

## Breaks & Envelopes

### Introduction

Breaks and envelopes are tubular electrical isolators which are composed of metal adapters brazed to both ends of a ceramic insulator. These assemblies are used primarily for voltage isolation. Assemblies with inner diameters less than 76.2mm are typically referred to as breaks and those with larger inner diameters are called envelopes.

LewVac offers several mounting options for breaks and envelopes: CF flanged, KF flanged and weldable. Custom designs and configurations are available upon request.

### Cryogenic Breaks



Electrical breaks are often required in transmission lines for cryogenic fluid. Several standard designs are offered which are safe to operate to  $-200^{\circ}\text{C}$ . These cryogenic breaks are intended to be TIG welded into cryogenic fluid transmission lines, and typical adapter designs are available with 3.2mm to 9.5mm diameters.

### Liquid Breaks



Coolant fluid lines often require an electrical break. Installation of liquid breaks into a transmission line for coolant fluid requires soldering or low temperature brazing (below  $700^{\circ}\text{C}$ ). Standard adapters fit 6.5mm to 12.7mm diameter tubes.

### Vacuum Breaks & Envelopes



Various transitions in vacuum systems require voltage isolation. Breaks and envelopes are all suitable for ultra high vacuum environments. Both are constructed using a high purity alumina insulator sealed into stainless steel or Kovar<sup>®</sup> sleeve adapters.

Vacuum breaks are available with nominal tube diameters up to 61mm, and voltage ratings up to 40,000 volts DC. Standard designs include CF flanged, KF flanged and weldable.

Vacuum envelopes are available with nominal tube diameters up to 203.2mm, and voltage ratings up to 15,000 volts DC. Standard designs include CF flanged and weldable.

Cryogenic Breaks



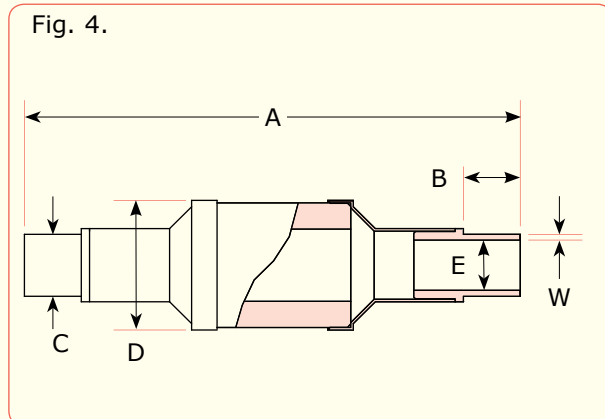
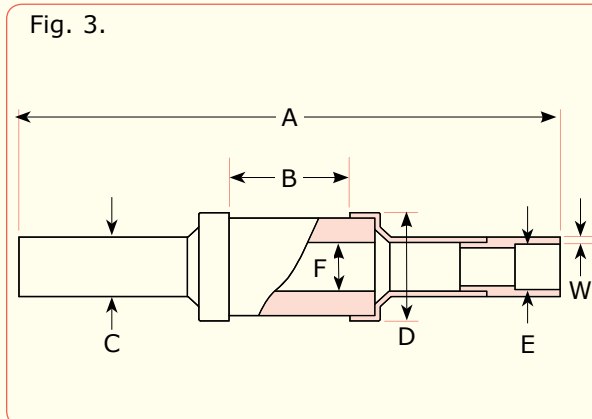
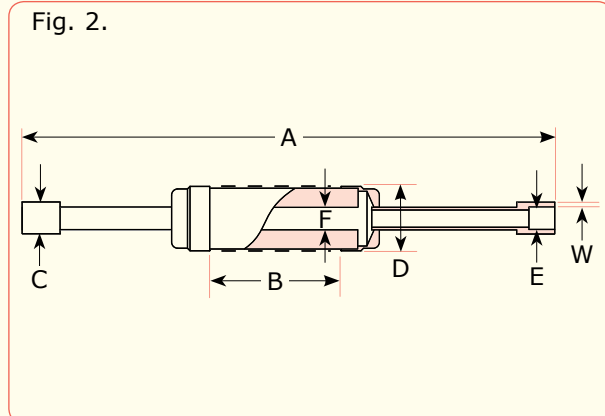
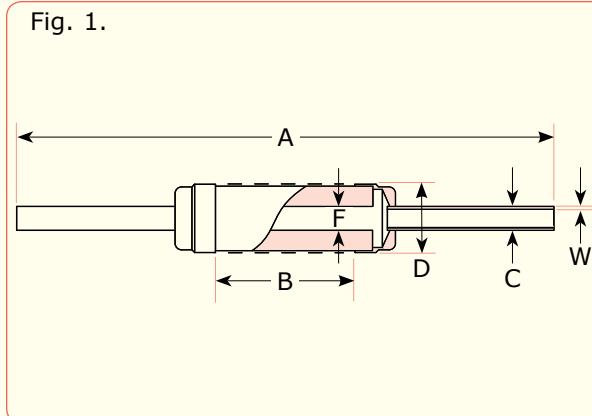
**Specifications:**

<b>Voltage<sup>1</sup></b>	Up to 10kV DC
<b>Material</b>	
Adapter	Kovar® / St.St.
Insulation	Alumina ceramic
<b>Temperature Range<sup>2</sup></b>	-200°C to 450°C

<sup>1</sup> - Please see section introduction for safety information.  
<sup>2</sup> - Assembly rating is reduced to that of the lowest rated component.

**Features:**

- Voltage insulation up to 10kV.
- Custom versions available on request.



All dimensions are nominal in millimetres unless otherwise specified

**5kV**



Fig.	A	B	C	D	E	F	W	Part Code	Price £	Price €
1	58.4	6.4	2.4	7.9	-	2.7	0.4	CB5-2.4-58	£42	€49
1	45.7	6.4	3.2	7.9	-	2.7	0.4	CB5-3.2-46	£47	€55
1	58.4	6.4	3.2	7.9	-	2.7	0.4	CB5-3.2-58	£47	€55
1	72.4	6.4	3.2	7.9	-	2.7	0.4	CB5-3.2-72.4	£47	€55
1	42.9	6.4	3.2	7.9	-	2.7	0.4	CB5-3.2-43	£55	€64
2	59.4	6.4	4.1	7.9	3.4	2.7	0.4	CB5-3.2S-59	£63	€73

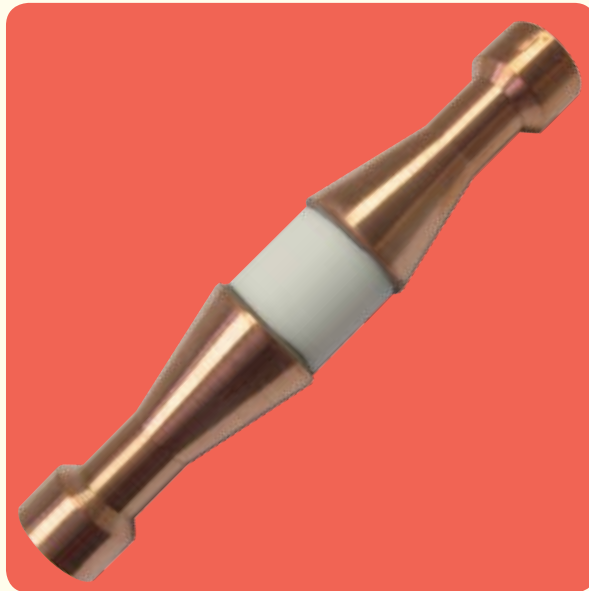
**10kV**



Fig.	A	B	C	D	E	F	W	Part Code	Price £	Price €
3	76.2	17.0	7.9	13.7	6.4	6.9	0.8	CB10-7.9-76	£69	€80
3	76.2	17.0	6.4	13.7	4.6	6.9	0.9	CB10-6.4-76	£69	€80
3	76.2	17.0	11.2	20.1	9.6	10.9	0.8	CB10-11.2-76	£119	€137
4	76.2	8.8	9.5	19.9	7.4	N/A	0.9	CB10-9.7-76	£119	€137

All dimensions are nominal in millimetres unless otherwise specified

## Water Breaks

**Specifications:**

**Voltage<sup>1</sup>** Up to 5kV DC

**Material**

**Adapter** OFHC Copper

**Insulation** Alumina ceramic

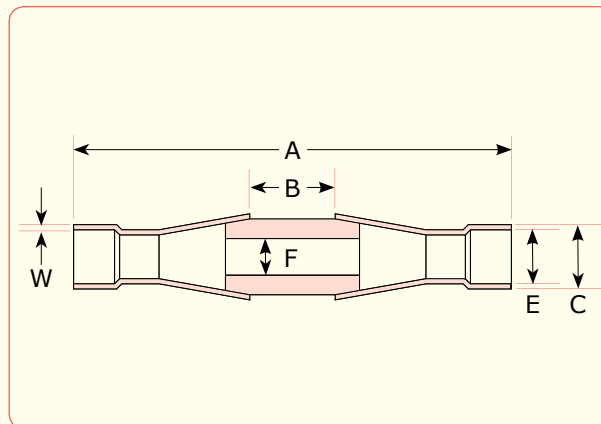
**Max Temperature<sup>2</sup>** 450°C

<sup>1</sup> - Please see section introduction for safety information.

<sup>2</sup> - Assembly rating is reduced to that of the lowest rated component.

**Features:**

- Voltage insulation up to 5kV.
- Custom versions available on request.



All dimensions are nominal in millimetres unless otherwise specified

**To 5kV**

A	B	C	E	F	W	Part Code	Price £	Price €
76.2	12.7	8.1	6.5	5.3	0.9	WB5-6.5-76	£119	€137
76.2	12.7	11.2	9.7	6.4	0.9	WB5-9.7-76	£128	€148
76.2	12.7	15.0	12.8	10.4	1.0	WB5-12.8-76	£137	€158

All dimensions are nominal in millimetres unless otherwise specified

Vacuum Breaks & Envelopes



**Specifications:**

**Voltage<sup>1</sup>** Up to 60kV DC

**Material**

**Adapter** Kovar® / St.St.

**Insulation** Alumina ceramic

**Temperature Range<sup>2</sup>** -200°C to 450°C

<sup>1</sup> - Please see section introduction for safety information.  
<sup>2</sup> - Assembly rating is reduced to that of the lowest rated component.

**Features:**

- Voltage insulation up to 60kV
- Custom versions available on request.

Fig. 1.

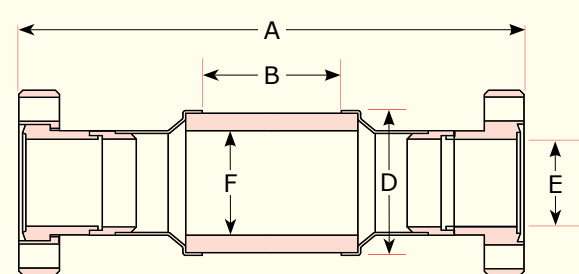


Fig. 2.

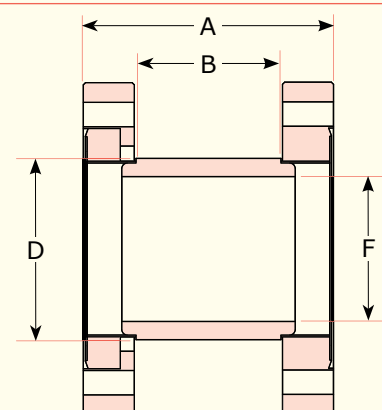
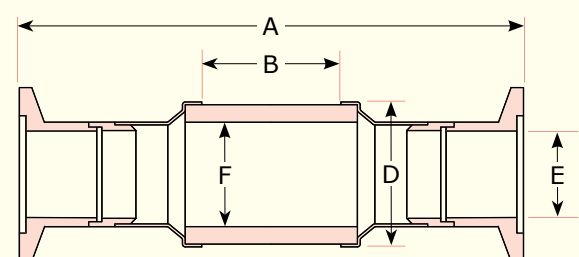


Fig. 3.



**CF Flanged**



Voltage, kV	Fig.	A	B	D	E	F	Flange	Part Code	Price £	Price €
5	1	73.6	7.6	25.4	16.0	19.1	DN16CF	VB5-16CF	£194	€224
15	1	91.9	25.4	25.4	16.0	19.1	DN16CF	VB15-16CF	£218	€251
30	1	116.8	50.8	25.4	16.0	19.1	DN16CF	VB30-16CF	£278	€320
5	1	67.3	6.4	42.2	34.8	31.8	DN40CF	VB5-40CF	£222	€256
30	1	106.7	50.8	42.2	34.8	31.8	DN40CF	VB30-40CF	£226	€260
60	1	160.0	101.6	42.2	34.8	31.8	DN40CF	VB60-40CF	£357	€411
10	2	46.7	19.1	16.5	-	7.9	DN16CF	VB10-16CF	£375	€432
20	2	76.2	38.1	35.6	-	22.9	DN40CF	VB20-40CF	£492	€566
30	2	101.6	50.8	63.5	-	50.8	DN63CF	VB30-63CF	£682	€785
40	2	121.9	76.2	76.2	-	61.0	DN100CF	VB40-100CF	£776	€893

**KF Flanged**



Voltage, kV	Fig.	A	B	D	E	F	Flange	Part Code	Price £	Price €
5	3	73.6	7.8	25.4	16.0	19.1	DN16KF	VB5-16KF	£194	€224
15	3	91.9	25.4	25.4	16.0	19.1	DN16KF	VB15-16KF	£218	€251
30	3	116.8	50.8	25.4	16.0	19.1	DN16KF	VB30-16KF	£278	€320
5	3	63.5	6.4	42.2	34.8	31.8	DN40KF	VB5-40KF	£222	€256
30	3	104.1	50.8	42.2	34.8	31.8	DN40KF	VB30-40KF	£226	€260
60	3	157.5	101.6	42.2	34.8	31.8	DN40KF	VB60-40KF	£357	€411
5	3	63.5	6.3	42.2	34.8	31.8	DN50KF	VB5-50KF	£219	€252
30	3	102.4	50.8	42.2	34.8	31.8	DN50KF	VB30-50KF	£231	€266
60	3	156.7	101.6	42.2	34.8	31.8	DN50KF	VB60-50KF	£383	€441

**Weldable**



Voltage, kV	Fig.	A	B	C	D	E	F	W	Part Code	Price £	Price €
5	4	48.3	7.6	19.1	25.4	16.0	19.1	0.9	VB5-19.1-W	£126	€145
15	4	66.5	25.4	19.1	25.4	16.0	19.1	0.9	VB15-19.1-W	£145	€167
30	4	116.8	50.8	19.1	25.4	16.0	19.1	0.9	VB30-19.1-W	£198	€228
5	4	55.9	6.4	38.1	42.2	34.8	31.8	1.7	VB5-34.8-W	£128	€148
30	4	96.5	50.8	38.1	42.2	34.8	31.8	1.7	VB30-34.8-W	£137	€158
60	4	149.9	101.6	38.1	42.2	34.8	31.8	1.7	VB60-34.8-W	£244	€281
10	5	39.4	19.1	12.9	16.5	-	7.9	-	VB10-12.9-W	£277	€319
20	5	65.5	38.1	30.5	35.6	-	22.9	-	VB20-30.5-W	£312	€359
30	5	85.3	50.8	60.3	63.5	-	50.8	-	VB30-60.3-W	£357	€411
40	5	110.7	76.2	71.1	76.2	-	61.0	-	VB40-71.1-W	£394	€454

Fig. 4.

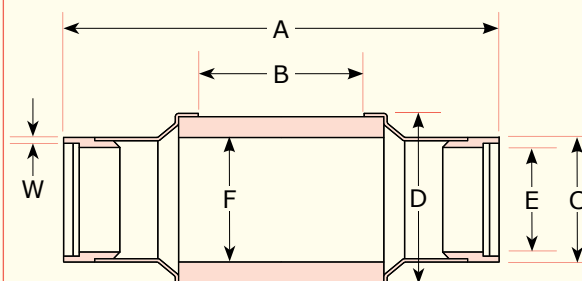
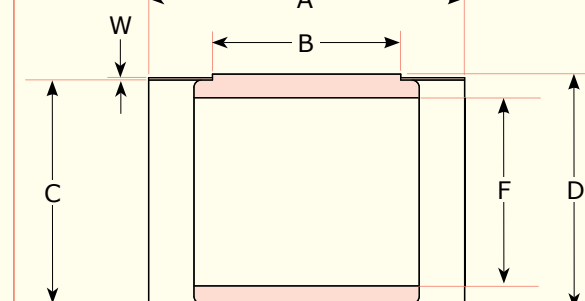


Fig. 5.



All dimensions are nominal in millimetres unless otherwise specified

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Vacuum Breaks & Envelopes



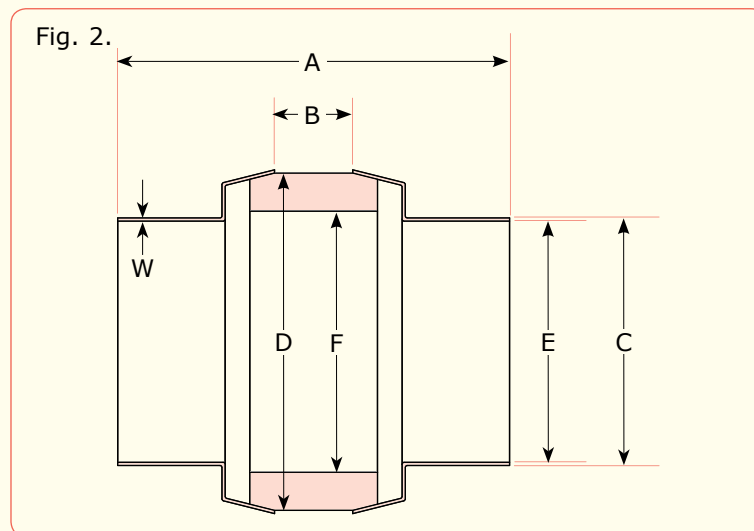
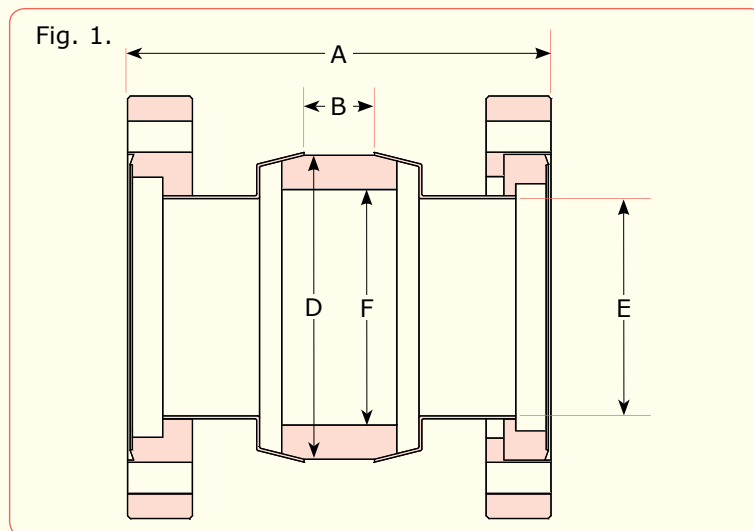
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<b>Temperature Range<sup>2</sup></b>	-200°C to 450°C

<sup>1</sup> - Please see section introduction for safety information.  
<sup>2</sup> - Assembly rating is reduced to that of the lowest rated component.

**Features:**

- Voltage insulation up to 20kV.
- Custom versions available on request.



All dimensions are nominal in millimetres unless otherwise specified

**CF Flanged**



Voltage, kV	Fig.	A	B	D	E	F	Flange	Part Code	Price £	Price €
10	1	114.3	19.1	82.0	58.7	63.5	DN63CF	VE10-63CF	£834	€960
10	1	117.3	19.1	108.0	95.3	88.9	DN100CF	VE10-100CF	£1,037	€1193
20	1	139.7	38.1	175.8	152.4	152.4	DN160CF	VE20-160CF	£1,780	€2047
20	1	146.1	38.1	223.5	196.9	196.9	DN200CF	VE20-200CF	£2,621	€3015

**Weldable**



Voltage, kV	Fig.	A	B	C	D	E	F	W	Part Code	Price £	Price €
10	2	92.2	19.1	60.2	82.0	58.7	63.5	0.8	VE10-60.2W	£559	€643
10	2	90.7	19.1	96.8	108.0	95.3	88.9	0.8	VE10-96.8W	£677	€779
20	2	114.3	38.1	154.4	175.8	152.4	152.4	1.0	VE20-154.4W	£1,307	€1504
20	2	117.9	38.1	198.9	223.5	196.9	196.9	1.0	VE20-198.9W	£1,757	€2021

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