

SOURIAU PA&E

Electrical Feedthrus and Windows for
Hermetic Medical Applications



Presentation

For more than 30 years, SOURIAU PA&E has provided unique solutions to deliver medical components used in FDA-approved medical devices that are helping thousands of patients. SOURIAU PA&E’s hermetic medical feedthrus and windows use materials with a proven track record of implantable viability and have successfully passed state of the art testing.

Contents

Overview		Hermetic Electrical Feedthrus	
Typical Applications.....	6	Technical Features	12
Hermetic Feedthrus Features & Benefits.....	7	Range Overview	13
Hermetic Windows Features & Benefits.....	8	Dimensions & Characteristics	14
		Ordering Information	16
		Hermetic Windows	
		Technical Features	20
		Dimensions & Characteristics	21
		Ordering Information	22

Hermetic Medical Devices

Overview

■ Typical Applications.....	6
■ Electrical Feedthrus Features & Benefits.....	7
■ Hermetic Windows Features & Benefits.....	8



Typical applications



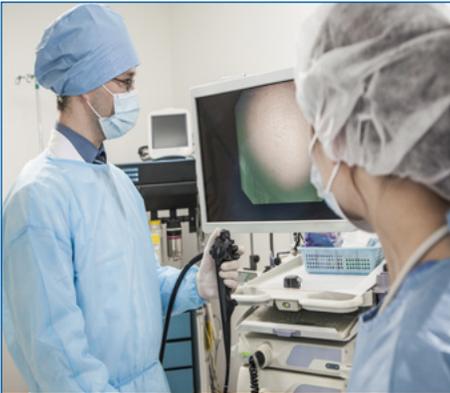
Neurostimulators



Cochlear Implants



Implantable Cardiac Devices



Surgical Navigation Systems



Implantable Drug Pumps



Endoscopes, Video Cameras, Couplers

Electrical feedthrus features & benefits

COMPACT

Smaller Footprints

SOURIAU PA&E's ceramic-to-metal joining technology allows us to make components smaller without compromising performance. Pin pitches go down to 0.050" on our standard products and could even go smaller in a custom design.

WIDE RANGE

7 Shapes, 2 Pin Lengths

SOURIAU PA&E's feedthru range is the widest bio-medical standard offering on the market.

INERT MATERIALS

Cytotoxicity Tests Available

While all implantable devices must pass tests as finished final devices, SOURIAU PA&E's feedthrus have passed component-level cytotoxicity testing with flying colors.

We have submitted two representative feedthru configurations to the test and both show no reactivity after incubation.

PROVEN TECHNOLOGY

Over 35 Years of Field Experience

In 1976, SOURIAU PA&E designed and sold its first medical 4-pin feedthru for a pacemaker. We have produced more than 250,000 units of that feedthru over the years.

Today, SOURIAU PA&E has produced over 1,000,000 hermetic components for use in implantable medical devices.

RELIABLE

Testing Protocol

SOURIAU PA&E's feedthrus passed extensive testing that demonstrate extreme robustness and reliability under extreme conditions.

Windows features & benefits

FLEXIBLE OPTIONS

Variety of Materials

SOURIAU PA&E's sealing technology allows us to hermetically seal Sapphire into stainless steel, titanium or even aluminum frames.

EASY TO INSTALL

Laser Weldable

SOURIAU PA&E's windows can be laser welded (as opposed to soldered) into a variety of housing materials, ensuring a quick and easy installation process, a better yield and reworkability.

RELIABLE

No Solder Joint Fatigue

Windows produced with SOURIAU PA&E's process are extremely robust and reliable because a key point of failure – solder joint fatigue – is eliminated.

AUTO- CLAVE PROVEN

More Than 1,200 Cycles Passed

SOURIAU PA&E's hermetic windows provide a leak rate $\leq 1 \times 10^{-9}$ atm. cm^3/sec helium at 1 atm differential pressure, even after more than 1,200 autoclave sterilization cycles.

INERT MATERIALS

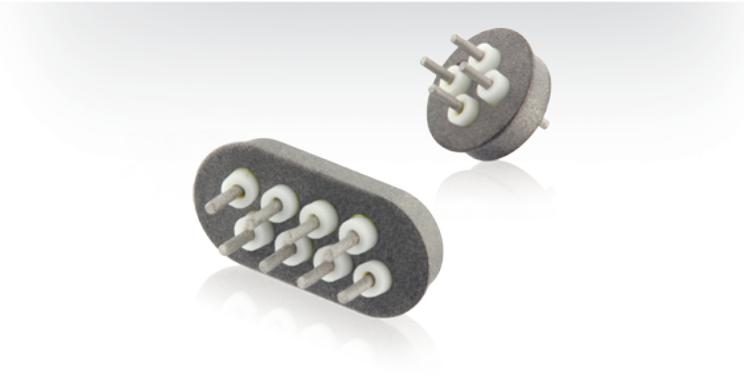
Cytotoxicity Tests Available

While all implantable devices must pass tests as finished final devices, SOURIAU PA&E's ceramic-sealed windows have passed component-level cytotoxicity testing, proving our materials are safe for use within the human body.

Electrical Feedthrus

■ Technical Features	12
■ Range Overview	13
■ Dimensions & Characteristics	14
■ Custom Feedthru Design Guidelines	15
■ Ordering Information	16





Description

- Direct ceramic-to-metal sealing
- Standard configurations include:
 - Single pin
 - 2 pin in-line .050" pitch
 - 3-pin in-line .050" pitch
 - 4 pin in-line .050" pitch
 - 4 pin quad-polar.050" pitch
 - 8 pin, 2 rows, .050" pitch
 - 8 pin, 2 rows, .100" pitch

Applications

- Implantable medical devices (Cardiac assist, cochlear implants, neurostimulators)
- Medical implant control units

Technical features

Electrical

- **Pins:** 0.01325" OD
- **Current rating:** 0.39 A
- **Test voltage rating:** 500 Vrms, 50Hz, 1min
- **Insulation resistance:** ≥ 5,000 MΩ under 500 Vdc

Mechanical

- **Leads pull test:** > 368 pounds
- **Vibration:** 10g, 58 to 500Hz, 3x2 hours

Environmental

- **Temperature range:** -55 to +85°C (-67 to 185°F)

Hermetic performance

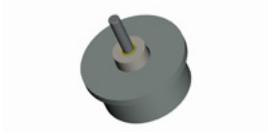
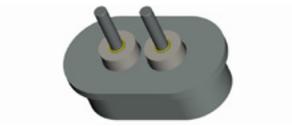
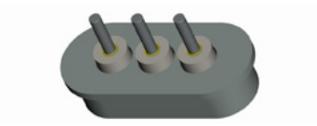
- **Helium leak test:** 1 x 10⁻⁹ cc/sec at 1 atm differential pressure

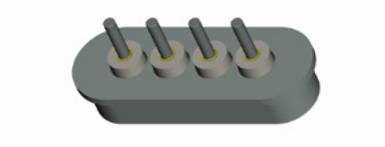
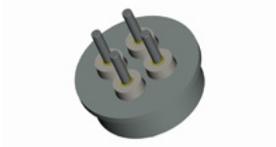
	Standard feedthru		
	Flange	Seals	Contacts
Material	Titanium Grade 4	Kryoflex® Ceramic	Platinum/Iridium (80/20)

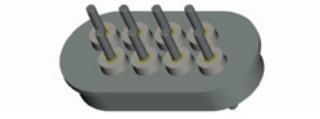
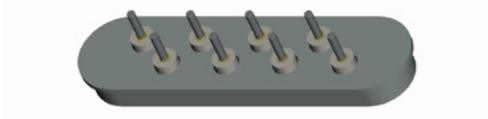
Product details

Overview

To support a variety of device configurations, SOURIAU PA&E provides 7 different standard feedthru layouts:

Single pin	2-pin, .050" (1.27mm) pitch	3-pin, .050" (1.27mm) pitch
		

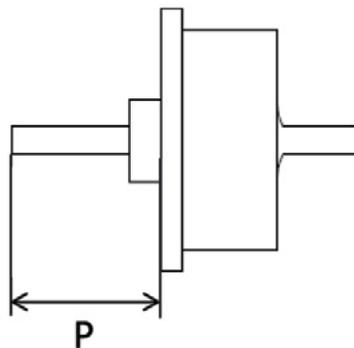
4-pin in-line, .050" (1.27mm) pitch	4-pin quadpolar, .050" (1.27mm) pitch
	

8-pin, .050" (1.27mm) pitch	8-pin, .100" (2.54mm) pitch
	

Pin extensions

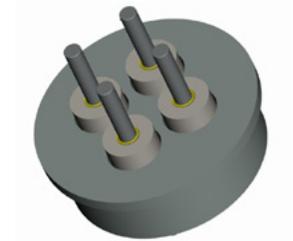
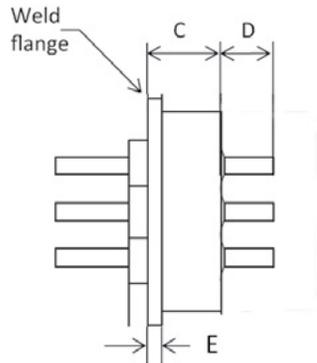
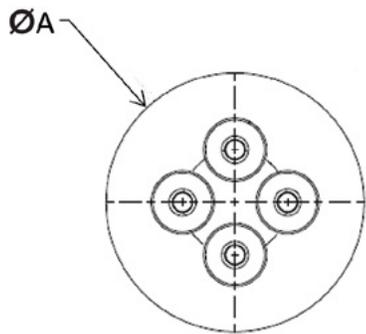
Available for all layouts:

Extension P
.070" (1.80mm)
.360" (9.15mm)



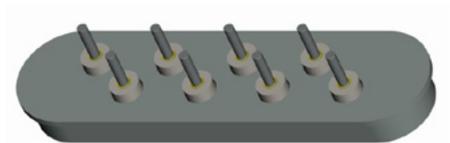
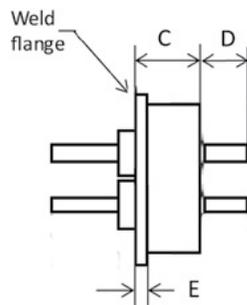
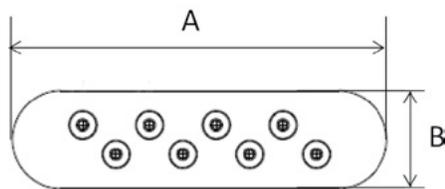
Standard feedthrus

Circular shape



Inches	$\text{ØA} \pm .001$	$C \pm .001$	$D \pm .001$	$E \pm .001$
Single pin	$\text{Ø} .125$.055	.040	.010
4-pin quadpolar	$\text{Ø} .172$.055	.040	.010

Oval shape



Inches	$A \pm .001$	$B \pm .001$	$C \pm .001$	$D \pm .001$	$E \pm .001$
2-pin	.175	.100	.055	.040	.010
3-pin	.225	.100	.055	.040	.010
4-pin in-line	.280	.100	.055	.040	.010
8-pin .050"	.300	.145	.055	.040	.010
8-pin .100"	.560	.145	.055	.040	.010

Design guidelines

Custom feedthrus

If our standard products don't provide a solution for your application, please contact us for the development of a custom design :

Materials: any combination of the following is available

Flange:

- Titanium grade 4
- Titanium 6Al4V

Pins:

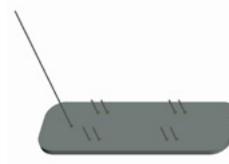
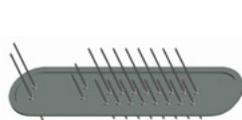
- Platinum/Iridium (80/20)
- Platinum/Iridium (90/10)
- Pure Platinum

Pin diameter: from .009" to .013" (0.23 to 0.34mm) - Other diameters, please consult us

Pin counts: No limitation based on regular density - For tighter pitch requirements, please consult us

Pin configuration options:

- Bent pins : 45° ; 90° - please consult us for custom angles
- Signal integrity : individual discoidal capacitors available



Integrated feedthrus

SOURIAU PA&E can deliver a full, turnkey solution by integrating feedthrus into housings by:

- Laser welding of a standard or custom stand-alone feedthru to the housing
- or
- Sealing the pins directly into the housing

Housing material:

- Titanium Grade 4
- Titanium 6Al4V
- Alumina / Titanium combination (for RF transparency)



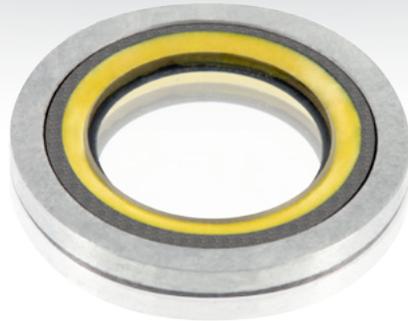
Ordering information

Standard feedthrus

Basic Series	MSF	04	C	070
Layout:				
01: Single pin (circular only)				
02: 2 pins (oval only)				
03: 3 pins (oval only)				
04: 4 pins				
18: 8-pin, .050" pitch (oval only)				
28: 8-pin, .100" pitch (oval only)				
Shell shape:				
C: Circular				
L: Oval				
Pin extension:				
070: Pin extension of .070"				
360: Pin extension of .360"				

Hermetic Windows

■ Technical Features	20
■ Dimensions & Characteristics	21
■ Custom Window Design Guidelines & Ordering Information.....	22



Description

- Direct ceramic-to-metal sealing
- Designed to be laser welded to:
 - Titanium
 - Stainless steel
 - Aluminum
- 5 different sizes available

Applications

- Endoscope couplers, camera, video cameras
- Surgical navigation systems

Technical features

Optical

- **Orientation:**
C-axis
- **Anti-reflective coating:**
Internal face, 400-700µm

Environmental

- **Autoclave:**
1,200 cycles
134°C (280°F) for 18 min / dry time 5min

Hermetic performance

- **Helium leak test:**
 1×10^{-9} cc/sec at 1 atm differential pressure

	Window assembly		
	Window	Seals	Weld flange
Material	Sapphire	Kryoflex® Ceramic	Titanium grade 4 Aluminum Serie 4000 Stainless steel 304L Stainless steel 17-4PH

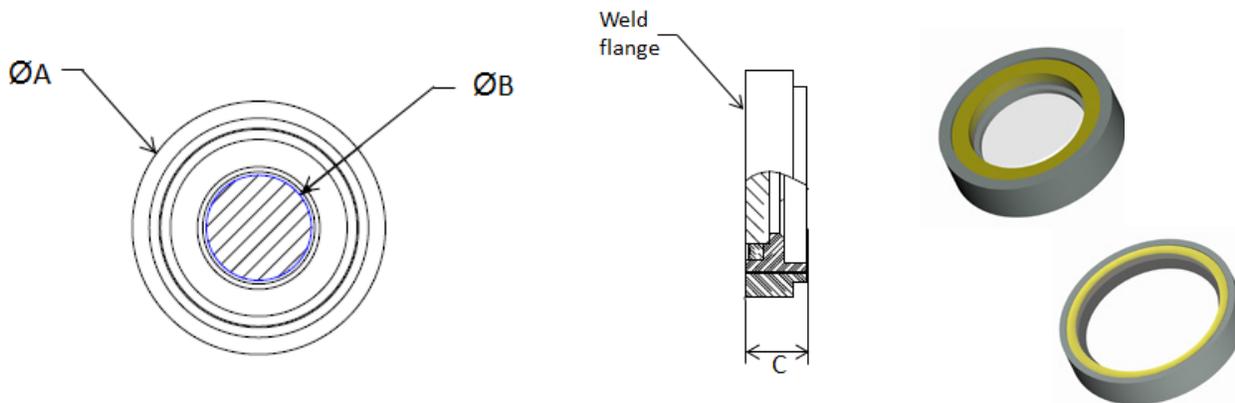
Window details

Overview

In order to match most applications, SOURIAU PA&E offers 5 different standard window sizes. Each size is available with 4 different weld flange materials:

Clear aperture	Weld flange material
4mm 5.5mm 7mm 9mm 10mm	Titanium grade 4 Aluminum 4000 Series Stainless steel 304L Stainless steel 17-4PH

Dimensions



Inches	Weld flange material		ØB min	C ± .001
	ØA ± .001 304L Aluminum	ØA ± .001 Titanium 17-4PH		
4mm clear aperture	.376	.293	.157	.100
5.5mm clear aperture	.436	.353	.217	.100
7mm clear aperture	.495	.412	.276	.100
9mm clear aperture	.573	.490	.354	.100
10mm clear aperture	.613	.530	.394	.100

Design guidelines for custom windows

Custom windows

If our standard products don't provide a solution to your application, please consult us for the development of a custom design :

Weld flange materials:

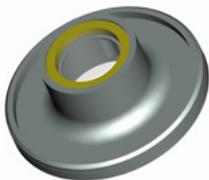
- Titanium grade 4
- Titanium 6Al4V
- Aluminum 4000 Series
- Stainless steel 304L
- Stainless steel 17-4PH

Weld flange shape: we can accommodate a variety of unconventional shapes.

Window shape: Circular, oval, several windows combined in the same bezel...

Sapphire thickness:

- Most common is 1mm
- Our technology can accommodate other thicknesses



Ordering information

Standard windows

Basic Series	MSW	55	C	A
Size:				
40: 4mm clear aperture				
55: 5.5mm clear aperture				
70: 7mm clear aperture				
90: 9mm clear aperture				
10: 10mm clear aperture				
Window shape:				
C: Circular				
Weld flange material:				
A: Aluminum				
B: Stainless steel 304L				
C: Titanium				
D: Stainless steel 17-4PH				

Reliable People, Reliable Solutions



SOURIAU PA&E

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