

Code Heaters, Heat Resistance Tapes

Micro Heaters, Silicon Belt Heaters

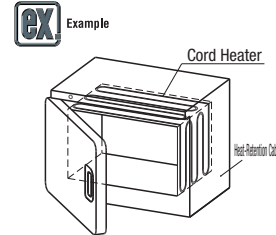
Cord Heaters

MCDH (100V, 200V / Single-phase)

Maximum Operating Temperature: 180°C

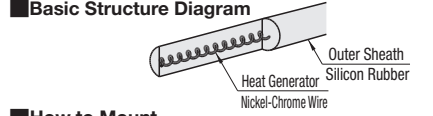
Material Element: Silicon Rubber
Sleeve: Silicon Rubber
Lead Wire: Copper (Cu)
Lead Wire Film: Silicon Rubber

Part Number Type	No.	L (Heating Element)	W (Electric Power)	V (Voltage)	Electrical Power Density (W/cm ²)	Unit Price
MCDH	1	1000	10	100	0.13	
	2	2000	20			
	3	3000	30			
	4	4000	40	200		
	5	5000	50			



Ordering Example
Part Number: MCDH2

- Features**
- Excel in heat resistance as the sheathing of the heater is silicon rubber.
 - As the heater is cord shape, it can be fitted in any type of shape.
- Basic Structure**
- This is a heater integrating a heat generating body with the silicon rubber.



How to Mount

- Install directly onto piping.
- As an example to secure the heater, heat resistant aluminum tape can be used. (Fig. 1)

- Precautions for Use**
- Do not let heater run idle by itself in the atmosphere. It may cause fires and broken wire. Ensure the heater is closely contacted with a heated object when using.
 - Do not install by overlapping the heater.
 - Pay attention to the current contact conditions to connect wire terminals properly.
 - Do not use over the rated voltage (V).
 - When removing the heater from the heated object, make sure the power is turned off. Do not touch the heater immediately after the power is turned off.

How to Determine the Number of Winding
See P.1644.

Selecting Method (Cord Heaters and Silicon Belt Heaters)
Specify the heat insulating thickness, size of piping, temperature of piping and temperature difference from the external atmospheric temperature, and calculate the calories required for the heater by using the following formula. (Refer to Fig. 2, Table 1 and 2)

Heat Quantity Required for The Heater (W) = Wattage per 1m of Pipe (W/m) x Length of Pipe (m)

Ex.) For piping size 15A (1/4B) and length 1m to be 30°C (Heat-insulation thickness is 25mm and external atmospheric temperature is 20°C)
From Table 1, when the insulation thickness is 25mm, piping size is 15A (1/4B) and the temperature difference between pipe temperature (30°C) and external atmospheric temperature (20°C) is 10°C, the wattage is 4.0 (W/m). Thus,
Heat Quantity Required for The Heater (W) = 4.0(W/m)x1(m)=4.0W

Table 1 When heat-retention thickness is 25 mm Unit: W/m (Wattage per 1m of Pipe)

Pipe Size	Temperature Difference between Pipe Temperature and External Atmospheric Temperature	Temperature Difference between Pipe Temperature and External Atmospheric Temperature						
		10°C	20°C	30°C	40°C	60°C	80°C	
A	1/4	4.0	8.1	12.1	16.1	24.4	32.6	
20	1/2	4.6	9.2	13.9	18.5	27.6	36.9	
25	1	5.4	10.6	16.0	21.4	32.0	42.8	
32	1 1/4	6.3	12.5	18.8	24.9	37.5	50.1	
40	1 1/2	6.9	13.7	20.5	27.5	41.3	54.9	
50	2	8.1	16.1	24.2	32.2	48.4	64.5	
65	2 1/2	9.5	19.1	28.6	38.3	57.2	76.4	
80	3	10.9	21.6	32.5	43.4	65.0	86.6	
100	4	13.2	26.6	39.9	53.3	79.6	126.5	
150	6	18.2	36.5	54.8	73.1	109.5	145.9	
200	8	23.3	46.5	69.6	92.9	139.1	185.5	
250	10	28.1	56.3	84.4	112.5	168.8	225.0	

Table 2 When heat-retention thickness is 50 mm Unit: W/m (Wattage per 1m of Pipe)

Pipe Size	Temperature Difference between Pipe Temperature and External Atmospheric Temperature	Temperature Difference between Pipe Temperature and External Atmospheric Temperature						
		10°C	20°C	30°C	40°C	60°C	80°C	
15	1/4	2.7	5.6	8.4	11.3	16.9	22.5	
20	1/2	3.1	6.2	9.4	12.5	18.8	25.5	
25	1	3.5	7.0	10.6	14.1	21.1	28.1	
32	1 1/4	4.0	8.0	12.0	16.0	24.1	32.1	
40	1 1/2	4.4	8.6	13.0	17.3	26.0	34.7	
50	2	5.0	9.9	14.9	19.7	29.9	39.8	
65	2 1/2	5.7	11.5	17.3	23.1	34.5	46.0	
80	3	6.4	12.9	19.2	25.6	38.5	51.2	
100	4	7.6	15.4	23.0	30.8	46.0	61.4	
150	6	10.2	20.4	30.6	40.9	61.1	81.5	
200	8	12.8	25.4	38.1	50.9	76.1	101.5	
250	10	15.1	30.4	45.5	60.8	91.0	121.4	

Heat Resistance Tapes

Type	Surface	Material	Heater	Adhesive Part	Heat Resistance Temperature
① MCAT	Aluminum	Glass Cloth	Acrylic Adhesive Material		150°C
② MCTF	Fluororesin (PTFE)	Silicon Adhesives			200°C
③ MCTFG	Fluororesin (PTFE)	Glass Cloth	Silicon Adhesives		200°C

Peel off backing paper and adhere the tape to an object. (MCAT only)
Wipe off oil and dust on the mating surface before adhering.
Can be cut with a utility knife.

Characteristic Values of Heat Resistance Tapes (Listed values are not guaranteed values but reference values.)

Item	MCAT	MCTF	MCTFG
Operating Temperature (°C)	150	200	200
Tensile Strength (N/cm)	24	108	330
Elongation (%)	12.5	20.0	4.7
Adhesive Strength (N/25mm Width)	16	10	12.9

* The adhesive strength means the 180 degree peeling strength. (When adhered to SUS304)

Ordering Example
Part Number: MCAT20

Micro Heaters

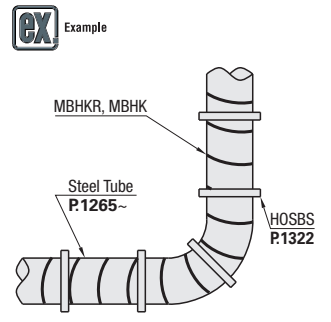
MBHKR (Both Terminal Type)

MBHK (One Terminal Type)

Maximum Operating Temperature: 600°C
Heat Resistance Temperature of Sleeve: 200°C

Material: SUS316
Sheath Body: SUS316
Heat Generator: Nickel Heat Generator
Lead: Nickel Lead

Part Number Type	D	V (Voltage)	W (Electric Power)	L (Heating Element)	L1	D1	D2	Electrical Power Density (W/cm ²)	Unit Price
MBHKR	1.0	100	200	1750	50	5.0	1.0	3.6	
		200	400	3500		6.4			
	1.6	100	300	3000	50	6.4	1.0	2	
		200	600	6000					
	2.4	100	600	3600	70	8.0	1.4	2.2	
		200	1200	7200					
MBHK	1.6	100	250	1350	36	6.4	1.0	3.7	
		200	500	2700		3.7			
	2.4	100	400	1950	36	8.0	1.4	2.7	
		200	800	3800		2.8			



- Structure**
- Insulating powers and a heat generator are hermetic-sealed and enclosed within sheath in the same manner as sheath thermocouple.
- Features**
- The tube of the heater is extremely thin. This makes it usable for narrow and complicated places.
 - Enhanced flexibility enables you to change shapes as you want.
 - Minimum bending radius should be up to 3 times of D dimension.
- Precautions for Use**
- Do not cross the sheath part or contact to the part.
 - If a heater is covered with material of low thermal conductivity such as heat insulation material, heat is more likely to stay. In this case, be sure to use in combination with Temperature Control Unit.
 - The tube of the heater is extremely thin. Excessive tension may cause breakage in the tube.

Silicon Belt Heaters

MBEH (100V, 200V / Single-phase)

Operating Temp. Range: -50 ~ 180°C

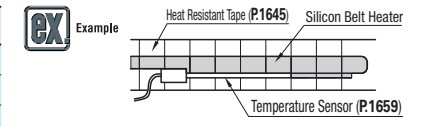
Features:

- Belt type heater with Nickel-chrome wire molded with silicon rubber.
- The belt type structure enables to stick to the object closely and heat it.
- For Selecting Method, see P.1645.

Selecting Method: See Left-hand page

Material: Nickel-chrome Wire
Coating Material: Silicon Rubber
Lead Wire: Silicon Rubber Film
Tin Plated Annealed Copper Wire

Part Number Type	No.	L (Heating Element)	V (Voltage)	W (Electric Power)	Electrical Power Density (W/cm ²)	Unit Price
MBEH	1050	1000	100	50	0.7	
	2050	2000	200	50	0.35	
	3100	3000	200	100	0.5	



- Precautions for Use**
- Do not let the heaters run idle in the atmosphere. It may cause fires and broken wire.
 - Do not install by overlapping the heater.
 - Do not use over the rated voltage (V).
 - This product is not water-proof. Do not use in places where water splashes or humidity is high.
 - Wrap with heat resistant tape from the top to use.
 - When removing the heater from the heated object, make sure the power is turned off. Do not touch the heater immediately after the power is turned off.
 - Use Temperature Adjusters or Temperature Controllers for safety.

Ordering Example
Part Number: MBHKR1.0 - V100 - W200 - L1750
MBEH 1050