03

Heaters

Catalog

OKAZAKI
MANUFACTURING COMPANY

Green Procurement

Okazaki Manufacturing Company has established a policy for the control of hazardous chemical substances as an environmental measure, and promotes green purchasing and procurement activities that take the environment into consideration.

Security Policy

Okazaki Manufacturing Company handles customer information as a critical asset.
We thoroughly recognize the importance of ensuring confidentiality and protecting information, and have implemented security measures through company rules and regulations.
To prevent the leakage of information, we take steps such as installing anti-virus software on company computers, implementing measures to prevent data leaks when exchanging data between computers, and prohibiting employees from taking computers out of company facilities and bringing their own private computers into company facilities.
In addition, we comply with the Act on the Protection of Personal Information and refrain from activities such as making digital copies of our customers' business cards.

Product Warranty

Okazaki Manufacturing Company conducts appropriate product inspections based on our own company standards. If a problem occurs with the product, contact your nearest service representative with the specific details of the problem.

Warranty Period

Period of warranty will be limited to one year from the date of the delivery.

Scope of Warranty

If, during the warranty period specified above, a problem occurs due to a fault attributable to Okazaki Manufacturing Company, the product shall be replaced or repaired.
However, this warranty does not apply in the following cases:

(1) If the product has been handled or used improperly
(2) If the cause of the problem is attributable to factors external to the purchased product
(3) If modifications or repairs have been performed by a party other than Okazaki Manufacturing Company
(4) If the product is used for purposes or applications in which the product is intended as a consumable item
(5) If corrosion such as salt damage occurs due to usage in a corrosive environment.
(6) In other cases such as a natural disaster or accident

In addition, this warranty does not apply if the product is not used in accordance with the details specified in prior discussions, the conditions of use, the precautions, or the recommendations described in the product drawings created by Okazaki Manufacturing Company. Furthermore, the scope of the warranty is limited to the purchased product itself, and it does not cover other damage arising from the problem with the purchased product.

INDEX

OKAZAKI
MANUFACTURING COMPANY

OKAZAKI
MANUFACTURING COMPANY
Temperature is our Business (Sensor, Heater & MI Cable)

Connecting with

Head Office

Main Manufacturing Factory

Okazaki Manufacturing Company supplies highly reliable and trusted products for use in a wide range of industries.

Aerospace

Petrochemicals

Gas

Fibers

Semiconductors

the world through "heat"

Aerospace Division

Kobe-Iwaoka Factory

Fukuoka Factory

Kyushu Factory

Okazaki Manufacturing (Taiwan) Company

ARi INDUSTRIES,INC.,USA

[Business Sites]

Sales Offices	International Division/Tokyo Branch/Ibaraki Branch/Kita-kanto Branch/Chiba Branch/Yokohama Branch/Nagoya Branch/Kyoto Branch/ Osaka Branch/Kobe Sales Office/Takasago Branch/Okayama Branch/Hiroshima Branch/Kita-kyushu Branch/Nagasaki Bianch
Factories	Main Manufacturing Factory/Aerospace Division in Main Manufacturing Factory/Kobe-Iwaoka Factory/Fukuoka Factory/Kyushu Factory
Overseas Bases	ARi Industries Inc., USA/Okazaki Manufacturing (Taiwan) Co., Ltd./Okazaki Manufacturing Company UK Limited

Environment

Power Generation

Medical & Food

Automobiles

Ships

Iron & Steel

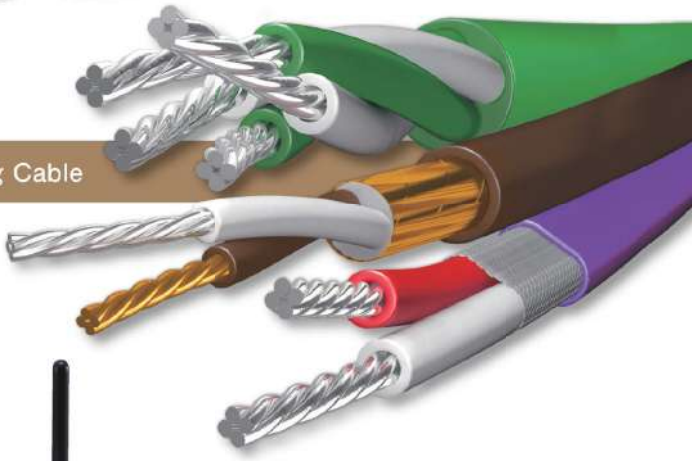
Sensors and Heaters

Connecting across industries with "heat"

03 Heaters

AEROHEAT®

04 Compensating Cable



05 Thermowells

OKAZAKI

Micro Heaters

Micro heaters are economical heaters with high reliability, which can generate heat with very quick response. The heated section can be bent, wound in a coil shape, soldered with silver brazing, or cast into a metal block.
The sheath material is stainless steel or NCF (equivalent to Inconel) with high heat/corrosion-resistance, and the thin outer diameter enables the heater to be installed in complex places where space is extremely limited.

Characteristics

Our micro heaters have the characteristics outlined below.

1. Wide application range
2. Uniformity
3. Easy handling
4. Longer product life
5. Great mechanical strength and pressure resistance

Standard Specifications of Micro Heaters

No of cores	Code	Sheath OD	Resistance value Ω/m		JIS compli-ance	Sheath Thick-ness	Core cable diameter	Sheath max. length	Approx. weight	Max. rated voltage recommend-ed value (V max.)	Voltage resistance inspection value (V/1min.)	Max. rec-ommended allowable temperature for heat generating element (°C)
			Nickel chromium	Nickel								
2	B	1.6	46.5	3.80	×	0.17	0.26	100	10	100	300	500
	XA	1.9	33.0	-	×	0.20	0.31	90	17	100	500	500
	C	2.3	22.5	1.74	×	0.24	0.38	150	25	100	600	600
	XB	2.7	16.2	-	×	0.28	0.45	110	32	150	700	600
	D	3.2	11.5		×	0.33	0.53	140	45	150	800	650
	DH	3.2	28	-	○	0.33	0.34	140	45	200	1200	650
	XC	3.8	8.13	-	×	0.39	0.63	100	63	200	1000	650
	XD	3.8	20.2	-	○	0.39	0.39	100	63	300	1500	650
	E	4.8	5.1	0.4	○	0.49	0.79	63	100	300	1500	650
	EH	4.8	12.9	-	○	0.49	0.51	63	100	300	1500	650
	F	6.4	2.85	-	○	0.65	1.05	35	178	300	1500	650
	G	8.0	1.8	-	○	0.82	1.32	22	278	300	1500	650
1	A	1.0	26.9	-	×	0.17	0.24	100	4	100	450	500
	B	1.6	10.5	1.0	×	0.17	0.39	100	10	100	600	500
	XA	1.9	7.5	-	×	0.20	0.46	90	17	150	600	500
	C	2.3	5.12	0.5	×	0.24	0.56	150	25	150	800	600
	XB	2.7	3.65	-	×	0.28	0.66	110	32	300	900	600
	D	3.2	2.6	0.26	○	0.33	0.77	140	45	300	1500	650
	DH	3.2	5.6	-	○	0.33	0.53	140	45	300	1500	650
	XC	3.8	1.83	-	○	0.39	0.90	100	63	300	1500	650
	XD	3.8	4.13	-	○	0.39	0.62	100	63	300	1500	650
	E	4.8	1.15	0.125	○	0.49	1.10	63	100	300	1500	650
	F	6.4	0.68	-	○	0.65	1.47	35	178	300	1500	650

Notes:

- JIS compliance indicates JIS C3651. (JIS compliance does not include sheath material equivalent to Inconel.)
  The voltage resistance testing value is 1,000 V/1 min. for a rated voltage of 150 V or lower, and 1,500 V/1 min. for over 150 V. However, the voltage to ground is 300 V or lower.
  Please provide notification if JIS compliance is required.
- Sheaths with code A and G are not standard inventory items. Please check the delivery date when ordering.
- If JIS compliance is not required, a rated voltage of 440 V can be used for heaters with one core and an outer diameter of ϕ3.2 or more.
- The sheath tip of the single-ended termination type micro heater is welded and sealed. If requested, the tip can be finished with the same diameter as the sheath.

Inspection Standards

Dimensional inspection

Heater sheath outer diameter tolerance	±0.05 mm (except at the tip of single-ended termination type heaters)		
Heater sheath length	<1000 mm 1000 mm ≦		±15 mm ±1.5%
Type K heated section length	1-core	<1000 mm 1000 mm ≦	±30 mm ±3%
	2-core	< 1000 mm 1000 mm ≦	±15 mm ±1.5%
Lead wire length	<1000 mm 1000 mm ≦		±15 mm ±1.5%

Insulation resistance test

Measured at room temperature between core cable and sheath.

5 MΩ or more/500 V DC
Note: 5 MΩ or more/250 V DC (room temperature) for 1-core heater with sheath outer diameter of ϕ1.0
5 MΩ or more/250 V DC (room temperature) for 2-core heater with sheath outer diameter of ϕ1.6

Conductor resistance

Room temperature resistance value which corresponds to the heater capacity with a tolerance of ±10% (Resistance temperature coefficient is not considered).
Different criteria shall, however, be applicable to the item listed below.
Capacity tolerance of ±20% : H35K, H36K, H45N, H46N, and heaters with sheath outer diameter of ϕ1.0
Capacity tolerance of ±30% : Heaters with sheath length of less than 1000 mm

Voltage resistance test

The voltage resistance testing value is the same as the voltage resistance inspection value provided on the previous page in the "Standard Specifications of Micro Heaters" (room temperature).
However, for products subjected to bending in the manufacturing process, the coefficients indicated in the table below are applied to the voltage resistance testing value.
Please contact us for details regarding JIS compliance.

Central bending radius	> 5D	2.5D to 5D
Coefficient	1.0	0.8

Documentation

The inspection certificate shall be attached to the product. Detailed test report shall be available upon request.
Note: Please make sure to measure the electrical continuity and insulation resistance prior to use.

H35 » G-6

Basic micro heater with single-ended termination

H36 » G-7

Basic micro heater with double-ended termination

H45 » G-8

Anti-freezing micro heater with single-ended termination

H46 » G-9

Anti-freezing micro heater with double-ended termination

H55 » G-10

Micro heater with lead wire and single-ended termination

H56 » G-11

Micro heater with lead wire and double-ended termination

H75 » G-12

Micro heater with low-heat section and single-ended termination

H95 » G-13

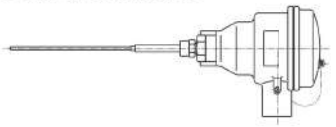
Micro heater with connection head and single-ended termination

H96 » G-14

Micro heater with connection head and double-ended termination

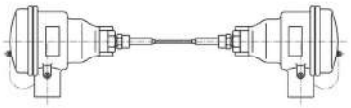
H95G » G-15

Micro heater with connection head and single-ended termination



H96G » G-16

Micro heater with connection head and double-ended termination



H35K » G-17

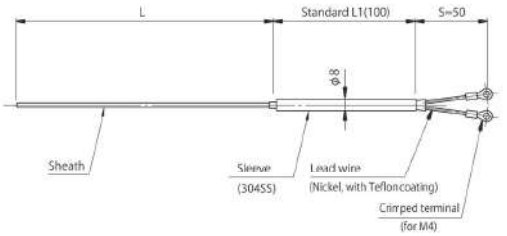
Micro heater with cold section and single-ended termination

H36K » G-18

Micro heater with cold section and double-ended termination

OKAZAKI MANUFACTURING COMPANY

Basic micro heater with single-ended termination



Characteristics

The H35 is a basic micro heater model with single-ended termination (two cores).
It can be used in various types of applications, such as in experimentation equipment.
This model does not come as waterproof. Please contact us before purchasing if waterproof construction is required or if you intend to use product in a vacuum.

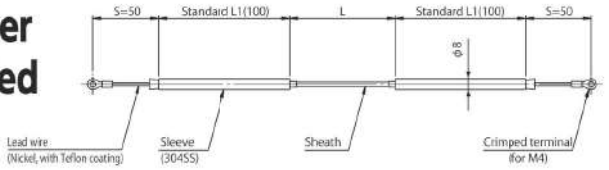
Model code H35

H35 – ① ② ③ ④ ⑤ – ⑥ / ⑦

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	B	φ1.6	XA	φ1.9
		C	φ2.3	XB	φ2.7
		D	φ3.2	XC	φ3.8
		E	φ4.8	DH	φ3.2
		F	φ6.4	XD	φ3.8
		G	φ8.0	EH	φ4.8
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Lead wire length (Unit: mm)	S			
⑦	Sleeve length (Unit: mm)	L1			

Sleeve length L1 mm	Insulation thickness (reference) mm
100	50
150	100
200	150
250	200

Basic micro heater with double-ended termination



Characteristics

The H36 is a basic micro heater model with double-ended termination (one core).
It can be used in various types of applications, such as in experimentation equipment.
This model does not come as waterproof. Please contact us before purchasing if waterproof construction is required or if you intend to use product in a vacuum.

Model code H36

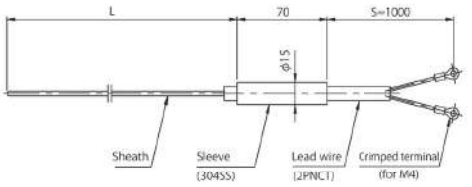
H36 – ① ② ③ ④ ⑤ – ⑥ / ⑦

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	A	φ1.0	XA	φ1.9
		B	φ1.6	XB	φ2.7
		C	φ2.3	XC	φ3.8
		D	φ3.2	DH	φ3.2
		E	φ4.8	XD	φ3.8
		F	φ6.4		
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Lead wire length (Unit: mm)	S			
⑦	Sleeve length (Unit: mm)	L1			

Sleeve length L1 mm	Insulation thickness (reference) mm
100	50
150	100
200	150
250	200

OKAZAKI MANUFACTURING COMPANY

Anti-freezing micro heater with single-ended termination



Characteristics

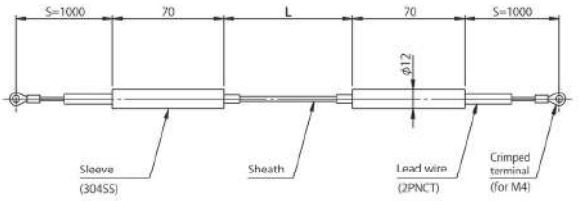
The H45 is suitable for heating and maintaining warmth in pipes used in cold climates, and can be used to prevent pipelines from freezing.
A chloroprene cabtyre cable (600V, 2PNCT, JIS C 3327) is used for the lead wire, making it suitable for outdoor use. This model is designed for use in applications where the temperature of the heated object does not exceed 60°C. The heater is designed for use at a power density of less than 0.25W/cm^2.
Models that use nickel for the heat generation cable are available. These models are intended for use in applications where the temperature of the heated object does not exceed 20°C.

Model code H45

H45 ① ___ – ② ___ ③ ___ ④ ___ ⑤ ___ ⑥ ___ – ⑦ ___

①	Type of Element	None	Nickel chromium wire		
		N	Nickel wire		
②	Length (Unit: mm)	L			
③	Sheath outer diameter (Unit: mm)	A	φ1.6	XA	φ1.9
		B	φ2.3	XB	φ2.7
		C	φ3.2	XC	φ3.8
		D	φ4.8	DH	φ3.2
		E	φ6.4	XD	φ3.8
		F	φ8.0	EH	φ4.8
④	Power (Unit: kW)	W			
⑤	Sheath material	C	316SS		
		B	NCF600eq.		
⑥	Voltage (Unit: V)	E			
⑦	Lead wire length (Unit: mm)	S			

Anti-freezing micro heater with double-ended termination



Characteristics

The H46 is suitable for heating and sustaining warmth in pipes used in cold climates, and can be used to prevent pipelines from freezing.
A chloroprene cabtyre cable (600 V, 2PNCT, JIS C 3327) is used for the lead wire, making it suitable for outdoor use. This model is designed for use in applications where the temperature of the heated object does not exceed 60°C. The heater is designed for use at a power density of less than 0.25W/cm^2.
Models that use nickel for the heat generation cable are available. These models are intended for use in applications where the temperature of the heated object does not exceed 20°C.

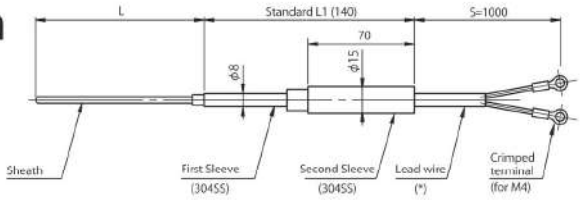
Model code H46

H46 ① ___ — ② ___ ③ ___ ④ ___ ⑤ ___ ⑥ ___ — ⑦ ___

①	Type of Element	None	Nickel chromium wire		
		N	Nickel wire		
②	Length (Unit: mm)	L			
③	Sheath outer diameter (Unit: mm)	A	φ1.0	XA	φ1.9
		B	φ1.6	XB	φ2.7
		C	φ2.3	XC	φ3.8
		D	φ3.2	DH	φ3.2
		E	φ4.8	XD	φ3.8
		F	φ6.4		
④	Power (Unit: kW)	W			
⑤	Sheath material	C	316SS		
		B	NCF600eq.		
⑥	Voltage (Unit: V)	E			
⑦	Lead wire length (Unit: mm)	S			

OKAZAKI MANUFACTURING COMPANY

Micro heater with lead wire and single-ended termination



Characteristics

The H55 is similar to the H35, but is equipped with a second sleeve to house and protect the lead wire.

* A cabtyre cable is used for the lead wire. It is also possible to use other types of lead wire, such as silicone rubber glass fiber braided wire (600 V, LKGB), or non-halogen flame-retardant flexible cross-linked polyethylene insulated electric wire (600 V, EM-UWFC).

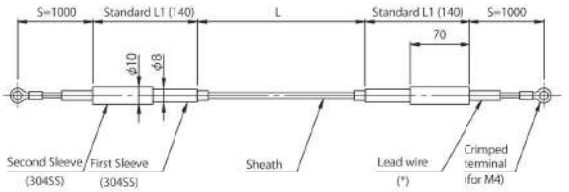
Model code H55

H55 – ① ② ③ ④ ⑤ – ⑥ / ⑦ – ⑧

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	B	ϕ1.6	XA	ϕ1.9
		C	ϕ2.3	XB	ϕ2.7
		D	ϕ3.2	XC	ϕ3.8
		E	ϕ4.8	DH	ϕ3.2
		F	ϕ6.4	XD	ϕ3.8
		G	ϕ8.0	EH	ϕ4.8
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Lead wire length (Unit: mm)	S			
⑦	Sleeve length (Unit: mm)	L1			
⑧	Lead wire Type/Other				

Sleeve length L1 mm	Insulation thickness (refereice) mm
140	50
190	100
240	150
290	200

Micro heater with lead wire and double-ended termination



Characteristics

The H56 is similar to the H36, but is equipped with a second sleeve to house and protect the lead wire.

* A cabtyre cable is used for the lead wire. It is also possible to use other types of lead wire, such as silicone rubber glass fiber braided wire (600 V, LKGB), or non-halogen flame-retardant flexible cross-linked polyethylene insulated electric wire (600 V, EM-LMFC).

Model code H56

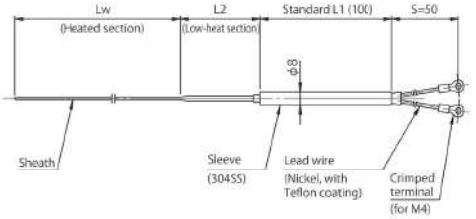
H56 – ① ② ③ ④ ⑤ – ⑥ / ⑦ – ⑧

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	A	φ1.0	XA	φ1.9
		B	φ1.6	XB	φ2.7
		C	φ2.3	XC	φ3.8
		D	φ3.2	DH	φ3.2
		E	φ4.8	XD	φ3.8
		F	φ6.4		
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Lead wire length (Unit: mm)	S			
⑦	Sleeve length (Unit: mm)	L1			
⑧	Lead wire Type/Other				

Sleeve length L1 mm	Insulation thickness (reference) mm
140	50
190	100
240	150
290	200

OKAZAKI MANUFACTURING COMPANY

Micro heater with low-heat section and single-ended termination



Characteristics

The H75 is equipped with an AERODOD (two-step) type metal sheath and a low-heat section, which prevents the sleeve from reaching a high temperature and increases the power density of the heated section.

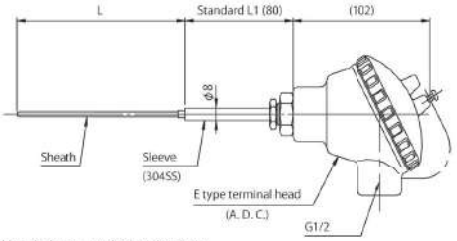
Model code H75

– ① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ / ⑨

①	Length of heated section (Unit: mm)	Lw			
②	Heated section sheath outer diameter (Unit: mm)	B C D E	ϕ1.6 ϕ2.3 ϕ3.2 ϕ4.8		
③	Length of low-heat section (Unit: mm)	L2			
④	Low-heat section sheath outer diameter (Unit: mm)	C D	ϕ2.3 ϕ3.2	E F	ϕ4.8 ϕ6.4
⑤	Power (Unit: kW)	W			
⑥	Sheath material	C B	316SS NCF600eq.		
⑦	Voltage (Unit: V)	E			
⑧	Lead wire length (Unit: mm)	S			
⑨	Sleeve length (Unit: mm)	L1			

Sleeve length L1 mm	Insulation thickness (reference) mm
100	50
150	100
200	150
250	200

Micro heater with connection head and single-ended termination



Characteristics

The H95 is equipped with an aluminum die cast terminal box (E type terminal head) that is attached to the sleeve.
This model is suitable for use in environments with high levels of dust or high humidity. A connector piece that provides strong support is available as an additional specification.

Model code H95

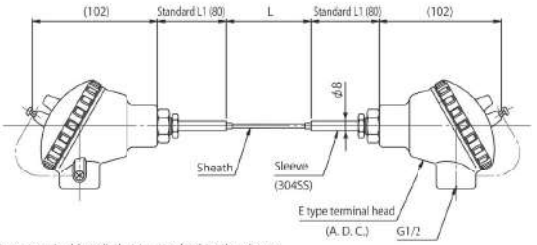
H95 – ① ② ③ ④ ⑤ / ⑥ ⑦

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	B	φ1.6	XA	φ1.9
		C	φ2.3	XB	φ2.7
		D	φ3.2	XC	φ3.8
		E	φ4.8	DH	φ3.2
		F	φ6.4	XD	φ3.8
		G	φ8.0	EH	φ4.8
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Sleeve length (Unit: mm)	L1			
⑦	With connector	CP			

Sleeve length L1 mm	Insulation thickness (reference) mm
80	50
130	100
180	150
230	200

OKAZAKI MANUFACTURING COMPANY

Micro heater with connection head and double-ended termination



Characteristics

The H96 is equipped with an aluminum die cast terminal box (E type terminal head) that is attached to the sleeve.
This model is suitable for use in environments with high levels of dust or high humidity. A connector piece that provides strong support is available as an additional specification.

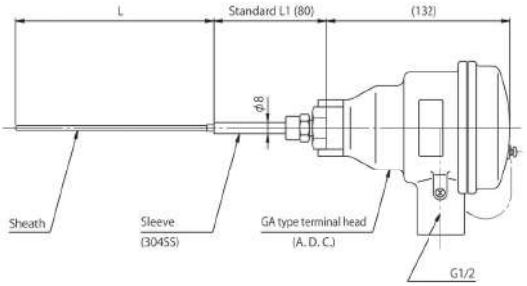
Model code H96

H96 — ① ② ③ ④ ⑤ / ⑥ ⑦

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	A	φ1.0	XA	φ1.9
		B	φ1.6	XB	φ2.7
		C	φ2.3	XC	φ3.8
		D	φ3.2	DH	φ3.2
		E	φ4.8	XD	φ3.8
		F	φ6.4		
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Sleeve length (Unit: mm)	L1			
⑦	With connector	CP			

Sleeve length L1 mm	Insulation thickness (reference) mm
80	50
130	100
180	150
230	200

Micro heater with connection head and single-ended termination



Characteristics

The H95G is equipped with an aluminum die cast explosion-proof terminal box (GA type terminal head) that is attached to the sleeve.
This model is suitable for use in environments with high levels of dust or high humidity, and in atmospheres classified as dangerous places that do not require explosion-proof certification.
A connector piece that provides strong support is available as an additional specification.

Model code H95G

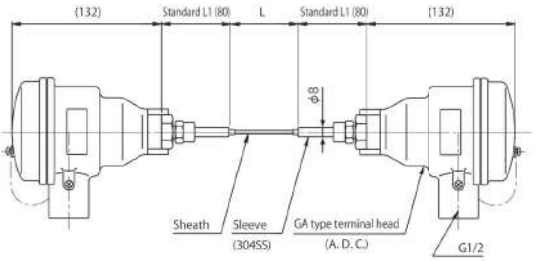
H95G – ① ② ③ ④ ⑤ / ⑥ ⑦

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	B	φ1.6	XA	φ1.9
		C	φ2.3	XB	φ2.7
		D	φ3.2	XC	φ3.8
		E	φ4.8	DH	φ3.2
		F	φ6.4	XD	φ3.8
		G	φ8.0	EH	φ4.8
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Sleeve length (Unit: mm)	L1			
⑦	With connector	CP			

Sleeve length L1 mm	Insulation thickness (reference) mm
80	50
130	100
180	150
230	200

OKAZAKI MANUFACTURING COMPANY

Micro heater with connection head and double-ended termination



Characteristics

The H96G is equipped with an aluminum die cast explosion-proof terminal box (GA type terminal head) that is attached to the sleeve.
This model is suitable for use in environments with high levels of dust or high humidity, and in atmospheres classified as dangerous places that do not require explosion-proof certification.
A connector piece that provides strong support is available as an additional specification.

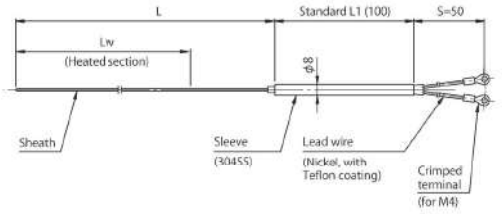
Model code H96G

H96G – ① ② ③ ④ ⑤ / ⑥ ⑦

①	Length (Unit: mm)	L			
②	Sheath outer diameter (Unit: mm)	A	ϕ1.0	XA	ϕ1.9
		B	ϕ1.6	XB	ϕ2.7
		C	ϕ2.3	XC	ϕ3.8
		D	ϕ3.2	DH	ϕ3.2
		E	ϕ4.8	XD	ϕ3.8
		F	ϕ6.4		
③	Power (Unit: kW)	W			
④	Sheath material	C	316SS		
		B	NCF600eq.		
⑤	Voltage (Unit: V)	E			
⑥	Sleeve length (Unit: mm)	L1			
⑦	With connector	CP			

Sleeve length L1 mm	Insulation thickness (reference) mm
80	50
130	100
180	150
230	200

Micro heater with cold section and single-ended termination



Characteristics

The H35K is a basic micro heater model with single-ended termination (two cores), in which parts of the total heater sheath length can be separated into heated and cold sections of arbitrary lengths.
This model is intended for use in vacuum equipment or in high-temperature atmosphere applications that require the cables to be routed n a particular arrangement.
This model does not come as waterproof. Please contact us before purchasing if waterproof construction is required or if you intend to use product in a vacuum.

Model code H35K

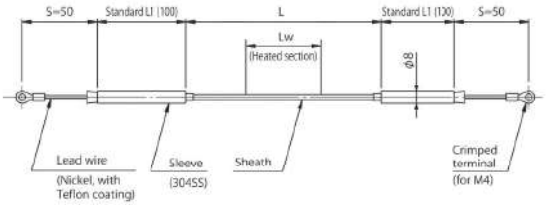
H35K ① — ② ③ ④ ⑤ ⑥ — ⑦ / ⑧

①	Length (Unit: mm)	L			
②	Length of heated section (Unit: mm)	Lw			
③	Sheath outer diameter (Unit: mm)	B	ϕ1.6	XA	ϕ1.9
		C	ϕ2.3	XB	ϕ2.7
		D	ϕ3.2	XC	ϕ3.8
		E	ϕ4.8	DH	ϕ3.2
		F	ϕ6.4	XD	ϕ3.8
		G	ϕ8.0	EH	ϕ4.8
④	Power (Unit: kW)	W			
⑤	Sheath material	C	316SS		
		B	NCF600eq.		
⑥	Voltage (Unit: V)	E			
⑦	Lead wire length (Unit: mm)	S			
⑧	Sleeve length (Unit: mm)	L1			

Sleeve length L1 mm	Insulation thickness (reference) mm
100	50
150	100
200	150
250	200

OKAZAKI MANUFACTURING COMPANY

Micro heater with cold section and double-ended termination



Characteristics

The H36K is a basic micro heater model with double-ended termination (one core), in which parts of the total heater sheath length can be separated into heated and cold sections of arbitrary lengths.

This model is intended for use in vacuum equipment or in high-temperature atmosphere applications that require the cables to be routed in a particular arrangement.

This model does not come as waterproof. Please contact us before purchasing if waterproof construction is required or if you intend to use product in a vacuum.

Model code H36K

H36K ① ② ③ ④ ⑤ ⑥ – ⑦ / ⑧

①	Length (Unit: mm)	L				
②	Length of heated section (Unit: mm)	Lw				
③	Sheath outer diameter (Unit: mm)	A	φ1.0	XA	φ1.9	
		B	φ1.6	XB	φ2.7	
		C	φ2.3	XC	φ3.8	
		D	φ3.2	DH	φ3.2	
		E	φ4.8	XD	φ3.8	
		F	φ6.4			
④	Power (Unit: kW)	W				
⑤	Sheath material	C				
		B				
⑥	Voltage (Unit: V)	E				
⑦	Lead wire length (Unit: mm)	S				
⑧	Sleeve length (Unit: mm)	L1				

Sleeve length L1 mm	Insulation thickness (reference) mm
100	50
150	100
200	150
250	200

OKAZAKI

Sheathed Heaters

Sheathed heaters are economical heaters with high reliability, which can generate heat with very quick response at high temperatures that are not available with conventional heaters. The metal sheathed part can be bent, welded, soldered with silver brazing, or cast into a metal block.
The sheath material is made of stainless steel or NCF (equivalent to Inconel) with high heat/corrosion-resistance.

Characteristics

Our sheathed heaters have the characteristics outlined below.

1. Wide application range
2. Ability to perform direct heating
3. Easy handling
4. Longer product life
5. Great mechanical strength and pressure resistance

Inspection Standards

Dimensional inspection

Heater sheath outer diameter tolerance	±0.3mm	
Heater sheath length	<500 mm 500mm ≦	±8mm ±1.5%
Lead wire length	<1000 mm 1000 mm ≦	±15 mm ±1.5%

Insulation resistance test

Measured at room temperature between core cable and sheath.

5 MΩ or more/500 V DC

Conductor resistance

Room temperature resistance value which corresponds to the heater capacity with a tolerance of ±10% (Resistance temperature coeficient is not considered).

Voltage resistance test

Testing is performed at room temperature with the product in a standalone configuration. However, for products subjected to bending in the manufacturing process, the coefficients indicated in the table below are applied to the voltage resistance testing value.

AC (rated voltage × 2 + 1000 V)/1 min.

Central bending radius	> 5D	2.5D to 5D
Coefficient	1.0	0.8

Documentation

The inspection certificate shall be attached to the product. Detailed test report shall be available upon request.
Note: Please make sure to measure the electrical coutinuity and insulation resistance prior to use.

SH10 » H-5

Sheathed heater with double-ended termination

SH20 » H-10

Cartridge heater

SH11 » H-6

Sheathed heater with lead wire and double-ended termination

SH21 » H-11

Sheathed heater with single-ended termination

SH12 » H-7

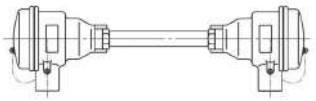
Sheathed heater with connection head and double-ended termination

SH22 » H-12

Sheathed heater with connection head and single-ended termination

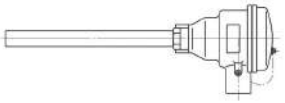
SH12G » H-8

Sheathed heater with connection head and double-ended termination



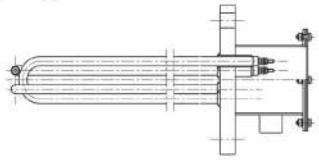
SH22G » H-13

Sheathed heater with connection head and single-ended termination



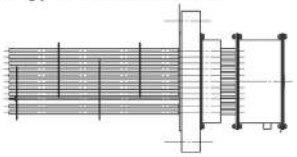
SH13 » H-9

Flanged type sheathed heater



SH23 » H-14

Flanged type sheathed heater



OKAZAKI MANUFACTURING COMPANY

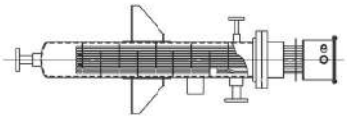
SH31 » H-15

Multi-core heater

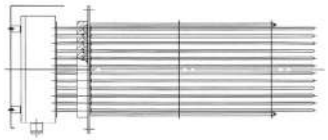
SH40 » H-16

High-output heater

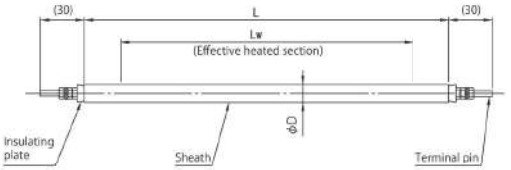
Circulation heater » H-17



Duct heater » H-17



Sheathed heater with double-ended termination



Characteristics

The SH10 is a basic sheathed heater model.

This model features a sturdy construction and supplied with terminal pins located on both ends. The metal sheath houses a spiral-wounc heat generation element, and the space between the element and the sheath is filled with insulator material with good heat conduction.

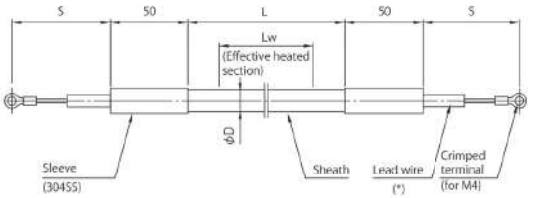
Model code SH10

SH10 − ① (②) ③ − ④ ⑤ ⑥ / ⑦

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	ϕD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Other		

OKAZAKI MANUFACTURING COMPANY

Sheathed heater with lead wire and double-ended termination



Characteristics

The SH11 is similar to the SH10, with the addition of a lead wire at both ends.

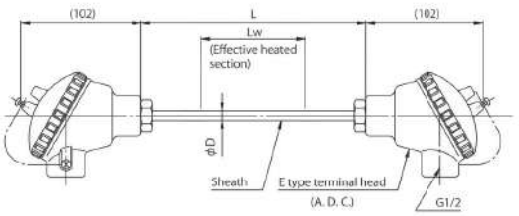
* A cabtyre cable is used for the lead wire. It is also possible to use other types of lead wire, such as silicone rubber glass fiber braided wire (600 V, LKGB), or non-halogen flame-retardant flexible cross-linked polyethylene insulated electric wire (600 V, EM-LMFC).

Model code SH11

SH11 − ① (②) ③ − ④ ⑤ ⑥ − ⑦ / ⑧

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Lead wire length (Unit: mm)	S	
⑧	Other		

Sheathed heater with connection head and double-ended termination



Characteristics

The SH12 is similar to the SH10, with the addition of aluminum die cast terminal boxes (E type terminal heads) at both ends.
This model is suitable for use in environments with high levels of dust or high humidity.

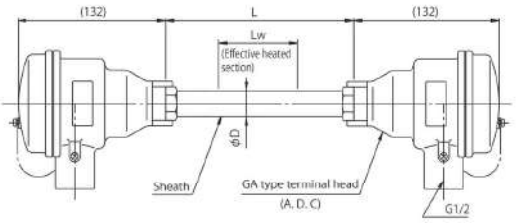
Model code SH12

SH12 − ① (②) ③ − ④ ⑤ ⑥ / ⑦

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A C B Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Other		

OKAZAKI MANUFACTURING COMPANY

Sheathed heater with connection head and double-ended termination



Characteristics

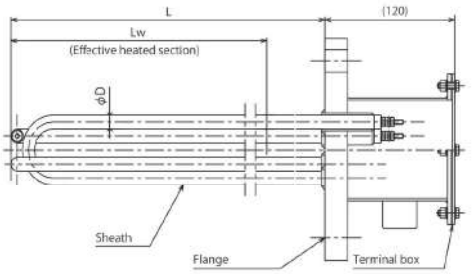
The SH12G is equipped with an aluminum die cast explosion-proof terminal box (GA type terminal head) that is attached to the sleeve.
This model is suitable for use in environments with high levels of dust or high humidity, and in atmospheres classified as dangerous places that do not require explosion-proof certification.

Model code SH12G

SH12G – ① (②) ③ – ④ ⑤ ⑥ / ⑦

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Other		

Flanged type sheathed heater



Characteristics

The SH13 is similar to the SH10, with the addition of a flange.
This model can be used to heat liquid or gas, as an in-tank liquid heater or shell and tube type heat exchanger.

Model code SH13

SH13 − ① (②) ③ − ④ ⑤ ⑥ − ⑦ / ⑧

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	φ12 is standard
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Number of heaters		
⑧	Flange size		

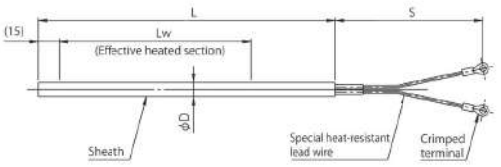
Note: The structure is designed so that the terminal box rises when there is a risk of the flange reaching a temperature of 80°C or more.

Examples of the number of heaters installed for each type of flange

For models with sheath outer diameter of φ12 mm

Flange size	Number of heaters installed
80A	3
100A	6
150A	9
200A	12
250A	24
300A	39

Cartridge heater



Characteristics

This model features a sturdy construction and supplied with a lead wire on one end. The spiral-wound heat generation element is placed as near as possible to the inner surface of the metal sheath, and the space between the element and the sheath is filled with insulator material with good heat conduction. By placing the heat generation element near the metal sheath, the temperature difference is reduced and the heater can be used at higher temperatures. This model is intended for use when inserted in a metal block or well.

The product life of the cartridge heater is significantly affected by the amount of space between the heater and the inside surface of the insertion hole.

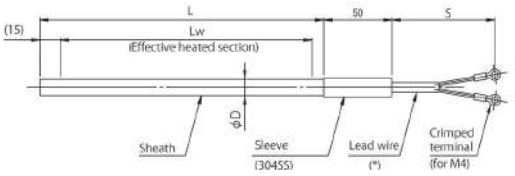
Model code SH20

SH20 – ① (②) ③ – ④ ⑤ ⑥ – ⑦ / ⑧

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Lead wire length (Unit: mm)	S	
⑧	Other		

KEI-KING ENTERPRISE CO., LTD. 鉅仁企業有限公司 北市中山北路3段27號12樓2室 TEL:(02)2595-1131(代表號) FAX:(02)2595-5361/2586-3386 TAIPEI TAIWAN 104-429 R.O.C

Sheathed heater with single-ended termination



Characteristics

This model features a sturdy construction and supplied with a lead wire on one end. The metal sheath houses two spiral-wound heat generation elements (U-turn at end), and the space between the elements and the sheath is filled with insulator material with good heat conduction.

* A cabtyre cable is used for the lead wire. It is also possible to use other types of lead wire, such as silicone rubber glass fiber braided wire (600 V, LKGB), or non-halogen flame-retardant flexible cross-linked polyethylene insulated electric wire (600 V, EM-UMFC).

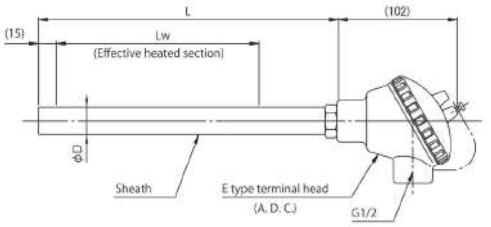
Model code SH21

SH21 − ① (②) ③ − ④ ⑤ ⑥ − ⑦ / ⑧

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	ϕD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Lead wire length (Unit: mm)	S	
⑧	Other		

OKAZAKI MANUFACTURING COMPANY

Sheathed heater with connection head and single-ended termination



Characteristics

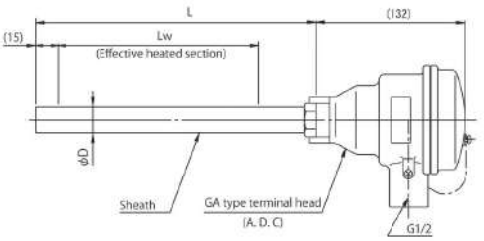
The SH22 is similar to the SH21, with the addition of an aluminum die cast terminal box (E type terminal head) at one end.
This model is suitable for use in environments with high levels of dust or high humidity.

Model code SH22

SH22 – ① (②) ③ – ④ ⑤ ⑥ / ⑦

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A C B Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Other		

Sheathed heater with connection head and single-ended termination



Characteristics

The SH22G is similar to the SH21, with the addition of an aluminum die cast explosion-proof terminal box (GA type terminal head).
This model is suitable for use in environments with high levels of dust or high humidity, and in atmospheres classified as dangerous places that do not require explosion-proof certification.

Model code SH22G

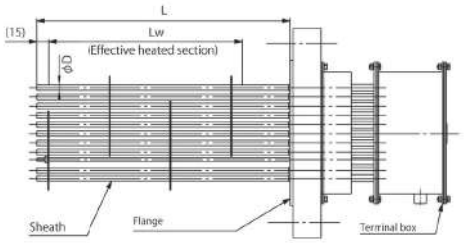
SH22G − ① (②) ③ − ④ ⑤ ⑥ / ⑦

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Other		

OKAZAKI MANUFACTURING COMPANY

KEI-KING ENTERPRISE CO., LTD. 鉅仁企業有限公司 北市中山北路3段27號12樓2室 TEL:(02)2595-1131(代表號) FAX:(02)2595-5361/2586-3386 TAIPEI TAIWAN 104-429 R.O.C

Flanged type sheathed heater



Characteristics

The SH23 is similar to the SH21, with the addition of a flange.
This model can be used to heat liquid or gas, as an in-tank liquid heater or shell and tube type heat exchanger.

Model code SH23

SH23 − ① (②) ③ − ④ ⑤ ⑥ − ⑦ / ⑧

①	Flange length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	φ16 is standard
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Number of heaters		
⑧	Flange size		

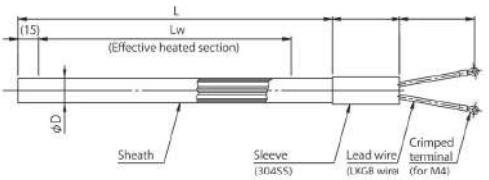
Note: The structure is designed so that the terminal box rises when there is a risk of the flange reaching a temperature of 80°C or more.

Examples of the number of heaters installed for each type of flange

For models with sheath outer diameter of φ6 mm and pitch of 26 mm

Flange size	Number of heaters installed
80A	6
125A	19
200A	37
250A	61

Multi-core heater



Characteristics

The SH31 is a heater with an even temperature distribution in the axial direction.
Due to the small temperature difference between the heat generation element and the inner surface of the sheath, this heater is suitable for use in high-temperature atmospheres and at high power densities.

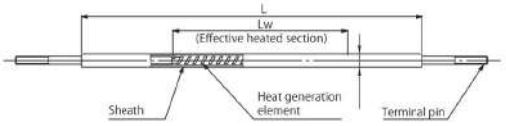
Model code SH31

SH31 − ① (②) ③ − ④ ⑤ ⑥ − ⑦ / ⑧

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	ϕD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Lead wire length (Unit: mm)	S	
⑧	Other		

OKAZAKI MANUFACTURING COMPANY

High-output heater



Characteristics

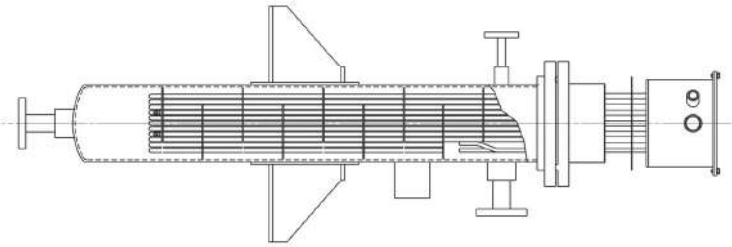
The SH40 features a banded heat generation element, which transfers the generated heat to the metal sheath more easily.
The power density of the sheath surface is extremely high, and the construction has a particularly strong resistance to heat shock. The generated heat is distributed in the axial direction, making this model suitable for use as a simulated nuclear fuel rod.

Model code SH40

SH40 – ① (②) ③ – ④ ⑤ ⑥ – ⑦ / ⑧

①	Length (Unit: mm)	L	
②	Length of heated section (Unit: mm)	Lw	
③	Sheath outer diameter (Unit: mm)	φD	
④	Power (Unit: kW)	W	
⑤	Sheath material	A	304SS
		C	316SS
		B	NCF600eq.
		Other	Can also be manufactured with 304LSS, 316LSS, or NCF800eq.
⑥	Voltage (Unit: V)	E	
⑦	Lead wire length (Unit: mm)	S	
⑧	Other		

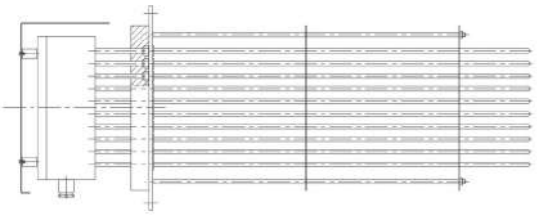
Circulation heater



Characteristics

1. Suitable for use in air heating and liquid heating applications.
2. Suitable for use in applications where airtightness or high pressure is required.
3. Compatibility with the construction code for pressure vessels, the High Pressure Gas Safety Act, and boiler standards.
   We can also manufacture heater equipment that supports nuclear power equipment technical standards, reprocessing, and the Fire Service Act.

Duct heater



Characteristics

1. Suitable for use in applications for heating low-pressure air or gas.
2. Duct heaters use fin heaters or finless heaters, depending on the temperature and type of gas.
3. Please contact us if waterproof or airtight construction is required.

OKAZAKI
MANUFACTURING COMPANY

OKAZAKI MANUFACTURING COMPANY
HEAD OFFICE/KOBE JAPAN
TEL:+81 78 251 8200 FAX:+81 78 251 8210
URL:https://www.okazaki-mfg.com
E-mail:jp-sales@okazaki-mfg.com (from Japan)
:sales@okazaki-mfg.com (from over seas)

TOKYO BRANCH
TEL:+81 3 5641 0200 FAX:+81 3 5641 9100

ARi Industries, Inc., USA
TEL:+1 630 953 9100 FAX:+1 630 953 0590
URL:https://www.ariindustries.biz
E-mail:sales@ariindustries.com

Okazaki Manufacturing Company UK Limited
TEL:+44 (0) 2920 814333
URL:https://www.okazaki-mfg.co.uk
E-mail:sales@okazaki-mfg.co.uk

CAT.NO.OMC-P706-3-E
First Ver. Mar 2020 300 parts