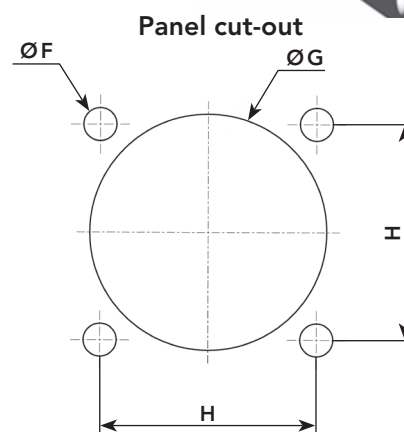
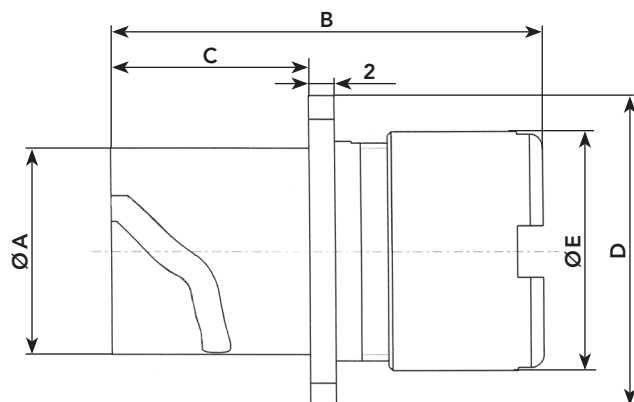
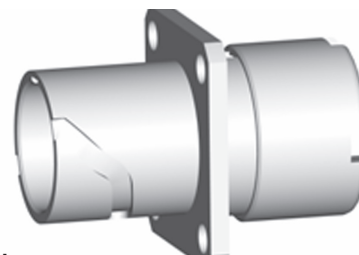
Shell sizes and contact layouts	
Shell size 1	Shell size 2
	
3 contacts Ø 1.5mm	7 contacts Ø 1.5mm

## Receptacle & backshell details

### 8N45 Square flange receptacle

**2 types of receptacle backshells are available:**

- Simple backnut (represented & described hereunder)
- Straight with cable clamp and sealing gland (refer to plug description on next page)



Shell size	Ø A	B	C	D	Ø E	Ø F	Ø G	H
1	16.00	33.50	15.40	24.00	18.60	3.2	19.00	18.00
2	20.00	33.50	15.40	27.00	22.60	3.2	23.00	21.00

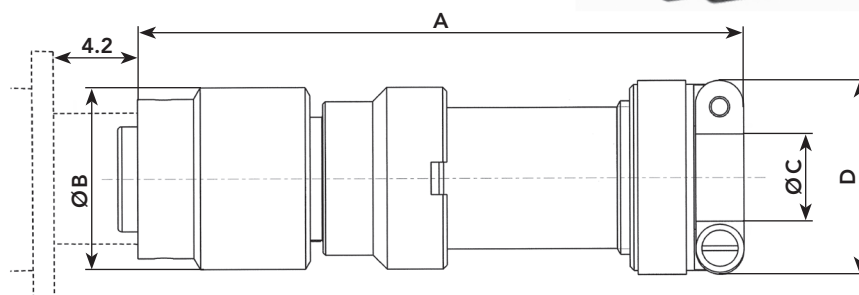
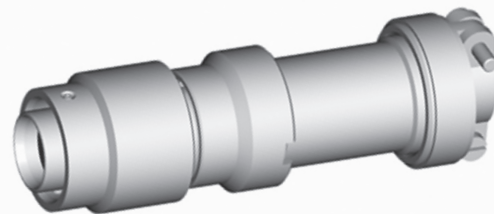
Note: all dimensions are in mm

## Plug & backshell details

### 8N45 Plug details

#### 2 types of plug backshells are available

- Simple backnut (refer to receptacle description on previous page)
- Straight with cable clamp and sealing gland (described here under)



Shell size	Type *	A	Ø B	Ø C min.	Ø C max.	D
1	21	80	22.50	7.50	9.50	23.00
	51	80	22.50	10.50	12.00	23.00
2	21	80	26.50	10.50	12.00	23.00

\* 2 types of straight backshells with cable clamp and sealing gland are available for shell size 11 depending on cable diameter.

Note: all dimensions are in mm

## Ordering information

Basic Series	8N45	11	1	1	21	-	-
Shell size/Contact layout							
11: (3 contacts)							
21: (7 contacts)							
Shell type							
1: Receptacle							
8: Plug							
Contact type							
1: Pin							
5: Socket							
Backshell/Interface type							
25: Simple Backnut (receptacles only)							
21*: Straight backshell (Shell size 1 & 2)							
51*: Straight backshell (Shell size 1 only)							
Wiring code:							
Blank: note wired							
XX: egal to the maximum number of contacts in the layout (e.g/03 for size 1, 07 for size 2...)							
Classification**							
Blank: K2 qualified product according to RCC-E code							
NC: Non-classified product							

\* See definition in the table above - \*\* K2 connectors are manufactured with specific traceability and delivered with End of Manufacturing Report, according to RCC-E code. NC connectors are manufactured with standard traceability and delivered with Certificate of Conformity only.



## Tools

### Crimping, insertion & extraction tools

**SOURIAU offers a large range of tools to prepare the connectors for use.**

The tools listed hereunder perfectly suit the 8N45 Series connectors.



Shell size	Crimping tool	Locators	Insertion tools for pin & socket contacts	Extraction tools - pin contacts	Extraction tools - socket contacts
1 & 2	8365EL	8365-02EL	8400-1475EL	8400-448EL	8400-446EL

## Spare parts

### Panel gasket

Shell size	Part numbers
1	8400-2222 EL
2	8400-2223 EL

### Contacts for re-ordering (sets of 10 contacts)

Shell size	Contact type	Set of 10 male contacts P/N	Set of 10 female contacts P/N
1 & 2	Ø1.5mm crimp Small barrel	8400-307 AKMEL	8400-9019-900EL
	Ø1.5mm crimp Large barrel	8400-144 AKMEL	8400-9018-900EL

## Nuclear Power Generation

# 8N35/36 Series - K2 Qualified Connectors

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■ Ordering information & wiring tables .....	89
■ Tools & spare parts .....	91



## Description

- RCC-E K2 Qualified Nuclear Grade Connectors
- Screw coupling mechanism
- Design and manufacturing standard: RCC-E code, 1993 & 2002 edition

## Applications

- Safety instrumentation and control equipments inside reactor building

## Technical features

### Electrical

- **Current rating:** 11 A max
- **Peak current:** 50 A/30 ms
- **Test voltage rating:** 2000 Vrms
- **Insulation resistance:**  $\geq 5000 \text{ M}\Omega$  under 500 Vdc
- **Contact resistance:**  $\leq 20 \text{ m}\Omega$

### Mechanical

- **Tightening torque:** 8.5 Nm
- **Endurance:** 500 mating/unmating
- **Cable clamp resistance:** Traction 50 N/Torsion 0.5 Nm

### Accident testing

- **Shocks:**
  - Operating Basis Earthquake (OBE): 3g ZPA
  - Safe Shutdown Earthquake (SSE): 6g ZPA
- **Vibration (Sine):** 5g, 10 to 2000Hz, 3.5mm

### Environmental

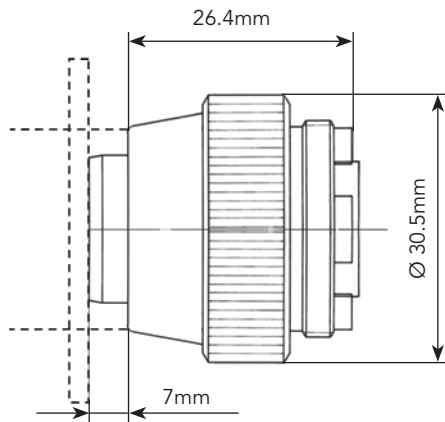
- **Temperature range:** -10°C to +70°C (+14°F to +158°F)
- **Ambient humidity:** 75% max
- **Dry heat test:** + 40°C (+104°F)/93% HR/504h
- **Cumulated radiations:** 250 kGy (25 MRads)/+70°C (+158°F)
- **Salt spray resistance:** 168 hrs
- **Protection against water penetration:** IPX6 (100 l/min, 3 min)
- **Qualified lifetime:** 40 years

Materials & plating	Connector part			
	Shells	Insulator & grommet	Seals	Contacts
<b>Material</b>	Stainless steel	Silicon (8N35) Fused glass (8N36)	Silicon	Copper alloy
<b>Plating</b>	Nickel (locally)	-	-	Gold over nickel

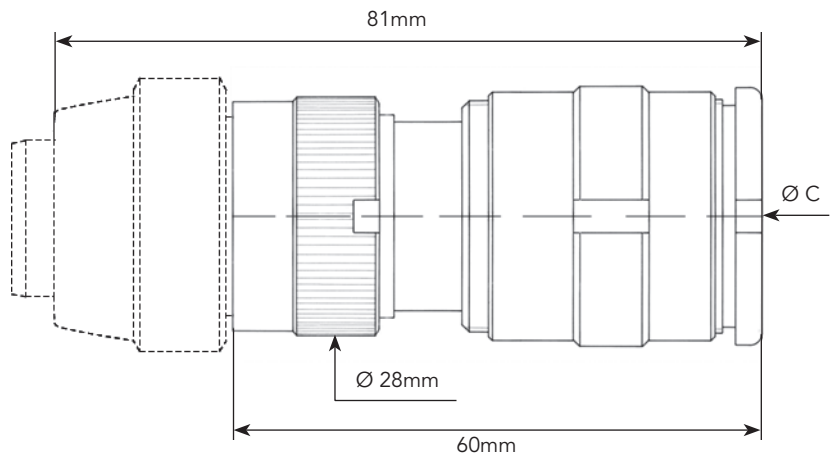
## Dimension & characteristics

### 8N35 Series plugs and backshells

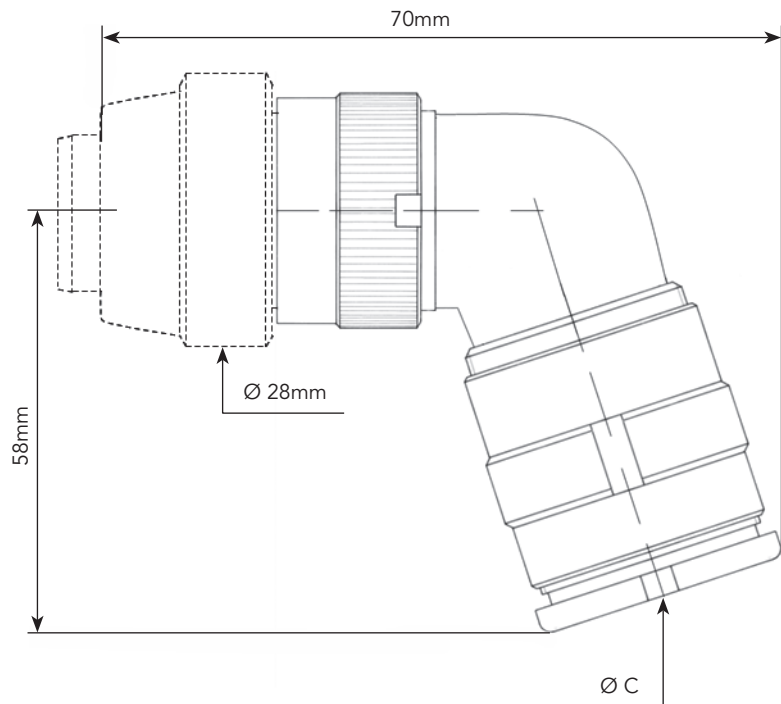
Plug



Straight backshell



Elbow backshell



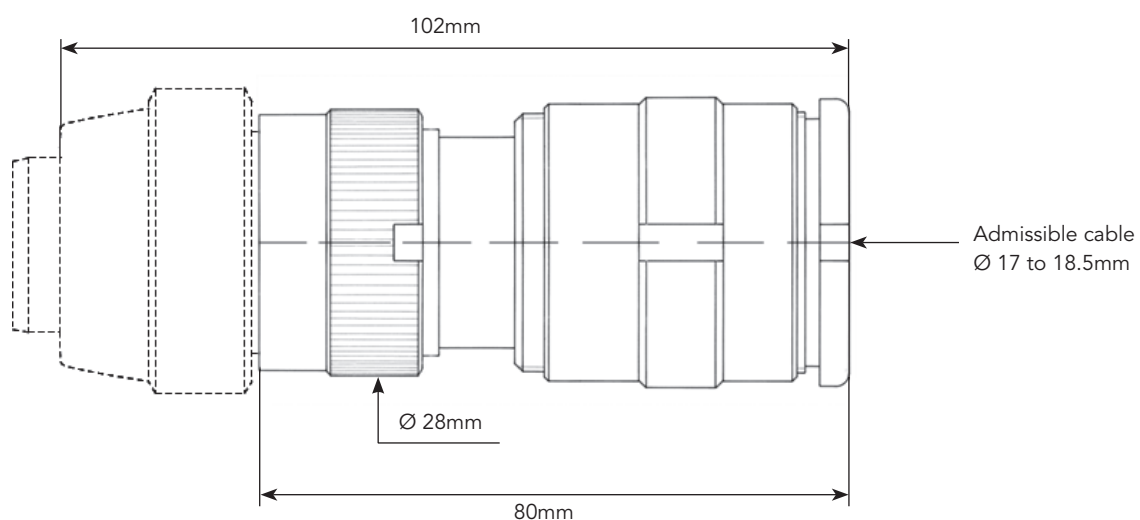
Admissible cable diameter (Ø C)	Backshell identification code
14 to 15mm	A
12 to 14mm	B
10 to 12mm	C
6mm	D
7.5 to 9mm	E

## Dimension & characteristics

### SN2265 Series plugs (non-qualified)

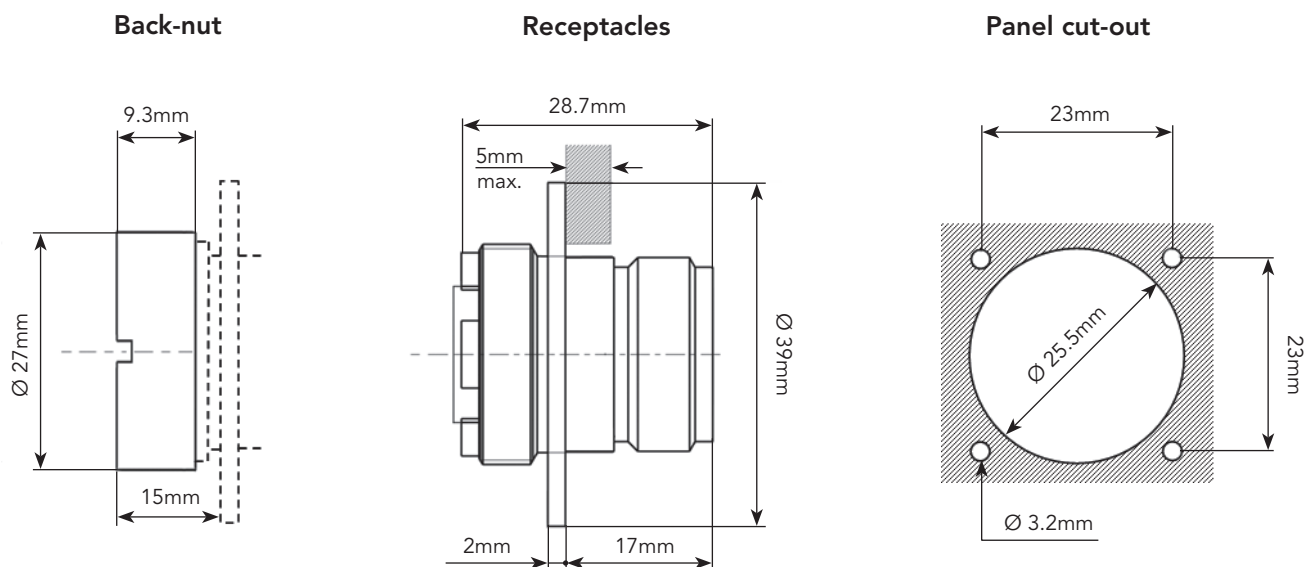
SN2265 Series Plugs are non-qualified plugs with straight backshells for large cable diameters up to 18.5mm. They are fully compatible with 8N35/8N36 Series receptacles.

**Note:** SN2265 Series are delivered without contacts. Contacts have to be ordered separately.



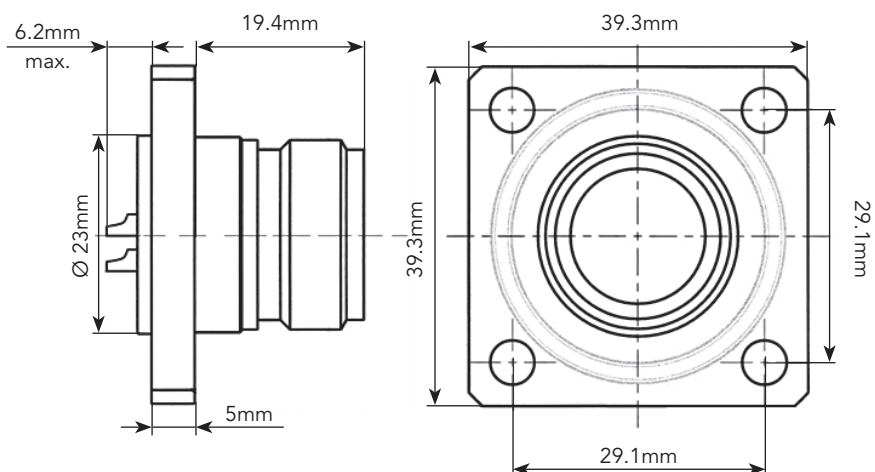
## Dimension & characteristics

### 8N35 Series sealed receptacles

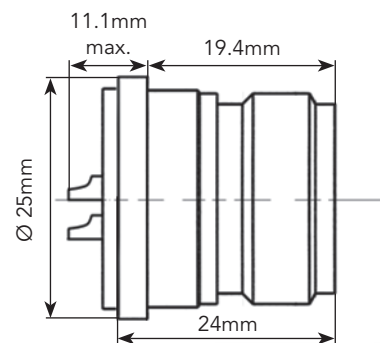


### 8N36 Series hermetic receptacles (Fused glass insulator)

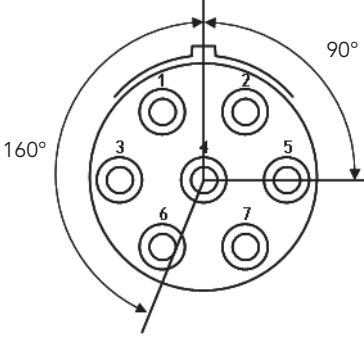
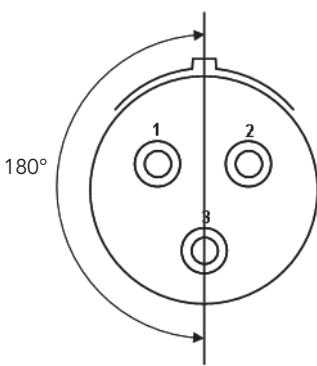
Type 1: Square flange, screwed receptacle



Type 2: Round flange, welded receptacle



## Contact layouts

Available contact layouts	
Layout 21	Layout 26
	
7 contacts Ø 1.5mm	3 contacts Ø 1.5mm

Contacts characteristics			
Connector	Type of contacts	Admissible wire section	Maximum sleeving diameter
8N35 Series plugs and receptacles	Ø 1.5mm, crimp	Small barrel contacts: 0.38 to 0.93mm <sup>2</sup>	3.3mm
		Large barrel contacts: 0.93 to 1.91mm <sup>2</sup>	
SN2265 Series plugs	Ø 1.5mm, crimp	Small barrel contacts: 0.38 to 0.93mm <sup>2</sup>	3.3mm
		Large barrel contacts: 0.93 to 1.91mm <sup>2</sup>	
8N36 Series receptacles	Ø 1.5mm, solder	1.91mm <sup>2</sup>	3.3mm

## Ordering information

### 8N35 Series receptacles and plugs

<b>Basic Series</b>	<b>8N35</b>	<b>21</b>	<b>8</b>	<b>5</b>	<b>7</b>	<b>D</b>	<b>3S</b>	<b>-</b>
<b>Contact layout</b>								
21: 7 contacts Ø 1.5mm								
26: 3 contacts Ø 1.5mm								
<b>Shell type</b>								
1: Receptacle, round flange, screw mounting								
8: Plug								
<b>Contact type</b>								
1: Male								
5: Female								
<b>Backshell type</b>								
0: Without backshell								
2: Simple backnut								
1: Straight backshell with collet and sealing gland								
7: Elbow backshell with collet and sealing gland								
<b>Admissible cable diameter</b>								
Blank: Connector without backshell or with simple backnut								
A: 14 to 15mm								
B: 12 to 14mm								
C: 10 to 12mm								
D: 6mm								
E: 7.5 to 9mm								
<b>Contact type</b>								
Blank: Small barrel contacts								
XS: Large barrel contacts (X = Number of contacts)								
<b>Classification*:</b>								
Blank: K2 classified according to RCC-E 1993 & 2002								
NC: non-classified connectors								

\* K2 connectors are manufactured with specific traceability and delivered with End of Manufacturing Report, according to RCC-E code. NC connectors are manufactured with standard traceability and delivered with Certificate of Conformity only.

### 8N35 Series backshells

<b>Basic Series</b>	<b>8N3520</b>	<b>002</b>	<b>A</b>	<b>-</b>
<b>Backshell type</b>				
002: Simple backnut				
001: straight backshell with collet and sealing gland				
007: elbow backshell with collet and sealing gland				
<b>Admissible cable diameter</b>				
Blank: Connector without backshell or with simple backnut				
A: 14 to 15mm				
B: 12 to 14mm				
C: 10 to 12mm				
D: 6mm				
E: 7.5 to 9mm				
<b>Classification*:</b>				
Blank: K2 classified according to RCC-E 1993 & 2002				
NC: non-classified connectors				

\* K2 connectors are manufactured with specific traceability and delivered with End of Manufacturing Report, according to RCC-E code. NC connectors are manufactured with standard traceability and delivered with Certificate of Conformity only.



## Ordering information

### 8N36 Series receptacles

Type	8N36	21	1	3	0
<b>Contact layout</b>					
21: 7 contacts Ø 1.5mm					
26: 3 contacts Ø 1.5mm					
<b>Receptacle type</b>					
1: Square flange receptacle mounted with 4 screws					
2: Round flange receptacle to be welded on equipment					
<b>Contact type</b>					
3: Male, soler					
<b>Backshell type</b>					
0: Without backshell					
<b>Classification*:</b>					
Blank: K2 classified according to RCC-E 1993 & 2002					
NC: non-classified connectors					

\* K2 connectors are manufactured with specific traceability and delivered with End of Manufacturing Report, according to RCC-E code. NC connectors are manufactured with standard traceability and delivered with Certificate of Conformity only.

### SN2265 Series plugs with backshell\*


Type	SN2265	21	1	01	L	P
<b>Contact layout</b>						
21: 7 contacts Ø 1.5mm						
<b>Backshell type</b>						
1: Straight backshell with collet sealing gland						
<b>Admissible cable diameter</b>						
01: 17 to 18.5mm						
<b>Contact type</b>						
L: Delivered without contact						
<b>Insulator gender</b>						
P: insulator for male contacts**						
S: insulator for female contacts**						

\* Non qualified.

\*\* Contacts to be ordered separately.

Tools

Crimping, insertion and extraction tools



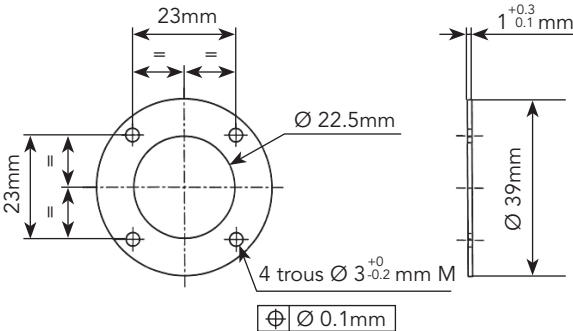
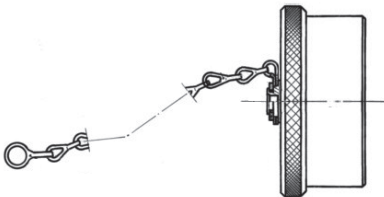
Crimping tool	Locator	Insertion tool for male and female contacts	Extraction tool	
			Male contact	Female contacts
8365EL	8365-02EL	8400-1475EL	8400-448EL	8400-446EL

Spare parts

Contacts for re-ordering (sets of 10 contacts)

Type of contacts	Set of 10 male contacts P/N	Set of 10 female contacts P/N
Ø 1.5mm small barrel, crimp	8400-307 AKMEL	8400-9019-900EL
Ø 1.5mm large barre, crimp	8400-144 AKMEL	8400-9018-900EL

Dust caps and panel gaskets



Dust caps	Plugs	Receptacles
	8N35-2022	8N35-2012

Panel gaskets for receptacles (8N35)
8300-474

## Nuclear Power Generation

# 8NS Series - K2 - K3 Qualified Connectors

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■ Dimensions & characteristics .....	95
■ Contact layouts.....	100
■ Ordering information.....	101
■ Tools .....	103



## Description

- Class 1E qualified connectors
- Quick connect screw coupling

## Applications

- Connection of control units of valve power actuators

## Qualification standards

- EDF HM63/7195, Class 1E K2
- RCC-E 1993 & 2002

## Technical features

### Electrical

- **Contacts:** Crimp or Solder
- **Wires section:**  
ø1.5mm (AWG 14-16)
- **Test voltage rating:**  
1500 Vrms, 50Hz, 1mn
- **Insulation resistance:**  
≥ 5000 MΩ under 500 Vdc
- **Shell sizes & contact layouts:** page 100
- **Max current rating per contact:**  
#20 = 7.5A; #16 = 13A

	Contact resistance	
	Sealed version	Hermetic version
#20	≤ 5 mΩ	≤ 20 mΩ
#16	≤ 0.3 mΩ	≤ 11 mΩ

### Mechanical - Endurance

- **Aluminum version:**  
300 mating/unmating
- **Stainless steel version:**  
500 mating/unmating

### Accident testing

- **Vibration (Sine):** 10g, 58 to 500Hz, 3x2 hrs

### Environmental

- **Temperature range:** -55°C to +160°C (-67°F to +320°F)
- **Temperature peak:**  
+200°C (+392°F)
- **Radiation:** 25 MRads  
"gamma" at +20°C (+68°F)
- **Hermeticity (hermetic version):** leak ≤1.03  
10-7cm³/s under a helium  
air differential pressure of  
0.1MPa

Materials & plating	Connector part			
	Shells	Insulator	Seals	Contacts
Material	Passivated stainless steel or Nickel plated aluminium	Thermoset or Fused glass	EP Elastomer	Copper alloy
Plating		-	-	Gold over nickel

Class 1E connector

Class 1E qualified

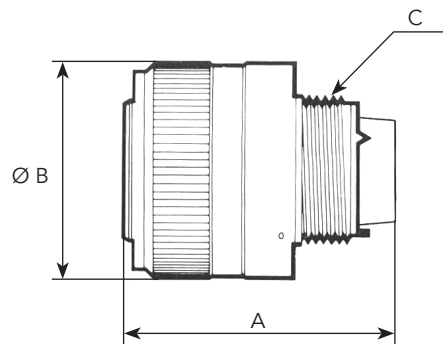
8NS 16-24 protected aluminium connectors are K2 qualified and 8NS 16-24 passivated stainless steel version is K3 qualified according to RCC-E 2002. 8NS 12-03, 12-12 & 16-10 are designed in accordance with RCC-E Class 1E, K2 equipment requirements, they are not qualified.

Thanks to a robust mechanical design, they are built to operate during normal and seismic conditions.

These connectors are equipped with crimp contacts or solder contacts for the hermetic receptacle version.

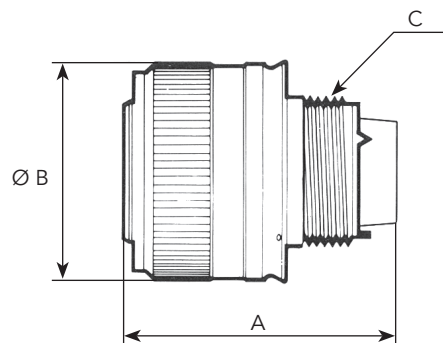
Plug details

Aluminium plug (6R)



Shell size	A	ØB	C
12	34.5	27.40	3/4" - 20 UNEF.2A
16	34.5	32.20	1" - 20 UNEF.2A

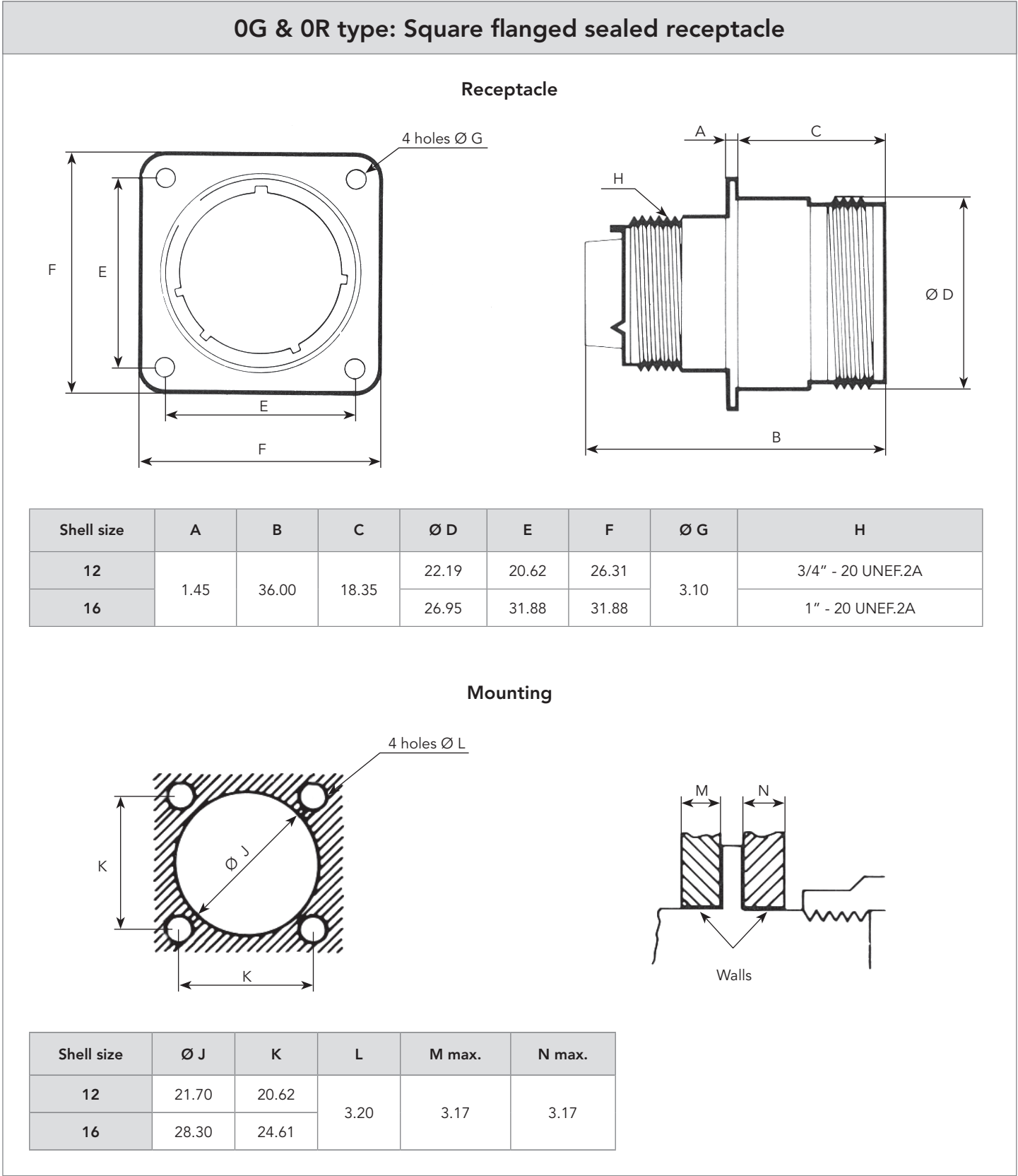
Stainless steel plug (6G)



Shell size	A	ØB	C
12	34.5	27.40	3/4" - 20 UNEF.2A
16	34.5	32.20	1" - 20 UNEF.2A

Note: all dimensions are in mm

Receptacle details

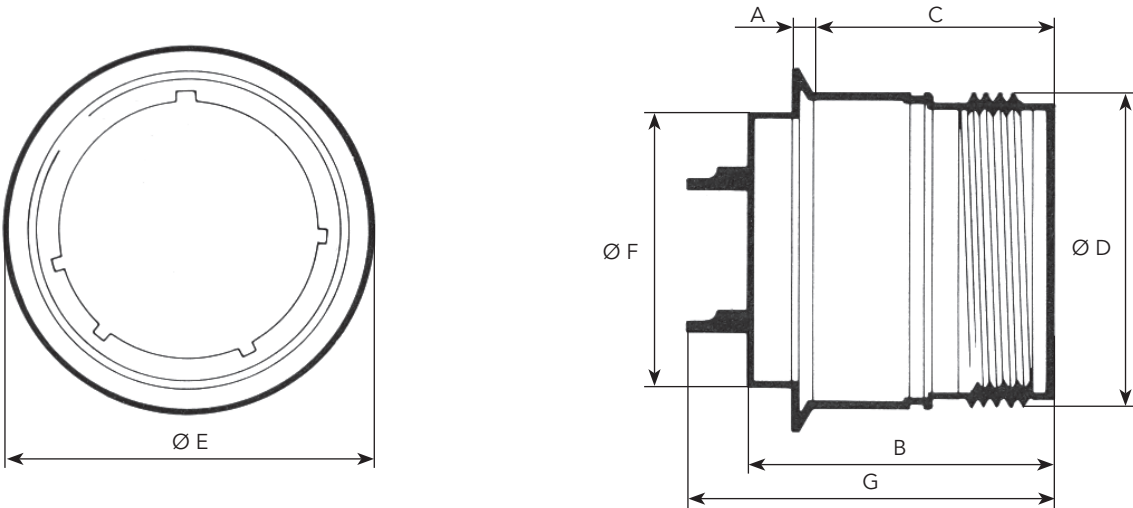


Note: all dimensions are in mm

Receptacle details

1Y Type: Hermetic receptacle (Fused glass insulator)

Receptacle



Shell size	A	B	C	Ø D	Ø E	Ø F	G
12	1.45	22.05	18.45	22.19	26.57	19.00	26.50
16				26.95	30.92	23.79	

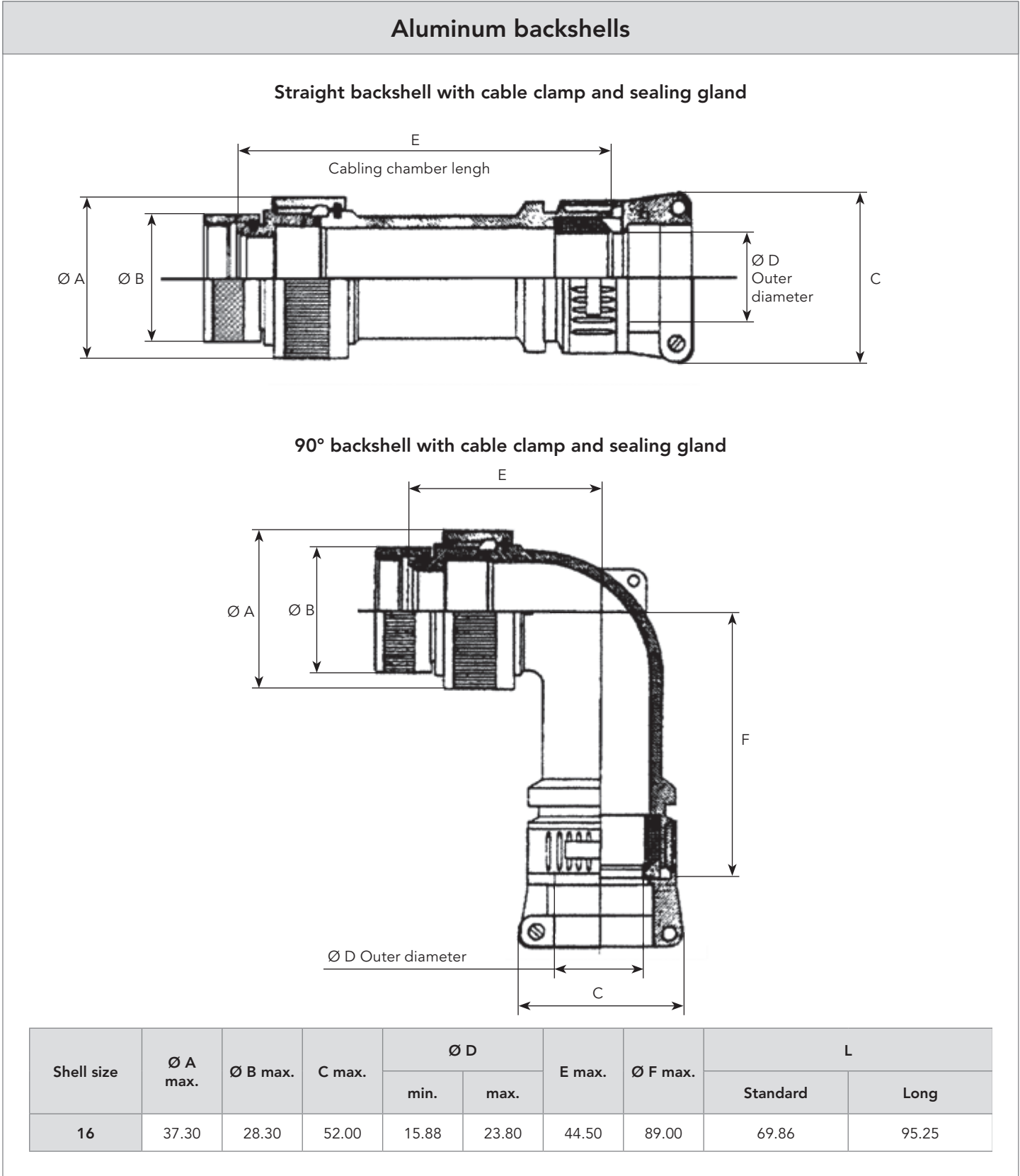
Mounting



Shell size	Ø J
12	19.18
16	23.93

Note: all dimensions are in mm

Backshell details



Note: all dimensions are in mm



Backshell details

## Stainless steel backshells

### Backnut

Technical drawing of a backnut. The drawing shows a cylindrical component with a central threaded section. Dimension A indicates the width of the component. Dimension ØB indicates the outer diameter of the main body. Dimension ØC indicates the inner diameter of the central section.

Shell size	A	Ø B max.	Ø C
12	12.70	12.90	21.50
16		18.05	28.10

### Straight backshell with cable clamp

Technical drawing of a straight backshell with a cable clamp. The drawing shows a cylindrical component with a central threaded section and a cable clamp on the right side. Dimension A indicates the width of the component. Dimension ØB indicates the outer diameter of the main body. Dimension ØC indicates the inner diameter of the central section. Dimension D indicates the height of the cable clamp.

Shell size	A	Ø B	Ø C	D
12	28.55	7.39	21.50	25.10
16	31.70	12.72	28.10	33.50

Caps details

## Plug & receptacle caps

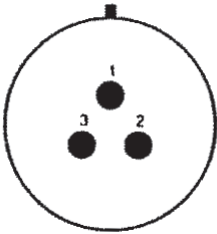
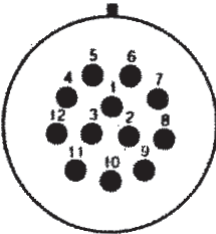
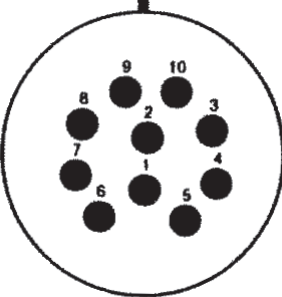
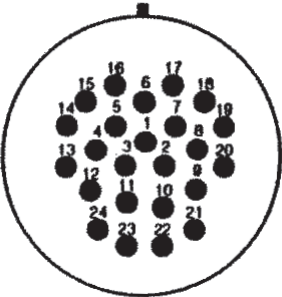
Plug cap

Receptacle cap

Shell size	Ø A max.	B max.
12	3.20	134.00
16		

Note: all dimensions are in mm

## Contact layouts & Orientations

8NS 12-03 <sup>(2) (3)</sup>	8NS 12-12 <sup>(2)</sup>	8NS 16-10 <sup>(2) (3)</sup>	8NS 16-24 <sup>(1)</sup>
			
03 contacts # 16	12 contacts # 20	10 contacts # 16	24 contacts # 20

(1) 8NS 16-24 protected aluminium is K2 qualified according to RCC-E 1993 & 2002.

8NS 16-24 passivated stainless steel is K3 qualified acc. to RCC-E 2002.

(2) 8NS 12-03, 12-12 & 16-10 layouts are designed according to RCC-E Class 1E, K2 equipment requirements. Not qualified.

(3) For 8NS 12-03 & 16-10 availability, please contact us.

## Orientations

### List of orientations possible for pins and insulators

		Orientations									
		N	1	2	3	4	5	6	7	8	
Shell sizes	12										
	16										

 Orientations available

## Contact details

Type	Size	Diameter (mm)	Part number	Admissible section				Outer sleeve diameters (mm)	
				Section (mm²)		AWG			
				min.	max.	min.	max.	min.	max.
Male	20	1.00	8526-1348	0.21	0.60	24	20	1.02	2.11
	20*	1.00	8341-5345	0.38	1.00	22	-	1.02	2.11
	16	1.60	8526-1349	0.60	1.34	20	16	1.34	2.62
	16*	1.60	8522-6179A	0.31	1.91	18	14	1.34	2.62
Female	20	1.00	8526-1344	0.21	0.60	24	20	1.02	2.11
	20*	1.00	8341-5340	0.38	1.00	22	-	1.02	2.11
	16	1.60	8526-1346A	0.60	1.34	20	16	1.34	2.62
	16*	1.60	8522-6180B	0.93	1.91	18	14	1.34	2.62

\* Large barrels

## Ordering information

### Plugs & receptacles

Basic Series	8NS	-	6	G	16-24	S	N	A
Specificity index								
Body type								
0: Square flange receptacle with panel gasket								
6: Plug								
1: Soldered hermetic receptacle								
X: Specific (contact us)								
Material & plating								
G: Passivated stainless steel								
R: Nickel-plated aluminum								
Y: Passivated stainless steel (hermetic receptacles)								
Shell sizes & contact layouts								
12 - 03*: Shell size 12 - 03 contacts #16								
12 - 12*: Shell size 12 - 12 contacts #20								
16 - 10*: Shell size 16 - 10 contacts #16								
16 - 24: Shell size 16 - 24 contacts #20								
Type of contact								
P: Pin								
S: Socket								
Orientation								
N (Standard), 1 to 8: Refer to page 100								
Mandatory specification for K2 or K3 products								
A								
Contact specification								
: Standard contacts								
01: Large barrel contacts								

### Aluminum backshells

Basic Series	8NS	02	R	16	A
Backshell type					
01: Backnut					
02: Straight backshell with cable clamp and sealing gland					
03: 90° backshell with cable clamp and sealing gland					
Plating					
R: Nickel plated aluminium					
Shell size					
16: Shell size 16					
Specification:					
: For backshell type 01					
A: Standard chamber for backshell type 02					

\* Designed according to RCC-E Class 1E, K2 equipment requirements. Not qualified.

## Ordering information

### Stainless steel backshells

Basic series	8527-	02	16	A
Backshell type				
01: Backnut				
02: Straight backshell with cable clamp				
Shell size				
12: Shell size 12				
16: Shell size 16				
Specification				
: For backshell type 01				
A: Mandatory for backshell type 02				

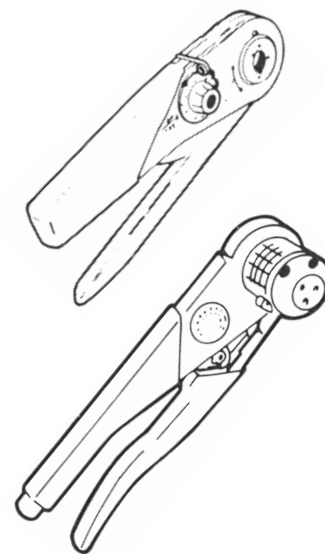
### Caps

Basic series	8NS	-	22	G	16	S
Specificity index						
Cap type						
21: Cap for receptacle						
22: Cap for plug						
Material & plating						
G: Passivated stainless steel						
R: Nickel-plated aluminium						
Shell sizes						
12: Shell size 12						
16: Shell size 16						
Specific requirements						
*						

## Tools

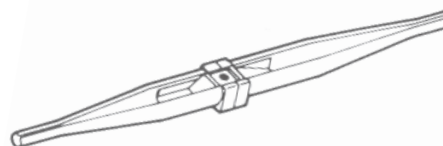
### Crimping tools

Contact Sizes	Cables		Part numbers	
	Min	AWG	Crimping pliers	Locator
20	0.93	18	8365 (M22520 1.01) or 8476-01 (M22520 2.01)	8365-02 (M22520 1.02) or 8476-02 (M22520 2.02)
	0.60	20		
	0.38	22		
	0.21	24		
16	1.91	14	8365 (M22520 1.01)	8365-02 (M22520 1.02)
	1.34	16		
	0.93	18		
	0.60	20		
	0.38	22		



### Insertion & extraction tools

Contact Sizes	Part numbers	Colour
20	(M 81969-14-02) 8522-20	Red
16	(M 81969-14-03) 8522-16	Blue



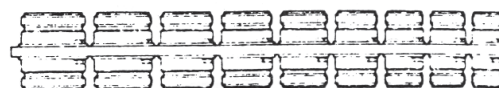
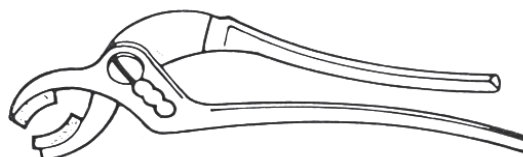
### Other useful tools & equipments

**Tightening pliers for rear accessories** – Ref: 8498-03

**Spare jaws (set of 2)** – Ref: 8500-1015

**Tightening holders:**

- Aluminum version – Ref: 8533-1150
- Stainless steel version – Ref: 8533-1151



## Nuclear Power Generation

# MEN Series

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## Description

- Class 1E qualified connectors
- Screw coupling
- 2 shell sizes: 2012 or 2612

## Application

- Power and control devices
- Ideal for Reactor Control & Limitation System (RCLS)

## Qualification standards

- EDF HM63/7195, Class 1E K2
- RCC-E 1993 & 2002

## Technical features

### Electrical

- **Contacts:** crimp
- **Contacts diameter:**  
2mm (2012); 5mm(2612)
- **Current rating:**  
10 A (2012); 50 A (2612)
- **Test voltage rating:**  
2500 Vrms
- **Insulation resistance:**  
≥ 5000 MΩ under 500 Vdc
- **Contact resistance:**  
≤ 5 mΩ under 50mA

### Mechanical - Endurance

- **Un/Mating effort:**  
2.2 daN.m
- **Endurance:**  
500 mating/unmating

### Accident testing

- **Shocks:**
  - Operating Basis Earthquake (OBE): 3g ZPA
  - Safe Shutdown Earthquake (SSE): 6g ZPA
- **Vibration (Sine):**  
5g, 10 to 2000Hz

### Environmental

- **Temperature range:**  
-15°C to +110°C (+5°F to +212°F)
- **Radiation:**  
25 MRads «gamma» at +70°C (+158°F)
- **Salt spray resistance:**  
5% of sodium chloride
- **Sealing:** 0.5MPa (IP68 coupled)

Materials & plating	Connector part			
	Backshells	Locking screws	Insulator & grommet	Contacts
<b>Material</b>	Aluminium alloy	Brass	EPDM & Noryl	Brass
<b>Plating</b>	Nickel Kanigen® & tin nickel	Tin nickel	-	Gold over nickel

## Features & benefits

### Class 1E connector

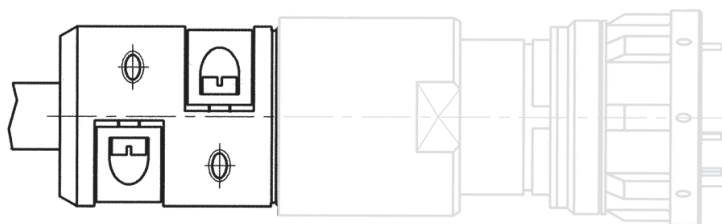
#### Class 1E qualified

MEN 2012 connectors are K2 qualified according to RCC-E. MEN 2612 is designed according to RCCE requirements. Thanks to a ruggedized mechanical design, they can operate during normal and seismic conditions.

### Robust cable clamp

#### Reliable and durable cable clamping

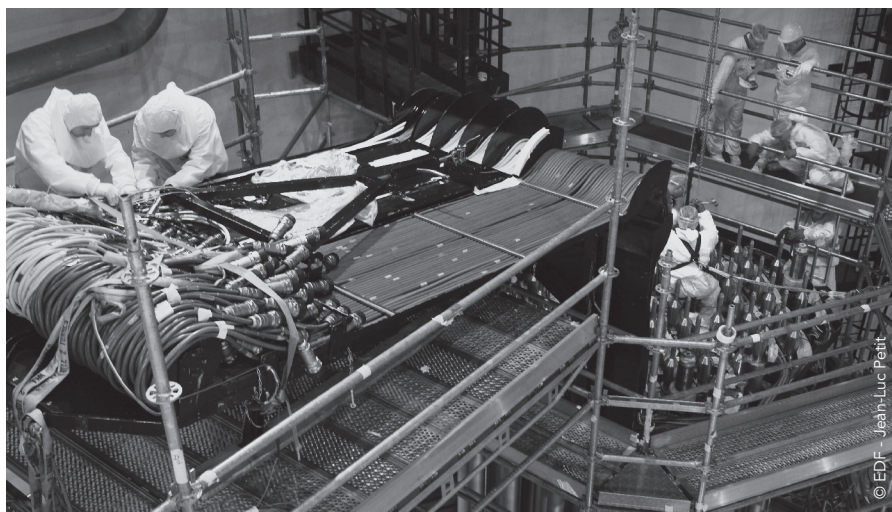
MEN connectors feature a robust cable clamp that ensures heavy cables will be durably maintained in position.



### High sealing level

#### IP68

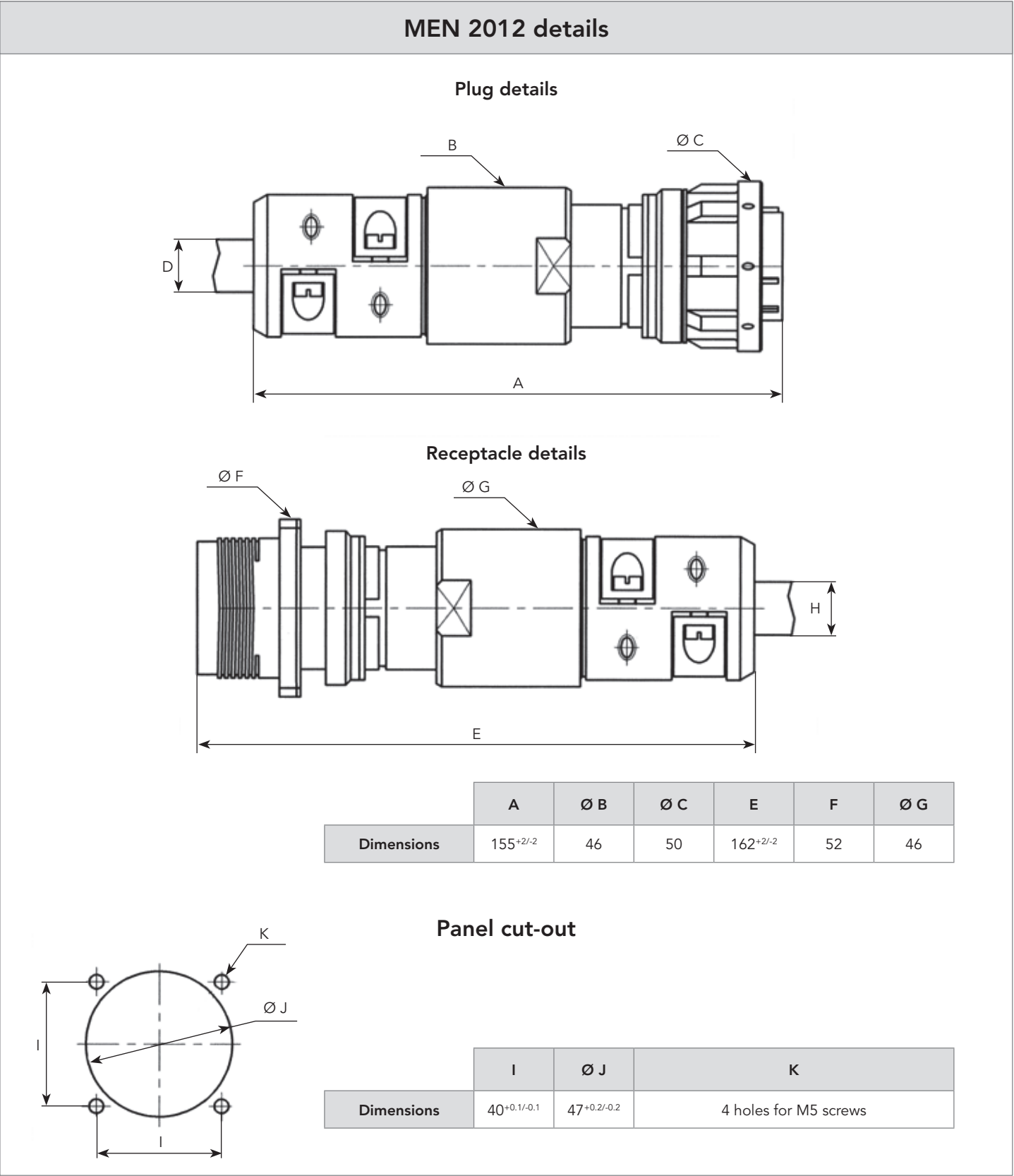
When mated and thanks to a large sealing gland the MEN connectors achieve a high sealing level (IP68).



MEN Series connectors used in the CRDM system.




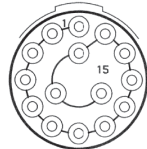
Plug & receptacle dimensions



Note: all dimensions are in mm

## MEN 2012 plug & receptacle ordering information

### Contact layouts

M12	M15
	
12 contacts Ø 2mm	15 contacts Ø 2mm

Wires section	M12	M15
Plug (pin contacts)	0.38 to 0.93mm <sup>2</sup> or 0.93 to 1.91mm <sup>2</sup> (FEM2012M12173 only)	0.93 to 1.91mm <sup>2</sup>
Receptacle (socket contacts)	0.93 to 1.91mm <sup>2</sup>	0.93 to 1.91mm <sup>2</sup>

### Max./min. cable diameters

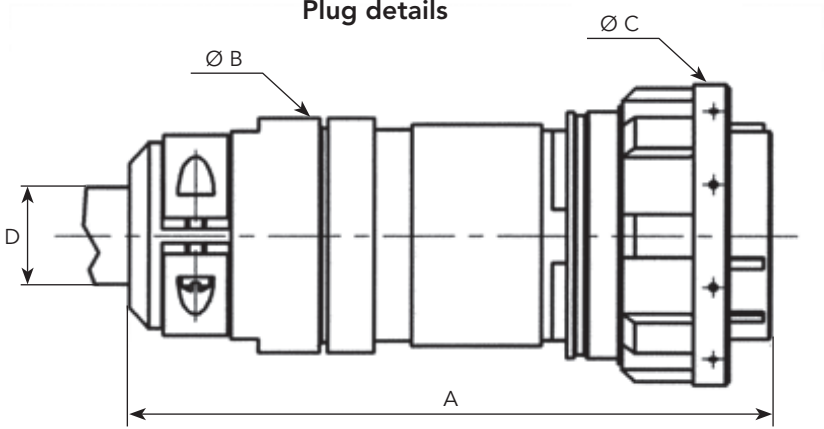
Reference	Plug designation	D		Receptacle designation	H	
		max.	min.		max.	min.
2012 M12	FE2012M12	17	14.5	RECSC2012M12	25.5	22
	FEDM2012M12SC295	29.5	27.5	RECSCF2012M12240	24	22
	FEM2012M12173	17.3	-	RECSCF2012M12230	23	20.5
2012 M15	FE2012M15	20.5	-	RECSC2012M15	26.5	-
	FEM2012M15192	19.2	17.7	RECSCF2012M15252	25.2	22.9

Note: all dimensions are in mm

Plug & receptacle dimensions

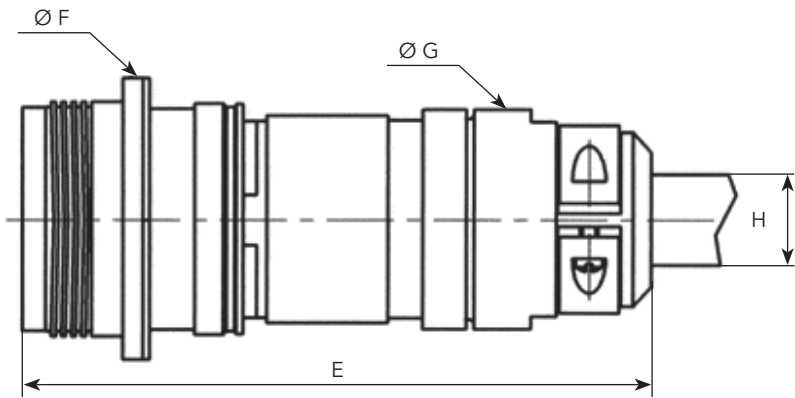
MEN 2612 details

Plug details



Side view of the plug connector. Dimension A is the total length. Dimension B is the diameter of the main body. Dimension C is the diameter of the rear flange. Dimension D is the height of the front face.

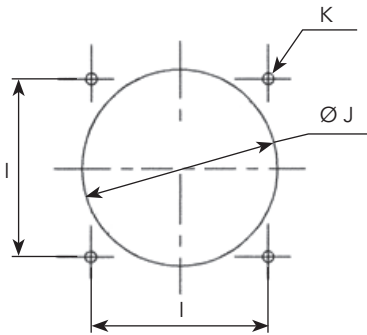
Receptacle details



Side view of the receptacle connector. Dimension E is the total length. Dimension F is the diameter of the front flange. Dimension G is the diameter of the main body. Dimension H is the height of the rear face.

	A	Ø B	Ø C	E	F	Ø G
Dimensions	183 <sup>+3/-3</sup>	65.5	84	192 <sup>+3/-3</sup>	84	65.5

Panel cut-out



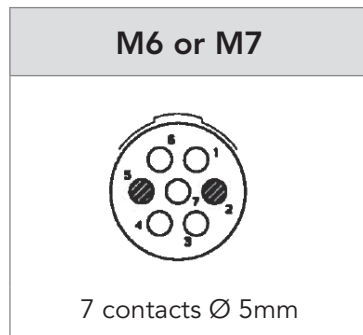
Top view of the panel cut-out. Dimension I is the square opening size. Dimension J is the circular hole diameter. Dimension K indicates the four mounting holes for M6 screws.

	I	Ø J	K
Dimensions	61 <sup>+0.2/-0.2</sup>	73 <sup>+0.2/-0.2</sup>	4 holes for M6 screws

Note: all dimensions are in mm

## MEN 2612 plug & receptacle ordering information

### Contact layouts



Wire section	M6 or M7
Plug (Pin contacts)	● 10mm <sup>2</sup> ○ 6mm <sup>2</sup>
Receptacle (Socket contacts)	● 16mm <sup>2</sup> ○ 10mm <sup>2</sup>

### Max./min. cable diameters

Reference	Plug designation	D		Receptacle designation	H	
		max.	min.		max.	min.
2612 M6 2612 M7	FE2612M6 FE2612M7	22.8	20.5	RECSC2612M6 RECSC2612M7 RECSC261220	28	27
	FEM2612M7205	20.5	19	RECSCF2612M7235	23.5	21.2
	FEM2612M7212	21.2	18	RECSCF2612M7240	24	21.5
	FEDM2612M6245	24.5	22.5	RECSCF2612M6280	28	27

Note: all dimensions are in mm

## Tools & spare parts

### Crimping & extraction tools

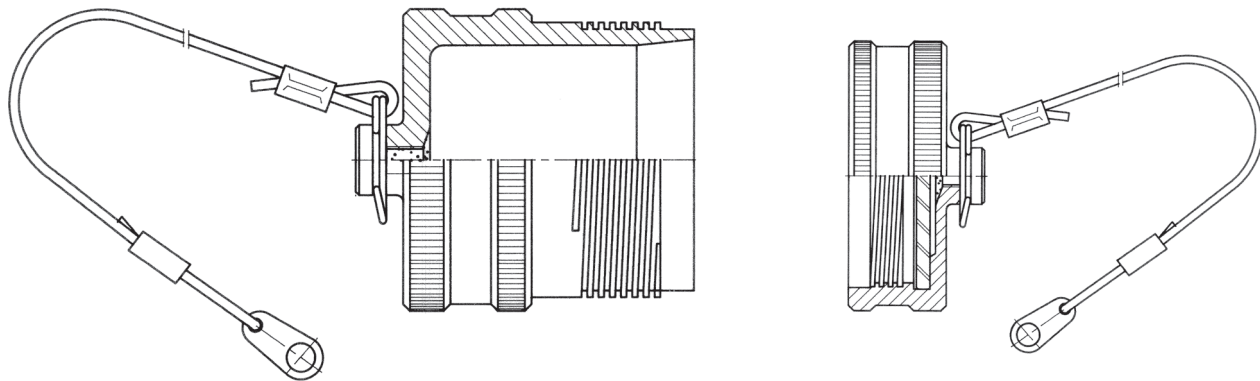
Contact Reference	Crimping tool	Locators	Extraction tools	Contact unlocking tool
BM26112020MT	8365EL	M22520MS EL	OUTDBM2000 EL	OUTM2000 EL OUTMBDB2000 EL
BM26112013MT				
BF20112020MT		836502EL	OUTDBK2000 EL	
BF20112022MT				
BM26115034ST90	M22520501EL	OUT2611B60 EL	-	-
BM26115046ST	SMELISOLECII EL	4E5010EL	-	-
BF26115056ST	SIMELISOLECII EL	4E7016 EL	-	-
BF26115046ST		4E5010 EL	-	-

## Contacts

Contact Layouts	Contact size	Pin contact	Barrel size	Socket contact	Barrel size	Comments
2012 M12	Ø2mm	BM26112020MT	Ø2mm	BF20112020MT	Ø2mm	
		BM26112013MT	Ø1.3mm			FEM2012M12173 only
2012 M15		BM26112020MT	Ø2mm	BF20112020MT	Ø2mm	13 contacts out of 15
				BF20112022MT	Ø2.2mm	2 contacts out of 15
2612 M6 2612 M7	Ø5mm	BM26115034ST90	Ø4.6mm	BF26115056ST	Ø5.6mm	●
		BM26115046ST	Ø3.4mm	BF26115046ST	Ø4.6mm	○

## Accessories

### Plug & receptacle caps



Connector size	Plug cap reference	Receptacle cap reference
2012	BEFC2012 EL	BERC2012 EL
2612	BEFC2612 EL	BERC2612 EL

Алматы (7273)495-231  
 Ангарск (3955)60-70-56  
 Архангельск (8182)63-90-72  
 Астрахань (8512)99-46-04  
 Барнаул (3852)73-04-60  
 Белгород (4722)40-23-64  
 Благовещенск (4162)22-76-07  
 Брянск (4832)59-03-52  
 Владивосток (423)249-28-31  
 Владикавказ (8672)28-90-48  
 Владимир (4922)49-43-18  
 Волгоград (844)278-03-48  
 Вологда (8172)26-41-59  
 Воронеж (473)204-51-73  
 Екатеринбург (343)384-55-89

Иваново (4932)77-34-06  
 Ижевск (3412)26-03-58  
 Иркутск (395)279-98-46  
 Казань (843)206-01-48  
 Калининград (4012)72-03-81  
 Калуга (4842)92-23-67  
 Кемерово (3842)65-04-62  
 Киров (8332)68-02-04  
 Коломна (4966)23-41-49  
 Кострома (4942)77-07-48  
 Краснодар (861)203-40-90  
 Красноярск (391)204-63-61  
 Курск (4712)77-13-04  
 Курган (3522)50-90-47  
 Липецк (4742)52-20-81

Россия +7(495)268-04-70

Магнитогорск (3519)55-03-13  
 Москва (495)268-04-70  
 Мурманск (8152)59-64-93  
 Набережные Челны (8552)20-53-41  
 Нижний Новгород (831)429-08-12  
 Новокузнецк (3843)20-46-81  
 Ноябрьск (3496)41-32-12  
 Новосибирск (383)227-86-73  
 Омск (3812)21-46-40  
 Орел (4862)44-53-42  
 Оренбург (3532)37-68-04  
 Пенза (8412)22-31-16  
 Петрозаводск (8142)55-98-37  
 Псков (8112)59-10-37  
 Пермь (342)205-81-47

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Ростов-на-Дону (863)308-18-15  
 Рязань (4912)46-61-64  
 Самара (846)206-03-16  
 Санкт-Петербург (812)309-46-40  
 Саратов (845)249-38-78  
 Севастополь (8692)22-31-93  
 Саранск (8342)22-96-24  
 Симферополь (3652)67-13-56  
 Смоленск (4812)29-41-54  
 Сочи (862)225-72-31  
 Ставрополь (8652)20-65-13  
 Сургут (3462)77-98-35  
 Сыктывкар (8212)25-95-17  
 Тамбов (4752)50-40-97  
 Тверь (4822)63-31-35

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 Томск (3822)98-41-53  
 Тула (4872)33-79-87  
 Тюмень (3452)66-21-18  
 Ульяновск (8422)24-23-59  
 Улан-Удэ (3012)59-97-51  
 Уфа (347)229-48-12  
 Хабаровск (4212)92-98-04  
 Чебоксары (8352)28-53-07  
 Челябинск (351)202-03-61  
 Череповец (8202)49-02-64  
 Чита (3022)38-34-83  
 Якутск (4112)23-90-97  
 Ярославль (4852)69-52-93

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