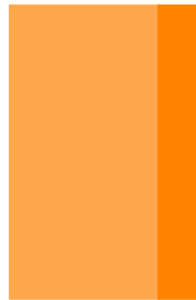
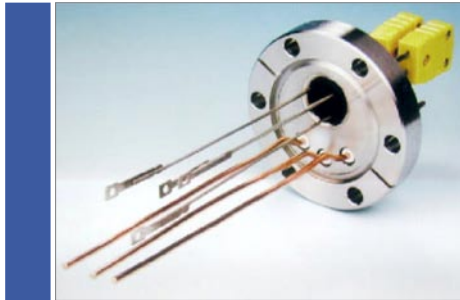
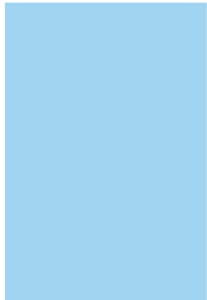


high and ultra



high vacuum



***feedthroughs*** *and components*



## Catalogue 2009 - Contents

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## Technical Information, Flange Sizes

### Nominal Internal Diameters (DN) and Flange Sizes

Cinquepascal uses the internationally accepted system of nominal internal diameters (DN) to identify flange sizes. These correspond with other naming conventions as the following table. The DN convention applies to Copper Gasket Flanges (CF Types) Clamp Flanges (KF) Types, ISO-K, and ISO-F flanges (LF Types). The sizes DN25 and DN50 are not in common use for CF flanges. Additionally there are sizes DN80 (4 5/8"), DN125 (6 3/4") and O.D.s 13 1/4", 14" and 16 1/2". These are available on request.

DN	NW	Typical Tube I.D. mm	US Tube Size (O.D.) (inches)	I.D. -Ø (CF) mm	CF Flange O.D. mm	CF Flange O.D. (inches)	KF / ISO-K Flange O.D. mm
DN16	16	16	3/4"	16	34	1 1/3"	30
DN25	25	22	1"	-	-54	(2 1/8")	40
DN40	35	35	1 1/2"	37	70	2 3/4"	55
DN50	50	47	2"	-	-86	(3 3/8")	75
DN63	63	57	2 1/2"	64	114	4 1/2"	95
DN100	100	98	4"	102	150	6"	130
DN160	150	146	6"	153	203	8"	180
DN200	200	197	8"	200	254	10"	240

### Choice of Stainless Steel for UHV

The best choice of stainless steel is the type 316LN (1.4429). It has the lowest magnetic permeability, the best stability after working and good TIG welding characteristics. It also has good corrosion resistance particularly against Chloride compounds. Unfortunately this material is quite expensive and is generally not available in the form of tubes.

The best compromise between price, performance and availability is the close relative 316L (1.4404). This material has very similar properties to 316LN. The good welding characteristics, corrosion resistance and mechanical hardness are very similar. The magnetic permeability can be as low as 1.005.

### Summary of the Composition and Vacuum Properties of Stainless Steels used for UHV.

USA AISI	Europ. EN	C max.	Cr	Ni	Mo	N	Uses and Properties	Suitability for UHV
304	14.301	0,08	18	9	-	-	General Purpose austenitic stainless steel, relatively low cost	Medium
304L	14.306	0,03	18	9	-	-	Extra low C prevents carbide precipitation – suitable for general UHV use	Good
304LN	14.311	0,03	18	9	-	0,18	Improved mechanical properties compared to 304L	Good
316	14.401	0,08	16,6	12	2,5	-	General Purpose but higher corrosion resistance than 304	Very Good
316L	14.404	0,03	16,6	12	2,5	0,1 (max.)	Extra low carbon – good TIG welding properties, highest corrosion resistance especially to Chlorides, low magnetic permeability	Excellent
316LN	1.01:29	0,03	16,6	12	2,5	0,12-0,22	Extra low carbon – good TIG welding properties, highest corrosion resistance especially to Chlorides, magnetic permeability typically less than 1.005 Better mechanical stability than 316L	Excellent
321	14.541	0,08	17,5	9,1	-	-	General Purpose especially for bellows	Good

## Vacuum Specification, Conformance & Terms

### Vacuum-Specification / Operating Temperatures

All UHV Components are specified for a maximum differential pressure of 1 bar and for use in vacuum better than  $1 \cdot 10^{-10}$  mbar. Components are leak tested for a leak rate less than  $5 \cdot 10^{-10}$  mbar / l s. Almost all components are bakeable to 200°C, unless otherwise specified in the description.

KF and ISO-K Components are specified for use to  $10^{-8}$  mbar provided that the gasket material can withstand elevated temperatures. Viton is suitable for 150°C. The maximum differential pressure is 1 bar.

Feedthroughs, some of which contain Kovar (a NiFe alloy which has a good match to the thermal extension of Glass and Ceramic) can be used down to -50°C. At lower temperatures, a phase transition occurs which can damage the feedthrough. Special cryogenic feedthroughs are available, please ask the Sales Office for details.

### Conformance of Cinquepascal Components

Cinquepascal CF UHV Components use the internationally accepted copper gasket flange system. They are compatible with the Varian Conflat® and CF or FC types from Vacuum Generators and other manufacturers for sizes up to and including DN200CF. They conform to the Alternate Series of Flanges described in ISO 3669. For sizes over DN200CF, no international standard exists. Please ask Sales Office for advice in this case.

KF types are compatible with Klein Flange types and conform to ISO 1609.

ISO-K & ISO-F types are compatible with LF (Large Flange) types and conform to ISO 2861.

Cinquepascal	16CF	40CF	63CF	100CF	160CF	200CF
DN	DN16CF	DN40CF	DN63CF	DN100CF	DN160CF	DN200CF
NW	NW16/19CF	NW35/38CF	NW64CF	NW100CF	NW150CF	NW200CF
OD mm	34mm	70mm	114mm	150mm	200mm	250mm
OD inches	1 1/3"	2 3/4"	4 1/2"	6"	8"	10"

### Cinquepascal Vacuum Components Catalogue - Terms and Conditions (Summary)

- All prices are in Euros, ex-works Cinquepascal stores in Milan. Prices can be quoted in Pounds Sterling, US Dollars or other currencies. Please call the Sales Office.
- Prices are for guidance only and are subject to change at any time without notice. Please contact the Sales Office for a firm quotation.
- The prices do not include IVA for Italy, (minimum order is € 120,00).
- Delivery within Italy is free of charge, delivery within the European Union is free of charge for shipments of value € 1000,00, or over. For orders under that amount, the standard delivery charge is € 20,00. This may be greater in some cases for heavy or bulky items.
- Quantity Discounts are available. Please ask for details.
- Cinquepascal Products carry a two year warranty. Wear and Tear and mis-use are excepted.

**N.B. Safety of Electrical Installations:** Cinquepascal offers components for the construction of Vacuum Systems. Some of these components, particularly those designed for use with Voltages of 40V or over can cause injury or death, if incorrectly installed. It is the purchaser's responsibility to ensure that Components are installed correctly and in accordance with current safety regulations by competent persons.

#### Copyright and Trade Mark Ownership

- “**Caburn UHV**” is a registered trade mark of Dr Michael Holmes
- “**Viton**” and “**Kapton**” are registered trade marks of Du Pont
- “**Conflat**” is a registered trade mark of Varian Associates
- “**Chromel**” and “**Alumel**” are registered trade marks of Hoskins Manufacturing Co.
- “**PEEK**” is a registered trade mark of Victrex plc.
- “**Constantan**” is a registered trade mark of Wilber B Driver Co.

### Sub-D Feedthroughs



Sub-D Wiring System

The Sub-miniature D system comprises (see photo left):

- Air Side Socket (see page 5)
- Feedthrough (this page)
- Vacuum Side Socket and Pins (see pages 5 and 6)
- In-Vacuum Cable (see page 26)

Depending on the application, Cinquepascal offers a wide variety of feedthroughs, sockets, wires and cables.

We offer a comprehensive range

- 9, 15 and 25 Pins on 40CF
- 9 Pins on 25KF
- 50 Pins on 63CF
- 37 Pin Feedthroughs



9 Pins on 25KF

Pins	CF FEEDTHROUGHS	Part Number	Euro
9	40CF Sub-D Feedthrough 9 Pin on DN40CF Flange	210-D09-CF40	362,00
15	40CF Sub-D Feedthrough 15 Pin on DN40CF Flange	210-D15-CF40	405,00
15	63CF Sub-D Feedthrough 15 Pin on DN63CF Flange	210-D15-CF63	437,00
25	40CF Sub-D Feedthrough 25 Pin on DN40CF Flange	210-D25-CF40	469,00
25	63CF Sub-D Feedthrough 25 Pin on DN63CF Flange	210-D25-CF63	469,00
2x25	63CF 2 off Sub-D Feedthroughs 25 Pin on DN63CF Flange	210-D25-CF63-2	774,00
37	63CF Sub-D Feedthrough 37 Pin on DN63CF Flange	210-D37-CF63	573,00
37	100CF Sub-D Feedthrough 37 Pin on DN100CF Flange	210-D37-CF100	576,00
50	63CF Sub-D Feedthrough 50 Pin on DN63CF Flange	210-D50-CF63	598,00
50	100CF Sub-D Feedthrough 50 Pin on DN100CF Flange	210-D50-CF100	598,00

Pins	KF / ISO-K FEEDTHROUGHS	Part Number	Euro
9	25KF Sub-D Feedthrough 9 Pin on DN25KF Flange	210-D09-KF25	348,00
9	40KF Sub-D Feedthrough 9 Pin on DN40KF Flange	210-D09-KF40	362,00
15	40KF Sub-D Feedthrough 15 Pin on DN40KF Flange	210-D15-KF40	397,00
15	50KF Sub-D Feedthrough 15 Pin on DN50KF Flange	210-D15-KF50	405,00
25	ISO-K 63 Sub-D Feedthrough 25 Pin on DN63ISO-K Flange	210-D25-ISO63	469,00
37	ISO-K 100 Sub-D Feedthrough 37 Pin on DN100 ISO-K Flange	210-D37-ISO100	576,00
50	ISO-K 100 Sub-D Feedthrough 50 Pin on DN100ISO-K Flange	210-D50-ISO100	598,00

#### Specifications



- True UHV Feedthrough
- Versions with 9 / 15 / 25 / 37 and 50 Pins
- 500V, max. 5 A per Pin
- Bakeable to 220°C max. gradient 25 K/min (CF) •
- Industry Standard Sub-D Design I to MIL
- Pins do not protrude from the housing
- Sockets for the Vacuum Side are available in HV and UHV types.
- To get the highest possible pin density, use the "Small" Socket connector with the feedthroughs shown in orange

Weldable Versions available to order. Please call Sales Office.



Custom made Feedthrough assemblies are built to order.

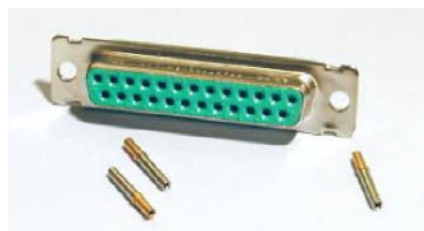
Mixed Type Feedthroughs are also available including Sub-D combinations with miniature coaxial SMA types.

Also Sub-D types on other flanges not shown here, including special purpose flanges or direct mounting into the walls of chambers.

**Please call Sales Office for a quotation**



## HV Sockets



Depending on the application, different types of socket can be used:

- Standard Socket for the Air Side (up to 80°C)
- High Vacuum Socket (glass filled polymer and stainless steel) for max. 110°C, and 10<sup>-8</sup> mbar
- UHV- Socket (Ceramic), max. 300°C (see next page)
- UHV Socket(PEEK), max. 200°C

Please order Pins separately – see Page 6

For High Vacuum applications, Cinquepascal offers fully Nickel plated All Metal Housings with a Strain Relief Clamp for the wires. The Strain Relief can be mounted in 3 positions, straight, to the left or to the right (as shown on the picture).

The SMALL Versions are designed for use when there is no space for the standard types.

Pins	Vacuum	SUB-D SOCKET FEMALE (FOR FEEDTHROUGHS), HIGH VACUUM	Qty.	Part Number	Euro
9	HV	Sub-D Socket, Female, 9 Pins ,	1	211-FS09-HV	93,00
9	HV	Sub-D Socket, Female, 9 Pins, SMALL	1	211-FS09-HV-S	93,00
15	HV	Sub-D Socket, Female, 15 Pins	1	211-FS15-HV	96,00
15	HV	Sub-D Socket, Female, 15 Pins, SMALL	1	211-FS15-HV-S	96,00
25	HV	Sub-D Socket, Female, 25 Pins	1	211-FS25-HV	105,00
25	HV	Sub-D Socket, Female, 25 Pins, SMALL	1	211-FS25-HV-S	105,00
37	HV	Sub-D Socket, Female, 37 Pins	1	211-FS37-HV	121,00
37	HV	Sub-D Socket, Female, 37 Pins, SMALL	1	211-FS37-HV-S	121,00
50	HV	Sub-D Socket, Female, 50 Pins	1	211-FS50-HV	134,00
50	HV	Sub-D Socket, Female, 50 Pins, SMALL	1	211-FS50-HV-S	134,00

### Specification HV-Socket

- Versions with 9 / 15 / 25 / 37 and 50 Pins
  - Various Pin Types available
  - Dimensions are the same as standard Sub-D types. (SMALL Versions without locking screw holes)
  - Male Plug and Female Socket Pairs can be used in other applications
- Material Glass filled Polymer, Stainless Steel Housing  
 Temperature -55°C ... 110°C  
 Vacuum to 10<sup>-8</sup> mbar  
 Design one part – Pins can be removed using a special tool

Pins	Vacuum	SUB-D PLUG, MALE, HIGH VACUUM	Qty.	Part Number	Euro
9	HV	Sub-D Plug, Male 9 Pins	1	211-MS09-HV	81,00
15	HV	Sub-D Plug, Male 15 Pins	1	211-MS15-HV	88,00
25	HV	Sub-D Plug, Male 25 Pins	1	211-MS25-HV	90,00
37	HV	Sub-D Plug, Male 37 Pins	1	211-MS37-HV	99,00
50	HV	Sub-D Plug, Male 50 Pins	1	211-MS50-HV	101,00

### Specification Hv-Socket Housing



HV Plug with Metal Housing

- Material Nickel Plated, Zinc  
 Temperature -55°C ... 110°C  
 Vacuum to 10<sup>-8</sup> mbar  
 Design Stainless Steel screws

The Housings are not suitable for use with the SMALL versions.

Pins	Vacuum	METAL HOUSING FOR HV SUB-D SOCKETS & PLUGS	Qty.	Part Number	Euro
9	HV	Metal Housing Nickel Plated for HV Sub-D Plug & Sockets 9-Pin	1	211-HOUSING-D09	56,00
15	HV	Metal Housing Nickel Plated for HV Sub-D Plug & Sockets 15-Pin	1	211-HOUSING-D15	60,00
25	HV	Metal Housing Nickel Plated for HV Sub-D Plug & Sockets 25-Pin	1	211-HOUSING-D25	63,00

### Specification for All-Metal Housing



- Material Nickel Plated, Zinc  
 Temperature -55°C...110°C  
 Vacuum to 10<sup>-8</sup> mbar  
 Cable diam. 4-7mm (8-10 mm for 50 pin version)  
 Housings will fit the female sockets and male plug HV connectors.

Pins	Vacuum	ALL METAL HOUSINGS FOR HV SOCKETS WITH STRAIN RELIEF	Qty.	Part Number	Euro
9	HV	Housing including Strain Relief Clamp	1	211-Housing-D09-SR	68,00
15	HV	Housing including Strain Relief Clamp	1	211-Housing-D15-SR	72,00
25	HV	Housing including Strain Relief Clamp	1	211-Housing-D25-SR	74,00
50	HV	Housing including Strain Relief Clamp	1	211-Housing-D50-SR	77,00

Pins	Vacuum	SUB-D SOCKET FEMALE, AIR SIDE	Qty.	Part Number	Euro
9	Air	Sub-D Socket, Female, 9 Pins	1	211-FS09-AIR	49,00
15	Air	Sub-D Socket, Female, 15 Pins	1	211-FS15-AIR	50,00
25	Air	Sub-D Socket, Female, 25 Pins	1	211-FS25-AIR	51,00
37	Air	Sub-D Socket, Female, 37 Pins	1	211-FS37-AIR	55,00
50	Air	Sub-D Socket, Female, 50 Pins	1	211-FS50-AIR	56,00



- Wire fixing Solder Housing  
 9 / 15 / 25 pin black Plastic with knurled knob  
 37 / 50 pin Metalised Plastic with standard screws

Air Side Male Plugs are available at the same price as sockets.

### Sub-D UHV Plugs & Sockets

Sub-D FT



Cinquepascal Sub-D UHV Sockets are made from Glass Ceramic.

- Impermeable material (does not absorb gas or water vapour).
- Free from Carbon compounds of any sort.
- High Bakeout temperatures – up to 300°C (Glass Ceramic itself can be baked to 700°C). It is also suitable for cryogenic use.

#### Specification UHV-Socket

Material Glass Ceramic, impermeable  
 Temperature 4K ... 300°C (Incl. Pins)  
 Vacuum 10<sup>-11</sup> mbar  
 Design 2 Part screwed  
 Included with the UHV Sockets are screws for fixing the socket to the feedthrough.

The male Plugs include long fastening screws (see photo above left) which enable the Sockets and Plugs to be fixed together as a pair.

**Please order pins separately**

Pins	SOCKET FEMALE (FOR FEEDTHROUGHS)	Part Number	Euro
9	Sub-D Socket, female, UHV Type, Glass Ceramic for 9 Pins	211-FS09-UHV	218,00
15	Sub-D Socket, female, UHV Type Glass Ceramic for 15 Pins	211-FS15-UHV	248,00
25	Sub-D Socket, female, UHV Type Glass Ceramic for 25 Pins	211-FS25-UHV	260,00
25	Sub-D Socket, female, small, special type for 25 Pins on DN40CF	211-FS25S-UHV	280,00
37	Sub-D Socket, female, UHV Type, Glass Ceramic for 37 Pins	211-FS37-UHV	293,00
50	Sub-D Socket, female, UHV Type, Glass Ceramic for 50 Pins	211-FS50-UHV	303,00

Pins	PLUG MALE	Part Number	Euro
9	Sub-D Plug, male, UHV, for 9 Pins	211-MS09-UHV	218,00
15	Sub-D Plug, male, UHV, for 15 Pins	211-MS15-UHV	248,00
25	Sub-D Plug, male, UHV, for 25 Pins	211-MS25-UHV	260,00
37	Sub-D Plug, male, UHV, for 37 Pins	211-MS37-UHV	POR
50	Sub-D Plug, male, UHV, for 50 Pins	211-MS50-UHV	POR

### Sub-D UHV Peek Plugs and Sockets

As an alternative to the Glass-Ceramic types, Cinquepascal offers Plugs and Sockets made from PEEK. PEEK can be used for most High Vacuum and UHV applications.

- High temperature range.
- Low water absorption in air.
- Impact resistant material.
- **Significant price reduction compared to Glass Ceramic.**

Pins	SOCKET FEMALE (FOR FEEDTHROUGHS)	Part Number	Euro
9	Sub-D Socket, female, PEEK, 9 Pins	211-FS09-PK	169,00
15	Sub-D Socket, female PEEK, 15 Pins	211-FS15-PK	192,00
25	Sub-D Socket, female, PEEK, 25 Pins	211-FS25-PK	201,00
37	Sub-D Socket, female, PEEK, 37 Pins	211-FS37-PK	221,00
50	SubSub-D Socket, female, PEEK, 50 Pins	211-FS50-PK	232,00

Pins	PLUG MALE	Part Number	Euro
9	Sub-D Socket, male, PEEK Version, 9 Pins	211-MS09-PK	169,00
15	Sub-D Socket, male, PEEK Version, 15 Pins	211-MS15-PK	192,00
25	Sub-D Socket, male, PEEK Version, 25 Pins	211-MS25-PK	201,00
37	Sub-D Socket, male, PEEK Version, 37 Pins	211-MS37-PK	221,00
50	Sub-D Socket, male, PEEK Version, 50 Pins	211-MS50-PK	232,00



#### Specification PEEK Plug & Socket

Vacuum UHV  
 Temperature -65 ... +250°C  
 Thermal conductivity: 0.25 W/m K  
 Water absorption in air < 0.1% (For UHV applications, bakeout is required).  
 Fixing screws for the connector and vented fixing screws for the female sockets are included.  
 The male plugs have connection screws to secure them to the female sockets.



## Crimp Pins for HV and UHV Sub-D Sockets & Tools

As well as the Standard Crimp Pins, Cinquepascal offers other versions for special purposes. Call Sales Office for advice on the best choice of pin for your application.

Pin	Cable Ø	Use Crimp Tool	Application
Standard	0.25 – 1 mm	214-CTOOL / 214-CTOOL-HQ	With Stainless Steel Shell, high quality, our standard pin for UHV
B (Budget)	0.25 – 1mm	214-CTOOL / 214-CTOOL-HQ	No stainless steel shell, good value for less demanding applications
S (Small)	0.08 – 0.5mm	214-CTOOL-HQ	As Standard Pin, but for very thin wires- only the "HQ"- Crimp tool is suitable
Thermocouple	0.25 – 0.6mm	214-CTOOL-TC	Type K Thermocouple material Pins, made from Cromel and Alumel .

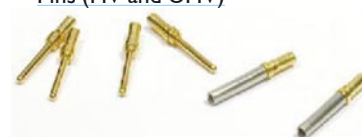
N.B. For Semiconductor Applications, Nickel Plated Pins are available to order..

Type	PINS, FEMALE FOR SOCKETS	Qty.	Part Number	Euro
Std	Standard Crimp Pins, female for UHV and HV	10	212-PINF-10	53,00
Std	Standard Crimp Pins, female for UHV and HV	25	212-PINF-25	65,00
B	Budget Crimp Pins, female for UHV and HV	10	212-PINF-10-B	50,00
B	Budget Crimp Pins, female for UHV and HV	25	212-PINF-25-B	60,00
S	"Small" Crimp Pins, female for UHV and HV	10	212-PINF-10-S	54,00
S	"Small" Crimp Pins, female for UHV and HV	25	212-PINF-25-S	67,00

Type	PINS, MALE FOR PLUGS	Qty.	Part Number	Euro
Std	Crimp Pins for Sub-D Plugs, male, UHV and HV	10	212-PINM-10	48,00
Std	Crimp Pins for Sub-D Plugs, male, UHV and HV	25	212-PINM-25	55,00
S	"Small" Crimp Pins for Sub-D Plugs, male, UHV and HV	10	212-PINM-10-S	49,00
S	"Small" Crimp Pins for Sub-D Plugs, male, UHV and HV	25	212-PINM-10-S	58,00

TOOLS	Qty.	Part Number	Euro
Crimp Tool for HV and UHV Sub-D Crimp Pins, no positioner, not suitable for "S"-Versions	1	214-CTOOL	253,00
Crimp Tool for HV und UHV Sub-D Crimp Pins, with positioner	1	214-CTOOL-HQ	495,00
Crimp Tool (Pliers) for Thermocouple Pins	1	214-CTOOL-TC	66,00
Demounting Tool for Crimp Pins (for use only with HV Sockets)	1	214-CRIMPINS	67,00

### Pins (HV and UHV)



Material Gold Plated Copper Alloy  
Standard Pins: include Stainless Steel Shell

Budget Pins no shell  
Wire Mount Crimp

For thin wires of diameters 0.08mm Ø and above, we recommend the „Small“ Version (See Table above)

**Thermocouple Pins - see next page**

### Crimp Tools

In order to make secure connections of wires to the Crimp-Pins, the use of the correct Crimp Tool is recommended.

See page 6 for details of which Tool to use with which Pin



214-CRIMPINS



214-CTOOL-HQ  
4-Indent Crimp Tool with Positioner



214-CTOOL-TC  
Pliers for Thermocouple Pins



214-CTOOL  
This tool fits all Pin types except Thermocouple - Pins. These should be crimped with Pliers (214-CTOOL-TC.)

### Thermocouple Pins, Adaptors & Sockets

Sub-D Feedthroughs may be used as Thermocouple Feedthroughs. In order to do this the standard D Type feedthrough is used but the air and vacuum side Pins are changed to Thermocouple types. These are made from Chromel and Alumel respectively. Although the use of Nickel pin material in contact with the Thermocouple Pins results in the creation of two thermocouple junctions, the measurement error introduced is negligible provided the vacuum side of the feedthrough contacts and their air side are at the same temperature. If required, the Sub-D feedthrough can be used for a mixture of Thermocouple and normal connections by appropriate choice of the Socket Pins. If very accurate temperature measurement is required, the use of a Platinum Resistance Thermometer is recommended.

Type	THERMOCOUPLE PINS FOR SUB-D		Qty.	Part Number	Euro
K	HV + UHV	Thermocouple Crimp Pins for Sub-D Socket, female, Type K, 5 Pairs (Chromel and Alumel)	2x5	213-PINF-K	82,00
K	HV + UHV	Thermocouple Crimp Pins for Sub-D Plug, male, Type K, 5 Pairs (Chromel and Alumel)	2x5	213-PINM-K	82,00

#### Thermocouple Pins

Material Chromel and Alumel  
Construction Stamped Contacts  
(Air side Thermocouple Housings are available on request)

Pins	ADAPTOR	Qty.	Part Number	Euro
9	Sub-D Adaptor, female to female, for Air Side 9-Pin Feedthrough	1	211-D9-ADAPT	48,00
15	Sub-D Adaptor, female to female, for Air Side 15-Pin Feedthrough	1	211-D15-ADAPT	50,00
25	Sub-D Adaptor, female to female, for Air Side 25-Pin Feedthrough	1	211-D25-ADAPT	51,00
37	Sub-D Adaptor, female to female, for Air Side 37-Pin Feedthrough	1	211-D37-ADAPT	54,00

#### Demounting Tool 214-CRIMPINS

The Pins click into place in the HV Sockets. If it is required to remove them, the Demounting Tool should be used.

This Tool can also be used to easily insert the Pins into the HV Sockets.

Adaptor (See Picture left)

The Sub-D Feedthroughs have male Plug type connections both inside and outside. The Adaptor converts the air side Plug into a (female) Socket (see Illustration far left).

To fit Kapton Wire to Sub-D Pins, the use of a Wire Stripper is recommended (see page 30).



Wire Stripper



Thermocouple Pins



9-Pin Feedthrough with Adaptor fitted

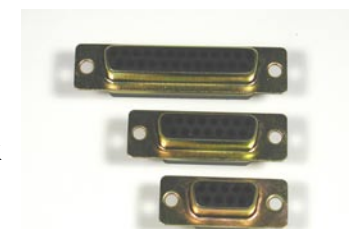
For Wires and Ribbon Cable see Page 26

For finished Sub-D Cable see Page 31

### Air Side Thermocouple Sockets

As Sub-D Feedthroughs can also be used for thermocouple readout, we now offer low cost sockets for the air side, which can be used with the Thermocouple Crimp Pins (Our measurements showed a maximum error of 1.2K when using a Sub-D Feedthrough, i.e. within the region of tolerance of a K-Type Thermocouple).

Pins	AIR SIDE SOCKETS FOR T/C PINS	Qty.	Part Number	Euro
9	9-pin Socket for T/C pins, female	1	211-FS09-ATC	60,00
15	15-pin Socket for T/C pins, female	1	211-FS15-ATC	63,00
25	25-pin Socket for T/C pins, female	1	211-FS25-ATC	67,00
50	50-pin Socket for T/C pins, female	1	211-FS50-ATC	74,00



#### Specification TC-Socket

Version For Air Side use  
Temperature 65°C

Housings accept Thermocouple Pins as well as all the other female Crimp Pins

## Choice of Co-axial Types

Co-axial Feedthroughs are well suited for measurement signals. If high frequencies or short pulses are used, the 50 Ω versions are best.

	BNC	BNC50	SMA50	SMB	MHV	SHV	SHV50	N50
Type	BNC Standard	50 Ohm BNC	50 Ohm SMA	Miniature Type	MHV similar to BNC but 5 kV	“SAVE HIGH VOLTAGE“	50 Ohm SHV	Type N typically used for RF
Max.Volts.	500	1000	1000	500	5000	5 kV-20 kV	6000	3000
Max.Amps	3	3	3	0,5	3	5	3	5
Max. MHz	-	100 *)	6500	-	-	-	100	200
Impedance Ω	-	50	50	-	-	-	50	50
Application	General Purpose	Middle Frequency	High Frequency	Restricted Space	Higher Voltages	High Voltage	Signal at High voltage	RF

\*) : Double Sided BNC Feedthroughs are rated to 4 Ghz.

COAX FT

## BNC- Feedthroughs

Specification BNC



Vacuum UHV  
 Temperature 300°C  
 Max.Voltage 500V\*  
 Max. Current 3A  
 Impedance Not Constant except 50 Ohm types  
 Frequency (50 Ω ): to 100MHz standard type, 4GHz double sided type  
 Pin Diam. 2.4mm  
 Pin Length 9mm  
 13mm (50 Ohm)

\*Voltage limited by Connector

All Types are available on KF- Flanges



Floating Shield BNC



BNC FEEDTHROUGH – STANDARD		Pins	Part Number	Euro
-	BNC Feedthrough, weldable, ø12.6mm	1	241-BNC	82,00
16CF	BNC Feedthrough on DN16CF	1	241-BNC-C16	163,00
40CF	BNC Feedthrough on DN40CF	1	241-BNC-C40	169,00
40CF	BNC Feedthrough, 2 Pins, on DN40CF	2	241-BNC-C40-2	215,00
40CF	BNC Feedthrough, 3 Pins, on DN40CF	3	241-BNC-C40-3	285,00
40CF	BNC Feedthrough, 4 Pins, on DN40CF	4	241-BNC-C40-4	350,00

BNC 50 OHM TYPE		Pins	Part Number	Euro	
-	BNC Feedthrough, weldable, 50 Ohm, max. 100MHz	50 Ω	1	241-BNC50	164,00
16CF	BNC Feedthrough on DN16CF, 50 Ohm, max. 100MHz	50 Ω	1	241-BNC50-C16	212,00
40CF	BNC Feedthrough, 2 Pins, on DN40CF, 50 Ohm, max. 100MHz	50 Ω	2	241-BNC50-C40-2	364,00

BNC 50 Ohm FLOATING SHIELD		Pins	Part Number	Euro	
-	BNC Feedthrough Floating Shield, weldable, 50 Ohm, max. 100MHz, ø16.5mm	50 Ω floating	1	241-BNCF50	250,00
16CF	BNC Feedthrough Floating Shield, DN16CF, 50 Ohm, max. 100MHz	50 Ω floating	1	241-BNCF50-C16	279,00

BNC DOUBLE SIDED FLOATING SHIELD		Pins	Part Number	Euro	
-	BNC Feedthrough Floating Shield, weldable, 50 Ohm, max. 4 GHz, double sided, 16.5mm Ø	50 Ω	1	241-BNCDF50	353,00
16CF	BNC Feedthrough Floating Shield, DN16CF, 50 Ohm, max. 4 GHz, double sided	50 Ω	1	241-BNCDF50-C16	436,00
40CF	BNC Feedthrough Floating Shield, DN40CF, 50 Ohm, max. 4 GHz, double sided	50 Ω	1	241-BNCDF50-C40	442,00
40CF	DN40CF with 2x BNC Feedthroughs, floating Shield, 50 Ohm, max. 4 GHz, double sided	50 Ω	2	241-BNCDF50-C40-2	726,00

### SMA Feedthroughs

The SMA Co-axial Feedthrough has several advantages over other types:

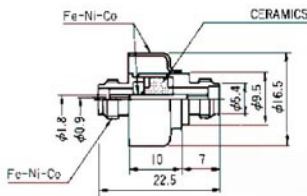
- Miniature size means up to 4 feedthroughs can be housed on a DN40CF flange
- SMA is available double sided with both internal and external 50 Ohm plugs.
- UHV compatible 50 Ohm Kapton Cable fits to the Vacuum side Sockets
- Vacuum sockets are available in Ceramic or PTFE (Teflon). The latter is best for high frequency performance.
- Floating Shield versions are available.



COAX FT

#### SMA Specification

Vacuum	UHV
Temperature	300°C
Max Voltage	1000V
Max Current	3A
Impedance	50 Ohm
Frequency	to 6,5GHz
Ø Weld-	
(242-SMA50)	9.5mm
(242-SMAD/SMADF)	16.5mm



Dimensions of the weldable version 242-SMAD (and 242-SMADF)



Socket Connector for Vacuum

#### Socket Connector UHV

Material	Stainless Steel & Cu, Gold Plated
Isolation	PTFE or Glass Ceramic
Max. Temp.	250°C
Wire fixing	solder or crimp

#### Accessories

- UHV Solder 315-SOLDER
- 50 Ohm Cable 311-KAP50

All Feedthroughs are available on KF flanges on request!

A separate data sheet for SMA feedthroughs is available on request. Please call Sales Office.

SMA HIGH FREQUENCY		Imp.	Type	Part Number	Euro
-	SMA Feedthrough, weldable, 50 Ohm, max. 6.5GHz, 1000V 3A	50Ω	Single	242-SMA50	278,00
16CF	SMA Feedthrough on DN16CF, 50 Ohm	50Ω	Single	242-SMA50-C16	348,00
40CF	SMA Feedthrough on DN40CF, 50 Ohm	50Ω	Single	242-SMA50-C40	355,00
40CF	2x SMA Feedthrough on DN40CF, 50 Ohm	50Ω	Single	242-SMA50-C40-2	607,00
-	SMA Feedthrough, double sided, weldable, 50 Ohm, max. 6.5GHz, 1000V 3A	50Ω	Double-sided	242-SMAD50	360,00
16CF	SMA Feedthrough, double sided on DN16CF	50Ω	Double-sided	242-SMAD50-C16	447,00
40CF	SMA Feedthrough, double sided on DN40CF	50Ω	Double-sided	242-SMAD50-C40	454,00
40CF	2x SMA Feedthrough, double sided on DN40CF	50Ω	Double-sided	242-SMAD50-C40-2	776,00
-	SMA Feedthrough, double sided, Floating Shield, weldable, 50 Ohm, max. 6.5GHz, 1000V 3A	50Ω	Double Floating	242-SMADF50	433,00
16CF	SMA Feedthrough, double sided, Floating Shield, on DN16CF	50Ω	Double Floating	242-SMADF50-C16	513,00
40CF	SMA Feedthrough, double sided, Floating Shield, on DN40CF	50Ω	Double Floating	242-SMADF50-C40	521,00
40CF	2x SMA Feedthrough, double sided, Floating Shield, on DN40CF	50Ω	Double Floating	242-SMADF50-C40-2	900,00
40CF	3x SMA Feedthrough, double sided, Floating Shield, on DN40CF	50Ω	Double Floating	242-SMADF50-C40-3	1327,00

SOCKETS AND ADAPTORS		Imp.	Type	Part Number	Euro
Vacuum	SMA Socket, gold plated, with PTFE Isolation	50Ω	Socket	245-CON-SMA	85,00
Vacuum	SMA Socket, gold plated, with Ceramic Isolation	50Ω	Socket	245-CON-SMA-CER	115,00
Vacuum	SMA Plug, gold plated, with PTFE Isolation	50Ω	Plug	245-CON-SMA-F	95,00
Air	SMA Socket, air side for Cable RG174	50Ω	Socket	245-CON-SMA-AIR	51,00
Air	SMA Socket, for air side for Cable RG58	50Ω	Socket	245-CON-SMA-AIR58	51,00
Air	Adaptor BNC Plug to SMA Socket ( to fit BNC Cable to SMA Feedthrough)	50Ω	Adaptor	245-ADAPT-BNC-SMA	56,00

We offer ready made cables, see Page 29  
These can be made up with SMA Sockets at one end or both ends.



## SMB / MHV / SHV & Type-N Feedthroughs

**SMB** is the smallest co-axial feedthrough which is available.

**MHV** is a variation of the BNC type. The main difference is that it can be used up to 5000V

**SHV** (Safe High Voltage) is a modern System for Voltages up to 5 kV, the maximum current rating is higher than the MHV type.

**Type-N** is used for RF Signals.



### General Specification

Vacuum UHV  
Temperature. 300°C

### Specification SMB

Max. Voltage 500V  
Max. Current 0.5A  
Impedance Not constant  
ø weldable: 4,75mm  
Pin ø 0.8mm  
Cable RG174A/U

### Specification MHV

Max Voltage 5000V / 6000V  
Max Current 3A  
Impedance Not Constant  
ø Weldable 12.6mm  
Pin ø 2.4mm  
Cable RG59B/U

### Specification SHV / SHVE

Max. Voltage 5000V  
Max. Current 5A  
Impedance Not Constant  
ø Weldable 12.6mm  
Pin ø 2.4mm  
Cable RG59B/U  
- 241-SHV-C16 see photo above right-

### Specification Type-N

Max Voltage 3000V  
Max. Current 5A  
Impedance 50 Ohm, to 200MHz  
ø Weldable 12.6mm  
Pin ø 2.4mm  
Cable RG213 / RG214/U

SMB MINIATURE CO-AXIAL FEEDTHROUGHS		Part Number	Euro
-	SMB Feedthrough, weldable, 500V 0.5A	241-SMB	215,00
16CF	SMB Feedthrough on DNI6CF, 500V, 0.5A	241-SMB-C16	324,00

MHV 5 kV FEEDTHROUGHS		Part Number	Euro
-	MHV Feedthrough, weldable, 5 kV 3A	241-MHV	82,00
16CF	MHV Feedthrough on DNI6CF, 5 kV, 3A	241-MHV-C16	163,00
40CF	MHV Feedthrough on DN40CF, 5 kV, 3A	241-MHV-C40	169,00
40CF	2x MHV Feedthroughs on DN40CF, 5 kV, 3A	241-MHV-C40-2	215,00
40CF	3x MHV Feedthroughs on DN40CF, 5 kV, 3A	241-MHV-C40-3	285,00
40CF	4x MHV Feedthroughs on DN40CF, 5 kV, 3A	241-MHV-C40-4	356,00

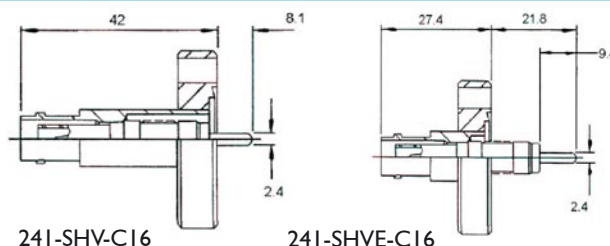
SHV (SAFE HIGH VOLTAGE) FEEDTHROUGHS		Part Number	Euro
-	SHV Feedthrough, weldable, 5 kV 5A	241-SHV	118,00
16CF	SHV Feedthrough on DNI6CF, 5 kV, 5A	241-SHV-C16	202,00
40CF	SHV Feedthrough on DN40CF, 5 kV, 5A	241-SHV-C40	208,00
40CF	2x SHV Feedthroughs on DN40CF, 5 kV, 5A	241-SHV-C40-2	298,00
40CF	3x SHV Feedthroughs on DN40CF, 5 kV, 5A	241-SHV-C40-3	415,00
40CF	4x SHV Feedthroughs on DN40CF, 5 kV, 5A	241-SHV-C40-4	515,00

SHVE (EXPOSED CERAMIC TYPE) F/T		Part Number	Euro
-	SHVE Feedthrough, weldable, 5 kV 5A, long ceramic	241-SHVE	137,00
16CF	SHVE Feedthrough on DNI6CF, 5 kV, 5A	241-SHVE-C16	253,00
40CF	SHVE Feedthrough on DN40CF, 5 kV, 5A	241-SHVE-C40	253,00
40CF	2x SHVE Feedthroughs on DN40CF, 5 kV, 5A	241-SHVE-C40-2	382,00
40CF	3x SHVE Feedthroughs on DN40CF, 5 kV, 5A	241-SHVE-C40-3	518,00
40CF	4x SHVE Feedthroughs on DN40CF, 5 kV, 5A	241-SHVE-C40-4	653,00

Type-N FEEDTHROUGHS		Imp.	Part Number	Euro
-	Type-N Feedthrough, weldable, 50 Ohm, max.200MHz, 3 kV, 5A	50Ω	242-N50	209,00
16CF	Type-N Feedthrough on DNI6CF, 50 Ohm, max. 200MHz, 3 kV, 5A	50Ω	242-N50-C16	277,00
40CF	Type-N Feedthrough on DN40CF, 50 Ohm, max. 200MHz, 3 kV, 5A	50Ω	242-N50-C40	282,00
40CF	2x Type-N Feedthroughs on DN40CF, 50 Ohm, max. 200MHz, 3 kV, 5A	50Ω	242-N50-C40-2	493,00



Type N Feedthrough



All Feedthroughs are complete with Air Side Socket Connector

COAX FT

### 20 kV Co-axial Feedthroughs and 5 kV Triaxial

The SHV-20 High Voltage Feedthrough offers a safe air side connection for high voltage signals.

Two distinct types are offered. The standard type has the high voltage insulator within the body of the feedthrough while the extended type has the ceramic exposed on the vacuum side.

For sensitive signals the Triaxial-Feedthrough can be used. The Triaxial feedthrough is doubly shielded. The inner shield is isolated from both the conductor and the system ground. The outer shield is connected to system ground.

COAX FT

SHV HIGH VOLTAGE 20 kV FEEDTHROUGHS		A	B	Pins	Part Number	Euro
-	20 kV SHV High Voltage Feedthrough, Weldable, 20 kV, 5A	96	9	1	250-SHV-20K	292,00
16CF	DN16CF 20 kV SHV High Voltage Feedthrough 20 kV, 5A	96	8	1	250-SHV-20K-C16	376,00
40CF	DN40CF 20 kV SHV High Voltage Feedthrough, 20 kV, 5A	96	8	1	250-SHV-20K-C40	376,00
40CF	DN40CF 2x 20 kV SHV High Voltage Feedthrough, 20 kV, 5A	96	8	2	250-SHV-20K-C40-2	678,00

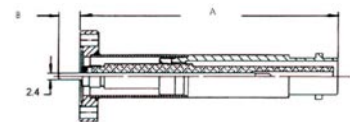
SHV EXTENDED 20 kV FEEDTHROUGHS		A	B	Pins	Part Number	Euro
-	20 kV SHVE High Voltage Feedthrough, Weldable, 20 kV, 5A, extended type	70	35	1	250-SHVE-20K	292,00
16CF	DN16CF 20 kV SHVE High Voltage Feedthrough 20 kV, 5A, extended type	71	34	1	250-SHVE-20K-C16	376,00
40CF	DN40CF 20 kV SHVE High Voltage Feedthrough, 20 kV, 5A, extended type	71	34	1	250-SHVE-20K-C40	376,00
40CF	DN40CF 2x 20 kV SHVE High Voltage Feedthroughs, 20 kV, 5A, extended type	71	34	2	250-SHVE-20K-C40-2	678,00

TRIAxIAL FEEDTHROUGHS		A	B	Pins	Part Number	Euro
-	Triaxial Feedthrough, weldable, 5 kV, 3A, Weld diameter-Ø 32.6mm	23	25	1	243-TRIAX	653,00
40CF	DN40CF Triaxial Feedthrough, 5 kV, 3A	23	25	1	243-TRIAX-C40	737,00
40KF	DN40KF Triaxial Feedthrough, 5 kV, 3A	22	26	1	243-TRIAX-K40	737,00

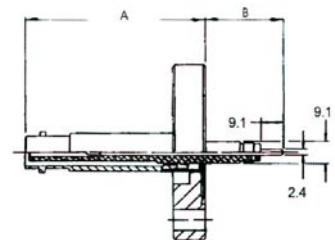


High Voltage Feedthrough SHV-20 kV

Vacuum	UHV
Temperature	300°C
Max. Volts	20.000V
Max. Current	15A
Length in Vacuum	
SHV	8 - 9mm
SHVE	34mm
Pin Ø	2.3mm
Weld diam.	Ø 15.7mm



250-SHV-20K-C16



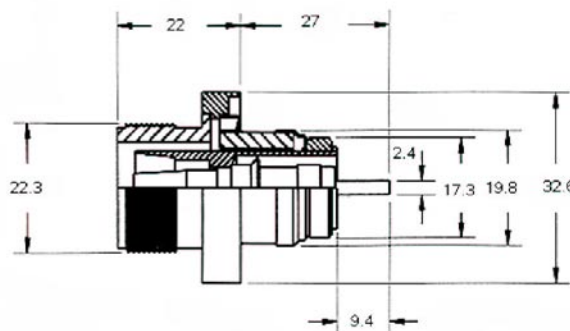
250-SHVE-20-C40

Triaxial Feedthrough

Vacuum	UHV
Temperature	300°C
Max. Volts	5.000V
Max. Current	3A
Pin Ø	2.4mm
Shielding Ø	17,3mm
Weld Ø	32,6mm
Socket	included
Matching Cable	RG11A/U

We offer a matching 50 Ohm Vacuum-Cable for these feedthroughs – see Page 29

All feedthroughs are available on KF or other flange types on request. Special Flanges with multiples or mixed types are built to customer's order. Please call Sales Office.



## CM (Circular Miniature) Feedthroughs

A new series of Feedthroughs has been developed by Cinquepascal. Circular Miniature (CM)-Feedthroughs have 12 or 19 pins on a CFI6 Mini Flange. A high quality fully shielded screw connector on the air side and a PEEK connector with optional shielding and strain relief on the vacuum side give a complete solution. CM series are compatible with industry standard air side connectors.



### 12- and 19-Pin Feedthrough

Vacuum UHV  
 Temperature 230°C  
 Max. Voltage 500V\*  
 Max. Current / pin 3A  
 Max. Current all pins loaded 20A

#### Air Side Socket

All Sockets are fully shielded with gold plated contacts. A cable clamp for strain relief is included.

#### Vacuum Side Socket

Pin diameter 1mm  
 max. cable diameter 0,6mm  
 max. total ø of cable 6mm  
 Crimp Pins (12/19 off) are included

#### Set

The set contains:

- Feedthrough on DNI 16CF
- Air Side straight Socket
- Vacuum Side Socket
- Crimp Pins (12 or 20 off)

#### Additional products:

Air Side Cable, 12x0.14mm<sup>2</sup>, shielded 314-CAB12-AIR € 50,00/m  
 Air Side Cable, 20x0.214mm<sup>2</sup>, shielded 314-CAB20-AIR € 52,00/m  
 Both cables are twisted pair versions.

#### Additional Crimp pins for Vacuum Side

Pack of 10:  
 220-CM-PINF-10 € 58,00  
 Pack of 20:  
 220-CM-PINF-20 € 72,00

#### - Ready made cables on request -

	16CF SETS	Part Number	Euro
16CF	12-pin CM F/T on 16CF Flange with Air Side and Vacuum Side Socket and Crimp Pins	220-SET12-1	454,00
16CF	19-pin CM F/T on 16CF Flange with Air Side and Vacuum Side Socket and Crimp Pins	220-SET19-1	605,00

	12-PIN CM F/T	Pins	Part Number	Euro
16CF	12-pin CM F/T on 16CF Flange	12	220-CM12-C16	304,00
40CF	12-pin CM F/T on 40CF Flange	12	220-CM12-C40	304,00
40CF	2x 12-pin CM F/Ts on 40CF Flange	24	220-CM12-C40-2	524,00
40CF	3x 12-pin CM F/Ts on 40CF Flange	36	220-CM12-C40-3	758,00

	19-PIN CM F/T	Pins	Part Number	Euro
16CF	19-pin CM F/T on 16CF Flange	19	220-CM19-C16	432,00
40CF	19-pin CM F/T on 40CF Flange	19	220-CM19-C40	432,00
40CF	2x 19-pin CM F/Ts on 40CF Flange	38	220-CM19-C40-2	694,00
40CF	3x 19-pin CM F/Ts on 40CF Flange	57	220-CM19-C40-3	1016,00

Pins	AIR SIDE SOCKETS	Part Number	Euro
12	12-pin Socket, straight	220-CON12-AIR	59,00
12	12-pin Socket, 90°	220-CON12-AIR90	66,00
19	19-pin Socket, straight	220-CON19-AIR	66,00
19	19-pin Socket, 90°	220-CON19-AIR90	75,00

Pins	SOCKET WITH CABLE	Part Number	Euro
12	12-pin Cable, 2m, straight connector	220-CAB12-AIR	95,00
12	12-pin Cable, 2m, 90° connector	220-CAB12-AIR90	109,00

Pins	VACUUM SIDE SOCKETS	Part Number	Euro
12	12-pin Socket, straight, incl. Pins	220-CON12	192,00
19	19-pin Socket, straight, incl. Pins	220-CON19	201,00

Pins	VAC. SOCKET, HOUSING & STRAIN RELIEF	Part Number	Euro
12	12-pin Socket, straight, with Housing	220-CON12-SR	275,00
19	12-pin Socket, straight, with Housing	220-CON19-SR	282,00

For the vacuum side we propose the use of Ribbon Cable:  
 - 15 way for 12 pin  
 - 15 way + 4 way for 19 pin

CM FT

### Dual in Line (DIL) Feedthroughs

A new, ultra-compact signal feedthrough is now available. This has a high density 2x2mm pitch and 40 pins with 0.5mm diameter.

- Ideal to fix electronic boards direct to flange
- Cost effective way for high pin requirements
- Weldables available on request.



Specification Dual In-line Feedthrough

Vacuum	UHV
Temperature	230°C
Test Voltage	500V
Max. current	0.5A
Pin Diameter	0.5mm
Pitch	2x2mm

DIL FT

Flange	DUAL INLINE(DIL) F/T	Pins	Part Number	Euro
63CF	1x 40 pin f/t on DN63CF Flange	40	230-DIL40M-C63	661,00
63CF	2x 40 pin f/t on DN63CF Flange	80	230-DIL40M-C63-2	1081,00
63CF	3x 40 pin f/t on DN63CF Flange	120	230-DIL40M-C63-3	1559,00
I00C	1x 40 pin f/t on DNI00CF Flange	40	230-DIL40M-C100	694,00
I00CF	2x 40 pin f/t on DNI00CF Flange	80	230-DIL40M-C100-2	1124,00
I00CF	3x 40 pin f/t on DNI00CF Flange	120	230-DIL40M-C100-3	1591,00
I00CF	4x 40 pin f/t on DNI00CF Flange	160	230-DIL40M-C100-4	2065,00

	CONNECTORS AIR / VACUUM	Qty.	Part Number	Euro
Air	Air Side Connector, IDC for 1mm pitch	1	230-CON40M-IDC-AIR	46,00
Air	Air Side Connector, solder pins	1	230-CON40M-W-AIR	46,00
Vac	Vac. Side Connector, PEEK (no pins)	1	230-CON40M	249,00
Vac	Pins for Vacuum side, 10 off	10	360-CRF-05-10	83,00
Vac	Pins for vacuum side, 40 off	40	360-CRF-05-40	180,00
Air	Ribbon Cable, 40 wires, 1mm pitch	1m	314-RIB40-1-AIR	55,00



### Braid

High quality Nickel plated Copper Braid is offered in two basic dimensions. Copper gives much better shielding than S/S Braid. The braid comes with a plastic insert for simple and easy use.

	BRAID	Length	Part Number	Euro
3 mm	Copper Braid, Nickel plated, nom. ID 3 mm ( ID variable from 2-6mm)	1m	640-QAD63	55,00
4 mm	Copper Braid, Nickel plated, nom. ID 3 mm ( ID variable from 2-6mm)	1m	640-QAD100	58,00



Please note: If the ID of the Braid is increased, the length is reduced accordingly.



## Power Feedthroughs 500 V to 1 kV up to 15 A

A wide variety of Power Feedthroughs are available with Voltage Ratings from 500V to 100 kV for currents from mA to 1.000 A. On the following pages the types are sorted by Voltage rating . Special High Current types (>30 A) are on page 18 For High Voltage types see Page 19.

The 500V versions are very small. As standard for these 500V miniature types, we offer Molybdenum Conductors These have a current rating up to 10 A. 1 kV types have as standard Copper Conductors. Stainless Steel and Nickel Conductors are available on request for all types.



Pins	500 V WELDABLE	A	B	C	D	Part Number	Euro
1	500V 10 A, Mo-Pin 0.8 mm	53	0,8	3,9	25	261-010MO500	79,00
2	500V 10 A, Mo-Pin 0.8 mm, 2 Pins	64	0,8	12,6	40	261-010MO500-2	118,00
4	500V 10 A, Mo-Pin 0.8 mm, 4 Pins	64	0,8	12,6	40	261-010MO500-4	131,00
8	500V 10 A, Mo-Pin 0.8 mm, 8 Pins	64	0,8	19	40	261-010MO500-8	169,00

Specification 500V Miniature Types

Pin-Material Molybdenum  
 Weld Adaptor Stainless Steel  
 Max.Voltage: 500V  
 Max. Current 10 A  
 Conductor Ø 0.8 mm

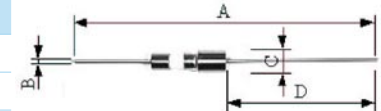
Pins	500 V CF FLANGE	A	B	C	D	Part Number	Euro
1	Feedthrough 500V 10 A, Mo-Pin 0.8 mm, DNI6CF Flange	53	0,8	-	25	261-010MO500-C16	153,00
2	Feedthrough 500V 10 A, Mo-Pin 0.8 mm, 2 Pins, DNI6CF Flange	64	0,8	-	39	261-010MO500-C16-2	182,00
4	Feedthrough 500V 10 A, Mo-Pin 0.8 mm, 4 Pins, DNI6CF Flange	64	0,8	-	39	261-010MO500-C16-4	195,00
8	Feedthrough 500V 10 A, Mo-Pin 0.8 mm, 8 Pins, DNI6CF Flange	64	0,8	-	39	261-010MO500-C16-8	227,00

These feedthroughs are also available with the following conductor materials:

- Stainless Steel < 1 A
- Copper 3 A
- Nickel 2 A
- Constantan \* 1 A

(\* only 1-Pin Version, suitable for Cryogenic use).

Pins	1 kV WELDABLE	A	B	C	D	Part Number	Euro
1	1 kV 15 A, Cu-Pin 1.3 mm	83	1,3	6,3	57	261-015CUIK	79,00
2	1 kV 15 A, Cu-Pin 1.3 mm, 2 Pins	102	1,3	19	48	261-015CUIK-2	105,00
4	1 kV 15 A, Cu-Pin 1.3 mm, 4 Pins	102	1,3	19	48	261-015CUIK-4	144,00
8	1 kV 15 A, Kovar-Pin 1.3 mm, 8 Pins	102	1,3	19	48	261-015CUIK-8	195,00



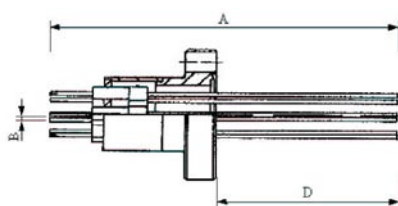
N.B.: Molybdenum is hard and brittle. Great care is needed if the conductor is to be shortened . Short conductors are available to order.

Pins	1 kV CF FLANGE	A	B	C	D	Part Number	Euro
1	DNI6CF Feedthrough, 1 Pin, 1 kV 15 A, Cu-Pin 1.3 mm	83	1,3	-	56	261-015CUIK-C16	144,00
2	DNI6CF Feedthrough, 2 Pins, 1 kV 15 A, Cu-Pin 1.3 mm	102	1,3	-	35	261-015CUIK-C16-2	156,00
4	DNI6CF Feedthrough, 4 Pins, 1 kV 15 A, Cu-Pin 1.3 mm	102	1,3	-	35	261-015CUIK-4-C16	176,00
8	DNI6CF Feedthrough, 8 Pins, 1 kV 15 A, Kovar-Pin 1.3 mm	133	1,3	-	89	261-015CUIK-8-C16	221,00

Specification 1 kV Types

Pin-Material Copper (Nickel and SS optional)  
 8-Pin Version with Kovar-Pins  
 Weld adaptor Stainless Steel  
 Max.Voltage 1 kV  
 Max Current 15 A (Cu)  
 Conductor Ø 1.3 mm

These feedthroughs are also available on DN40CF /25KF/40KF or 1" base plate flanges



### Socket Connectors

500V: Crimp contacts for 0.75/ 0.8mm can be used (see Page 27) Alternatively the Sub-D Pins crimp can be directly crimped to the feedthrough pins (See Page 6).

For 1 kV: versions, crimp contacts are available in addition to screw contacts. See Page 27 for details.



POWER FT

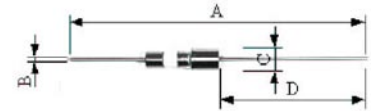
## Power Feedthroughs 3 kV to 10 kV, up to 30 A

Cinquepascal offers Power Feedthroughs, flanged and unflanged from 3 to 10 kV with current capacity up to 30 A Custom fabrications with several Feedthroughs on one flange to order. Choice of Conductor materials: Copper (Cu), Nickel (Ni), Stainless Steel (SS), Alumel or Nickel -Molybdenum alloy (Ni-Mo).



### Specification

Pin-Material	Copper Standard, Nickel or Stainless Steel optional
Weld Adaptor	Stainless Steel
Max. Voltage	3.5 kV/ 5 kV/ 10 kV DC
Current	1 A - 30 A
Conductor	Ø 0.8/1.3/2.3/2.4mm

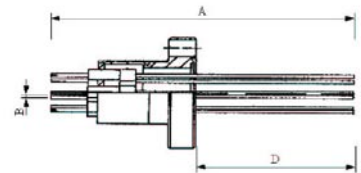


Single Pin Weld Adaptor

WELD VERSION SINGLE PIN								
kV	A	Pin Mat.	Pin Ø	C	A	D	Part Number	Euro
5	15	Cu	1,3	6,3	102	55	261-015CU5K	79,00
5	5	Ni	1,3	6,3	102	55	261-005NI5K	79,00
5	1	SS	1,3	6,3	102	55	261-001SS5K	79,00
10	30	Cu	2,4	11	184	117	261-030CU10K	79,00
10	15	Ni	2,3	11	184	117	261-015NI10K	79,00

WELD VERSION MULTI-PIN									
Pins	kV	A	Pin Mat.	Pin Ø	C	A	D	Part Number	Euro
2	5	15	Cu	1,3	19	102	54	264-015KU5K-2	131,00
2	5	5	Ni	1,3	19	102	54	264-005NI5K-2	131,00
2	5	1	SS	1,3	19	102	54	264-001SS5K-2	131,00
4	5	15	Cu	1,3	19	102	54	264-015CU5K-4	144,00
4	5	5	Ni	1,3	19	102	54	264-005NI5K-4	144,00
4	5	1	SS	1,3	19	102	54	264-001SS5K-4	144,00
6	2	10	Alumel	1,4	19	133	81	264-010AL5K-6	240,00
7	3,5	10	Ni-Mo	0,8	19	145	102	264-010-MO3K-7	273,00
10	3,5	10	Ni-Mo	0,8	19	148	89	264-010-MO3K-10	324,00
20	3,5	10	Ni-Mo	0,8	38,1	148	86	264-010-MO3K-20	518,00

CF VERSIONS									
Pins	kV	A	Pin Mat.	CF	Pin Ø	A	D	Part Number	Euro
7	3,5	10	Ni-Mo	CF16	0,8	145	89	264-010-MO3K-7-C16	318,00
10	3,5	10	Ni-Mo	CF16	0,8	148	77	264-010-MO3K-10-C16	466,00
1	5	15	Cu*	CF16	1,3	101	54	261-015CU5K-C16	128,00
2	5	15	Cu*	CF16	1,3	101	41	264-015CU5K-2-C16	176,00
4	5	15	Cu*	CF16	1,3	101	41	264-015CU5K-4-C16	195,00
1	5	30	Cu*	CF16	2,4	192	135	261-030CU5K-C16	144,00
2	5	30	Cu*	CF16	2,4	192	135	264-030CU5K-2-C16	215,00
3	5	30	Cu*	CF16	2,4	192	135	264-030CU5K-3-C16	247,00
1	10	30	Cu*	CF16	2,4	184	117	261-030CU10K-C16	195,00
2	10	30	Cu*	CF16	2,4	184	117	264-030CU10K-2-C16	253,00
7	3,5	10	Ni-Mo	CF40	0,8	145	89	264-010-MO3K-7-C40	466,00
10	3,5	10	Ni-Mo	CF40	0,8	148	76	264-010-MO3K-10-C40	424,00
20	3,5	10	Ni-Mo	CF40	0,8	148	85	264-010-MO3K-20-C40	550,00
1	5	30	Cu*	CF40	2,4	197	125	261-030CU5K-C40	136,00
2	5	30	Cu*	CF40	2,4	192	70	264-030CU5K-2-C40	221,00
4	5	30	Cu*	CF40	2,4	192	70	264-030CU5K-4-C40	292,00
8	5	30	Cu*	CF40	2,4	192	70	264-030CU5K-8-C40	427,00
12	5	30	Cu*	CF40	2,4	192	70	264-030CU5K-12-C40	511,00
2	10	30	Cu*	CF40	2,4	184	117	264-030CU10K-2-C40	260,00
4	10	30	Cu*	CF40	2,4	184	117	264-030CU10K-4-C40	344,00



Multi-pin flanged type

All Feedthroughs are available on KF or other flange types to order.

For other flanges or special types . please call Sales Office

\* Also with Nickel-Conductor, Current Rating 5A for 1.3mm / 15A for 2.4mm Ø

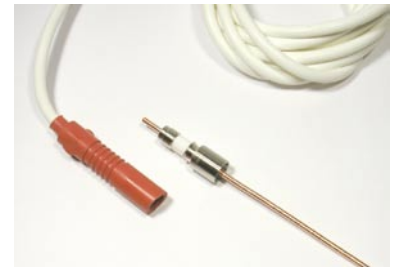
All Types are available with KF flanges, Please call Sales Office for prices.

## Feedthroughs with Single Boot Socket 5 kV-40 kV

Single Boot Sockets provide a component for the construction of safe and convenient high voltage feedthrough assemblies.

N.B. All high voltage sockets and feedthroughs must be carefully installed in accordance with current safety regulations. If multiple feedthroughs are used, care must be taken that one Boot Socket cannot be removed alone.

Cinquepascal offers Single Boot Sockets for 5 kV, 20 kV and 40 kV



Pins	WELDABLE VERSION 5 kV	Ø	C	A	D	Part Number	Euro
	Weldable Feedthrough, 5 kV 25A, Cu-Pin 2.4mm, with 2.4m Cable	2,4	11	178	135	265-025CU5K	105,00
	Weldable Feedthrough, 5 kV 15A, Ni-Pin 2.4mm, with 2.4m Cable	2,4	11	178	135	265-015NI5K	105,00
	Weldable Feedthrough, 5 kV 1A, SS-Pin 2.4mm, with 2.4m Cable	2,4	11	178	135	265-001SS5K	105,00

### Specification 5 kV

Pin-Material	Cu, Ni und Stainless Steel
Weld Adaptor	Stainless Steel
Max. Volts	5 kV DC
Max. Current	25A (Cu)
Conductor Cable	Ø 2,4mm Silicon isolated
Temperature	-55... 125°C

CF	VERSION 5 kV	Ø	A	D	Part Number	Euro
16CF 1	Copper Pin including 2.4m Cable	2,4	178	135	265-025CU5K-C16	176,00
40CF 1	Copper Pin including 2.4m Cable	2,4	178	135	265-025CU5K-C40	202,00
40CF 2	Copper Pins including 2.4m Cable	2,4	178	135	265-025CU5K-2-C40	285,00
40CF 3	Copper Pins including 2.4m Cable	2,4	178	135	265-025CU5K-3-C40	350,00
40CF 4	Copper Pins including 2.4m Cable	2,4	178	135	265-025CU5K-4-C40	421,00
40CF 5	Copper Pins including 2.4m Cable	2,4	178	135	265-025CU5K-5-C40	479,00
40CF 6	Copper Pins including 2.4m Cable	2,4	178	135	265-025CU5K-6-C40	550,00
40CF 7	Copper Pins including 2.4m Cable	2,4	178	135	265-025CU5K-7-C40	615,00
40CF 8	Copper Pins including 2.4m Cable	2,4	178	135	265-025CU5K-8-C40	672,00

### Specification 20 kV

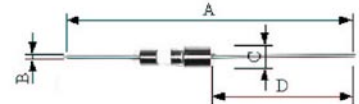
Max. Volts	20 kV DC
Max. Current	25A (Cu)
Other parameters	as above

Every Feedthrough on this page (except the 40 kV type) includes a Single Boot Socket and 2.4m Cable

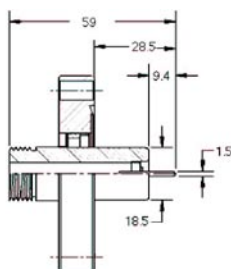
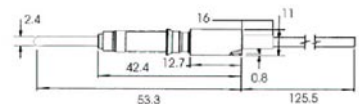
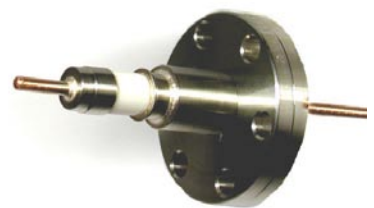
Pins	WELDABLE VERSION 20 kV	Ø	C	A	D	Part Number	Euro
	Weldable Feedthrough, 20 kV 25A, Cu Pin 2.4mm, with 2.4m Cable	2,4	11	178	122	265-025CU20K	111,00
	Weldable Feedthrough, 20 kV 15A, Ni-Pin 2.4mm, with 2.4m Cable	2,4	11	178	122	265-015NI20K	111,00
	Weldable Feedthrough, 20 kV 1A, SS-Pin 2.4mm, with 2.4m Cable	2,4	11	178	122	265-001SS20K	111,00

Sockets for the 2.4mm Pins can be found on page 29. All Feedthroughs are available on KF or other flanges.

CF	VERSION 20 kV	Ø	A	D	Part Number	Euro
16CF 1	Copper Pin including 2.4m Cable	2,4	178	122	265-025CU20K-C16	227,00
40CF 1	Copper Pin including 2.4m Cable	2,4	178	122	265-025CU20K-C40	253,00
40CF 2	Copper Pins including 2.4m Cable	2,4	178	122	265-025CU20K-C40-2	324,00
40CF 3	Copper Pins including 2.4m Cable	2,4	178	122	265-025CU20K-C40-3	395,00
40CF 4	Copper Pins including 2.4m Cable	2,4	178	122	265-025CU20K-C40-4	473,00
40CF 5	Copper Pins including 2.4m Cable	2,4	178	77	265-025CU20K-C40-5	573,00
40CF 6	Copper Pins including 2.4m Cable	2,4	178	77	265-025CU20K-C40-6	615,00
40CF 7	Copper Pins including 2.4m Cable	2,4	178	77	265-025CU20K-C40-7	672,00
40CF 8	Copper Pins including 2.4m Cable	2,4	178	77	265-025CU20K-C40-8	749,00



	40 kV FEEDTHROUGH	A	B	C	D	Part Number	Euro
weld	Weldable, 40 kV 7A, 1 Pin 1.6mm, with 9m Cable	59	1,6	28,5	28	265-007SS40K	550,00
40CF	DN40CF Version, 40 kV 7A, 1 Pin 1.6mm, with 9m Cable	59	1,6	-	28	265-007SS40K-C40	589,00



40 kV Feedthrough and Cable see photos left for dimensions refer to figure left



### High Current Feedthroughs 40 A – 1000 A (3-20 kV)

High current Feedthroughs are typically used for heaters and furnaces. These feedthroughs are also used for applications such as Electron Beam Evaporation Sources. We offer a range of high current feedthroughs with weld adaptors, CF flanges or other flanges including KF types on request.

POWER FT

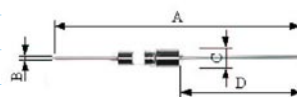
A	kV	WELDABLE	A	B	C	D	Part Number	Euro
75	5	Cu,	58	4	10,8	14	261-075CU5K	95,00
150	5	Cu	184	6,35	15,8	105	261-150CU5K	102,00
150	12	Cu	184	6,35	17,4	93	261-150CU12K	169,00
150	20	Cu, fluted Ceramic	184	6,35	38,1	89	261-150CU20K	266,00
250	3	Cu,	184	9,6	19	104	261-250CU3K	118,00
600	3	Cu,	184	19	28,5	86	261-600CU3K	208,00
75	5	Ni	184	6,35	15,8	105	261-075Ni5K	102,00
75	12	Ni	184	6,35	17,4	93	261-075Ni12K	169,00
75	20	Ni fluted Ceramic	184	6,35	38,1	89	261-075Ni20K	266,00



A	CF	Pins	kV	CF FLANGE	A	B	D	Part Number	Euro
75	16CF	1	5	Cu,	58	4,00	13	261-075CU5K-C16	153,00
75	40CF	1	5	Cu	58	4,00	13	261-075CU5K-C40	158,00
75	40CF	2	5	Cu	58	4,00	13	264-075CU5K-C40-2	268,00
75	40CF	3	5	Cu	58	4,00	13	264-075CU5K-C40-3	360,00
75	40CF	4	5	Cu	58	4,00	13	264-075CU5K-C40-4	412,00
150	16CF	1	5	Cu	184	6,35	116	261-150CU5K-C16	150,00
150	40CF	1	5	Cu	184	6,35	103	261-150CU5K-C40	156,00
150	40CF	2	5	Cu	184	6,35	103	264-150CU5K-C40-2	260,00
150	40CF	3	5	Cu	184	6,35	103	264-150CU5K-C40-3	331,00
150	40CF	4	5	Cu	184	6,35	103	264-150CU5K-C40-4	395,00
150	16CF	1	12	Cu	184	6,35	102	261-150CU12K-C16	285,00
150	40CF	1	12	Cu	184	6,35	82	261-150CU12K-C40-2	285,00
150	40CF	2	12	Cu,	184	6,35	82	264-150CU12K-C40-2	556,00
150	40CF	1	20	Cu, fluted Ceramic	184	6,35	90	261-150CU20K-C40	363,00
250	16CF	1	3	Cu	184	9,60	116	261-250CU3K-C16	189,00
600	40CF	1	3	Cu	184	19,00	85	261-600CU3K-C40	273,00
1000	40CF	1	3	Cu, Water Cooled	333	19,00	149	261-1000CU3K-C40	1059,00
75	16CF	1	5	Ni,	184	6,35	102	261-075Ni5K-C16	150,00
75	40CF	1	5	Ni,	184	6,35	82	261-075Ni5K-C40	156,00
75	40CF	2	5	Ni	184	6,35	82	264-075Ni5K-C40-2	260,00
75	40CF	3	5	Ni	184	6,35	82	264-075Ni5K-C40-3	331,00
75	40CF	4	5	Ni	184	6,35	82	264-075Ni5K-C40-4	395,00
75	16CF	1	12	Ni	184	6,35	102	261-075Ni12K-C16	285,00
75	40CF	1	12	Ni	184	6,35	82	261-075Ni12K-C40	285,00
75	40CF	2	12	Ni	184	6,35	82	264-075Ni12K-C40-2	556,00
75	40CF	1	20	Ni, fluted Ceramic	184	6,35	90	261-075Ni20K-C40	363,00

#### Specification

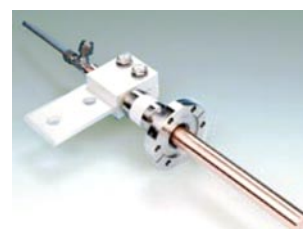
Pin-Material	Copper, Nickel Stainless Steel on request
Weld Adaptor	Stainless Steel
Max. Volts	3 kV – 20 kV DC
Max. Current with Cu conductor	
4mm	75A
6.35mm	150A
9.6mm	250A
19mm	600A



#### Water Cooled 1000A Feedthrough

Max. Current	1000A
Pin-Material	Copper
Water Connection	1/4" (6.35mm) Swagelock

The Water Connection is held at high voltage. Therefore the water pipe work must be constructed from insulating material such as plastic.



All Feedthroughs can be delivered on KF or other flange types. Also mixed combinations on various flanges are possible. Please call Sales Office for details

## High Voltage Feedthroughs 20 kV – 100 kV Tube Feedthroughs

High Voltage Feedthroughs are offered in ratings up to 100 kV.  
High Voltage Feedthroughs are not build for high currents as high voltage and high current are typically not used together.

Tube Feedthroughs are suitable for liquid cooling applications and High Voltages where higher currents are necessary.



20 kV 2.4mm CONDUCTOR	Ø	C	A	D	Part Number	Euro
High Voltage Weldable Feedthrough, 20 kV 15A, Ni-Pin 2.4mm with thread on the air side	2,4	19	224	143	266-015Ni20K	144,00
DN16CF High Voltage Feedthrough, 20 kV 15A, Ni-Pin 2.4mm with thread on the air side	2,4	-	224	143	266-015Ni20K-C16	182,00

30 kV 2.4mm CONDUCTOR	Ø	C	A	D	Part Number	Euro
High Voltage Weldable Feedthrough 30 kV 1A, Stainless Steel -Pin 2.4mm with thread on the air side	2,4	38,1	226	122	266-001SS30K	240,00
DN40CF High Voltage Feedthrough 30 kV 1A, Stainless Steel -Pin 2.4mm with thread on the air side	2,4	-	226	121	266-001SS30K-C40	318,00

25 kV 2 PINS, 2.4mm CONDUCTOR	Ø	C	A	D	Part Number	Euro
Weld Feedthrough 25 kV 30A, 2xCu-Pins 2.4mm with thread on the air side	2,4	38,1	136	25	266-030CU25K-2	485,00
DN40CF Feedthrough 25 kV 30A, 2xCu-Pins 2.4mm with thread on the air side	2,4	-	162	42	266-030CU25K-2-C40	589,00

40-100 kV 4mm CONDUCTOR	Ø	C	A	D	Part Number	Euro
40CF 40 kV 3A Feedthrough, Stainless Steel Pin 4mm	4	-	317	100	266-003SS40K-C40	550,00
63CF 60 kV 3A Feedthrough, Stainless Steel Pin 4mm, fluted ceramic	4	-	316	118	266-003SS60K-C63	1291,00
100CF 100 kV 3A Feedthrough, Stainless Steel Pin 4mm, fluted ceramic	4	-	419	142	266-003SS100K-C100	2865,00

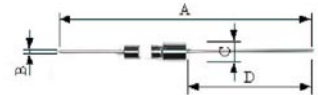
TUBE FEEDTHROUGHS WELDABLE	Ø	C	A	D	Part Number	Euro
Cu Tube Feedthrough, 6,35mm OD	6,35	15,8	184	105	272-TU6CU5K	118,00
Ni Tube Feedthrough, 6,35mm OD	6,35	15,8	184	105	272-TU6NI5K	118,00
SS Tube Feedthrough, 6,35mm OD	6,35	15,8	184	105	272-TU6SS5K	118,00

TUBE FEEDTHROUGH CF16	Ø	A	D	Part Number	Euro
Tube Feedthrough, 6,35mm OD,	6,35	184	123	272-TU6CU5K-C16	150,00
Ni Tube Feedthrough, 6,35mm OD,	6,35	184	123	272-TU6NI5K-C16	150,00
SS Tube Feedthrough, 6,35mm OD,	6,35	184	123	272-TU6SS5K-C16	150,00

TUBE FEEDTHROUGH CF40, SS	Ø	A	D	Part Number	Euro
SS 1 Stainless Steel Tube, CF40	6,35	184	123	272-TU6SS5K-C40	156,00
SS 2 Stainless Steel Tubes, CF40	6,35	184	123	272-TU6SS5K-2-C40	260,00
SS 3 Stainless Steel Tubes, CF40	6,35	184	123	272-TU6SS5K-3-C40	331,00
SS 4 Stainless Steel Tubes, CF40	6,35	184	123	272-TU6SS5K-4-C40	395,00

### High Voltage Feedthroughs

Pin-Material	Copper, Ni and Stainless Steel( SS)
Weld Adaptor	Stainless Steel
Max. Volts	5 kV – 30 kV DC
Max. Current (Cu-conductor)	
2.4mm	30A
4mm	75A
6.53mm	150A



Versions with 2 or 3 Pins are typically used for filament power supplies.

For multi-pin versions, the maximum voltage between pins is 3 kV

### Tube Feedthrough

Max. Volts	5 kV
Tube Diameter	¼" = 6.35mm (9.6mm or 19mm to order)
Wall Thickness	0.8mm



Maximum Current Ratings are not specified for Tube Feedthroughs. If cooling liquid is used, very high currents can be passed.

### Multi-Way Feedthroughs with MS Socket

- Multi-pin Feedthroughs with MS (screwed) connection on the air side.
- Double Ended Versions with vacuum compatible connector on the vacuum side.
- CF and Weldable Versions, KF Types available to order.



Pins	MULTI-PIN F/T WELDABLE	A	B	D	Part Number	Euro
4	Weldable, 10 A, 700 V, with air side socket	61	79	19	221-10AL700-4	266,00
6	Weldable, 10 A, 700 V, with air side socket	61	79	19	221-10AL700-6	285,00
10	Weldable, 10 A, 700 V, with air side socket	61	79	19	221-10AL700-10	447,00
20	Weldable, 10 A, 700 V, with air side socket	64	88	35	221-10AL700-20	524,00
35	Weldable, 10 A, 700 V, with air side socket	101	53	38,1	221-10AL700-35	949,00

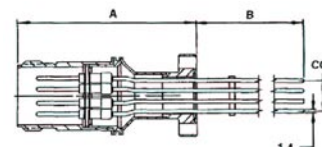
Pins	MULTI-PIN F/T CF	A	B	CC	Part Number	Euro
4	DN16CF, 10 A, 700 V, with air side socket	74	67	9,7	221-10AL700-4-CF16	298,00
6	DN16CF, 10 A, 700 V, with air side socket	74	67	11	221-10AL700-6-CF16	318,00
6	DN40CF, 10 A, 700 V, with air side socket	63	78	11	221-10AL700-6-C40	331,00
10	DN16CF, 10 A, 700 V, with air side socket	74	67	13	221-10AL700-10-C16	479,00
10	DN40CF, 10 A, 700 V, with air side socket	63	78	13	221-10AL700-10-C40	492,00
20	DN40CF, 10 A, 700 V, with air side socket	85,5	87	26	221-10AL700-20-C40	634,00
35	DN40CF, 10 A, 700 V, with air side socket	102	52	31	221-10AL700-35-C40	995,00

Pins	MULTI-PIN F/T DOUBLE SIDED WELDABLE	A	B	D	Part Number	Euro
4	Weldable, 10 A, 700 V, double sided with vacuum and air side socket	60	89	34,8	222-10AL700-4D	891,00
6	Weldable, 10 A, 700 V, double sided with vacuum and air side socket	60	89	34,8	222-10AL700-6D	982,00
10	Weldable, 10 A, 700 V, double sided with vacuum and air side socket	60	89	34,8	222-10AL700-10D	1124,00
20	Weldable, 10 A, 700 V, double sided with vacuum and air side socket	71	89	63,4	222-10AL700-20D	1348,00
35	Weldable, 10 A, 700 V, double sided with vacuum and air side socket	64	99	63,4	221-10AL700-35D	2400,00

Pins	MULTI-PIN F/T DOUBLE SIDED CF	A	B	Part Number	Euro
4	DN40CF, 10 A, 700 V, double sided with vacuum and air side socket	61	87	222-10AL700-4D-C40	1014,00
6	DN40CF, 10 A, 700 V, double sided with vacuum and air side socket	61	87	222-10AL700-6D-C40	1130,00
10	DN40CF, 10 A, 700 V, double sided with vacuum and air side socket	61	87	222-10AL700-10D-C40	1259,00
20	DN63CF, 10 A, 700 V, double sided with vacuum and air side socket	72	87	222-10AL700-20D-C63	1548,00
35	DN100CF, 10 A, 700 V, double sided with vacuum and air side socket	65	98	222-10AL700-35D-C100	2710,00

Pins	MULTI-PIN F/T HIGH VOLTAGE CF	Part Number	Euro
2	DN16CF, 7.5 A, 12 kV, with air side socket	267-075HV12K-C16-2	591,00
4	DN16CF, 7.5 A, 12 kV, with air side socket	267-075HV12K-C16-4	637,00
7	DN16CF, 7.5 A, 12 kV, with air side socket	267-075HV12K-C16-7	677,00
2	DN40CF, 7.5 A, 12 kV, with air side socket	267-075HV12K-C40-2	593,00
4	DN40CF, 7.5 A, 12 kV, with air side socket	267-075HV12K-C40-4	639,00
7	DN40CF, 7.5 A, 12 kV, with air side socket	267-075HV12K-C40-7	680,00

#### Specification



Max. Voltage 700V (limited by the Socket, Feedthrough to 2 kV)

Max. Current 10A / Pin max.

Temperature 450°C

(Socket 125°C)

Pin-Material Alumel

Pin ø 1.4mm

A ceramic disc on the vacuum side protects the pin positions.

#### Double Sided Feedthroughs



Max. Voltage 700V  
 Max. Current 10A / Pin max.  
 Temperature 400°C, incl. Vacuum-Socket  
 (Air Side Socket 125°C)  
 Pin-Material Alumel  
 Pin ø 1.4mm

Maximum total current shared by all pins at once

4 Pins	28A
6 Pins	36A
10 Pins	50A
20 Pins	75A
35 Pins	100A

Additional Sockets are available to order.

#### Vacuum Side Connections

The Crimp-Pins 360-CRIMP-I.3, can be directly fitted to the vacuum side of the feedthroughs. See Page 30

360-PPO-I.3 and 360-PIC-I.8 can also be used in some cases but not where space is restricted.

D = Diameter of the Weld Adaptor

All Types are available on KF / ISO-K Flanges. Connections for the Vacuum side – See Page 30

## Thermocouple Feedthroughs Type K, N, C

Overview of the various Thermocouple Types

Type	Material	Temp. °C	Description
K	+ Chromel® - Alumel®	-200 ... 1250	Most Common Type, Alumel is magnetic, Socket Yellow (ANSI)
C	+ W5%Re - W26%Re	0 ... 2320	Feedthrough made from Extension Grade Material
N	+ Nicrosil - Nisil	-250 ... 1300	New Type, Best General Purpose Type, Socket pink (IEC)
E	+ Chromel® - Constantan®	-200 ... 900	High Temperature Socket violet
J	+ Iron - Constantan®	0 ... 750	Socket Black
T	+ Copper - Constantan®	-200 ... 350	Socket Blue (ANSI)
R	+ Pt13%Rh - Pt	0 ... 1450	Feedthrough made from Extension Material
S	+ Pt10%Rh - Pt	0 ... 1450	Feedthrough made from Extension Material



Extension Grade Material has the same thermo-electric characteristics as the original material up to 250° C

® Chromel, Alumel and Constantan are registered trade marks (see page 3)

The most common types used in UHV and High Vacuum are listed on this page: Type K, Type C and the new Type N

### Specification Type K

Temp. Range -200°C- +1250°C  
+ Pole Chromel  
- Pole Alumel (magnetic)

Pairs	TYPE K WELDABLE VERSIONS	A	B	C	Part Number	Euro
1	1 Pair Type K, Weldable Version	33	114	19	262-TCK-1	140,00
2	2 Pairs Type K, Weldable Version	54	114	19	262-TCK-2	220,00
3	3 Pairs Type K, Weldable Version	57	114	19	262-TCK-3	346,00
4	4 Pairs Type K, Weldable Version	51	114	19	262-TCK-4	451,00
5	5 Pairs Type K, Weldable Version	64	114	19	262-TCK-5	595,00

### Specification Type N

Temp. Range -250 °C... 1300°C  
+ Pole Nicrosil  
- Pole Nisil

Pairs	TYPE K CF VERSIONS	A	B	C	Part Number	Euro
1	DN16CF Feedthrough Type K, 1 Pair	47	101	-	262-TCK-1-C16	179,00
2	DN16CF Feedthrough Type K, 2 Pairs	67	101	-	262-TCK-2-C16	265,00
2	DN40CF Feedthrough Type K, 2 Pairs	55	113	-	262-TCK-2-C40	313,00
3	DN16CF Feedthrough Type K, 3 Pairs	71	101	-	262-TCK-3-C16	391,00
3	DN40CF Feedthrough Type K, 3 Pairs	58	115	-	262-TCK-3-C40	454,00
4	DN40CF Feedthrough Type K, 4 Pairs	50	100	-	262-TCK-4-C40	587,00
5	DN40CF Feedthrough Type K, 5 Pairs	57	100	-	262-TCK-5-C40	711,00

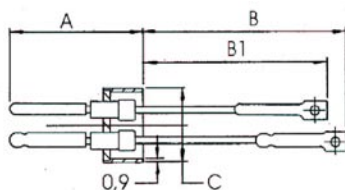
### Specification Type C

Temp. Range 0°C ... 2320°C  
(0°C... 250°C for Extension Material)  
+ Pole W5%Re  
- Pole W26%

Pairs	TYPE N WELDABLE VERSIONS	A	B	C	Part Number	Euro
1	1 Pair Type N, Weldable Version	33	114	19	262-TCN-1	140,00
2	2 Pairs Type N, Weldable Version	54	114	19	262-TCN-2	220,00
Pairs	TYPE N CF VERSIONS	A	B	C	Part Number	Euro
1	DN16CF Feedthrough Type N, 1 Pair	47	101	-	262-TCN-1-C16	179,00
2	DN16CF Feedthrough Type N, 2 Pairs	67	101	-	262-TCN-2-C16	265,00

ReExtension Grade Material which has the same thermo-electric properties is used to manufacture these feedthroughs

Not suitable for oxidising atmospheres



(B1 = B-25mm)

On the Vacuum Side, the + Pole is 25 mm longer than the - Pole

Pairs	TYPE C WELDABLE VERSIONS	A	B	C	Part Number	Euro
1	1 Pair, Type C, Weldable Version	33	114	19	262-TCC-1	140,00
2	2 Pairs, Type C, Weldable Version	54	114	19	262-TCC-2	220,00
Pairs	TYPE C CF VERSIONS	A	B	C	Part Number	Euro
1	DN16CF Feedthrough Type C, 1 Pair	47	101	-	262-TCC-1-C16	179,00
2	DN16CF Feedthrough Type C, 2 Pairs	67	101	-	263-TCC-2-C16	265,00

Thermocouples Type K / N / C / E / J are available as weldables in 1 - 5 Pairs. Additionally they are available on CF or KF flanges at the same prices as the K types

Kapton isolated Thermocouple Wire – see Page 26

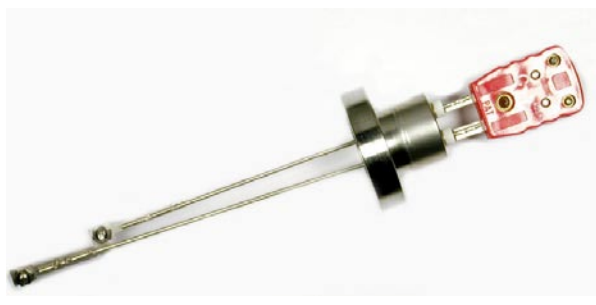
T/C FT

### Thermocouple Feedthroughs Type E, J, T, R and S

Type E and J Feedthroughs with Socket Connectors.

All these Thermocouple Feedthroughs are available in the same variety of types as the Type K (previous page).

Type R, S and T with air side screw connectors.



#### Specification Type E

Temp. Range -200°C ... +900°C  
 + Pole Chromel  
 - Pole Constantan

#### Specification Type J

Temp. Range 0 ... 750°C  
 + Pol Iron  
 - Pol Constantan

#### Specification Type R

Temp. Range 0 ... 1450°C  
 (0...250°C for Extension Material)  
 + Pole Pt13%Rh  
 - Pole Pt

#### Specification Type S

Temp. Range 0 ... 1450°C  
 (0...250°C for Extension Material)  
 + Pole Pt10%Rh  
 - Pole Pt

#### Specification Type T

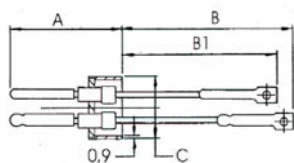
Temp. Range -200 ... 350°C  
 + Pole Copper  
 - Pole Constantan

TYPES E / J / R / S / T WELDABLE VERSION	A	B	C	Part Number	Euro
E Thermocouple Feedthrough Type E, 1 Pair, Weldable Version with Socket	33	114	19	262-TCE-I	140,00
J Thermocouple Feedthrough Type J, 1 Pair, Weldable Version with Socket	33	114	19	262-TCJ-I	140,00
R/S Thermocouple Feedthrough. Type R/S, 1 Pair, Weldable with Screw Connectors	44	114	19	262-TCR-I	153,00
T Thermocouple Feedthrough. Type T, 1 Pair, Weldable with Screw Connectors	44	114	19	262-TCT-I	153,00

Type E / J / R / S / T ON DNI 6CF FLANGE	A	B	C	Part Number	Euro
E DNI 6CF Thermocouple Feedthrough Type E, 1 Pair with Socket Connector	33	114	-	262-TCE-I-C16	179,00
J DNI 6CF Thermocouple Feedthrough Type E, 1 Pair with Socket Connector	33	114	-	262-TCJ-I-C16	179,00
R/S DNI 6CF Thermocouple Feedthrough Type R/S, 1 Pair, with Screw Connector	53	101	-	262-TCR-I-C16	192,00
T DNI 6CF Thermocouple Feedthrough Type T, 1 Pair, with Screw Connector	53	101	-	262-TCT-I-C16	192,00

HIGH TEMPERATURE SOCKETS	Part Number	Euro
K Thermocouple Socket . 650°C, K-Type	265-TC-CON-K-HT	66,00
C Thermocouple Socket . 650°C, C-Type	265-TC-CON-C-HT	66,00
N Thermocouple Socket . 650°C, N-Type	265-TC-CON-N-HT	77,00

Type R and Type S use the same Extension Material, so the same Feedthrough is used for both types.



The + Pole is 25mm longer on the Vacuum Side than the - Pole

The standard Plastic Thermocouple Socket is bakeable to 120°C. For High Temperature applications, Ceramic Thermocouple Sockets (see table above) are available. These can be used up to 650°C. These High Temperature Ceramic Sockets are also suitable for use in Vacuum.



Thermocouple Wire can be found on Page 29. A full range of Kapton and Teflon isolated Versions is offered.

Thermocouples Type E / J / R / S / T are available in 1 - 5 Pair versions as Weldables or on CF or KF Flanges.

The details are similar to those types shown on page 21.



## Combination Thermocouple - Power Feedthroughs - Weldable

Type	Mat.	POWER (x2), T/C	TYPE K	Pins*	V	I	Part Number	Euro
K	Cu	Weldable	Ø 19mm OD, Conductor Ø 1.3mm	2 / 1	1 kV	15A	263-TCK-I-CU15	260,00
K	Cu	Weldable	Ø 19mm OD, Conductor Ø 2.4mm	2 / 1	5 kV	30A	263-TCK-I-CU30	292,00
K	Ni	Weldable	Ø 19mm OD, Conductor Ø 1.3mm	2 / 1	1 kV	5A	263-TCK-I-NI5	260,00
K	Ni	Weldable	Ø 19mm OD, Conductor Ø 2.3mm	2 / 1	5 kV	15A	263-TCK-I-NI5	292,00
Type	Mat.	POWER (x2), T/C	TYPE C	Pins*	V	I	Part Number	Euro
C	Cu	Weldable	Ø 19mm OD, Conductor Ø 1.3mm	2 / 1	1 kV	15A	263-TCC-I-CU15	305,00
C	Cu	Weldable	Ø 19mm OD, Conductor Ø 2.4mm	2 / 1	5 kV	30A	263-TCC-I-CU30	337,00
C	Ni	Weldable	Ø 19mm OD, Conductor Ø 1.3mm	2 / 1	1 kV	5A	263-TCC-I-NI5	298,00
C	Ni	Weldable	Ø 19mm OD, Conductor Ø 2.3mm	2 / 1	5 kV	15A	263-TCC-I-NI5	331,00



Combination Feedthroughs are ideal for Heaters.

Thermocouple Type K / C N / E / J on request

Thermocouple feedthrough with air side connector, Vacuum side with screw contacts.

## Combination Thermocouple - Power Feedthroughs - DN16CF Flange

Type	Mat.	POWER (x2), T/C	TYPE K	Pins*	V	I	Part Number	Euro
K	Cu	DN16CF Flange, Conductor Ø 1.3mm		2 / 1	1 kV	15A	263-TCK-I-CU15-CI6	305,00
K	Cu	DN16CF Flange, Conductor Ø 2.4mm		2 / 1	5 kV	30A	263-TCK-I-CU30-CI6	337,00
K	Ni	DN16CF Flange, Conductor Ø 1.3mm		2 / 1	1 kV	5A	263-TCK-I-NI5-CI6	298,00
K	Ni	DN16CF Flange, Conductor Ø 2.3mm		2 / 1	5 kV	15A	263-TCK-I-NI5-CI6	331,00
Type	Mat.	POWER (x2), T/C	TYPE C	Pins*	V	I	Part Number	Euro
C	Cu	DN16CF Flange, Conductor Ø 1.3mm		2 / 1	1 kV	15A	263-TCC-I-CU15-CI6	305,00
C	Cu	DN16CF Flange, Conductor Ø 2.4mm		2 / 1	5 kV	30A	263-TCC-I-CU30-CI6	337,00
C	Ni	DN16CF Flange, Conductor Ø 1.3mm		2 / 1	1 kV	5A	263-TCC-I-NI5-CI6	298,00
C	Ni	DN16CF Flange, Conductor Ø 2.3mm		2 / 1	5 kV	15A	263-TCC-I-NI5-CI6	331,00

Specification (weldable, DN16CF)

Conductor Cu and Ni  
1.3 / 2.4mm  
Current(I) Cu 1.3mm: 15A  
Cu 2.4mm: 30A  
Ni 1.3mm: 5A  
Ni 2.3mm: 15A  
Max.Voltage(V) 1 kV or 5 kV  
16CF flange 1 Thermocouple,  
2 Power Conductors  
Weld Adaptor Ø 19mm O.D.

(KF16 flange versions to order)

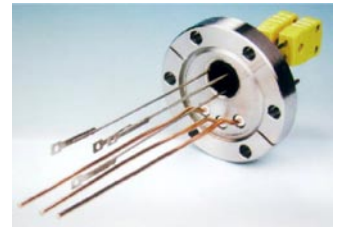
## Combination Thermocouple - Power Feedthroughs (High Current) - DN40CF Flange

Type	Mat.	POWER (x3), T/C (x2)	TYPE K	Pins*	V	I	Part Number	Euro
K	Cu	DN40CF Flange, Conductor Ø 2.4mm		3 / 2	5kV	30A	263-TCK-2-CU30-C40	589,00
C	Cu	DN40CF Flange, Conductor Ø 2.4mm		3 / 2	5kV	30A	263-TCC-2-CU30-C40	589,00
Type	Mat.	POWER (x3), T/C	TYPE C	Pins*	V	I	Part Number	Euro
K	Cu	DN40CF Flange, Conductor Ø 4mm		3 / 1	5kV	60A	263-TCK-I-CU60-C40	563,00
C	Cu	DN40CF Flange, Conductor Ø 4mm		3 / 1	5kV	60A	263-TCC-I-CU60-C40	563,00
Type	Mat.	POWER (x3), T/C (x2)	TYPE C	Pins*	V	I	Part Number	Euro
K	Cu	DN40CF Flange, Conductor Ø 4mm		3 / 2	5kV	60A	263-TCK-2-CU60-C40	615,00
C	Cu	DN40CF Flange, Conductor Ø 4mm		3 / 2	5kV	60A	263-TCC-2-CU60-C40	615,00
Type	Mat.	HIGH POWER (x2), T/C (x2)	TYPE C	Pins*	V	I	Part Number	Euro
K	Cu	DN40CF Flange, Conductor Ø 6.35 mm		2 / 2	5kV	150A	263-TCK-I-CU150-C40	556,00
C	Cu	DN40CF Flange, Conductor Ø 6.35 mm		2 / 2	5kV	150A	263-TCC-I-CU150-C40	556,00
Type	Mat.	HIGH POWER (x2), T/C (x2)	TYPE K	Pins*	V	I	Part Number	Euro
K	Cu	DN40CF Flange, Conductor Ø 6.35 mm		2 / 2	5kV	150A	263-TCK-2-CU150-C40	608,00
C	Cu	DN40CF Flange, Conductor Ø 6.35 mm		2 / 2	5kV	150A	263-TCC-2-CU150-C40	608,00

\* Power Pins / TC pairs



Power Thermocouple Feedthrough on DN16CF flange



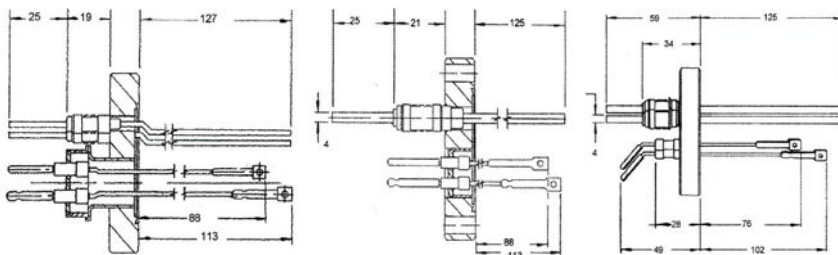
Specification (DN40CF)

Conductor Cu  
2.4 / 4 / 6.35mm  
Max. Current (I)  
Cu 2.4mm: 30A  
Cu 4mm: 60A  
Cu 6.35mm : 150A  
40CF 1 or 2 Thermocouples

30 A and 60 A versions have 3 Power Pins  
150 A versions have 2 Power Pins

The + Pole of the Thermocouple is 25 mm longer on the vacuum side

Other Combinations not shown here can be built to order



**All K and C Type Thermocouple Feedthroughs are supplied complete with Thermocouple Sockets. Socket Connectors for Power Pins are listed on Page 30.**

N.B. If it is necessary to shorten the conductor, care must be taken. The ceramic to metal bond is fragile and sensitive to knocks. The conductor should be held firmly on either side of the cut. Cinquepascal can supply feedthroughs with shortened conductors to order.

### Thermocouple Feedthroughs with MS Sockets

The MS Circular Connector provides a method of safe and secure connection for several thermocouple pairs in one feedthrough. The MS series can accommodate up to 10 pairs on one flange.

Double Sided versions are available. They have air and vacuum side socket connectors. The vacuum side one is fully bakeable.

These feedthroughs can be used to carry mixed power and thermocouple combinations.

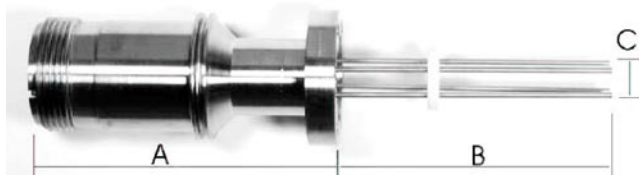


Double Sided Version

Pairs	MST/C FEEDTHROUGH TYPE			A	B	C	Part Number	Euro	Specification		
	K	CF	FLANGE						Types	Type	
2	16CF	DN16CF Thermocouple Feedthrough with MS Socket, Type K, 2 Pairs		69	69	10	263-TCK-MS-2-C16	402,00	Pairs		K Standard, E / J on request 2 / 3 / 5 on DN16CF
3	16CF	DN16CF Thermocouple Feedthrough with MS Socket, Type K, 3 Pairs		69	69	11	263-TCK-MS-3-C16	440,00			2 / 3 / 5 / 10 on DN40CF
5	16CF	DN16CF Thermocouple Feedthrough with MS Socket, Type K, 5 Pairs		69	69	13	263-TCK-MS-5-C16	518,00	Pin ø		1.4mm
2	40CF	DN40CF Thermocouple Feedthrough with MS Socket, Type K, 2 Pairs		57	80	10	263-TCK-MS-2-C40	421,00		Air side sockets are included.	
3	40CF	DN40CF Thermocouple Feedthrough with MS Socket, Type K, 3 Pairs		57	80	11	263-TCK-MS-3-C40	447,00	Specification	Double Sided Type.	
5	40CF	DN40CF Thermocouple Feedthrough with MS Socket, Type K, 5 Pairs		57	80	13	263-TCK-MS-5-C40	544,00	Types		Type K Standard, E / J on request
10	40CF	DN40CF Thermocouple Feedthrough with MS Socket, Type K, 10 Pairs		57	80	26	263-TCK-MS-5-C40	924,00	Pairs		2 / 3 / 5 on DN40CF
									Pin ø		10 on DN63CF
										Air and Vacuum Side socket connectors are included.	

C: Diameter of the Pin Circle on the Vacuum Side

Pairs	MST/C FEEDTHROUGH TYPE K		A	B	Part Number	Euro
	DOUBLE SIDED	CF FLANGE				
2	40CF	Double Sided, Type K, 2 Pairs, DN40CF	61	93	263-TCK-MSD-2-C40	1573,00
3	40CF	Double Sided, Type K, 3 Pairs, DN40CF	61	93	263-TCK-MSD-3-C40	1746,00
5	40CF	Double Sided, Type K, 5 Pairs, DN40CF	61	93	263-TCK-MSD-5-C40	2145,00
10	63CF	Double Sided, Type K, 10 Pairs, DN63CF	72	88	263-TCK-MSD-5-C63	2431,00



As an alternative to the MS Series, Sub-D Feedthroughs can be used with Thermocouple, Pins for Type K Thermocouples. See Page 8 for details.

Thermocouple-Crimp-Pins for these Feedthroughs are listed on page 29

MS Series Thermocouple Feedthroughs can be used either wholly or partly as Power Feedthroughs Max. Current per Pin: 10A Max. Voltage: 700V

## Ceramic Breaks and Isolators

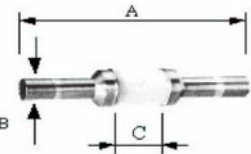
- Small Tube Size Breaks for Gas and Liquid lines
- Cryogenic versions for use with Liquid Nitrogen
- Large sizes for System Isolation

N.B. If using Ceramic Breaks to join two Vacuum Systems while maintaining electrical isolation, the use of a bellows in addition to the Break is recommended.

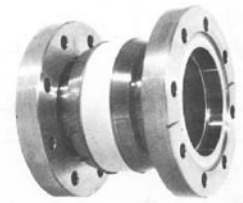
Stand-offs for mounting high voltage items are suitable for use in air or vacuum. (In air the Maximum Voltage rating should be reduced by a factor of 2.5)



Ceramic Breaks



Ceramic Max Volts  $Al_2O_3$  from 3 kV, to 100 kV  
 Temperature. 450°C max.  
 max. 25K /min



Isolators (Stand-offs)



273-CSO-10-10

Material Steatite (MgO)  
 Screws Stainless Steel

The voltage rating in air is approximately 2.5 less than in vacuum

Other Types and Sizes on request

Ø	CERAMIC BREAKS WELDABLE	A	B	C	Ø	Part Number	Euro
1/8"	Ceramic Break Weldable, 3 kV, 3.2mm Tube Diameter, suitable for cryogenic use (fits 1/8" SWG)	59	3,20	7,6	3,2	271-CB-03K-3	98,00
1/4"	Ceramic Break Weldable, 6 kV, 6.35mm (1/4") Tube Diameter, suitable for cryogenic use	76	7,90	17,0	6,35	271-CB-06K-6	135,00
3/8"	Ceramic Break Weldable, 6 kV, 9.5mm (3/8") Tube Diameter, suitable for cryogenic use	76	9,50	17,0	9,5	271-CB06K-9	154,00
1/2"	Ceramic Break Weldable, 5 kV, 12.7mm (1/2") Tube Diameter	76	15,00	12,7	12,7	271-CB-06K-12	227,00
16	Ceramic Break Weldable, 20 kV, 16 or 19mm (3/4") Tube Diameter	67	19,00	25,0	16	271-CB-20K-16	228,00
35	Ceramic Break Weldable, 3 kV, 35mm (1.5") Tube Diameter	56	38,10	6,3	35	271-CB-3K-35	311,00
35	Ceramic Break Weldable, 15 kV, 35mm (1.5") Tube Diameter	97	38,10	51,0	35	271-CB-15K-35	318,00
60	Ceramic Break Weldable, 30 kV, 51mm Tube Diameter	85	60,30	51,0	-	271-CB-30K-60	780,00
85	Ceramic Break (fluted) Weldable, 35 kV, 85mm Tube Diameter	118		60,0	-	271-CB-35K-85	932,00

CF	CERAMIC BREAKS CF	A	ID	C	Part Number	Euro
16CF	DNI16CF Ceramic Break, 10 kV, 16mm ID	92	16,0	25	271-CB-10K-16-C016	362,00
40CF	DN40CF Ceramic Break, 15 kV, 32mm ID	107	31,8	51	271-CB-15K-32-C040	318,00
63CF	DN63CF Ceramic Break, 15 kV, 60mm ID	114	60,2	19	271-CB-15K-60-C63	1392,00
100CF	DNI100CF Ceramic Break, 35 kV, 85mm ID, fluted Ceramic	145	85,0	60	271-CB-35K-85-C100	1398,00

Volts	ISOLATORS (STAND-OFFS)	Ø	H	Part Number	Euro
7 kV	Stand-off, 10mm high, 10mm Diameter, Thread both ends 6-32	10,00	10,00	273-CSO-10-10	82,00
10 kV	Stand-off, 12.7mm high, 10mm Diameter, Thread both ends 6-32	10,00	13,00	273-CSO-13-10	82,00
12 kV	Stand-off, 16mm high, 12.7mm Diameter, Thread both ends 8-32	13,00	16,00	273-CSO-16-13	82,00
35 kV	Stand-off, 51mm high, 13mm Diameter, Thread both ends 8-32	13,00	51,00	273-CSO-50-13	82,00
35 kV	Stand-off, 51mm high, 19mm Diameter, Thread both ends 10-32	19,00	51,00	273-CSO-50-20	82,00

H: Height without screws

## Kapton Wire Overview

For many years the Caburn UHV® type of Kapton® wire has been in use in UHV Systems. Cinquepascal offers these original types and a wide range of new Kapton Wire Types for use in UHV and High Vacuum. These include:

- Single Strand Dipped Kapton Wire
- Highly Flexible Multi Strand Types
- Co-axial Wires including 50 ohms type
- Shielded Twisted Pairs and Ribbon Cable



Type	Construction	Ø Cond. mm	Ø max. mm	V max Vac V DC 1)	I max A 2)	Leiter Fläche mm²	R ) Ohm/km 3)	Application Examples
311-KAP-010	Bare Copper Wire Dipped Kapton	0,1	0,28	2.000	0,1	0,01	2270	Suitable for STM / SPM
311-KAP-014	Bare Copper Wire Dipped Kapton	0,14	0,16	2.000	0,2	0,02	1160	Measurement Signals, Radiation Resistant
311-KAP-025	Bare Copper Wire Dipped Kapton	0,25	0,28	2.000	1	0,05	360	Measurement Signals, Radiation Resistant
311-KAP-060	Bare Copper Wire Dipped Kapton	0,63	0,69	2.000	5	0,31	58	Medium Current Radiation Resistant
311-KAP-100	Bare Copper Wire Dipped Kapton	1	1,1	10.000	10	0,79	23	Higher Current and Voltage Radiation Resistant
311-KAP-170	Bare Copper Wire Dipped Kapton	1,7	1,85	12.000	17	2,20	8	Very high Current, Radiation Resistant
311-KAP1	Silver Plated Copper Wrapped Type	0,25	0,55	4.000	1	0,05	360	Caburn UHV® Type, Signals and Sensors
311-KAP2	Silver Plated Copper Wrapped Type	0,6	0,9	4.000	4,5	0,28	64	Caburn UHV® Type, medium Current
311-KAPM-025	Silver Plated Wire, 7x 0.08mm	0,25	0,39	1.000	0,5	0,04	508	Highly Flexible Wire, small current and Voltages
311-KAPM-035	Silver Plated Wire 7x 0.12mm	0,35	0,5	1.000	1	0,08	225	Highly Flexible Wire, up to 1A
311-KAPM-060	Silver Plated Wire, 19x 0.1mm	0,6	0,67	1.000	2,5	0,15	119	Highly flexible Wire suitable for Motors
311-KAPM-100	Silver Plated Wire 19x 0.2mm	1	1,17	1.000	9	0,60	30	Highly Flexible Wire, High Current up to 10A
311-KAP50	<b>50 Ohm</b> Coax-Wire, 7x 0,15mm, Silver Plated Conductor & Shield	0,45	2,3	5.000	1	0,12	144	All 50 Ohm Signals -can be used with SMA Feedthroughs.
311-KAPM-060- COAX	19 x 0.1mm, shielded and insulated	0,6	1,4	1.000	2,5	0,15	119	Signals equivalent to KAP4
311-KAPM-025-SHIELD	Conductor 7x0,08mm, shielded	0,25	0,9	1.000	0,5	0,04	508	Shield is not isolated equivalent to. KAP3
311-KAPM-060- PAIR1	Shielded Twisted Pair 1 Pair	2x 0,6	1,7	1.000	2	0,15	119	Signals, high frequency Power Supplies
311-KAPM-060- PAIR2	Shielded Twisted Pair 2 Pair	4x 0,6	2,2	1.000	2	0,15	119	2-Phase Stepper Motors
311-RIB- 10/15	Ribbon Cable ,10 and 15Way Compact	0,35	0,5	1.000	1	0,08	225	Sub-D Connections, General Purpose

Wires and Cables are supplied on convenient Spools in 5m or 10m.lengths. Ribbon Cables are sold per meter. Special lengths including 100m Spools can be supplied to order.

1) Maximum Voltage in air is much lower than the vacuum rating. For air use, this data does not apply. In vacuum, these figures are conservative and may be exceeded in normal circumstances.They are rated for pressures of <math>10^{-3}</math> mbar.

2) The maximum current in vacuum depends on the degree of temperature rise which is acceptable. If the wire is wound into a coil, the maximum Current Rating should be reduced to 1/3.

3) Calculated values of resistivity for Cu with 56 S m /mm² at 20°C.

## Kapton Wires, Co-axial and Ribbon Cable

Characteristics of Kapton:	Copper Wire	Silver Plated Wire, Ribbon, Coax
Dielectric Constant (1kHz)	~3.5	~3.1
Disruptive Strength (dry) kV/mm	>135	>135
Temperature Range	4K...300°C	4K ... 260°C
Radiation Resistance	10 <sup>9</sup> Rad = 10 <sup>7</sup> Gy	10 <sup>7</sup> Rad = 10 <sup>5</sup> Gy (non-flexing applications)

KAPTON ISOLATED WIRES		Ø	V	Length	Part Number	Euro
Single	Cu Wire 0.1mm Ø, Kapton Isolation	0,1	2 kV	5m	311-KAP-010-5m	142,00
Single	Cu Wire 0.12mm Ø, Kapton Isolation	0,12	2 kV	10m	311-KAP-012	170,00
Single	Cu Wire 0.14mm Ø, Kapton Isolation	0,14	2 kV	10m	311-KAP-014	170,00
Single	Cu Wire 0.25mm Ø, Kapton Isolation	0,25	2 kV	10m	311-KAP-025	110,00
Single	Cu Wire 0.6mm Ø, Kapton Isolation	0,6	2 kV	10m	311-KAP-060	115,00
Single	Cu Wire 1.0mm Ø, Kapton Isolation	1	10 kV	10m	311-KAP-100	127,00
Single	Cu Wire 1.3mm Ø, Kapton Isolation	1,3	10 kV	10m	311-KAP-130	141,00
Single	Cu Wire 1.3mm Ø, Kapton Isolation	1,3	10 kV	5m	311-KAP-130-5m	96,00
Single	Cu Wire 1.7mm Ø, Kapton Isolation	1,7	12 kV	5m	311-KAP-170-5m	145,00
Single Silvered	Kapton Wire Silver Plated Cu 0.25mm, CABURN UHV® Type	0,25	4 kV	10m	311-KAPI	117,00
Single Silvered	Kapton Wire Silver Plated Cu 0.6mm, CABURN UHV® Type	0,6	4 kV	10m	311-KAP2	131,00
Multi-strand	Highly flexible Kapton Wire, 7x 0.08mm, Silver Plated Cu	0,25	1 kV	10m	311-KAPM-025	127,00
Multi-strand	Highly flexible Kapton Wire, 7x 0.12mm, Silver Plated Cu	0,35	1 kV	10m	311-KAPM-035	132,00
Multi-strand	Highly flexible Kapton Wire, 19x 0.12mm, Silver Plated Cu	0,6	1 kV	10m	311-KAPM-060	142,00
Multi-strand	High Flexibility Kapton Wire, 19x 0.12mm, Silver Plated Cu	0,8	1 kV	10m	311-KAPM-075	150,00
Multi-strand	Highly flexible Kapton Wire, 19x 0.2mm, Silver Plated Cu	1	1 kV	10m	311-KAPM-100	156,00
Multi-strand	Very High Flexibility Kapton Wire, 400 x 0.08mm, Silver Plated Cu	2,2	1 kV	5m	311-KAPM-200-5m	218,00
COAXIAL KAPTON CABLE		Ø	V	Length	Part Number	Euro
Coax	Highly flexible Kapton Coax Cable, Multi-strand, 19x 0.12mm, 600V, Conductor and Shield Silver Plated	0,6/1,4	1 kV	10m	311-KAPM-060-COAX	176,00
Coax	Highly flexible Kapton Coax Cable, Multi-strand 7x 0.08mm, Shielded, Shield not insulated	0,25/0,9	1 kV	10m	311-KAPM-025-SHIELD	146,00
50	50 Ohm Coaxial-Kapton Cable, 5m long	2,3	5 kV	5m	311-KAP50	190,00
50	50 Ohm Coaxial-Kapton Cable, 1m long	2,3	5 kV	1m	311-KAP50-1	89,00
MINIATURE COAXIAL CABLE		Ø	V	Length	Part Number	Euro
50 Ω MINI	50 Ohm Coaxial-Kapton Wire, 1.4mmØ, 7x0.08mm, similar to RG178	1,4	5 kV	1m	311-KAP50S-1m	90,00
				5m	311-KAP50S	193,00
TWISTED PAIR, SHIELDED		Ø	V	Length	Part Number	Euro
1 Pair	Twisted Pair Coax Cable, 2 Multistrand Wires 19x 0.1mm, Conductor and Shield Silver Plated	0,6/1,6	1 kV	5m	311-KAPM-060-PAIR1	151,00
2 Pairs	Twisted Pair Coax Cable, 4 Multistrand Wires 19x 0.1mm, Conductor and Shield Silver Plated	0,6/2,2	1 kV	5m	311-KAPM-060-PAIR2	210,00
KAPTON RIBBON CABLE		V	Length	Part Number	Euro	
4 Way	4-way, 7x 0.12mm, 1kV, Silver plated Copper	1 kV	1m	311-KAP-RIB4-1000	85,00	
10 Way	10 way, 7x 0.12mm, 1kV, Silver Plated Copper	1 kV	1m	311-KAP-RIB10-1000	120,00	
15 Way	15 way, 7x 0.12mm, 1kV, Silver Plated Copper	1 kV	1m	311-KAP-RIB15-1000	158,00	
25 Way	25 way, 7x 0.12mm, 1kV, Silver Plated Copper, (one 15 way + one 10way)	1 kV	1m	311-KAP-RIB25-1000	207,00	

**Kapton Wire**  
Ideal for flexible wiring.  
Temp. Range 4K ... 300°C  
(KAPI and KAP2 max.260°C)

**KAPTON-Multi-strand wire**  
Higher Flexibility make these wires ideal for movement in vacuum applications, e.g. UHV Manipulators.  
Temp. Range 4K ... 260°C

**Twisted Pairs**



**Wire** 311-KAPM-060Type  
Coloured Kapton or 2 Pairs, Shielded

Twisted Pair Coax are ideal for limit switches or current wires for Stepper Motors, to prevent cross talk in the vacuum chamber

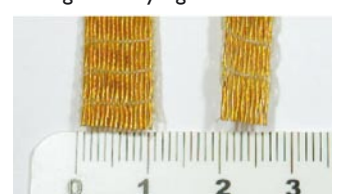


**50 Ohm Cable**  
Impedance 50 Ohm +/-10%  
Capacitance 115 pF/m  
Damping 0,1 db/m 100MHz  
1,1 db/m 500MHz  
1,9 db/m 1GHz

Highest Frequency ~17 GHz  
(Measured with SMA Socket)

**50 Ohm Miniature Cable**  
Impedance ~ 50 Ohm +/-10%  
Capacitance ~ 120 pF/m  
Damping ~ 3 db/m 1GHz

**Ribbon Cable**  
Ribbon Cable is very useful for the Vacuum Side connections to Sub-D feedthroughs, allowing convenient wiring and easy signal identification



### Thermocouples / PT-100 Sensors / Thin Constantan® Wire / PEEK® Material

- Thermocouple Type K with Kapton and Teflon Isolation
- Suitable for use to 260°C and 220°C respectively.

These temperatures must not be exceeded. When the Thermocouple is being used to measure higher temperatures, bare thermocouple wire should be used in the vacuum.

The new type N thermocouple is now available with Kapton Isolation. This type is recommended for general use. It has a wider temperature range and better stability than the popular type K. The Thermocouple Type C, R and S are relatively expensive because they contain noble metals.

For high accuracy measurements, PT100 Sensor Resistors are used as standard.

Special UHV compatible versions (ceramic & glass) are offered.

Ready made Sensors have 4-wire connection as standard, other connections on request.



*Kapton isolated Thermocouple*

Thermocouples Kapton isolated

Diameter 2x0.25mm  
Conductor ø  
Isolation 2 layers of Kapton  
+ Pole Bare  
- Pole Kapton Isolated  
(For Type K the - Pole is magnetic.)

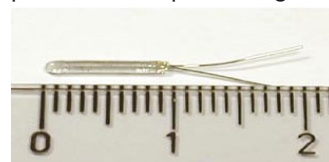
Both wires are isolated additionally with Kapton.

Thermocouple, PTFE isolated

Diameter ~1.4 x2.5 mm  
Conductor Ribbon Cable  
ø 0.5mm

Bare Wire

Bare Thermocouple Wires can be delivered in any required length. The prices shown are per unit length.



*PT-100 Sensor Resistor, Glass Version*

Temp. range -200.. 450°C  
Accuracy Class B  
(0,30 + 0,005 \* t)  
Dim. 1.3mm ø x10mm  
Wire lengths ~10mm

*PT-100 Sensor Resistor, Ceramic Version*

Temp. range -70... 500°C  
Accuracy Class I/3 B  
(0,10 + 0,005 \* t)  
Dim. 2.3mm x2.1mm  
Wire lengths ~10mm

Please note: The connection area from the Kapton Wires to the Resistors must not exceed 280°C.

Constantan-Wire

Very fine wire with poor thermal conductivity. Suitable for use at very low temperatures in applications such as STM/ SPM . Can be crimped to Sub-D Crimp Sockets

Diameter 0.08mm Conductor  
0.24mm Overall  
Isolation PTFE (Teflon)

PEEK

Poly-Ether-Ether-Keton ( PEEK ) is an UHV compatible Polymer. It is bake-able to 250°C. It is machinable with the correct tools but care is needed because it is brittle. Cinquepascal is pleased to quote for machined PEEK parts.

\*) Multiples of 1m can be delivered in one piece

Type	THERMOCOUPLE KAPTON/TEFLON ISOLATED	Length*	Part Number	Euro
K	Kapton isolated Thermocouple Type K 0.25mm	1m	312-KAP-TCK	73,00
K	Kapton isolated Thermocouple Type K 0.25mm	5m	312-KAP-TCK-5m	178,00
K	Kapton isolated Thermocouple Type K 0.25mm	10m	312-KAP-TCK-10m	298,00
K	Teflon isolated Thermocouple, 0.5mm braid	1m	312-PTFE-TCK	68,00
K	Teflon isolated Thermocouple, 0.5mm braid	5m	312-PTFE-TCK-5m	152,00
K	Teflon isolated Thermocouple, 0.5mm braid	10m	312-PTFE-TCK-10m	242,00
N	Kapton isolated Thermocouple Type N 0.25mm	1m	312-KAP-TCN	73,00
N	Kapton isolated Thermocouple Type N 0.25mm	5m	312-KAP-TCN-5m	178,00
N	Kapton isolated Thermocouple Type N 0.25mm	10m	312-KAP-TCN-10m	298,00

Type	BARE THERMOCOUPLE WIRES	Length*	Part Number	Euro
K	Bare Thermocouple Wires Type K 0.25mm	1m	313-TCK-025	51,00
N	Bare Thermocouple Wires Type N 0.25mm,	1m	313-TCN-025	52,00
C	Bare Thermocouple Pair Type C, 0.13mm, true thermocouple No Extension Grade Material	0,3m	313-TCC-013	70,00
C	Bare Thermocouple Pair Type C, 0.25mm, true Thermocouple, No Extension Grade Material	0,3m	313-TCC-025	98,00
R	Bare Thermocouple Pair Type R, 0.13mm, true Thermocouple, No Extension Grade Material	1,5m	313-TCR-013	288,00
R	Bare Thermocouple Pair Type R, 0.25mm, true Thermocouple, No Extension Grade Material	1,5m	313-TCR-025	503,00
S	Bare Thermocouple Pair Type S, 0.13mm, true Thermocouple, No Extension Grade Material	1,5m	313-TCS-013	277,00
S	Bare Thermocouple Pair Type S, 0.25mm, true Thermocouple, No Extension Grade Material	1,5m	313-TCS-025	492,00

Type	PT-100 SENSOR RESISTORS	Part Number	Euro
Glass	PT-100 Resistor in Glass tube	343-PT100-1.3-B	120,00
Glass	PT-100 Resistor in Glass tube with 4x1m Kapton Wire KAPM-025	343-PT100-1.3-B-1m	233,00
Cer.	PT-100 Resistor on Ceramic plate	343-PT100-C2	68,00
Cer.	PT-100 Resistor on Ceramic plate with 4x1m Kapton Wire KAPM-025	343-PT100-C2-1m	179,00

	CONSTANTAN WIRE, PTFE ISOLATED	Ø	Length	Part Number	Euro
	Teflon (PTFE) isolated Constantan Wire, 0.08mm Diameter; 0.24mm Outer Diameter	0,08mm	5m	312-PTFE-008-KON	132,00

	PEEK RAW MATERIAL, ROD	Ø	Part Number	Euro
	PEEK Rod, 6mm ø, 250mm long	6	351-PEEK-6D	53,00
	PEEK Rod, 10mm ø, 250mm long	10	351-PEEK-10D	69,00
	PEEK Rod, 16mm ø, 250mm long	16	351-PEEK-16D	99,00
	PEEK Rod, 20mm ø, 250mm long	20	351-PEEK-20D	113,00

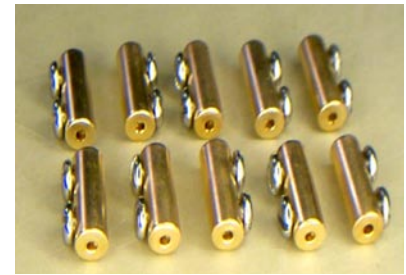
	PEEK RAW MATERIAL, RECTANGULAR	Part Number	Euro	
	Rectangular Rod, 6x15mm, 250mm long	6x15	351-PEEK-6x15	96,00
	Rectangular Rod, 10x14mm, 250mm long	10x14	351-PEEK-10x14	122,00
	Rectangular Rod, 10x50mm, 250mm long	10x50	351-PEEK-10x50	177,00



## Electrical Sockets and Crimp Pins

Cinquepascal offers Screw-on, Push-on and Crimp Connectors for Vacuum Side Connection to Multi-Pin and other types of Feedthroughs.

(For Crimp Connectors for the Sub-D types, please refer to Section 1)



360-PIC-1.8 Screw-on Sockets

Pin Ø	Push-on	Screw-on	Crimp	Remarks
0:05			360-CRF-05-10	Only female Crimp Pins
0.7-0.8			98145,45	Crimps directly to Feedthrough
1:00	-	360-PIC-1.5	- See Sub-D Section.	Large variety of types
1.3-1.4	360-PPO-1.3	360-PIC-1.8	360-CRIMP-1.3	
2:00	(360-PPO-1.3)	360-PIC-3.0		PPO type bored out
2.3-2.4	360-PPO-2.4	360-PIC-3.0	360-CRIMP-2.4	
4:00	360-PPO-4	360-PIC-6.6		PPO is Ag Plated
6:04		360-PIC-6.6		

SCREW- ON AND PUSH- ON CONNECTORS		Qty.	Part Number	Euro
In-line Screw-on	Screw-on Socket with 2 Screws, ID max. 1.5mm, 12.5mm long, Pack of 10	10	360-PIC-1.5	106,00
In-line Screw-on	Screw-on Socket with 2 Screws, ID max. 1.8mm, 12.5mm long, Pack of 10	10	360-PIC-1.8	106,00
In-line Screw-on	Screw-on Socket with 2 Screws, ID max. 3.0mm, 12.5mm long, Pack of 10	10	360-PIC-3.0	106,00
In-line Screw-on	Screw-on Socket with 2 Screws, ID max. 6.6mm, 12.5mm long, Pack of 10	10	360-PIC-6.6	152,00
Push-on	Push-on Socket for 1.27mm Pins, Pack of 10, including key, Cable-Ø 1.25mm max.	10	360-PPO-1.3	101,00
Push-on	Push-on Socket for 2.4mm Pins, Pack of 10, including key, Cable-Ø 1.25mm max.	10	360-PPO-2.4	101,00
Push-on	Push-on Socket for 4mm Pins, Pack of 5, including nuts and washers	5	360-PPO-4	84,00

Specification Screw-on Sockets

Max Current 20.. 35 A  
 Temperature 300°C  
 Material Copper-Beryllium  
 Reference PIC

Specification Push-on Sockets

Max. Current 25 A  
 Temperature 250°C  
 Material Copper-Beryllium  
 PPO-4 Cu-Be Contacts, Silver plated

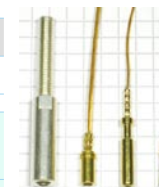
CRIMPS	Pin		Max. Length Cable		Max.		Qty.	Part Number	Euro
	Ø	Ø	mm	Ø	Amp.				
Female	0,5	1,4	12,5	0,4	3	10	360-CRF-05-10	83,00	
Female	0,75	1,7	13,3	0,8	5	10	360-CRF-07-10	83,00	
Male	0,75	1,3	13,2	0,8	5	10	360-CRM-07-10	58,00	
Female	1,3-1,5	3,75	28,5	1,25	10	5	360-CRIMP-1.3	82,00	
Male	1,45	3,7	33	1,5	10	5	360-CRIMP-1.3-M	66,00	
Female	2,3-2,4	4,9	15	1,7	25	5	360-CRIMP-2.4	82,00	



360-PPO-1.3 Push-on Sockets with key

Specification Crimp Pins

Temperature 250°C  
 Material Gold Plated Copper Alloy



left to right  
 4mm 2.4mm  
 1.3-1.5mm  
 1mm

Thermocouple-Crimps Alumel (-)	1,4	3,2	34	1,1		5	361-TCRIMP-AL	104,00
Thermocouple-Crimps, Chromel (+)	1,4	3,2	34	1,1		5	361-TCRIMP-CR	104,00

Thermocouple-Crimps for 1mm Pins -see Page 8 (Sub-D Feedthroughs)

The Socket PPO can be bored out to accept larger wire diameters. However, care must be taken when drilling CuBe-which should not be allowed to come into contact with skin.



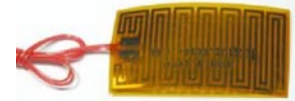
Crimp Pins for 1.3 -1.4mm, e.g. for all Multi-pin Feedthroughs with Socket Connector

0.5 mm  
 0.75 mm  
 1 mm



### Heaters, Tools

- Kapton Heaters for Vacuum
- Miniature Heaters for Vacuum
- Tools for Crimping and Wire Stripping



Kapton Heater

KAPTON HEATER FOILS -200°C... +200°C	Part Number	Euro
HV Kapton Heater Foil, 25.4 x 25.4mm ca. 78 Ohm, max. 30W	317-KAPH-1/1	134,00
HV Kapton Heater Foil, 25.4 x 50.8mm ca. 185 Ohm, max. 60W	317-KAPH-1/2	153,00
HV Kapton Heater Foil, 50.8 x 50.8mm ca. 39 Ohm, max. 110W	317-KAPH-2/2	139,00
HV Kapton Heater Foil, 102 x 102mm ca. 43 Ohm, max. 490W	317-KAPH-4/4	240,00

#### KAPTON-Heater Foil

Suitable for Preparation Chamber and Low Temperature Applications.

Thin flexible foil with PTFE connections 300mm long.

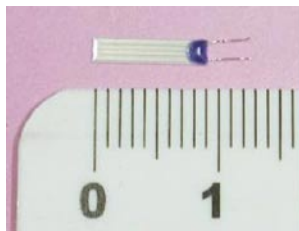
Vacuum to 10<sup>-9</sup> mbar  
Temperature -200°C... 200°C

MINIATURE HEATER	Part Number	Euro
UHV Ceramic Heater -40°...500°C, 9.5 x 2mm, 6.8 Ohm, max. 2A	343-HEATER-2x10	96,00

#### Miniature Heater

Temperature -40°C... 500°C  
Material Al<sub>2</sub>O<sub>3</sub> Pt, Glass  
Size 1.9 x 9.5mm  
Thickness < 0.2mm (Glass End typically 0.4mm)

Connections 0.1mm Pt-Wire  
~3.5mm long



Resistance	6.8 at 0°C
I max	2 A
U max	3.5 V
P max	27 W



KAPTON WIRE STRIPPER	Part Number	Euro
Precision Stripper for 0.12 - 0.4mm adjustable in 6 Steps (AWG 36 - 26)	321-STRIP04	89,00
Precision Stripper for 0.3 - 1.0mm, adjustable in 6 Steps 28 - 18)	321-STRIP10	89,00

#### Kapton Wire Strippers

Recommended for Stripping Kapton Wire, Two sizes available.



The Types of Crimp Tools:  
214-CTOOL 214-CTOOL-HQ 214-CTOOL-TC 214-CTOOL-SMA

For very thin wires, the use of KAPEX solvent paste is recommended.

#### Crimp Tools

For Crimp Contacts from 0.5 / 0.75 / 1 / 1.4 / and 2.4mm Diameter.

CRIMP TOOLS	Part Number	Euro
4-Chuck Crimp Tool	214-CTOOL	253,00
4 Pin Crimp Tool with Positioner	214-CTOOL-HQ	495,00
Simple Crimp Pliers	214-CTOOL-TC	66,00
Crimp Tool for the Outer Conductor of SMA Sockets	321-CTOOL-SMA	274,00

Refer to table below for correct choice of tool or call Sales Office for advice.

Crimp Contact	Tool	Comments
Sub-D 1.0mm	214-CTOOL-HQ/ 214-CTOOL	also suitable for thin wires and, "S"-Version Pins
Sub-D Thermocouple	214-CTOOL-TC	For open contacts
0.5mm	214-CTOOL-HQ /214-CTOOL	
0.75mm	214-CTOOL-HQ /214-CTOOL	
1.4mm	214-CTOOL/214-CTOOL-HQ	The Positioner must be used with the HQ type.
2.4mm	214-CTOOL	
SMA	321-CTOOL-SMA	RG174 / Kapton 50 Cable



## Vacuum Ready Cables

Cinquepascal offers a full range of Vacuum Ready Cables including both standard types and Cables made to customer's specification. The standard cable lengths are 0.5m and 1m. Other lengths are available on request.



### SMA Cable



Fits to double sided SMA Feedthroughs

Impedance 50 Ω

Damping 0.1 db/m 100MHz  
1.1 db/m 500MHz  
1.9 db/m 1GHz

Cut-off frequency~17 GHz (measured with 2x SMA-Sockets)

### BNC / MHV Cable

These cables fit to the single ended type BNC and MHV Feedthroughs. The cable is made from 50 Kapton Wire. N.B. the BNC and MHV feedthroughs and sockets do not have fixed impedance.



- BNC Cables and Sockets

Please ask for data sheet -

### BNC UHV Cable

Insulation PTFE  
Contact Gold plated Cu alloy  
Housing Nickel plated Zinc  
Connection Crimp /Crimp  
Impedance 50 Ω



### Triaxial

Second shield around 50 Ω Coax cable, no contact to connectors. Fixed with crimp ferrules on both ends



### Sub-D Ribbon Cables

Sub-D cables are available with HV, UHV (=Ceramic) or PEEK Sockets and Kapton Ribbon cable. Cables have a female socket (to fit the feedthrough) and an open cable end. Other cable types, including male plugs, are available on request.

The cables shown opposite are 0.5m. Extra lengths are available to order with prices per extra 0.5m as follows.

9 Way € 40,00  
5 Way € 59,00  
25 Way € 84,00

	SMA CABLE	Termination	Length	Part Number	Euro
SMA	50 Ohm Kapton Cable with 1x SMA Plug, open end	M open	0,5m	380-SMA-MX-500	146,00
SMA	50 Ohm Kapton Cable with 1x SMA Plug, open end	M open	1m	380-SMA-MX-1000	166,00
SMA	50 Ohm Kapton Cable with 2x SMA Plugs	M M	0,5m	380-SMA-MM-500	211,00
SMA	50 Ohm Kapton Cable with 2x SMA Plugs	M M	1m	380-SMA-MM-1000	232,00
SMA	50 Ohm Kapton Cable with 1x SMA Plug, 1x SMA Socket	M F	0,5m	380-SMA-MF-500	232,00
SMA	50 Ohm Kapton Cable with 1x SMA Plug, 1x SMA Socket	M F	1m	380-SMA-MF-1000	242,00

	BNC / MHV CABLE	Termination	Length	Part Number	Euro
BNC/ MHV	Feedthroughs Cable fits to 241-BNC and 241-MHV	SK S	0,5m	380-BNC-500	266,00
BNC/ MHV	Feedthroughs Cable fits to 241-BNC and 241-MHV	SK S	1m	380-BNC-1000	282,00
TRIAX/ BNC/	17.3mm Feedthroughs Cable fits to 243-TRIAX and other	SK S	0,5m	380-BNCF-500	266,00
TRIAX/ BNC/	17.3mm Feedthroughs Cable fits to 243-TRIAX and other	SK S	1m	380-BNCF-1000	282,00

	BNC / UHV CABLE	Termination	Length	Part Number	Euro
BNC	50 Ohm Kapton Cable with 1x BNC Plug, open end	M open	0,5m	380-BNC-MX-500	146,00
BNC	50 Ohm Kapton Cable with 1x BNC Plug, open end	M open	1m	380-BNC-MX-1000	166,00
BNC	50 Ohm Kapton Cable with 2x BNC Plugs	M M	0,5m	380-BNC-MM-500	211,00
BNC	50 Ohm Kapton Cable with 2x BNC Plugs	M M	1m	380-BNC-MM-1000	232,00

	DOUBLE SHIELDING / TRIAXIAL UHV CABLE	Part Number	Euro
	For all our Ready Made cables (SMA, BNC, Single Sided BNC and MHV) we offer a second shielding with Braid. As an option, the Braid is connected to a 25cm long wire with a horse shoe connector.		
	Additional Cost for double shielding, up to one meter	360-DS	92,00
	Additional Cost for double shielding including one wire contact, up to one meter	360-DS-C	104,00

Way	SUB-D RIBBON CABLE HV	Termination	Length	Part Number	Euro
9	HV Sub-D Socket, 500mm Cable	F open	0,5m	380-D9FXHR-500	194,00
15	HV Sub-D Socket, 500mm Cable	F open	0,5m	380-D15FXHR-500	232,00
25	HV Sub-D Socket, 500mm Cable	F open	0,5m	380-D25-FXHR-500	287,00
37	HV Sub-D Socket, 500mm Cable	F open	0,5m	380-D37-FXHR-500	410,00
50	HV Sub-D Socket, 500mm Cable	F open	0,5m	380-D50-FXHR-500	490,00

Way	SUB-D RIBBON CABLE UHV	Termination	Length	Part Number	Euro
9	UHV Sub-D Socket/ 500mm Cable	F open	0,5m	380-D9FXUR-500	324,00
15	UHV Sub-D Socket/ 500mm Cable	F open	0,5m	380-D15FXUR-500	393,00
25	UHV Sub-D Socket/ 500mm Cable	F open	0,5m	380-D25-FXUR-500	467,00
37	UHV Sub-D Socket/ 500mm Cable	F open	0,5m	380-D37-FXUR-500	608,00
50	UHV Sub-D Socket/ 500mm Cable	F open	0,5m	380-D50-FXUR-500	699,00

Way	SUB-D RIBBON CABLE UHV PEEK	Termination	Length	Part Number	Euro
9	UHV Sub-D Socket, PEEK 500mm	F open	0,5m	380-D9FXPR-500	281,00
15	UHV Sub-D Socket, PEEK 500mm	F open	0,5m	380-D15FXPR-500	344,00
25	UHV Sub-D Socket, PEEK 500mm	F open	0,5m	380-D25-FXPR-500	401,00
37	UHV Sub-D Socket, PEEK 500mm	F open	0,5m	380-D37-FXPR-500	548,00
50	UHV Sub-D Socket, PEEK 500mm	F open	0,5m	380-D50-FXPR-500	630,00



Abbreviations  
M= Male Plug  
F= Female  
Socket open= free cable end  
SK= Push-on Connector  
S= Screw Connector

## UHV Fibre Optic Components

Cinquepascal multimode step index silica-silica fibres have a pure silica core and doped silica cladding. The outer coating is a copper alloy which is UHV compatible and solderable. The UV grade (high OH type) will transmit light from 180 to 1200nm. The IR grade (low OH type) will transmit light from 500- 2600nm. They have very low fluorescence and are recommended for spectroscopy.

Cinquepascal Optical Fibres are offered as 300, 600 and 900 mm lengths terminating at one end with a special UHV compatible F-SMA coupler while the other end is polished and terminated with a metal ferrule. The standard core diameter is 600 microns. 200 and 400 microns are available to order.

Compatible Vacuum Feedthroughs on CF and KF vacuum flanges are offered.

Type	UHV FIBRE OPTIC CABLE, F-SMA / POLISHED END	Length	Core ø µm	Part Number	Euro
UV	Fibre Optic Cable, Metallised	300	600	151-FOC-UV-300-S	610,00
UV	Fibre Optic Cable, Metallised	600	600	151-FOC-UV-600-S	648,00
UV	Fibre Optic Cable, Metallised	900	600	151-FOC-UV-900-S	672,00
IR	Fibre Optic Cable, Metallised	300	600	151-FOC-IR-300-S	610,00
IR	Fibre Optic Cable, Metallised	600	600	151-FOC-IR-600-S	548,00
IR	Fibre Optic Cable, Metallised	900	600	151-FOC-IR-900-S	672,00

DN	VACUUM FEEDTHROUGH, UV CORE	Core ø µm	Part Number	Euro
16CF	UHV Feedthrough for UV Fibre	600	150-FFT-UV-C16	701,00
40CF	UHV Feedthrough for UV Fibre	600	150-FFT-UV-C40	715,00
16KF	UHV Feedthrough for UV Fibre	600	150-FFT-UV-K16	701,00
40KF	UHV Feedthrough for UV Fibre	600	150-FFT-UV-K40	715,00

DN	VACUUM FEEDTHROUGH, IR CORE	Core ø µm	Part Number	Euro
16CF	UHV Feedthrough for IR Fibre	600	150-FFT-IR-C16	701,00
40CF	UHV Feedthrough for IR Fibre	600	150-FFT-IR-C40	715,00
16KF	UHV Feedthrough for IR Fibre	600	150-FFT-IR-K16	701,00
40KF	UHV Feedthrough for IR Fibre	600	150-FFT-IR-K40	715,00

UHV FIBRE COUPLER		Part Number	Euro
UHV F-SMA Fibre Coupler		151-FC-UHV	76,00
AIR SIDE FIBRE COUPLER		Part Number	Euro
Air Use F-SMA Fibre Coupler		151-FC-AIR	70,00



UHV Fibre Optic Feedthrough and F-SMA Coupler

UHV Optical Fibre

Vacuum: UHV  
 Temperature: -270°C bis 700°C  
 Fibre Type: Step Index Multimode  
 Core: High Purity Synthetic Silica  
 Cladding: Doped Silica  
 Outer Coating: Proprietary Cu Alloy  
 Minimum Bend Radius: 100 x Fibre ø  
 Typical Damping UV  
 248nm (KrF Laser) < 1.2dB/m  
 308nm (XeCl Laser) < 0.26dB/m  
 Typical Damping IR  
 1.06µm (YAG Laser) < 0.01dB/m  
 Termination: Vacuum F-SMA / Polished end  
 Length: 300mm, 600mm, 900mm  
 - Special lengths to order -  
 Vacuum Feedthrough

Vacuum: UHV (CF Version)  
 Temperature: 200°C  
 Construction: All Metal  
 Flange: DN16CF, DN40CF  
 (High Vacuum Versions  
 DN16KF or DN40KF)

Terminations  
 Vacuum UHV-F-SMA  
 Air Side Standard SMA

Special types with several feedthroughs on one flange can be built to order.

UHV Fibre Coupler

Fibre Coupler: Double ended F-SMA  
 Construction: Stainless Steel with Vent Holes  
 Length: 23.6 mm  
 Diameter: 6.35 mm



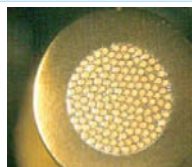
Fibre Optic Coupler F/T

Vacuum range 10<sup>-9</sup> mbar  
 Leak check < 1x10<sup>-9</sup> mbar  
 1/s He

Up to 4 feedthroughs can be mounted on one DN40 KF or CF flange.

The environmental properties of Cinquepascal metal coated fibres mean fibre bundles can now be used in vacuum applications. The thin metal coating ensures a good packing fraction.

For special applications and custom made assemblies, please call the Sales Office.  
*Fibre bundle soldered into a metal ferrule*



## Fibre Optic Coupler Feedthrough

For High Vacuum applications the Fibre Optic Coupler Feedthrough is a cost effective alternative to the UHV version. The vacuum seal is made with a miniature O-ring on the vacuum side of the F-SMA Fibre Connector. Cinquepascal's Vacuum Compatible Optical Fibre is recommended.

DN	FIBRE COUPLER F/T ON KF FLANGES	Part Number	Euro
16KF	Coupler f/t on DN16KF Flange	152-FCF-K16	234,00
25KF	Coupler f/t on DN25KF Flange	152-FCF-K25	234,00
40KF	Coupler f/t on DN40KF Flange	152-FCF-K40	234,00
40KF	2 x Coupler f/ts on DN40KF Flange	152-FCF-K40-2	422,00
DN	FIBRE COUPLER F/T ON CF FLANGES	Part Number	Euro
16CF	Coupler f/t on DN16CF Flange	152-FCF-C16	250,00
25CF	Coupler f/t on DN40CF Flange	152-FCF-C40	250,00
40CF	2 off Coupler f/ts on DN40CF Flange	152-FCF-C40-2	444,00

Additional Items Spare O-rings, 10 off Buna: 152-FCF-OB-10 Euro 69,00  
 Spare O-ring, 1 off, Viton: 152-FCF-OV Euro 73,00  
 Vacuum side blind plug: 152-FPLUG Euro 81,00

## Quick Access Doors

Cinquepascal's QAD series offer unequalled ease of access to the Prep Chamber work area with maximum open diameter and maximum view diameter.

The DNI60CF Quick Access Door has a work access diameter of 150mm, the optional viewport has a view diameter of 135mm.

An optional bakable micro-switch allows the door to be coupled into safety circuits to prevent for instance, incorrect and possibly hazardous valve opening.



Quick Access Door

Sizes 63CF / 100CF / 160CF  
 Seal Viton O-Ring  
 Max Temp. 200°C  
 Viewport Kodial Glass Welded construction  
 View diameter: 63mm for 63CF  
 90mm for 100CF  
 135mm for 160CF

Flange	QUICK ACCESS DOORS / NO VIEWPORT	Part Number	Euro
63CF	Quick Access Door, blank, ID 60mm	640-QAD63	699,00
100CF	Quick Access Door, blank, ID 95mm	640-QAD100	978,00
160CF	Quick Access Door, blank, ID 150mm	640-QAD160	1290,00

Flange	QUICK ACCESS DOORS / WITH VIEWPORT	Part Number	Euro
63CF	Quick Access Door with Viewport, ID 60mm	640-QAD63-VP	871,00
100CF	Quick Access Door with Viewport, ID 90mm	640-QAD100-VP	1156,00
160CF	Quick Access Door with Viewport, ID 150mm	640-QAD160-VP	POR

## Fast Entry Load Locks

Cinquepascal offers a variety of Fast Entry Systems to suit various applications. The Special Cinquepascal's Open Access Prep Chamber is particularly convenient for all sample sizes. The Prep Chamber can be built to customer specification with extra or fewer ports as required. Drawings for standard chambers are available.



Load-Lock-System

Standards for quoted parts:  
 - Open Access Chamber  
 - 600mm Mag. Transporter  
 - Manual Gate Valve  
 - Quick Access Door with Viewport  
 - 2 Additional Ports for Pressure Measurement and Gas Inlet

Flange	LOAD LOCK SYSTEMS	Part Number	Euro
63CF	Load Lock System, CF63 Door with Viewport, CF63 Gate Valve, 600mm travel	640-LLS63-VP-600	POR
100CF	Load Lock System, CF100 Door with Viewport, CF100 Gate Valve, 600mm travel	640-LLS100-VP-600	POR
160CF	Load Lock System, CF160 Door with Viewport, CF160 Gate Valve, 600mm travel	640-LLS160-VP-600	POR

SAMPLE TRANSFER

## FTM6 Digital Film Thickness Monitor



### Features & benefits

- Easy to read LED display of film thickness
- Memory storage for 2 deposition materials
- Automatic shutter control for reproducible film thickness termination
- Compact, space saving design

The FTM6 is an inexpensive film thickness monitor with high resolution and advanced features including shutter control for precise film thickness termination.

The compact size of the FTM6 makes it particularly suitable for use with small coating systems.

The FTM6 can be used as a free-standing instrument or mounted into control consoles using the panel mounting kit supplied.

### Display

Thickness display	0.0 nm - 999.9 $\mu\text{m}$
Resolution	0.1 nm
Display update rate	1 Hz

### Material parameters

Layers	1 or 2
Density	0.1 - 99.9 $\text{g cm}^{-3}$
Thickness termination	0.0 nm - 999.9 $\mu\text{m}$
Tooling factor	0.01 - 99.9%

Sensor crystal operating range 5.1 - 6.1 MHz

Dimensions 110 mm wide  
105 mm high  
185 mm deep

Weight 1.6 kg

### FTM6 FILM THICKNESS MONITOR Part Number Euro

An oscillator and crystal holder are required with each FTM6 film thickness monitor.

FTM6 film thickness monitor	E086-64-000	2779,00
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## Universal Crystal Holder

The BOC Edwards crystal holder is suitable for most deposition processes and it operates effectively in an RF sputtering environment.

Good thermal stability is achieved by water cooling

the crystal holder, which can also be baked up to 200 °C. The flexible water lines can be extended to allow easy positioning of the crystal head. The snap-in crystal enclosure makes crystal changing easy and quick.

The crystal holder has a standard NW25 leadthrough, and is ready for immediate installation without soldering, brazing or separate water connections.



### UNIVERSAL CRISTAL HOLDER Part Number Euro

Oscillator, 3 m cable	E086-66-000	448,00
Crystal holder, includes pack of 5 crystals	E086-67-000	1376,00
Spare crystals (pack of 5)	E086-68-000	82,71

## FTM7 Digital Film Thickness Monitor



### Features & benefits

- Easy to read LED display of film thickness and deposition rate
- Memory storage for 11 deposition materials
- Dual crystal holder/dual shutter control facility
- Tooling factor and acoustic impedance error correction
- Auto-sequence mode for simplified multi-layer deposition
- RS232 interface

The FTM7 is a sophisticated, fully featured instrument for monitoring film thickness and deposition rate.

Up to 2 quartz crystal sensors can be connected to the FTM7, enabling two deposition sources to be sequentially monitored by separate sensors.

Built-in relays can be used to control up to two separate source shutters allowing deposition from two sources to be precisely terminated. A unique feature is the auto-sequence mode which simplifies multi-layer deposition by automatically selecting the next deposition material each time the Run button is selected.

The RS232 interface allows the FTM7 to be programmed by an external computer and can also output data during the deposition process.

### Display

Thickness display	0.0 nm - 999.9 $\mu\text{m}$
Rate display	0.0 - 999.9 $\text{nm s}^{-1}$
Resolution	0.1 nm
Display update rate (variable)	1 - 4 Hz

### Material parameters

Layers	1 - 11
Density	0.1 - 99.9 $\text{g cm}^{-3}$
Thickness termination	0.1 nm - 999.99 $\mu\text{m}$
Film acoustic impedance	1 - 99.9 $\times 10^5 \text{ g cm}^{-2} \text{ s}^{-1}$

Tooling factor 0.01 - 99.9%

Sensor crystal operating range 5.1 - 6.1 MHz

### Analog output

Impedance	0 to 1 V, 1 k $\Omega$
Resolution	8 bit

### Dimensions

	192 mm wide
	96 mm high
	243 mm deep

### Weight

	2.9 kg
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### FTM7 FILM THICKNESS MONITOR Part Number Euro

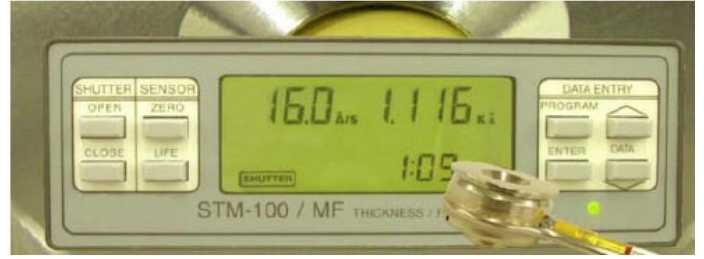
At least one oscillator and crystal holder are required with each FTM7.

FTM7 film thickness monitor	E086-69-000	4943,00
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## UHV Thin Film Monitoring

The Film Thickness Monitor use a Quartz Crystal Oscillator to measure fine changes in mass as an evaporant builds up a thin film on a substrate. The Quartz Crystal is held in a water cooled holder in the beam of evaporated material. The Monitor Unit measures rate of deposition and film thickness.

Several different types of Crystal Heads area available for High vacuum and UHV use. We also offer complete packages with all necessary feedthroughs and cable.



**Measuring Head**  
 Frequency 6MHz Quartz  
 Cooling Water cooled  
 option - no cooling  
 Max. Thickness 500 Å (Al)  
 Head Ø 30 mm  
 Length adjustable from  
 ca. 100-750 mm

**Monitor Unit 710-STM-100MF**  
 Input V 110/230V  
 Measurement Rate 4 per second  
 Resolution 0.1 Å/s  
 Outputs 4 Relays for  
 Shutter  
 Thickness  
 Time  
 Crystal Fail

**Analogue-Output 0...10V**  
 (for Rate or Thickness)  
 Inputs TTL Compatible  
 Shutter open  
 Shuter closed  
 Null point  
 Time Null point

**Interface**  
 RS232 Standard  
 RS488 Option

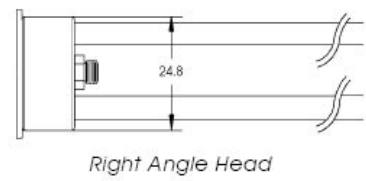
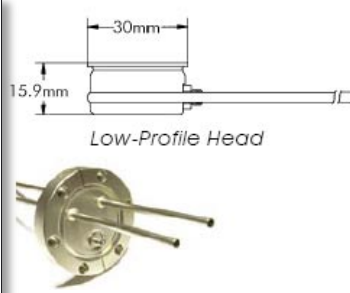
**Monitor Unit 710-STM-1B**  
 Measurement-System in compact  
 housing, no display, communicates  
 by RS232 / RS488 Interface,  
 Oscillator is integrated, (USB  
 Option), LABVIEW is necessary  
 for operation of this device.  
 Measurement Rate 10 per second  
 Resolution 0.1 Å/s

IN VACUUM MEASURING HEAD	Part Number	Euro
Low Profile Quartz Crystal Sensor Head parallel to water lines, with 76 cm long Water Connections	710-LPHS	576,00
Right Angle Quartz Crystal Sensor Head perpendicular to water lines, with 76 cm long Water Connections	710-RAHS	671,00
IN-VACUUM CABLE	Part Number	Euro
In-Vacuum Cable 250 mm long	710-IVC-250	128,00
In-Vacuum Cable 750 mm long	710-IVC-750	137,00
FEEDTHROUGHS	Part Number	Euro
DN 400 Flange with 1 x BNC - Microdot Feedthrough and 2 Water Pipes	710-BNC1-W2-C40	552,00
SWAGELOCK CONNECTOR	Part Number	Euro
Swagelock connectors for Water lines, 2 Pieces	710-SW-32-48	69,00
OSCILLATOR	Part Number	Euro
Oscillator for 6 MHz Crystal	710-OSC	268,00
Oscillator for 6 MHz Crystal, including BNC Vacuum Cable 15 cm + Air Cable 3 m and 5 Spare Quartz Crystals	710-OSC-PACK	360,00
FILM THICKNESS MONITOR UNIT	Part Number	Euro
Film Thickness Monitor for 1 Head, with RS232 interface	710-STM-100-MF	2034,00
COMPLETE PACKAGE	Part Number	Euro
Low Profile Sensor Head, In Vacuum Cable, DN40CF Feedthrough, Swagelock Connectors, Oscillator, BNC Cable, 5x Spare Crystal	710-LP-PACK I	1459,00
Right Angle Sensor Head, In Vacuum Cable, DN40CF Feedthrough, Swagelock Connectors, Oscillator, BNC Cable, 5x Spare Crystal	710-RA-PACK I	1566,00
COMPLETE PACKAGE FOR PC	Part Number	Euro
Low Profile Sensor Head, DN40CF Feedthrough, Swagelock Connectors, Oscillator, BNC Cable, 5x Spare Crystal, Monitor with RS232 Interface and Software	710-LP-PACK-PC	1989,00

The Complete Package includes all necessary parts, with exception of the Monitor 710-STM-100MF:

- Measuring Head
- In Vacuum Cable
- Feedthrough (BNC-Microdot + Water) on DN40CF
- Swagelock Couplers
- Oscillator
- External cable (3m)
- Spare Quartz Crystals

The "Complete Package for PC" includes the electronics but not Labview software.



A variety of other models of heads area available including double and shuttered types.  
**Please call Sales Office for details.**

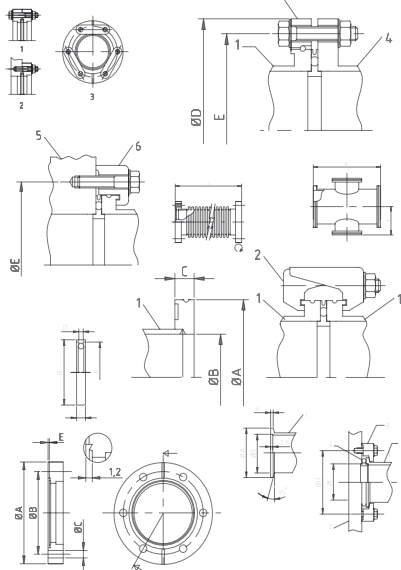
INSTRUMENTS

**5Pascal**

kf iso cf **2007**

Valid till April 30th, 2007

Flange Fittings



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