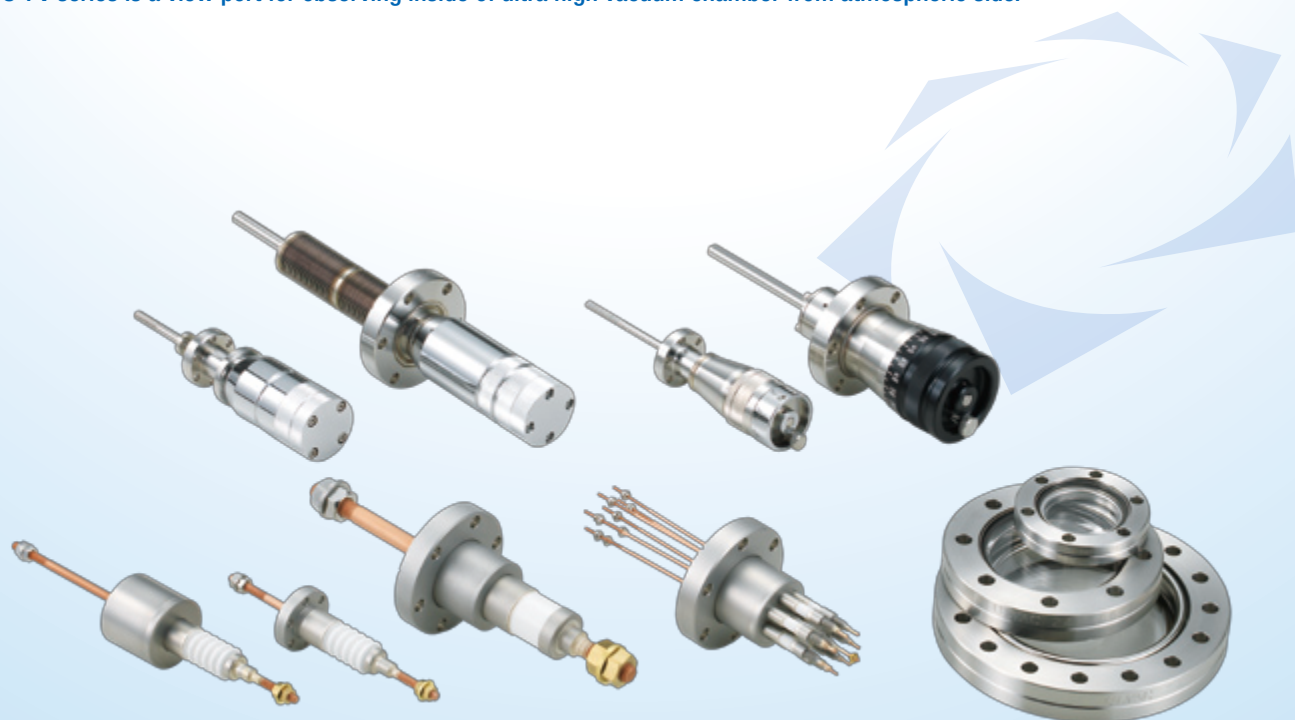


Ultra-High Vacuum Current & Rotary Motion & Linear Motion Feedthrough / Viewport [CMS / TDU / TSU / TVU-FV Series]

These feedthroughs with UFC knife-edge, metal seal and bakeable flange can be used in ultra high vacuum.

CMS series is used supplying current and voltage, TDU series is used for providing rotary motion and TSU series is used for providing linear motion.

TVU-FV series is a view port for observing inside of ultra high vacuum chamber from atmospheric side.



Features

- ▶ **Suitable for Ultra-High Vacuum**
Clean structure without gas transmission and outgas by metalizing finish is suitable for ultra high vacuum.
- ▶ **Corresponds to Bakeable**
No leak from sealed portion after baking out.

[CMS series]

- ▶ **Useable for Wide Pressure Range**
From 10^{-2} Pa (10^{-4} Torr / 10^{-4} mbar) to atmospheric pressure.
- ▶ **Abundant Lineup**
Various lineup, such as a BNC connector type for micro current, large current (400A), high voltages (12kV).

[TDU / TSU series]

- ▶ **Structure with Low Out Gas**
Stainless steel welding bellows is used for shaft seal, and bearing exposed to vacuum is un-lubricated and so clean (TDU series) (Bearings are arranged at atmospheric side in the case of TSU series.)
- ▶ **Fixable in Any Position**

[TDU series]

- ▶ **User-friendliness**
Rotational ratio between handle and rotating axis is 1:1, and rotation angle (normal and reverse rotation)

[TSU series]

- ▶ **User-friendliness**
Fine adjustment is possible because of 1mm stroke per one handle rotation.

[TVU-FV series]

- ▶ **Zero-length / Thin Structure**
Wide effective visible can be provided by zero length structure from flange to window.

Applications

- ▶ Various kinds of ultra high vacuum equipments
- ▶ Various kinds of R&D equipments
- ▶ Various kinds of film deposition equipments
- ▶ Other kinds of vacuum equipments

Ultra-High Vacuum Current & Rotary Motion & Linear Motion Feedthrough / Viewport [CMS / TDU / TSU / TVU-FV Series]

► Ultra-High Vacuum Current Feed through / CMS Series

Common specifications

Applicable pressure range			From 10 ⁻² Pa (10 ⁻⁴ Torr, 10 ⁻⁴ mbar) to ultra high vacuum
Permissible bake out temperature			≤300℃ (≤572℉)
Temperature variation rate			25℃/min (77℉/min) or less
Leak specification			1.0×10 ⁻¹⁰ Pa·m³/sec, 1.33×10 ⁻¹¹ Torr·L/sec , 1.0×10 ⁻¹¹ mbar·L/sec
Materials	Electrode poles	Copper	
	Insulator	Ceramic	
	Support fixture	Kovar metal *1	
	Seat plates, pipes, flanges	Austenite stainless steel	

*1 Alloy mainly with iron, nickel, and cobalt.

Specification table

Model	Number of electrodes	Maximum current *2	Withstand voltage *2, 3	Electrode connecting shape		Connection flange	Weight
				Vacuum side	Atmosphere side		
CMS2D09-1P	1	20A	DC3kV	M2	M5	—	100/50/20g *4
CMS2D09-1PF	1	20A	DC3kV	M2	M5	UFC070	350g
						UVF-40	700g
CMS2D09-1PFM	1	20A	DC3kV	M2	M5	UFC034	60g
CMS2D09-2PFM	2	20A	DC3kV	M2	M5 *5	UFC034	60g
CMS2D09-4P	4	20A	DC3kV	M2	M5	—	170/80g *4
CMS2D09-4PF	4	20A	DC3kV	M2	M5	UFC070	400g
						UVF-40	750g
CMS2D09-8P	8	20A	DC3kV	M2	$\phi 2$ *5	—	130/110g *4
						UFC070	400g
CMS2D09-8PF	8	20A	DC3kV	M2	$\phi 2$ *5	UVF-40	750g
						—	—
CMS5D20-1P	1	70A	DC5kV	M5	M5	—	140/90/70g *4
CMS5D20-1PF	1	70A	DC5kV	M5	M5	UFC070	400g
						UVF-40	750g
CMS5D20-1PFM	1	70A	DC5kV	M5	M5	UFC034	100g
CMS5D20-3P	3	70A	DC5kV	M5	M5	—	250/200g *4
CMS5D20-3PF	3	70A	DC5kV	M5	M5	UFC070	500g
						UVF-40	850g
CMS10D20-1P	1	180A	DC5kV	M10	M10	—	340/300/280g *4
						UFC070	600g
CMS10D20-1PF	1	180A	DC5kV	M10	M10	UVF-40	1100g
						—	—
CMS16D20-1P	1	400A	DC5kV	M16	M16	—	900/800/800g *4
CMS16D20-1PF	1	400A	DC5kV	M16	M16	UFC070	1000g
						UVF-40	1500g
CMS5D80-1P	1	70A	DC12kV	M5	M5	—	150/100/80g *4
CMS5D80-1PF	1	70A	DC12kV	M5	M5	UFC070	400g
						UVF-40	750g
CMS5D80-1PFM	1	70A	DC12kV	M5	M5	UFC034	100g
CMS10D80-1P	1	180A	DC12kV	M10	M10	—	650/600/550g *4
						UFC070	900g
CMS10D80-1PF	1	180A	DC12kV	M10	M10	UVF-40	1200g
						—	—
CMS2DBNC-1PFM	1	7A	DC1kV	$\phi 2.2$	BNC	UFC034	60g
CMS1DTMC-2PFM	2	2A	DC600V	$2 - \phi 1$	—	UFC034	50g

Caution : Nuts and washers are included for both the atmospheric and the vacuum side at electrode connection port. Not included for the atmospheric side of the CMS2D09-8P, 8PF and 2PFM.

*2 Per single terminal.

*3 Use at 10^{-2} Pa or less. Discharge could occurred at reduced pressures of 10^{-2} Pa or more and specified withstand voltage could not be performed.

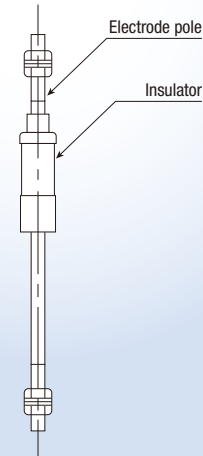
*4 Numbers are in order of electrode pole + insulator + seat plate + pipe / electrode pole + insulator + seat mass / electrode pole + insulator.

*5 Use clips, etc for electrode connections of CMS2D09-8P, 8PF, 2PFM on the atmospheric side. M5 screws cannot be used with these models.

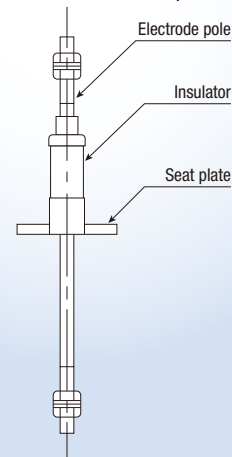
Connection Type

► CMS □□□□-□ P models are the welded types with no connection flange. The following 3 types are available.

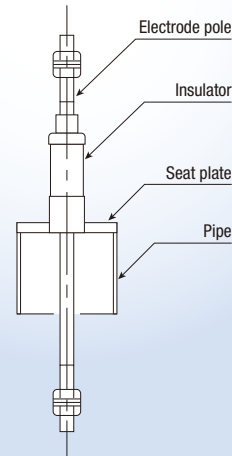
Electrode pole with insulator



Electrode pole with insulator and seat plate



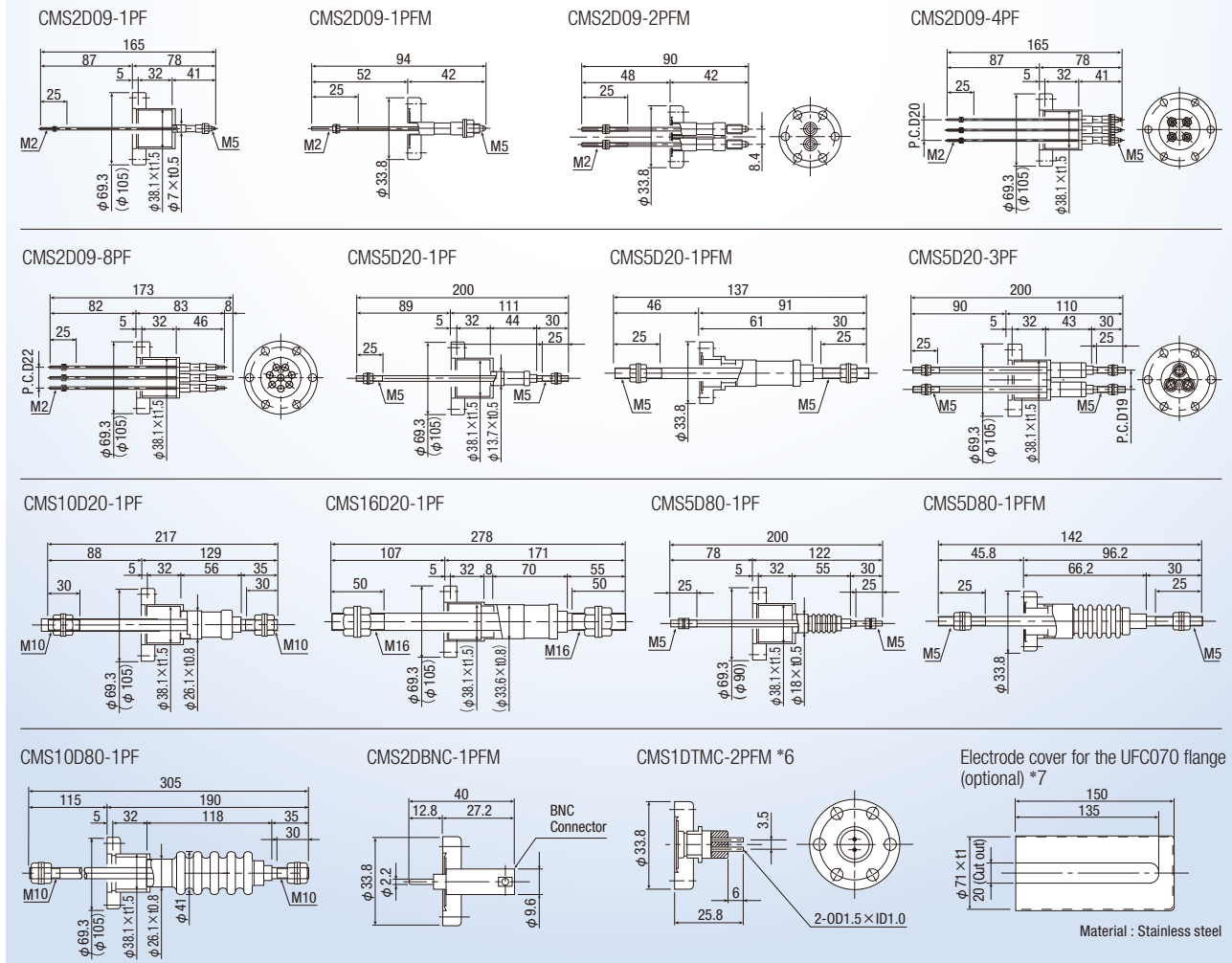
Electrode pole with insulator and seat plate and pipe



The welded flange type electrode pole with insulator, seat plate, and pipe is model CMS □□□□-□ PF. Refer to the CMS □□□□-□ PF diagram for dimensions.

Dimensions

Unit: mm



Caution : Dimensions are with the UFC flange. Dimensions in () are with the UVF flange.

*6 The CMS1DTMC-2PFM is the feedthrough for thermocouple introduction. Thermocouples are passed through 2 of dia.1mm holes and sealed by solder.

*7 Cannot be used with CMS16D20-1PF and CMS10D80-1PF

Ultra-High Vacuum Rotary Motion Feed through / TDU Series

Specifications

Model	TDU-04FM	TDU-08F
Rotational ratio between inside and outside	1 : 1	
Minimum scale unit	45°	10°
Driving axis diameter	φ5mm	φ8mm
Maximum torque *8	0.5N·m	2N·m
Connection flange	UFC034	UFC070
Weight	0.4kg	1.1kg
Leak specification	1.3×10^{-11} Pa·m ³ /s or less	
Bake out temperature *9	≤150°C (≤302°F)	≤250°C (≤482°F)
Bellows lifespan *10	10,000 cycles	

*8 Value when manual operation.

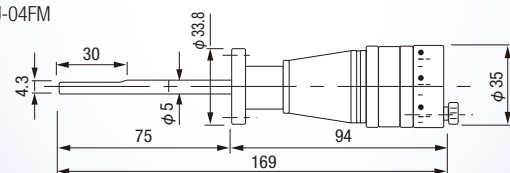
*9 Do not rotate during heating. After heating, do not rotate until it cools down to room temperature. Turning under heated conditions may result in rotation problems.

*10 Bearings may cause rotational problems before the bellows lifespan expires depending on subjective factors such as use environment and use method. Bearing replacement is possible with the TDU-08F models. Replacement operations must be done by the manufacturer or an authorized representative.

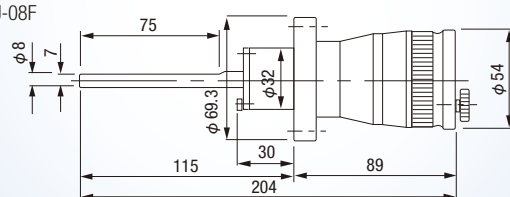
Dimensions

Unit: mm

TDU-04FM



TDU-08F



Ultra-High Vacuum Current & Rotary Motion & Linear Motion Feedthrough / Viewport [CMS / TDU / TSU / TVU-FV Series]

Ultra-High Vacuum Linear Motion Feed through / TSU Series

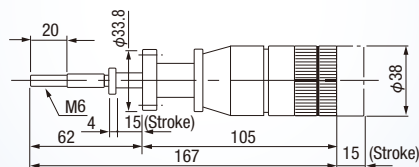
Specifications

model	TSU-15FM	TSU-15F	TSU-40F
Linear movement distance	15mm		40mm
Movement distance / rotation	1mm		
Minimum scale unit	0.05mm	1mm	
Driving axis diameter	M6	φ8mm	
Maximum thrust load	30kg		20kg
Connection flange	UFC034	UFC070	
Weight	0.7kg	1.2kg	1.4kg
Leak specification	$1.3 \times 10^{-11} \text{Pa} \cdot \text{m}^3/\text{s}$ or less		
Bake out temperature	$\leq 150^\circ\text{C}$ ($\leq 302^\circ\text{F}$)		$\leq 250^\circ\text{C}$ ($\leq 482^\circ\text{F}$)
Bellows lifespan	10,000 cycles		

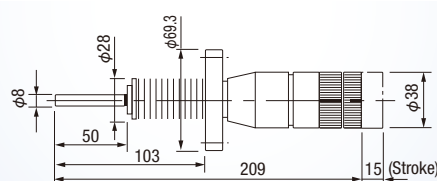
Dimensions

Unit: mm

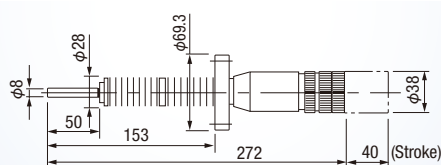
TSU-15FM



TSU-15F



TSU-40F



Ultra-High Vacuum Window / TVU series

Specifications

Leak specification	$1.3 \times 10^{-11} \text{Pa} \cdot \text{m}^3/\text{s}$ or less		
Heating temperature	420°C (788°F) or less (temperature variability rate: $20^\circ\text{C}/\text{min}$ ($68^\circ\text{F}/\text{min}$) or less)		
Materials	Glass window	Borosilicate glass (glass for kovar seal attachment)	
	Support cylinder	Kovar alloy	
	Flange	Austenite stainless steel	

Option

Stainless steel protection covers for TVU38FV, 64FV, 100FV, and 150FV are also available.

External Dimension Diagram

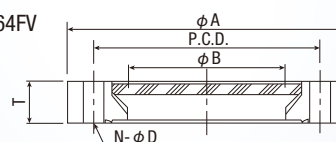
Unit: mm

model	φA	φB	T	P.C.D	N (units)	φD	Weight (kg)
TVU16FV	34.1	15.7	8.0	27.0	6	4.4	0.05
TVU38FV	69.9	38.0	13.0	58.7	6	6.9	0.3
TVU64FV	113.5	63.6	17.5	92.2	8	8.5	1.0
TVU100FV	151.5	89.3	20.0	130.3	16	8.5	1.5
TVU150FV	202.5	137.0	22.0	181.0	20	8.5	2.5

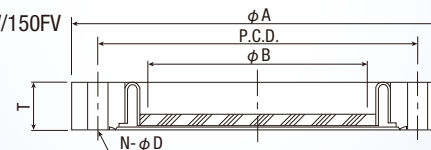
Connection flange is the bakeable knife-edge type metal seal flange for vacuum equipment. The parts are based on ISO standards which are recognized as international standards. Connection with other flanges following these standards is possible.

Dimensions

TVU16FV/38FV/64FV

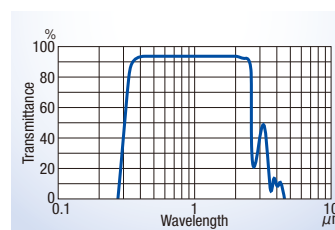


TVU100FV/150FV



Transmittance

The right graph shows the general relationship between transmittance and wavelength of the glass used in TVU series.



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