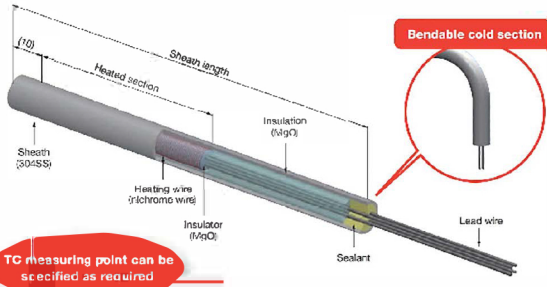


Type : MP20 (Thermocouple Built-in Small Diameter Cartridge Heater)

MP20 is a small diameter cartridge heater having a type K thermocouple inside. The heater and thermocouple are installed together, allowing for heating and temperature control in a small space. Cold cable length can be specified and designed to fit the heating object.



TC measuring point can be specified as required

[Basic reference specifications] □ Stock sheath material : 304SS

Model	Sheath O.D.	Sheath length	Heated section	Wattage	Voltage	Watt density	Dielectric strength test value
MP20	φ5.0 mm (+0/-0.1)	Min 52 mm	Approx. 32 mm	20W	100V	4W/cm ²	1000V/min
				30W		6W/cm ²	
				40W		8W/cm ²	
				50W		10W/cm ²	
				60W		12W/cm ²	
				30W		4W/cm ²	
		Min 68 mm	Approx. 48 mm	45W		6W/cm ²	
				60W		8W/cm ²	
				75W		10W/cm ²	
				90W		12W/cm ²	
				40W		4W/cm ²	
				60W		6W/cm ²	
		Min 84 mm	Approx. 64 mm	80W		8W/cm ²	
				100W		10W/cm ²	
				50W		4W/cm ²	
				75W		6W/cm ²	
Min 100 mm	Approx. 80 mm	100W	8W/cm ²				

* Product life is considerably influenced by the clearance between the heater and drilled hole for insert and it is important to improve heat transfer from the heater to the heating object. Please contact us for the details of drilled-hole diameter as it varies based on application and heater specification.

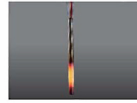
Small Diameter Micro Heater with Cold Section (MP35K)

A heated section and cold section can be designed within an assembly. Ideal design for application where cable tracing is required within a vacuum or under high temperature conditions



Thermocouple Built-in Small Diameter Cartridge Heater (MP20)

This is a heater combined with a thermocouple inside a heater sheath. The thermocouple and heater are a single unit, allowing for the heater temperature to be monitored with greater precision.



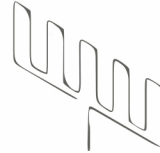
Type K TC Built-in Cartridge Heater



L-type cartridge heater

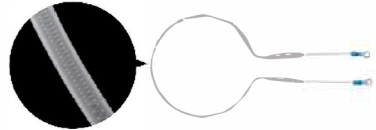
Valve heater (MP35 or other)

Suitable for vacuum valves or similar applications.



Small Diameter Sheath Heater (MP11)

This flexible small diameter sheath heater is available with a combination of different outputs (high output section and low output section), see the photo on the left.



Information in this catalog is subject to change without notice.

MICROPAK HEATER®

MICROPAK HEATER® is a small diameter sheath heater using a mineral insulated metal sheathed heater cable.

We supply MICROPAK HEATER® to various industries. Recently it is used widely in Fuel Cell, Vacuum Application and Analytical Instrumentation Devices.

The product's performance and durability have even been acknowledged by NASA, and the heater was installed in the "Curiosity" Mars rover by ARI, an Okazaki-associated company located in the U.S.A.

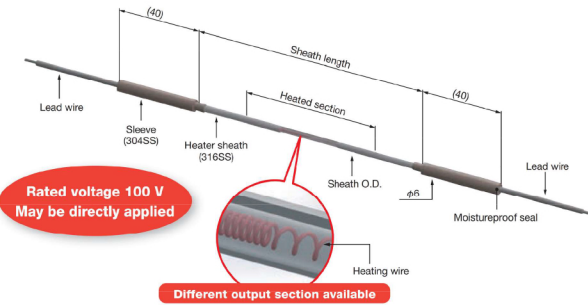


Mars rover "Curiosity"



Type : MP11 (Small Diameter Sheath Heater)

MP11, small diameter sheath heater, is available with
 - Desired heater capacity and length by changing the material of the heating element.
 - Various power-outputs within one heating element.
 - Complex and flexible bending using a small diameter.
 - Available with ceramic hermetic terminal or connectors.



[Basic reference specifications]

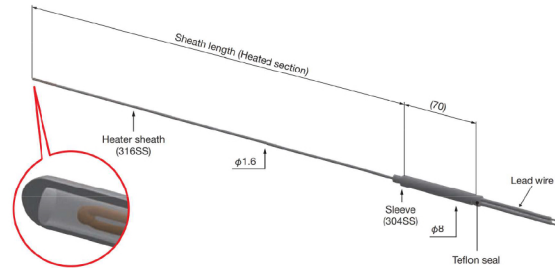
○ Stock sheath material : 316SS or NCF600eq

Model	Sheath O.D.	Sheath length	Heated section	Voltage	Wattage	Watt density	Dielectric strength test value			
MP11	φ1.6 mm	Max 1.5 m	500 mm	100V	25W	Approx. 1W/cm ²	300V/min			
					50W	Approx. 2W/cm ²				
		Max 2.0 m	1000 mm		75W	Approx. 3W/cm ²				
					50W	Approx. 1W/cm ²				
		φ2.3 mm	Max 1.5 m		500 mm	100V		100W	Approx. 2W/cm ²	600V/min
								150W	Approx. 3W/cm ²	
	Max 2.0 m		1000 mm	35W	Approx. 1W/cm ²					
				70W	Approx. 2W/cm ²					
	Max 3.0 m		2000 mm	100V	105W		Approx. 3W/cm ²			
					70W		Approx. 1W/cm ²			
		Max 1.5 m	500 mm		140W	Approx. 2W/cm ²	800V/min			
					210W	Approx. 3W/cm ²				
		Max 2.0 m	1000 mm		140W	Approx. 1W/cm ²				
					280W	Approx. 2W/cm ²				
	φ3.2 mm	Max 1.5 m	500 mm	100V	420W	Approx. 3W/cm ²				
					50W	Approx. 1W/cm ²				
		Max 2.0 m	1000 mm		100W	Approx. 2W/cm ²				
					150W	Approx. 3W/cm ²				
		Max 3.0 m	2000 mm		100W	Approx. 1W/cm ²				
					200W	Approx. 2W/cm ²				

Recommended sheath material: 316st for 450°C or less and NCF600eq for 500°C or above. Other specific materials available to suit applications such as 316L st/st.

Type : MP35 (Single Ended Termination Small Diameter Microheater)

MP35, a single ended termination small diameter microheater, is available with
 - Easy installation and attachment to small heating objects.
 - Operational in a vacuum, high-temperatures and pressure with a wide temperature range -200°C ~ 500°C.
 - Custom transition sleeve dimensions or termination with ceramic hermetic terminal or connectors.



[Basic reference specifications]

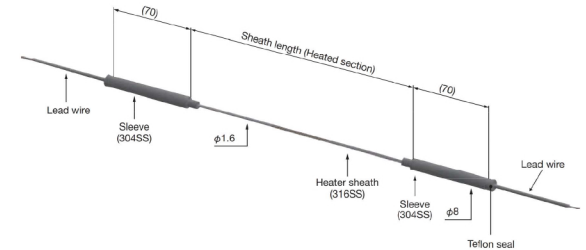
○ Stock sheath material : 316SS

Model	Sheath O.D.	Resistance value	Sheath length	Voltage	Wattage	Watt density	Dielectric strength test value	
MP35	φ1.6 mm	94Ω/m	1420 mm	100V	75W	Approx. 1W/cm ²	300V/min	
			1060 mm		100W	Approx. 2W/cm ²		
			850 mm		125W	Approx. 3W/cm ²		
			1850 mm		90W	Approx. 1W/cm ²		
			1330 mm		125W	Approx. 2W/cm ²		
			1040 mm		160W	Approx. 3W/cm ²		
		46.5Ω/m	2150 mm	100W	Approx. 1W/cm ²	100V	140W	Approx. 2W/cm ²
			1630 mm	180W	Approx. 3W/cm ²			
			1190 mm	180W	Approx. 3W/cm ²			
			2650 mm	130W	Approx. 1W/cm ²			
			29Ω/m	1910 mm	180W		Approx. 2W/cm ²	
				1500 mm	230W		Approx. 3W/cm ²	

Voltage, length, heater capacitance, and other specifications may be modified to suit your requirements. We also manufacture and install a range of adapters and flanges to support a variety of applications including vacuum atmospheres, high temperatures, and high voltages.

Type : MP36 (Double Ended Termination Small Diameter Microheater)

MP36, a double ended termination small diameter microheater is available with
 - Easy installation and attachment to complex configurations.
 - Operational in a vacuum, high-temperatures and pressure with a wide temperature range -200°C ~ 500°C.
 - Wide heating dimensions with a single heater based on technology for producing long heating cables.
 - Custom transition sleeve dimensions or termination with ceramic hermetic terminal or connectors.



[Basic reference specifications]

○ Stock sheath material : 316SS

Model	Sheath O.D.	Resistance value	Sheath length	Voltage	Wattage	Watt density	Dielectric strength test value	
MP36	φ1.6 mm	23.5Ω/m	2840 mm	100V	150W	Approx. 1W/cm ²	300V/min	
			2130 mm		200W	Approx. 2W/cm ²		
			1700 mm		250W	Approx. 3W/cm ²		
			3700 mm		180W	Approx. 1W/cm ²		
			2670 mm		250W	Approx. 2W/cm ²		
			2080 mm		320W	Approx. 3W/cm ²		
		11.83Ω/m	4300 mm	200W	Approx. 1W/cm ²	100V	280W	Approx. 2W/cm ²
			3070 mm	360W	Approx. 3W/cm ²			
			2390 mm	360W	Approx. 3W/cm ²			
			5300 mm	260W	Approx. 1W/cm ²			
			7.25Ω/m	3830 mm	360W		Approx. 2W/cm ²	
				3000 mm	460W		Approx. 3W/cm ²	

Voltage, length, heater capacitance, and other specifications may be modified to suit your requirements. We also manufacture and install a range of adapters and flanges to support a variety of applications including vacuum atmospheres, high temperatures, and high voltages.