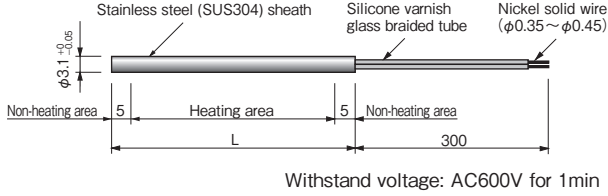


# INCH SIZE

Sheath diameter  $\phi 3.1$   
 Sheath diameter  $\phi 6.25 \sim 12.60$  120V

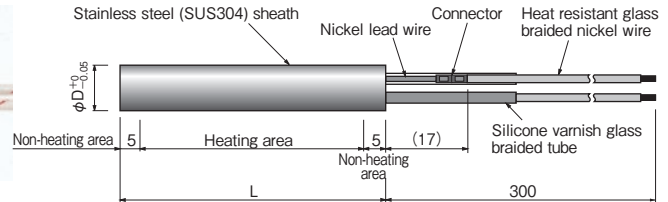
## Sheath diameter $\phi 3.1$



WD : Watt density of the effective heating area  
 WC : Wire cross-sectional area

In stock	Model No.	Product code	Power voltage	dimension L (mm)	Rated power (W)	WD (W/cm <sup>2</sup> )
○	HLJ1021	03083010	120V	31.8	25	12
○	HLJ1051	03083020			50	24
○	HLJ1032	03083030		38.1	30	11
○	HLJ1042	03083040			44	16
○	HLJ1062	03083050			60	22
○	HLJ1053	03083060			50.8	13
○	HLJ1074	03083070		63.5	13	
○	HLJ1115	03083080		88.9	14	
○	HLJ2042	03085010	1P 240V	38.1	44	16
○	HLJ2053	03085020			50.8	13
○	HLJ2074	03085030		63.5	13	
○	HLJ2115	03085040		88.9	14	
○	HLJ2276	03085050		139.7	21	
○					270	

## Sheath diameter $\phi 6.25 \sim 12.60$



120V	Wire cross-sectional area	1.25 mm <sup>2</sup>
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WD : Watt density of the effective heating area WC : Wire cross-sectional area

In stock	Model No.	Product code	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )
			D (inch)	L (mm)		
○	HLK1081	03083090	1/4 (6.25 mm)	25.4	80	26
○	HLK1101	03083100			100	33
○	HLK1151	03083110			150	50
○	HLK1072	03083120		31.8	75	18
○	HLK1102	03083130			100	23
○	HLK1152	03083140			150	35
○	HLK1053	03083150		38.1	50	9.1
○	HLK1103	03083160			100	18
○	HLK1153	03083170			150	27
○	HLK1203	03083180		50.8	200	36
○	HLK1104	03083190			100	12
○	HLK1154	03083200			150	19
○	HLK1204	03083210		76.2	200	25
○	HLK1254	03083220			250	31
○	HLK1105	03083230			100	7.7
○	HLK1205	03083240		101.6	200	15
○	HLK1305	03083250			300	23
○	HLK1106	03083260			100	5.6
○	HLK1206	03083270	3/8 (9.42 mm)	200	11	
○	HLK1306	03083280		300	17	
○	HLL1051	03083290		25.4	55	12
○	HLL1101	03083300	100		22	
○	HLL1151	03083310	150		33	
○	HLL1102	03083320	31.8	100	16	
○	HLL1122	03083330		125	19	
○	HLL1152	03083340		150	23	
○	HLL1202	03083350	38.1	200	31	
○	HLL1053	03083360		50	6.0	
○	HLL1073	03083370		75	9.0	
○	HLL1103	03083380	44.5	100	12	
○	HLL1153	03083390		150	18	
○	HLL1203	03083400		200	24	
○	HLL1253	03083410	125	250	30	
○	HLL1124	03083420		125	12	
○	HLL1174	03083430		175	17	
○	HLL1254	03083440	250	24		

In stock	Model No.	Product code	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )
			D (inch)	L (mm)		
○	HLL1055	03083450	3/8 (9.42 mm)	50.8	50	4.1
○	HLL1105	03083460			100	8.3
○	HLL1155	03083470			150	12
○	HLL1205	03083480			200	17
○	HLL1255	03083490			250	21
○	HLL1305	03083500			300	25
○	HLL1405	03083510		400	33	
○	HLL1076	03083520		57.2	75	5.4
○	HLL1126	03083530			125	8.9
○	HLL1176	03083540			175	13
○	HLL1256	03083550		63.5	250	18
○	HLL1306	03083560			300	21
○	HLL1356	03083570			350	25
○	HLL1207	03083580		76.2	200	13
○	HLL1257	03083590			250	16
○	HLL1307	03083600			300	19
○	HLL1407	03083610		88.9	400	25
○	HLL1507	03083620			500	32
○	HLL1108	03083630	100		5.1	
○	HLL1158	03083640	101.6	150	7.7	
○	HLL1208	03083650		200	10	
○	HLL1258	03083660		250	13	
○	HLL1308	03083670	114.3	300	15	
○	HLL1408	03083680		400	20	
○	HLL1508	03083690		500	26	
○	HLL1259	03083700	101.6	250	11	
○	HLL1309	03083710		300	13	
○	HLL1509	03083720		500	21	
○	HLL3121	03083730	101.6	125	4.6	
○	HLL3151	03083740		150	5.5	
○	HLL3251	03083750		250	9.2	
○	HLL3301	03083760	114.3	300	11	
○	HLL3401	03083770		400	15	
○	HLL3501	03083780		500	18	
○	HLL3302	03083790	114.3	300	9.7	
○	HLL3502	03083800		500	16	

Sheath diameter  $\phi 6.25 \sim 12.60$  120V / 1P 240V

120V		Wire cross-sectional area	1.25 mm <sup>2</sup>		WD : Watt density of the effective heating area		WC : Wire cross-sectional area	
In stock	Model No.	Product code	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )		
			D (inch)	L (mm)				
○	HLL3153	03083810	3/8 (9.42 mm)	127.0	150	4.3		
○	HLL3303	03083820			300	8.7		
○	HLL3503	03083830			500	14		
○	HLL3205	03083840		152.4	200	4.7		
○	HLL3255	03083850			250	5.9		
○	HLL3405	03083860			400	9.5		
○	HLL3505	03083870			500	12		
○	HLL3605	03083880			600	14		
○	HLL3257	03083890			177.8	250		
○	HLL3607	03083900		600		12		
○	HLL3309	03083910		203.2	300	5.2		
○	HLL3509	03083920			500	8.7		
○	HLL3609	03083930		254.0	600	10		
○	HLL5402	03083940			400	5.5		
○	HLL5602	03083950		304.8	600	8.3		
○	HLL5403	03083960			400	4.6		
○	HLL5603	03083970	600	6.9				
○	HLM1051	03083980	1/2 (12.60 mm)	25.4	50	8.2		
○	HLM1151	03083990			150	25		
○	HLM1052	03084000		31.8	50	5.8		
○	HLM1122	03084010			125	14		
○	HLM1053	03084020		38.1	50	4.5		
○	HLM1153	03084030			150	13		
○	HLM1203	03084040		50.8	200	18		
○	HLM1074	03084050			75	4.6		
○	HLM1204	03084060		57.2	200	12		
○	HLM1254	03084070			250	15		
○	HLM1304	03084080		60.3	300	19		
○	HLM1404	03084090			400	25		
○	HLM1075	03084100		63.5	75	4.0		
○	HLM1125	03084110			125	6.7		
○	HLM1255	03084120			250	13		
○	HLM1405	03084130			400	21		
○	HLM1505	03084140	69.8	500	27			
○	HLM1106	03084150		100	5.0			
○	HLM1256	03084160	76.2	250	13			
○	HLM1506	03084170		500	25			
○	HLM1107	03084180	88.9	100	4.7			
○	HLM1257	03084190		250	12			
○	HLM1307	03084200		300	14			
○	HLM1407	03084210		400	19			
○	HLM1507	03084220	101.6	500	24			
○	HLM1408	03084230		125	4.8			
○	HLM1129	03084240	114.3	250	9.5			
○	HLM1259	03084250		300	11			
○	HLM1309	03084260		400	15			
○	HLM1409	03084270		500	19			
○	HLM1509	03084280	127.0	600	23			
○	HLM1609	03084290		750	29			
○	HLM1759	03084300	150	250	8.0			
○	HLM3251	03084310		500	16			
○	HLM3152	03084330	177.8	150	4.1			
○	HLM3252	03084340		250	6.9			
○	HLM3302	03084350	203.2	300	8.3			
○	HLM3352	03084360		350	9.7			
○	HLM3402	03084370	254.0	400	11			
○	HLM3502	03084380		500	14			
○	HLM3752	03084390	304.8	750	21			
○	HLM3503	03084400		500	12			
○	HLM3753	03084410	354.8	750	18			
○	HLM3204	03084420		200	4.3			
○	HLM3354	03084430	381.8	350	7.6			
○	HLM3404	03084440		400	8.6			

In stock	Model No.	Product code	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )
			D (inch)	L (mm)		
○	HLM3504	03084450	1/2 (12.60 mm)	127.0	500	11
○	HLM3754	03084460		750	16	
○	HLM3505	03084470		139.7	500	9.7
○	HLM3755	03084480			750	15
○	HLM3706	03084490		146.0	700	13
○	HLM3257	03084500			250	4.4
○	HLM3507	03084510		152.4	500	8.9
○	HLM3757	03084520			750	13
○	HLM3997	03084530			1000	18
○	HLM3259	03084540		177.8	250	3.8
○	HLM3509	03084550			500	7.5
○	HLM3609	03084560		203.2	600	9.0
○	HLM5302	03084570			300	3.9
○	HLM5502	03084580		254.0	500	6.5
○	HLM5992	03084590			1000	13
○	HLM5506	03084600		304.8	500	5.2
○	HLM5996	03084610	1000		10	
○	HLM5507	03084620	354.8	500	4.3	
○	HLM5997	03084630		1000	8.6	

1P 240V用		Wire cross-sectional area	1.25 mm <sup>2</sup>			
In stock	Model No.	Product code	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )
			D (inch)	L (mm)		
○	HLK2222	03085060	1/4 (6.25 mm)	31.8	225	53
○	HLK2173	03085070		175	32	
○	HLK2203	03085080		38.1	200	36
○	HLK2253	03085090			250	45
○	HLK2124	03085100		50.8	125	16
○	HLK2154	03085110			150	19
○	HLK2204	03085120			200	25
○	HLK2254	03085130			250	31
○	HLK2304	03085140		76.2	300	37
○	HLK2205	03085150			200	15
○	HLK2305	03085160		101.6	300	23
○	HLK2206	03085170			200	11
○	HLK2306	03085180		127.0	300	17
○	HLK2357	03085190			350	15
○	HLK2408	03085200		152.4	400	14
○	HLL2201	03085210			25.4	200
○	HLL2152	03085220	31.8	150	23	
○	HLL2202	03085230		200	31	
○	HLL2103	03085240	38.1	100	12	
○	HLL2153	03085250		150	18	
○	HLL2203	03085260		200	24	
○	HLL2253	03085270		250	30	
○	HLL2254	03085280	44.5	250	24	
○	HLL2105	03085290		100	8.3	
○	HLL2155	03085300	50.8	150	12	
○	HLL2205	03085310		200	17	
○	HLL2255	03085320	57.2	250	21	
○	HLL2305	03085330		300	25	
○	HLL2405	03085340	63.5	400	33	
○	HLL2126	03085350		125	8.9	
○	HLL2256	03085360	76.2	250	18	
○	HLL2306	03085370		300	21	
○	HLL2356	03085380	89.1	350	25	
○	HLL2207	03085390		200	13	
○	HLL2257	03085400	101.6	250	16	
○	HLL2307	03085410		300	19	

No sign : [Build-to-order]  
Please inquire for details on delivery dates

Please provide model no. and product code when placing order.

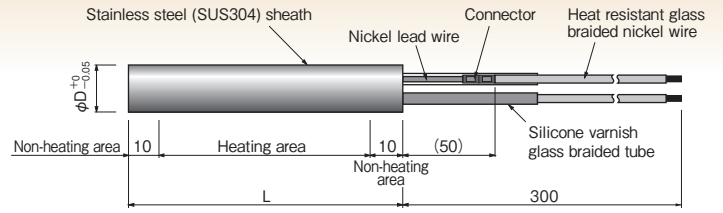
**Sheath diameter  $\phi 6.25 \sim \phi 12.60$  (continued)**

WD : Watt density of the effective heating area  
WC : Wire cross-sectional area

1P 240V		Wire cross-sectional area	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )
In stock	Model No.	Product code	D (inch)	L (mm)		
						1.25 mm <sup>2</sup>
○	HLL2407	03085420	3/8 (9.42mm)	63.5	400	25
○	HLL2507	03085430			500	32
○	HLL2108	03085440			100	5.1
○	HLL2208	03085450			200	10
○	HLL2258	03085460			250	13
○	HLL2308	03085470			300	15
○	HLL2408	03085480		76.2	400	20
○	HLL2508	03085490			500	26
○	HLL2608	03085500			600	31
○	HLL2259	03085510			250	11
○	HLL2309	03085520			300	13
○	HLL2509	03085530			500	21
○	HLL4121	03085540		101.6	125	4.6
○	HLL4251	03085550			250	9.2
○	HLL4301	03085560			300	11
○	HLL4401	03085570			400	15
○	HLL4501	03085580			500	18
○	HLL4302	03085590			114.3	300
○	HLL4502	03085600		500		16
○	HLL4153	03085610		150		4.3
○	HLL4303	03085620		300		8.7
○	HLL4503	03085630		500		14
○	HLL4753	03085640		750		22
○	HLL4993	03085650		127.0	1000	29
○	HLL4604	03085660			600	16
○	HLL4994	03085670			1000	26
○	HLL4255	03085680			250	5.9
○	HLL4405	03085690			400	9.5
○	HLL4505	03085700			500	12
○	HLL4605	03085710		152.4	600	14
○	HLL4755	03085720	750		18	
○	HLL4995	03085730	1000		24	
○	HLL4606	03085740	600		13	
○	HLL4996	03085750	1000		22	
○	HLL4257	03085760	250		5.0	
○	HLL4607	03085770	165.1	600	12	
○	HLL4997	03085780		1000	20	
○	HLL4608	03085790		600	11	
○	HLL4998	03085800		1000	19	
○	HLL4309	03085810		300	5.2	
○	HLL4509	03085820		500	8.7	
○	HLL4609	03085830	177.8	600	10	
○	HLL4999	03085840		1000	17	
○	HLL6601	03085850		600	8.8	
○	HLL6991	03085860		1000	15	
○	HLL6602	03085870		600	8.3	
○	HLL6992	03085880		1000	14	
○	HLL6603	03085890	190.5	600	6.9	
○	HLL6993	03085900		1000	11	
○	HLL2122	03085910		203.2	125	14
○	HLL2202	03085920			200	23
○	HLL2153	03085930			150	13
○	HLL2203	03085940			200	18
○	HLL2204	03085950	200		12	
○	HLL2254	03085960	250		15	
○	HLL2304	03085970	241.3	300	19	
○	HLL2404	03085980		400	25	
○	HLL2255	03085990		250	13	
○	HLL2405	03086000		400	21	
○	HLL2505	03086010		500	27	
○	HLL2106	03086020		100	5.0	
○	HLL2256	03086030	254.0	250	13	
○	HLL2506	03086040		500	25	
○	HLL2122	03085910		50.8	125	14
○	HLL2202	03085920			200	23
○	HLL2153	03085930			150	13
○	HLL2203	03085940			200	18
○	HLL2204	03085950	200		12	
○	HLL2254	03085960	250		15	
○	HLL2304	03085970	57.2	300	19	
○	HLL2404	03085980		400	25	
○	HLL2255	03085990		250	13	
○	HLL2405	03086000		400	21	
○	HLL2505	03086010		500	27	
○	HLL2106	03086020		100	5.0	
○	HLL2256	03086030	60.3	250	13	
○	HLL2506	03086040		500	25	

In stock	Model No.	Product code	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )
			D (inch)	L (mm)		
○	HLM2107	03086050	1/2 (12.60 mm)	63.5	100	4.7
○	HLM2257	03086060			250	12
○	HLM2307	03086070			300	14
○	HLM2407	03086080			400	19
○	HLM2507	03086090			500	24
○	HLM2408	03086100			69.8	400
○	HLM2129	03086110		125		4.8
○	HLM2259	03086120		250		9.5
○	HLM2309	03086130		300		11
○	HLM2409	03086140		400		15
○	HLM2509	03086150		76.2		500
○	HLM2609	03086160			600	23
○	HLM2759	03086170			750	29
○	HLM4251	03086180			250	8.0
○	HLM4351	03086190			350	11
○	HLM4501	03086200			500	16
○	HLM4751	03086210		88.9	750	24
○	HLM4152	03086220			150	4.1
○	HLM4252	03086230			250	6.9
○	HLM4302	03086240			300	8.3
○	HLM4352	03086250			350	9.7
○	HLM4402	03086260			400	11
○	HLM4502	03086270		101.6	500	14
○	HLM4752	03086280			750	21
○	HLM4992	03086290			1000	28
○	HLM4503	03086300			500	12
○	HLM4753	03086310			750	18
○	HLM4204	03086320			114.3	200
○	HLM4354	03086330		350		7.6
○	HLM4404	03086340		400		8.6
○	HLM4504	03086350	500	11		
○	HLM4754	03086360	750	16		
○	HLM4994	03086370	1000	22		
○	HLM4505	03086380	127.0	500	9.7	
○	HLM4755	03086390		750	15	
○	HLM4706	03086400		146.0	700	13
○	HLM4257	03086410		250	4.4	
○	HLM4507	03086420		500	8.9	
○	HLM4757	03086430		750	13	
○	HLM4997	03086440	139.7	1000	18	
○	HLM4508	03086450		500	8.1	
○	HLM4998	03086460		1000	16	
○	HLM4509	03086470		500	7.5	
○	HLM4609	03086480		600	9.0	
○	HLM4999	03086490		1000	15	
○	HLM6051	03086500	152.4	500	7.0	
○	HLM6101	03086510		1000	14	
○	HLM6052	03086520		500	6.5	
○	HLM6102	03086530		1000	13	
○	HLM6152	03086540		1500	20	
○	HLM6202	03086550		2000	26	
○	HLM6053	03086560	165.1	500	6.1	
○	HLM6103	03086570		1000	12	
○	HLM6054	03086580		500	5.8	
○	HLM6104	03086590		1000	12	
○	HLM6055	03086600		500	5.5	
○	HLM6105	03086610		1000	11	
○	HLM6056	03086620	177.8	500	5.2	
○	HLM6106	03086630		1000	10	
○	HLM6156	03086640		1500	16	
○	HLM6206	03086650		2000	21	
○	HLM6057	03086660		500	4.3	
○	HLM6107	03086670		1000	8.6	
○	HLM6157	03086680	190.5	1500	13	
○	HLM6207	03086690		2000	17	
○	HLM6108	03086700		1000	7.3	
○	HLM6238	03086710		2300	17	
○	HLM6159	03086720		1500	8.5	

**Sheath diameter  $\phi 15.77 \sim 18.95$**



120V		WD : Watt density of the effective heating area WC : Wire cross-sectional area		dimension D (inch) L (mm)	Rated power (W)	WD (W/cm <sup>2</sup> )	WC (mm <sup>2</sup> )
In stock	Model No.	Product code					
	HLN1051	03084640	5/8 (15.77mm)	31.8	50	8.6	1.25
	HLN1201	03084650			200	34	
	HLN1251	03084660			250	43	
	HLN1252	03084670			250	28	
	HLN1103	03084680		50.8	100	6.6	
	HLN1203	03084690			200	13	
	HLN1104	03084700		57.2	100	5.4	
	HLN1254	03084710			250	14	
	HLN1354	03084720		350	19		
	HLN1285	03084730		60.3	280	14	
	HLN1156	03084740			150	5.4	
	HLN1256	03084750		76.2	250	9.0	
	HLN1506	03084760			500	18	
	HLN1527	03084770		95.3	525	14	
	HLN1258	03084780		101.6	250	6.2	
	HLN1259	03084790			127.0	250	
	HLN3081	03084800		136.5	800	14	
	HLN3032	03084810			152.4	300	
	HLN3053	03084820		165.1	500	7.0	
	HLN3054	03084830			177.8	500	
	HLN3055	03084840	203.2	500	5.5		
	HLN3056	03084850		254.0	500	4.3	
	HLN3057	03084860	304.8	500	3.5		
	HLN3107	03084870		1000	7.1		
	HLP1021	03084880	3/4 (18.95mm)	57.2	200	9.0	1.25
	HLP1022	03084890			76.2	250	
	HLP1023	03084900		101.6	250	5.1	
	HLP1034	03084910			127.0	300	
	HLP1055	03084920		152.4	500	6.3	
	HLP1056	03084930			177.8	500	
	HLP1057	03084940		203.2	500	4.6	

1P 240V		WD : Watt density of the effective heating area WC : Wire cross-sectional area		dimension D (inch) L (mm)	Rated power (W)	WD (W/cm <sup>2</sup> )	WC (mm <sup>2</sup> )
In stock	Model No.	Product code					
	HLN2252	03086730	5/8 (15.77mm)	38.1	250	28	1.25
	HLN2503	03086740			500	33	
	HLN2254	03086750		57.2	250	14	
	HLN2354	03086760			350	19	
	HLN2285	03086770		60.3	280	14	
	HLN2256	03086780			250	9.0	
	HLN2506	03086790		76.2	500	18	
	HLN2756	03086800			750	27	
	HLN2527	03086810		95.3	525	14	
	HLN2258	03086820			250	6.2	
	HLN2408	03086830		101.6	400	9.9	
	HLN2508	03086840			500	12	
	HLN2608	03086850		127.0	600	15	
	HLN2758	03086860			750	19	
	HLN2998	03086870		136.5	1000	25	
	HLN2259	03086880			250	4.7	
	HLN2509	03086890		152.4	500	9.4	
	HLN2759	03086900			750	14	
	HLN2999	03086910		177.8	1000	19	
	HLN4081	03086920			800	14	
	HLN4032	03086930	191.5	300	4.6		
	HLN4052	03086940		500	7.6		
	HLN4072	03086950	203.2	750	11		
	HLN4102	03086960		1000	15		
	HLN4152	03086970	1500	23			

In stock	Model No.	Product code	dimension		Rated power (W)	WD (W/cm <sup>2</sup> )	WC (mm <sup>2</sup> )
			D (inch)	L (mm)			
	HLN4053	03086980	5/8 (15.77mm)	165.1	500	7.0	1.25
	HLN4054	03086990		177.8	500	6.4	
	HLN4104	03087000		203.2	1000	13	
	HLN4154	03087010			1500	19	
	HLN4055	03087020		254.0	500	5.5	
	HLN4085	03087030			850	9.4	
	HLN4105	03087040		304.8	1000	11	
	HLN4155	03087050			1500	17	
	HLN4205	03087060		355.6	2000	22	
	HLN4056	03087070			500	4.3	
	HLN4106	03087080		406.4	1000	8.6	
	HLN4156	03087090			1500	13	
	HLN4206	03087100		457.2	2000	17	
	HLN4057	03087110			500	3.5	
	HLN4107	03087120		508.0	1000	7.1	
	HLN4157	03087130			1500	11	
	HLN4207	03087140		559.6	2000	14	
	HLN4378	03087150			3700	22	
	HLN4079	03087160		609.6	750	4.2	
	HLN4249	03087170			2400	13	
	HLN4409	03087180	660.4	4000	22		
	HLN6251	03087190		2500	13		
	HLN6451	03087200	711.2	4500	24		
	HLN6302	03087210		3000	14		
	HLN6472	03087220	762.0	4700	22		
	HLN6153	03087230		1500	6.2		
	HLN6353	03087240	812.8	3500	14		
	HLN6473	03087250		4700	19		
	HLN6204	03087260	863.6	2000	6.8		
	HLN6474	03087270		4700	16		
	HLN6305	03087280	914.4	3000	6.8		
	HLP2052	03087290	3/4 (18.95mm)	76.2	500	15	1.25
	HLP2053	03087300		101.6	500	10	
	HLP2103	03087310		127.0	1000	21	
	HLP2054	03087320			500	7.8	
	HLP2104	03087330		152.4	1000	16	
	HLP2055	03087340			500	6.3	
	HLP2105	03087350		177.8	1000	13	
	HLP2205	03087360			2000	25	
	HLP2056	03087370		203.2	500	5.3	
	HLP2106	03087380			1000	11	
	HLP2057	03087390		254.0	500	4.6	
	HLP2107	03087400			1000	9.2	
	HLP2207	03087410		304.8	2000	18	
	HLP2108	03087420			1000	7.2	
	HLP2208	03087430		355.6	2000	14	
	HLP2109	03087440			1000	5.9	
	HLP2209	03087450		406.4	2000	12	
	HLP2409	03087460			4000	24	
	HLP4121	03087470		457.2	1250	6.3	
	HLP4251	03087480			2500	13	
	HLP4451	03087490	508.0	4500	23		
	HLP4152	03087500		1500	7.0		
	HLP4183	03087510	559.6	1800	7.8		
	HLP4473	03087520		4700	20		
	HLP4204	03087530	610.4	2000	7.7		
	HLP4504	03087540		5000	19		
	HLP4115	03087550	661.2	1150	4.0		
	HLP4225	03087560		2250	7.7		
	HLP4525	03087570	712.0	5250	18		
	HLP4136	03087580		1375	3.9		
	HLP4276	03087590	762.8	2750	7.8		
	HLP4556	03087600		5500	16		
	HLP4257	03087610	914.4	2500	4.7		

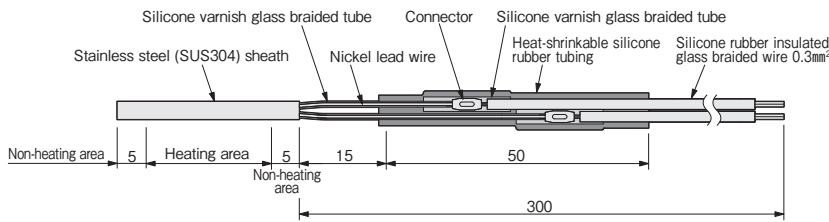
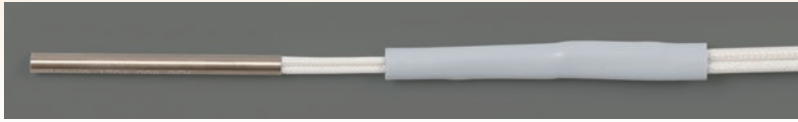
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Please inquire for details on delivery dates

Please provide model no. and product code when placing order.



## φ3.1, φ4.0 Ultra Five terminal options



- Nickel solid wire is replaced with silicone rubber insulated wire(copper stranded wire).
- Silicone varnish glass braided tube, which is used to protect the nickel lead wire, is securely fixed.
- Due to the structure of the terminal, maximum operating temperature is 280°C (mold temperature).
- The maximum operating temperature is 180°C for the heat-shrinkable silicone rubber tubing and the silicone rubber insulated glass braided copper stranded wire.

## Optional electric wires are available (Please specify the length when placing order)

Applicable models	Type	Electric wire type	Shape	Max. operating temperature*2
HL type or inch size	Standard	Heat resistant glass braided nickel wire		300°C *1
	Option 1 For sheath dia. of φ3.1 and above	FEP insulated wire		200°C
	Option 2 For sheath dia. of φ3.1 and above	Silica wool insulated wire		400°C *1
	Option 3 For sheath dia. of φ8 and above	Nickel solid wire + ceramic bead		500°C
SL type *3	Standard	Heat resistant glass braided nickel wire		300°C
	Option 1 For sheath dia. of φ12 and above	Silica wool insulated wire		400°C

\*1 : Max. operating temperature for wire connection protection tube is 250°C.

\*2 : Temperature will rise due to current flow, operating ambient temperature should be at least 50°C lower.

\*3 : The max. length of the wire for SL type is 500mm. Although it is possible to extend by connecting cables, the max. operating temp. for the wire connection protection tube is 250°C.

## Built to order Ultra Five's dimension range

Please inquire for dimensions that are out of range.

Sheath diameter (φ mm)	Sheath length min. (mm)~max. (mm)
2.3	*1 15 ~ 100
3.1 / 4.0	25 ~ 140
6.0 / 6.25 / 6.5	25 ~ 350
8.0 / 9.42	25 ~ 400
10.0	25 ~ 500
12.0 / 12.6	25 ~ 600
14.0	25 ~ 1000
15.0 / 15.77 / 16.0 / 18.0	40 ~ 1600 *2
18.95 / 20.0	45 ~ 1800 *2

Depending on the voltage and power, manufacturing may not be possible even if it is in the dimension range.

\*1 : Special specifications with a min. length of 12mm is possible.

\*2 : Max. length for SL type is 1000mm

## To use "Ultra Five" correctly

For cartridge heaters, it is important to make sure that the heat is well conducted to the heated metal part.

- The difference between the inserted hole diameter and the heater diameter should be minimized. (0.1mm and below: φ10.1 hole for φ10 heater)
- The inner surface of the hole should be smooth. Reaming is recommended.
- Please remove the oil used for hole machining. Remaining oil will become carbon products when heated, which will reduce heat conductivity.
- The heater can be used at voltages lower than the rated voltage. In this case, please use the following to calculate the power.

$$\left( \frac{\text{Operating voltage}}{\text{Rated voltage}} \right)^2 \times \text{Rated power} = \text{Operating power}$$

(Eg.) 120V 500W heater used at 100V will result in 347W.

- Special terminal (p20) is recommended if HL type/inch size is used for movable parts.
- When stored or not operated for long period, insulation resistance will drop due to the nature of the heater. Depending on operating conditions, if drop in insulation resistance needs to be avoided, please choose New Ultra Five (p21) or Glass Seal Cartridge Heaters (p22).

# Ultra Five Special Terminal Specifications

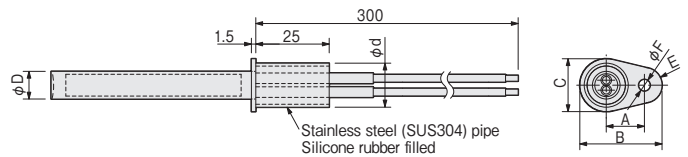
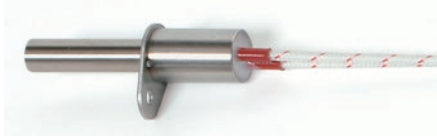
Delivery within 7 working days

- Applicable to standard HL type/inch size ( $\phi 3.1$ - $\phi 20.0$ ) Ultra Five products. The terminal is attached with B type flange, connecting pipe and others.
- Lead wire is excellent in withstanding bends, suitable for use in movable parts.
- Heater insertion length is shorten by the thickness of the flange (1.5mm).
- For stocked Ultra Five HL/inch size type standard products, delivery is within 7 working days (out of stock might occur).

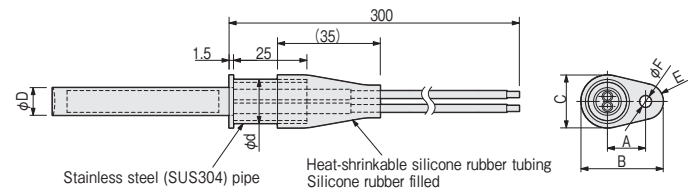
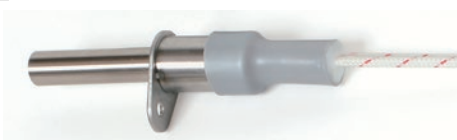
## Specifications & dimensions

Flange material: SUS304 (Stainless steel)  
Fixing method of heater with flange and flange with pipe: TIG welding

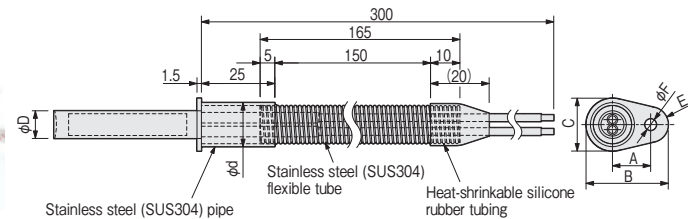
**Type 1** Max. operating temperature of terminal : 180°C



**Type 2** Max. operating temperature of terminal : 180°C



**Type 3** Max. operating temperature of terminal : 220°C



Heater sheath diameter $\phi D$	Dimensions (mm)					
	$\phi d$	A	B	C	E	F
3.1 / 4.0	8	8	15.5	9	R3	3.2
6.0 / 6.25 / 6.5 / 8.0	10	9	20	14	R4	4.2
9.42 / 10.0 / 12.0 / 12.6	15	13	28	18	R6	4.2
14.0 / 15.0 / 15.77 / 16.0 / 18.0 / 18.95 / 20.0	22	15	34	24	R7	4.2

## How to order

Standard stocked items, Ultra Five HL/SL/inch size type (sheath dia.  $\phi 3.1$ - $\phi 14$ ), with special terminal are short delivery items. Please specify the model no. and product code using the following method.

Model No.	Standard stocked item's model No.	⇒	Type 1	Type 2	Type 3
	□□□□□□		□□□□□□ T1	□□□□□□ T2	□□□□□□ T3

Product code	標準在庫品の商品コード	⇒	Type 1	Type 2	Type 3
	0308 □□□□		0313 □□□□	0314 □□□□	0315 □□□□
	0310 □□□□		0323 □□□□	0324 □□□□	0325 □□□□

Example) HLB1103 (HL type,  $\phi 6.5 \times 100, 100V100W$ ) with type 1 special terminal

Model No. : HLB1103 → HLB1103T1  
Product code : 03081050 → 03131050

For build to order products with special terminal, please specify the model no. and type of special terminal as in "HLA2103 Special Terminal Type 1". Also, please inquire on the delivery dates.

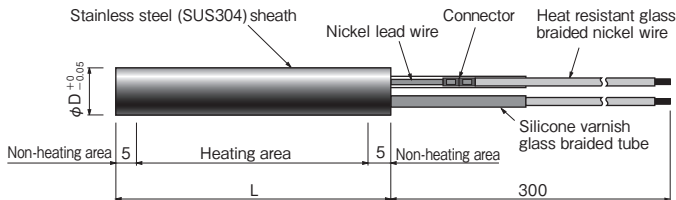
# NEW ULTRA FIVE

Cartridge heater that can prevent the drop in insulation resistance when not used for long period after installation or when storing.

- All standard products of Ultra Five (p9-p18 sheath dia.  $\phi 6$  and above) can be customized into "New Ultra Five" with the same specifications.
- HL type for 1P 200V with sheath diameter of  $\phi 6.5$ ,  $\phi 8.0$  and  $\phi 10.0$  are standard stocked items.

## High insulation resistance type cartridge heater

(max. operating temperature: heater surface temperature 400°C)



### HL Type 1P 200V applications

In stock	Model No.	Product code	dimension (mm)		Rated power (W)	WD (W/cm <sup>2</sup> )
			D	L		
◎	HLB2101S	03182020	6.5	50	100	12
◎	HLB2102S	03182030		80	100	7.0
◎	HLB2152S	03182040		100	150	10
◎	HLB2103S	03182050		100	100	5.4
◎	HLB2203S	03182060		100	200	11
◎	HLC2101S	03182110	8.0	50	100	9.9
◎	HLC2151S	03182120		50	150	15
◎	HLC2102S	03182130		80	100	5.7
◎	HLC2202S	03182140		80	200	11
◎	HLC2153S	03182150		100	150	6.6
◎	HLC2253S	03182160		100	250	11
◎	HLC2204S	03182170		130	200	6.6
◎	HLC2304S	03182180		130	300	9.9
◎	HLC2305S	03180510		150	300	8.5
◎	HLC2455S	03180520		150	450	13
◎	HLC2356S	03180530		180	350	8.2
◎	HLC2506S	03180540		180	500	12
◎	HLC2407S	03180550		200	400	8.4
◎	HLC2607S	03180560		200	600	13
◎	HLC2458S	03180570		230	450	8.1
◎	HLC2658S	03180580	230	650	12	
◎	HLC2509S	03180590	250	500	8.3	
◎	HLC2709S	03180600	250	700	12	
◎	HLC4551S	03180610	300	550	7.5	
◎	HLC4851S	03180620	300	850	12	
◎	HLE2101S	03182210	10.0	50	100	8.0
◎	HLE2201S	03182220		50	200	16
◎	HLE2152S	03182230		80	150	6.8
◎	HLE2252S	03182240		80	250	11
◎	HLE2203S	03182250		100	200	7.1
◎	HLE2303S	03182260		100	300	11
◎	HLE2204S	03182270		130	200	5.3
◎	HLE2404S	03182280		130	400	11
◎	HLE2305S	03182290		150	300	6.8
◎	HLE2505S	03182300		150	500	11
◎	HLE2406S	03180710		180	400	7.5
◎	HLE2656S	03180720		180	650	12
◎	HLE2457S	03180730		200	450	7.5
◎	HLE2707S	03180740		200	700	12
◎	HLE2558S	03180750		230	550	8.0
◎	HLE2808S	03180760		230	800	12
◎	HLE2609S	03180770		250	600	8.0
◎	HLE2909S	03180780		250	900	12
◎	HLE4701S	03180790		300	700	7.7
◎	HLE4101S	03180800		300	1000	11

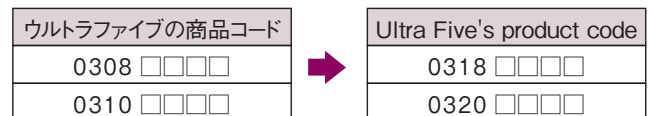
## How to order

◎ are build to order products. Please specify the model no. and product code using the following method.

Model no.



Product code



Example) To change HLB1103 (HL type,  $\phi 6.5 \times 100, 100W$ ) into "New Ultra Five"

Model no. : HLB1103 → HLB1103S

Product code : 03081050 → 03181050

Types with flange or internal thermocouple can be manufactured.

## About the selection of "New Ultra Five"

For cartridge heaters, if not used for long period in humid season, insulation resistance will drop due to the humidity in the air. In this case, it is required to recover the insulation resistance using methods such as powering it at low voltage before reusing (when operation starts, moisture will be removed shortly and the insulation resistance will recover). "New Ultra Five" is a cartridge heater that can prevent this insulation resistance drop.

- The effect of preventing insulation resistance drop will deteriorate if the heater is operated at surface temperatures exceeding 400°C. It should also be noted that if it is above 600°C, the effect will be loss within a short amount of time.
- Although insulation resistance drop will not be a problem when operated at temperature exceeding the max. operating temperature, the life of the heater will be less than 1/2 of the standard Ultra Five.
- For operating conditions where insulation resistance drop will not occur, there is no merit in using "New Ultra Five". Please use standard Ultra Five products.
- For high temperature operations, when insulation resistance drop due to long stopping period must be prevented, it is required to use standard Ultra Five with extended non-heating area (out of the mold) and employ a fully seal design. (Please refer Glass Seal Cartridge Heaters on p22)

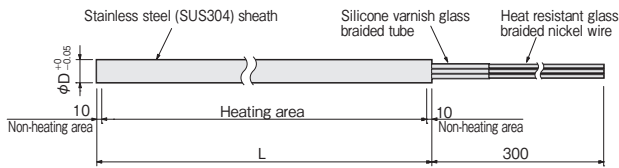
"In Stock" sign description

◎ : [Stocked items] Shipped on the day or the next working day of purchase (Out of stock may occur)

○ : [Short delivery items] Takes 2~5 working days for shipment (Out of stock may occur)



Suitable for packaging machine, bag forming equipment or other heat sealing applications



WD : Watt density of the effective heating area    WC : Wire cross-sectional area

In stock	Model No.	Product code	Power voltage	dimension (mm)		Rated power (kW)	WD (W/cm <sup>2</sup> )	WC (mm <sup>2</sup> )	Weight (kg)
				D	L				
	HLS6301	03089310	3P 200V	18.0	800	3.0	6.8	1.25	0.9
	HLS6352	03089320			900	3.5	7.0	2.0	1.0
	HLS6403	03089330			1000	4.0	7.2	3.5	1.1
	HLS6454	03089340			1100	4.5	7.4		1.2
	HLS6505	03089350			1200	5.0	7.5		1.3
	HLT6351	03089360	3P 200V	20.0	800	3.5	7.1	2.0	1.1
	HLT6402	03089370			900	4.0	7.2	3.5	1.2
	HLT6453	03089380			1000	4.5	7.3		1.4
	HLT6504	03089390			1100	5.0	7.4		1.5
	HLT6555	03089400			1200	5.5	7.4	1.6	

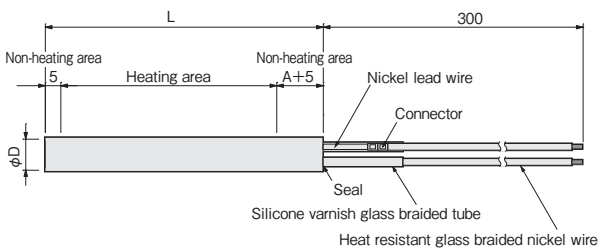
## GLASS SEAL CARTRIDGE HEATERS

High insulation resistance type cartridge heater with glass sealed terminal

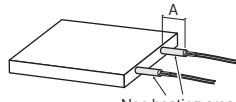


- Cartridge heater with glass sealed terminal for high insulation resistance.
- Insulation resistance will not deteriorate even when not used for long period.
- Design for high temperature operation with the non-heating area (dimension A figure below) extended out of the heated object (hot plate).

● Sheath diameter  $\phi D$   $\phi 8 / \phi 10$



Application



Sheath:	NCF800
Power supply wire:	Heat resistant glass braided nickel wire

Max. operating temperature for terminal: 250°C (temp. of seal)※1

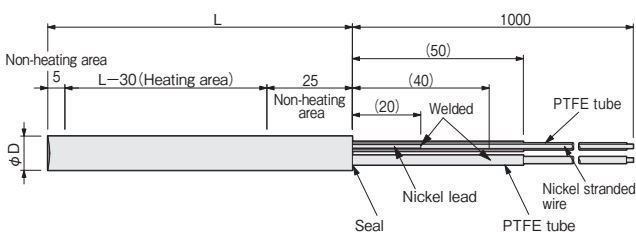
Sheath diameter $\phi D$	$\phi 8$	$\phi 10$
dimension L (mm)	100~400	100~500

A dimension (reference): at RT 25°C, for stainless steel hot plate

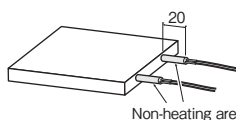
Temp. of hot plate (°C)	300	400	500	600	700	800
dimension A (mm)	20	30	35	40	45	50

The dimensions above are for reference only. If operated in high ambient temperature, please increase the length of A.

For vacuum ● Sheath diameter  $\phi D$   $\phi 8 / \phi 10$



Application On the terminal side, the non-heating area should be 20mm away.



Sheath:	NCF800
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Power supply wire:	Nickel stranded wire + PTFE
--------------------	-----------------------------

Max. operating temperature for terminal: 250°C (temp. of seal)※1

Rated voltage:	100V and below
----------------	----------------

Wire cross-sectional area: 1.0 W/cm<sup>2</sup>

Sheath diameter $\phi D$	$\phi 8$	$\phi 10$
dimension L (mm)	100 ~ 400	100 ~ 500

※1 : If used above max. operating temperature, insulation resistance will drop and short circuit might occur at the sealed area.



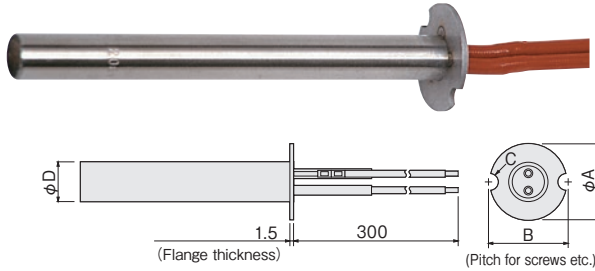
# CARTRIDGE HEATERS w/ FLANGE

Cartridge heaters with flange attached to the terminal. Heater can be easily fixed by using screws etc.

- Build to order products using the same flange can be manufactured.
- Heater insertion length will be shorten by the thickness of the flange (1.5mm).

○ : Products made by attaching flange to standard stocked items are "short delivery items".

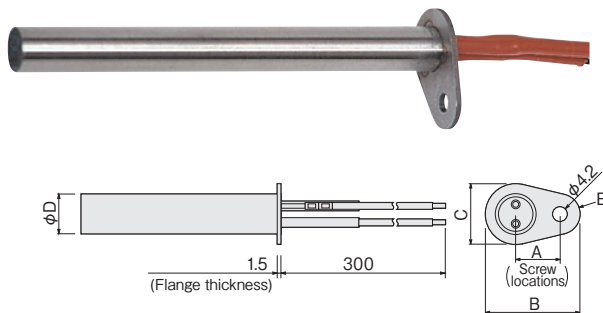
## ● A type flange



Flange material : SUS304  
Heater and flange attachment method : TIG welding

Heater sheath diameter φD	Dimensions (mm)		
	A	B	C
6.0 / 6.25 / 6.5 / 8.0	18	18	R2.5
9.42 / 10.0 / 12.0 / 12.6	24	24	R2.5
14.0 / 15.0 / 15.77 / 16.0	28	28	R3
18.0 / 18.95 / 20.0	32	32	R3

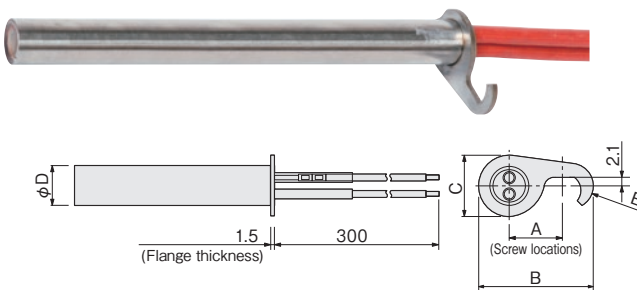
## ● B type flange



Flange material : SUS304  
Heater and flange attachment method : TIG welding

Heater sheath diameter φD	Dimensions (mm)			
	A	B	C	E
6.0 / 6.25 / 6.5 / 8.0	9	20	14	R4
9.42 / 10.0 / 12.0 / 12.6	13	28	18	R6
14.0 / 15.0 / 15.77 / 16.0 / 18.0 / 18.95 / 20.0	15	34	24	R7

## ● C type flange



- Heater replacement is possible by just loosening the screw.
- Screw positions that varies within some range can be tolerated.
- Please use M4 screws.

Flange material : SUS304  
Heater and flange attachment method : TIG welding

Heater sheath diameter φD	Dimensions (mm)			
	A	B	C	E
6.0 / 6.25 / 6.5	7~10	18.5	9	R4.5
8.0	8.5~11	20.5	10	R5
9.42 / 10.0 / 12.0 / 12.6	11~15	28	15	R5.5
14.0 / 15.0 / 15.77 / 16.0 / 18.0 / 18.95	14~16	32.5	21	R7
20.0	14.5~17	36	22	R8

## How to order

Standard stocked items, Ultra Five HL/SL/inch size type (sheath dia. φ3.1-φ14), with flange attached are short delivery items. Please specify the model no. and product code using the following method.

Model No.	Standard stocked item's model No.	A type	B type	C type
	□□□□□□	□□□□□□ AF	□□□□□□ BF	□□□□□□ CF
Product code	Standard stocked item's product code	A type	B type	C type
	0308 □□□□	0371 □□□□	0372 □□□□	0312 □□□□
	0310 □□□□	0361 □□□□	0362 □□□□	0322 □□□□

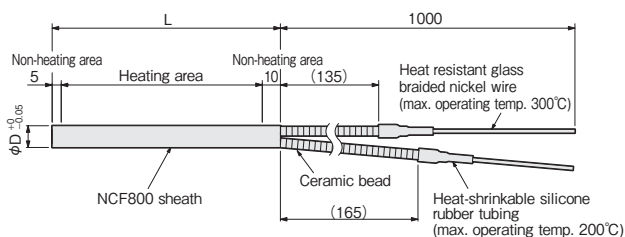
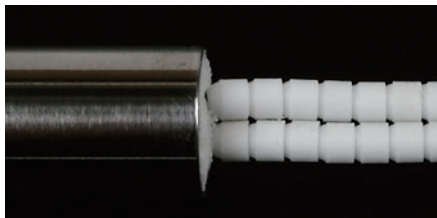
Example) HLB1103 (HL type, φ6.5×100,100V100W) with A type flange.

Model No. : HLB1103 → HLB1103AF  
Product code : 03081050 → 03711050

For build to order products with flange attached, please specify the model no. and type of flange as in "HLA2103 A type flange". Also, please inquire on the delivery dates.

# HIGH TEMPERATURE RESISTANCE CARTRIDGE HEATERS

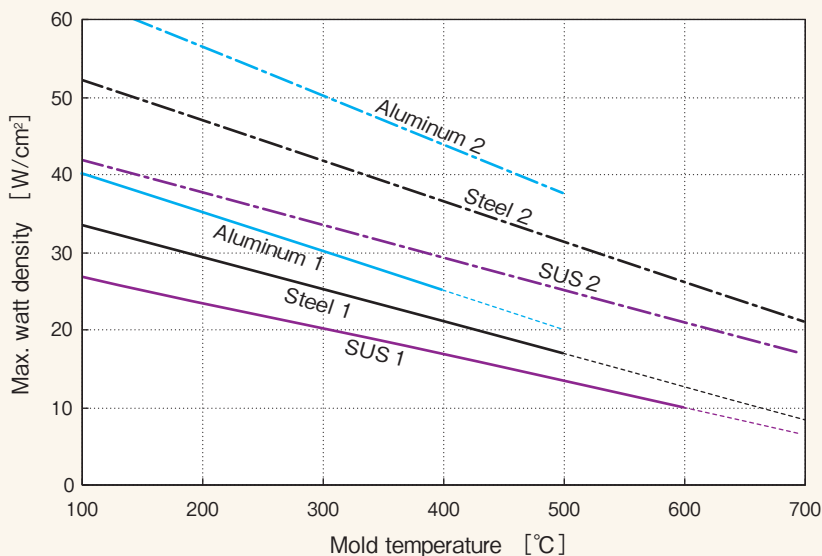
WD : Watt density of the effective heating area



- Cartridge heater with a maximum operating temperature of 800°C (temp. of the mold). Heater sheath is made of temperature resistance alloy (NCF800).
- Please operating in environment in which the ambient temperature for the heat resistant wire is below 250°C.
- Please do not use in applications where the ceramic bead part will be bended frequently.

100V			1P 200V			Dimensions (mm)		Rated power (W)	WD (W/cm <sup>2</sup> )	
In stock	Model No.	Product code	In stock	Model No.	Product code	D	L			
	GLC1101	03280010		GLC2101	03282010	8.0	50	100	11.4	
	GLC1152	03280020		GLC2152	03282020		80	150	9.2	
	GLC1202	03280030		GLC2202	03282030		100	200	12.2	
	GLC1203	03280040		GLC2203	03282040		100	200	9.4	
	GLC1303	03280050		GLC2303	03282050		130	300	14.0	
	GLC1254	03280060		GLC2254	03282060		130	250	8.6	
	GLC1354	03280070		GLC2354	03282070		150	300	8.8	
	GLC1305	03280080		GLC2305	03282080		150	450	13.3	
	GLC1455	03280090		GLC2455	03282090		180	350	9.0	
	GLC1356	03280100		GLC2356	03282100		180	500	12.8	
	GLC1506	03280110		GLC2506	03282110		200	400	8.6	
	GLC1407	03280120		GLC2407	03282120		200	600	12.9	
	GLC1607	03280130		GLC2607	03282130		230	450	8.3	
	GLC1458	03280140		GLC2458	03282140		230	700	13.0	
	GLC1708	03280150		GLC2708	03282150		250	500	8.5	
	GLC1509	03280160		GLC2509	03282160		250	800	13.5	
	GLC1809	03280170		GLC2809	03282170		300	600	8.4	
				GLC4601	03282180		300	900	12.6	
				GLC4901	03282190		350	700	8.3	
				GLC4702	03282200		350	1050	12.5	
				GLC4102	03282210		400	800	8.3	
				GLC4803	03282220		400	1200	12.4	
				GLC4123	03282230					
	GLE1101	03280510		GLE2101	03282510		10.0	50	100	9.1
	GLE1151	03280520		GLE2151	03282520			80	150	13.6
	GLE1152	03280530		GLE2152	03282530			80	150	8.7
	GLE1252	03280540		GLE2252	03282540			100	250	14.5
	GLE1253	03280550		GLE2253	03282550			100	250	9.4
	GLE1353	03280560		GLE2353	03282560			130	350	13.1
	GLE1304	03280570		GLE2304	03282570			130	300	8.3
	GLE1504	03280580		GLE2504	03282580	150		500	13.8	
	GLE1355	03280590		GLE2355	03282590	150		350	8.3	
	GLE1555	03280600		GLE2555	03282600	150		550	13.0	
	GLE1456	03280610		GLE2456	03282610	180		450	8.7	
	GLE1656	03280620		GLE2656	03282620	180		650	12.5	
	GLE1507	03280630		GLE2507	03282630	200		500	8.6	
	GLE1707	03280640		GLE2707	03282640	200		700	12.0	
	GLE1608	03280650		GLE2608	03282650	230		600	8.9	
	GLE1858	03280660		GLE2858	03282660	230		850	12.6	
	GLE1659	03280670		GLE2659	03282670	250		650	8.8	
	GLE1909	03280680		GLE2909	03282680	250		900	12.2	
	GLE3751	03280690		GLE4751	03282690	300		750	8.4	
	GLE3101	03280700		GLE4111	03282700	300		1100	12.3	
				GLE4902	03282710	350	900	8.6		
				GLE4132	03282720	350	1300	12.4		
				GLE4103	03282730	400	1000	8.3		
				GLE4153	03282740	400	1500	12.4		

## Reference for "mold temperature-heater max. watt density" for different mold materials



《The number after the material》

1: Long term usage (20,000hrs at 95% reliability)

2: Short term usage (1,000hrs average life)

- This is the case where the diameter of the inserted hole is equal to the heater diameter+0.1mm (φ10.1 hole for φ10 heater). If the inserted hole diameter is large, the heat transfer coefficient from the heater to the mold will drop, and the life will be shorten.
- The lifetime varies with the conditions of usage and the specifications of the heater.
- The data is for reference purposes, it does not guarantee the lifetime.
- For inch size cartridge heater that are used for 100V (120V) and 200 (240V), the power and watt density will be approximately 70%.
- For use in movable parts, the life due to the damage of wire is not considered.

No sign : [Build-to-order]  
Please inquire for details on delivery dates

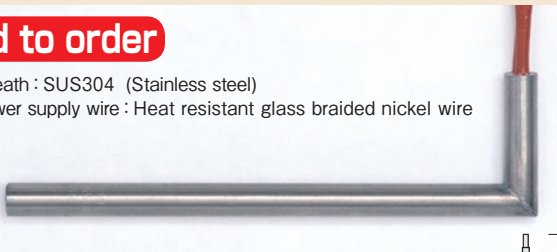
Please provide model no. and product code when placing order.

# L TYPE CARTRIDGE HEATERS

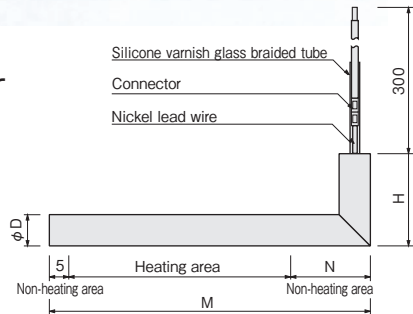
Ultra Five HL type cartridge heater with right angle terminal.

## Build to order

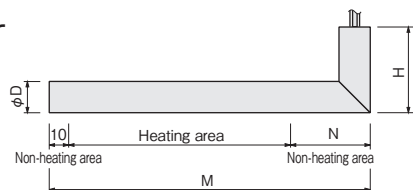
Sheath : SUS304 (Stainless steel)  
Power supply wire : Heat resistant glass braided nickel wire



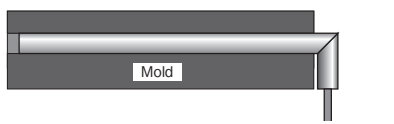
### ● Sheath diameter $\phi 6.25 \sim \phi 14.0$



### ● Sheath diameter $\phi 15.0 \sim \phi 20.0$



### Mold installation



- The heater can be attached in a manner that limited space is effectively used .
- L type heaters with the same specifications as HL/inch size type can be delivered (standard products with sheath diameter  $\phi 6.25 - \phi 20.0$ ).
- When placing order for standard product with L type modification, please specify the standard product model no. and H dimensions as in "HLL3153, L type, H dimension: 25".

### Sheath diameter $\phi 6.25 \sim \phi 14.0$

Sheath diameter $\phi D$	Dimensions M			Dimension N (Non-heating area)	Dimension H	
	min	max	For HL type		min	max
$\phi 6.25$	38	350	M = L + 13	18	20	35
$\phi 6.5$					20	35
$\phi 8.0$	42	400	M = L + 17	22	20	35
$\phi 9.42$	45	400	M = L + 20	25	25	40
$\phi 10.0$	45	500				
$\phi 12.0$	50	600	M = L + 25	30	25	40
$\phi 12.6$						
$\phi 14.0$	65	1000	M = L + 30	35	30	50

### Sheath diameter $\phi 15.0 \sim \phi 20.0$

Sheath diameter $\phi D$	Dimensions M			Dimension N (Non-heating area)	Dimension H	
	min	max	For HL type		min	max
$\phi 15.0$	65	1600	M = L + 25	35	30	50
$\phi 15.77$						
$\phi 16.0$	70	1600	M = L + 30	40	40	50
$\phi 18.0$						
$\phi 18.95$						
$\phi 20.0$						

# CARTRIDGE HEATERS FOR VACUUM

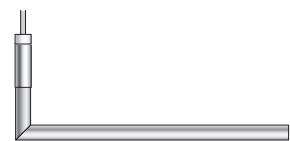
Cartridge heater which are fully sealed with ceramic hermetic seal for vacuum applications.

## Build to order

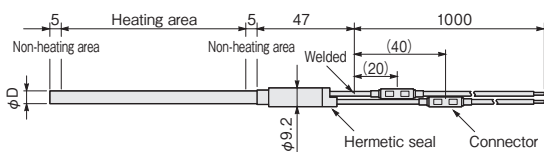


Sheath : SUS304(stainless steel)  
Power supply wire : FEP insulated wire

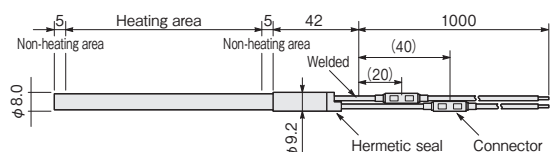
L type can be manufactured



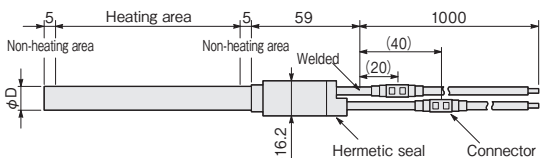
### ● Sheath diameter $\phi 6.25 / 6.5$



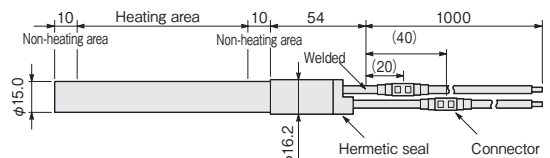
### ● Sheath diameter $\phi 8.0$



### ● Sheath diameter $\phi 9.42 / 10.0 / 12.0 / 12.6 / 14.0$



### ● Sheath diameter $\phi 15.0$

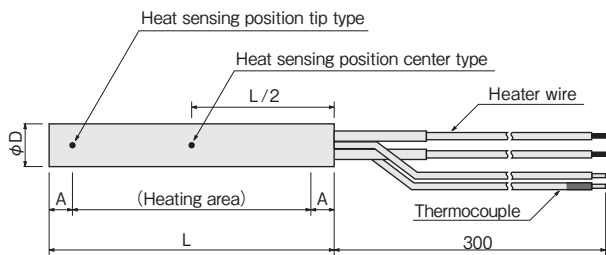


# CARTRIDGE HEATERS w/ INTERNAL THERMOCOUPLE

Cartridge heater with built-in internal K-type thermocouple.

## ● Standard type **Build to order**

- HL type cartridge heater with internal K-type thermocouple. Suitable for controlling heating in small spaces, as the heater and temperature sensor can be installed together.
- Heaters with internal thermocouple using the same specifications as HL/inch size type can be manufactured (standard products with sheath diameter  $\phi 6.25$ - $\phi 20.0$ ).
- The standard thermocouple sensing positions are "tip" and "center" of the sheath.
- For built to order items, heaters with other thermocouple sensing position can be manufactured.



Heater sheath : SUS304 (Stainless steel)  
 Thermocouple : K-type (Lead with glass braided tube, red color indication for positive wire)  
 Heater wire : Heat resistant glass braided nickel wire

**\* For ordering \***  
 When placing order for standard product with internal thermocouple, please specify the standard product model no. and heat sensing position as in "Cartridge heater w/ internal thermocouple, HLL3153, heat sensing position tip".

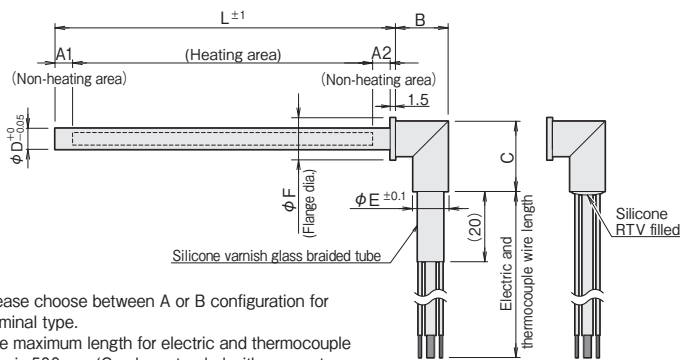
Sheath diameter $\phi D$	Dimensions (mm)			Thermocouple wire diameter
	L (min)	L (max)	A (Non-heating area)	
$\phi 6.0$	25	350	5	$\phi 0.5$
$\phi 6.25$				
$\phi 6.5$				
$\phi 8.0$	25	400		
$\phi 9.42$				
$\phi 10.0$				
$\phi 12.0$	25	600		
$\phi 12.6$				
$\phi 14.0$	25	1000		
$\phi 15.0$				
$\phi 15.77$	40	1600	10	$\phi 0.65$
$\phi 16.0$				
$\phi 18.0$				
$\phi 18.95$		1800		
$\phi 20.0$				

## ● L Type **Build to order**

- SL type cartridge heater with built-in internal K-type thermocouple.
- The wire connection terminal part has a L configuration. Can be fitted compactly within the space in the direction of insertion.
- SL type cartridge heaters of sheath diameter  $\phi 6.0$ - $\phi 20.0$  with internal thermocouple, attached with stopper flange and L shape metal part for protection.
- The standard thermocouple heat sensing positions are "tip" and "center" of the sheath.
- Heaters with special flange, other heat sensing positions and other lengths for electric wire/thermocouple wire can be manufactured.
- 2 types of terminal configuration can be selected to suit the application.



**\* For ordering \***  
 When placing order for standard SL type product with internal thermocouple, please specify the standard product model no., heat sensing position and terminal type as in "Cartridge heater w/ internal thermocouple, SLE1204, heat sensing position tip, A type terminal".



• Please choose between A or B configuration for terminal type.  
 • The maximum length for electric and thermocouple wire is 500mm. (Can be extended with connector for 500mm and above)

**A type terminal** Terminal max. operating temp.: 250°C  
**B type terminal** Terminal max. operating temp.: 200°C

Heater sheath : SUS304 (Stainless steel)  
 Thermocouple : K-type (Lead with glass braided tube, red color indication for positive wire)  
 Heater wire : Heat resistant glass braided nickel wire

Sheath diameter $\phi D$	Dimensions (mm)								Thermocouple wire diameter
	L Min.	L Max.	A1	A2	B	C	$\phi E$	$\phi F$	
$\phi 6.0$	25	350	5	8.5	15	20	$\phi 10$	$\phi 10$	$\phi 0.5$
$\phi 6.25$									
$\phi 6.5$									
$\phi 8.0$	25	400							
$\phi 9.42$									
$\phi 10.0$									
$\phi 12.0$	25	600							
$\phi 12.6$									
$\phi 14.0$	25	1000							
$\phi 15.0$									
$\phi 15.77$	40	1000	10	8.5	25	30	$\phi 15$	$\phi 17$	$\phi 0.65$
$\phi 16.0$									
$\phi 18.0$									
$\phi 18.95$							$\phi 20$		
$\phi 20.0$									

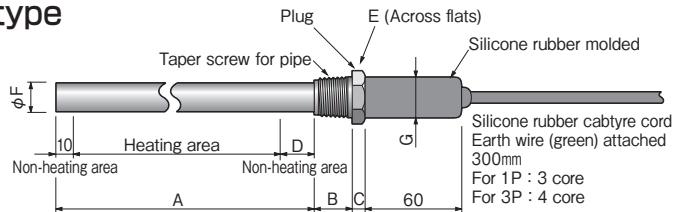


# CARTRIDGE HEATER FOR WATER HEATING

Compact and high power cartridge heaters for water heating that can be installed in small spaces. Generate heat with high heating efficiency and low loss.

- Water heater that is based on the highly recognized cartridge heater "Ultra Five".
- Long life with robust design that can withstand mechanical vibrations or shocks during operation.
- Improved water resistance with heat resistant silicone rubber molded terminal.
- Can be installed in small spaces where conventional plug heaters could not.
- The metal sheath is made of stainless steel pipe (SUS316L) or copper pipe (nickel plated surface).

## ● ULTRA W Stainless steel sheath type

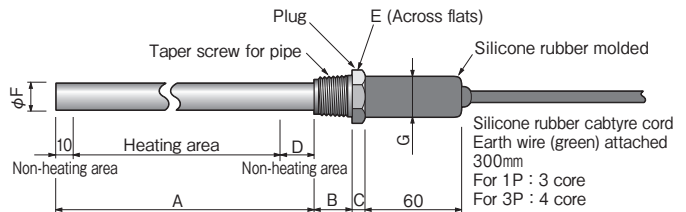


Heater sheath : SUS316L (Stainless steel)  
 Plug : SUS304 (Stainless steel)  
 Watt density of the effective heating area : 7 W/cm<sup>2</sup>

WC : Wire cross-sectional area

In stock	Model No.	Product code	Power voltage	Rated power	Nominal dia. of taper screw	Dimensions (mm)							WC (mm <sup>2</sup> )	Weight (kg)															
						A	B	C	D	E	F	G																	
○	SLW6052	03734210	110V	500W	R 3/8	220	16	6	20	21	12	20	0.75	0.2															
○	SLW6103	03734220		1kW	R 1/2	320									20	7	25	24	16	24	0.4								
○	SLW6154	03734230		1.5kW	R 3/4	380																20	7	25	30	20	28	1.25	0.7
○	SLW7052	03734240	1P 220V	500W	R 3/8	220	16	6	20	21	12	20	0.75	0.2															
○	SLW7103	03734250		1kW	R 1/2	320									20	7	25	24	16	24	0.4								
○	SLW7154	03734260		1.5kW	R 3/4	380																20	7	25	30	20	28	1.25	0.7
○	SLW7204	03734270		2kW		490									20	7	25	30	20	28	1.25								
○	SLW8103	03734280	3P 220V	1kW	R 1/2	330	20	7	25	24	16	24	0.75	0.5															
○	SLW8154	03734290		1.5kW	R 3/4	390																20	7	25	30	20	28	0.75	0.8
○	SLW8204	03734300		2kW		500									20	7	25	30	20	28	0.75								

## ● ULTRA W Copper sheath type



Heater sheath : Nickel plated C1220T (Copper pipe)  
 Plug : Nickel plated brass  
 Watt density of the effective heating area : 15 W/cm<sup>2</sup>

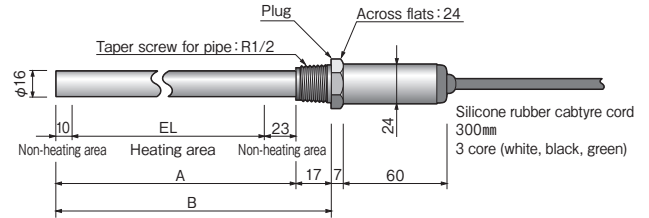
WC : Wire cross-sectional area

In stock	Model No.	Product code	Power voltage	Rated power	Nominal dia. of taper screw	Dimensions (mm)							WC (mm <sup>2</sup> )	Weight (kg)															
						A	B	C	D	E	F	G																	
○	SLW1052	03734010	110V	500W	R 3/8	120	16	6	20	21	12	20	0.75	0.2															
○	SLW1103	03734020		1kW	R 1/2	170									20	7	25	24	16	24	0.3								
○	SLW1154	03734030		1.5kW	R 3/4	195																20	7	25	30	20	28	1.25	0.4
○	SLW2052	03734040	1P 220V	500W	R 3/8	120	16	6	20	21	12	20	0.75	0.2															
○	SLW2103	03734050		1kW	R 1/2	170									20	7	25	24	16	24	0.3								
○	SLW2154	03734060		1.5kW	R 3/4	195																20	7	25	30	20	28	1.25	0.4
○	SLW2204	03734070		2kW		250									20	7	25	30	20	28	1.25								
○	SLW2304	03734080		3kW	355	20																							
○	SLW3103	03734090		3P 220V	1kW																	R 1/2	175	20	7	25	24	16	24
○	SLW3154	03734100	1.5kW		R 3/4		200	20	7	25	30	20	28	0.75	0.5														
○	SLW3204	03734110	2kW			255	20									7	25	30	20	28	0.75	0.6							
○	SLW3304	03734120	3kW		360	20																	7						

# ● ULTRA W800

Small and high power cartridge heater for water heating. It uses high performance nickel alloy sheath that can withstand corrosion and heat.

- Sheath is made of high performance nickel alloy NCF800 which can resist corrosion and heat. Compact and high power that can withstand high stress, corrosion and cracking.
- The terminal is molded with high water resistant silicone rubber. Can be operated as a single unit or as a set of multiple units to match the installation space.



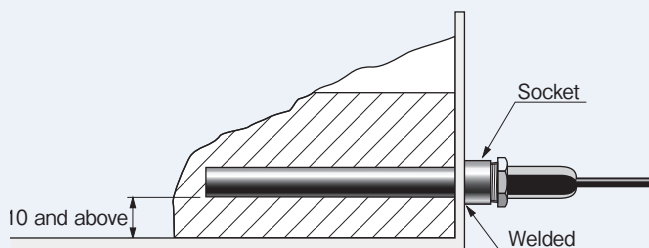
Heater sheath : NCF800  
 Plug : SUS304L (Stainless steel)  
 Terminal : Silicone rubber molded (SUS protection pipe attached)  
 Power supply cable : Silicone rubber cable cord 300mm  
 Watt density of the effective heating area : 20W/cm<sup>2</sup>

In stock	Model No.	Product code	Power voltage	Rated power	Dimensions (mm)			Wire cross-sectional area (mm <sup>2</sup> )	Weight (kg)
					A	B	EL		
◎	SLW4210	03550010	3P 220V	1 kW	133	150	100	0.75	0.3
◎	SLW4215	03550015		1.5 kW	183	200	150		0.4
◎	SLW4225	03550025		2.5 kW	283	300	250		0.5
◎	SLW4230	03550030		3 kW	333	350	300	1.25	0.5
◎	SLW4250	03550050		5 kW	533	550	500		0.7

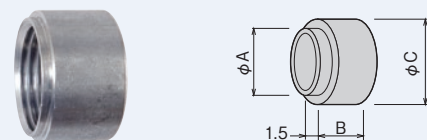
## To use cartridge heater for water (oil, chemical) heating correctly

- Please be careful to not expose the heater sheath into the air. If operated while exposed in air (dry-fired), the temperature of the heater sheath will be very high, and it might cause a fire or burnout.
- Please use Hakko's socket or other products that matches the dimensions for installation. If long socket is used, the heater's heating area will be exposed into the socket, and it might cause high temperatures and burnout.
- Deposits will form on the surface of the heater sheath if used for long period. The deposits will hinder the heater's heat transfer, and it might cause burnout or corrosion. Please check and remove routinely.

### ● Installation method



Socket for installation (SUS304)



Model No.	Product code	Nominal screw diameter for pipe	Dimensions (mm)		
			A	B	C
ZCS0211	03440015	R 3/8	19	12	22
ZCS0212	03440025	R 1/2	24	15	27
ZCS0213	03440035	R 3/4	30	17	33

# CARTRIDGE HEATERS FOR OIL, CHEMICAL AND SEAWATER HEATING

For applications where installation space is limited

## ● ULTRA WL Oil temperature max. 160°C type

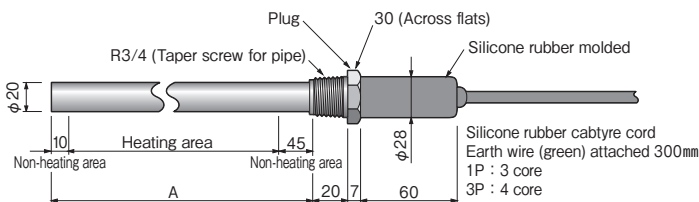
- Compact cartridge heaters for oil heating that can be installed in small spaces. Generate heat with high heating efficiency and low loss.
- Stainless steel sheath (SUS316L) has excellent corrosion resistance properties. Can be used for liquid other than oil such as alkaline solutions (solutions that do not corrode stainless steel).



Heater sheath : SUS316L (Stainless steel)

Plug : SUS304L (Stainless steel)

Watt density of the effective heating area : 2.5 W/cm<sup>2</sup>



In stock	Model No.	Product code	Power voltage	Rated power	Dimensions A	Wire cross-sectional area (mm <sup>2</sup> )	Weight (kg)
○	SLW5125	03740020	110V	250W	215	0.75	0.4
○	SLW5135	03740030		350W	280		0.6
○	SLW5150	03740040		500W	375		0.7
○	SLW5225	03740050	1P 220V	250W	215		0.4
○	SLW5235	03740060		350W	280		0.6
○	SLW5250	03740070		500W	375		0.7
○	SLW5325	03740080	3P 220V	250W	215		0.4
○	SLW5335	03740090		350W	280		0.6
○	SLW5350	03740100		500W	375		0.7

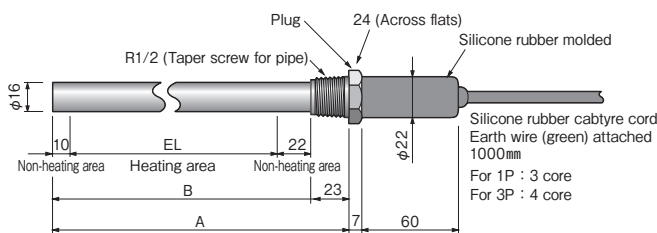
## ● ULTRA W for seawater heating

- The sheath is made from pure titanium which has excellent corrosion resistance properties. Suitable for chemicals or seawater heating.
- Lightweight for easy installation.
- As it comes with a plug, it can be securely attached to the tank.
- Long life with robust design that can withstand mechanical vibrations or shocks during operation.
- Improved water resistance with heat resistant silicone rubber molded terminal.



Heater sheath, plug : Titanium

Watt density of the effective heating area : 5 W/cm<sup>2</sup>

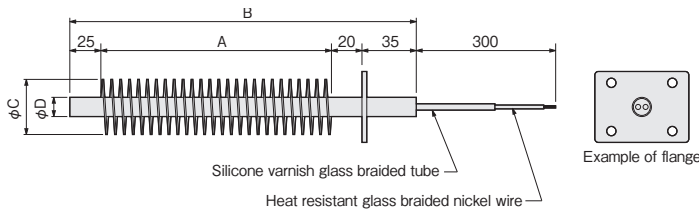


In stock	Model No.	Product code	Power voltage	Rated power	Dimensions (mm)			Wire cross-sectional area (mm <sup>2</sup> )	Power plug	Weight (kg)
					A	B	EL			
○	SLW0105	03750510	100V	500W	255	232	200	0.75	2P+E plug attached	0.3
○	SLW0110	03750520		1kW	455	432	400		None	0.4
○	SLW0210	03750530	1P 200V	1kW	455	432	400	0.75	None	0.4
○	SLW0310	03750540	3P 200V							

# CARTRIDGE HEATERS w/ FINS

**Build to order**

Ultra Five cartridge heater attached with fins for air heating. It can be attached from one side for a compact machine design.



## ● Standard specifications

Heater sheath, fin, flange material : SUS304 (Stainless steel)

Heater and flange : Fully TIG welded

Please operate with the heater sheath temperature below 400°C .  
Please specify the flange shape and dimensions.

Sheath diameter $\phi D$	Dimensions (mm)		
	A	B	$\phi C$
12	100 ~ 425	175 ~ 500	28
16	100 ~ 845	175 ~ 920	32
18	100 ~ 845	175 ~ 920	34
20	100 ~ 875	175 ~ 950	36

## Cartridge heater's special specifications

The specifications listed here are examples. Various modifications can be made according to customer request.

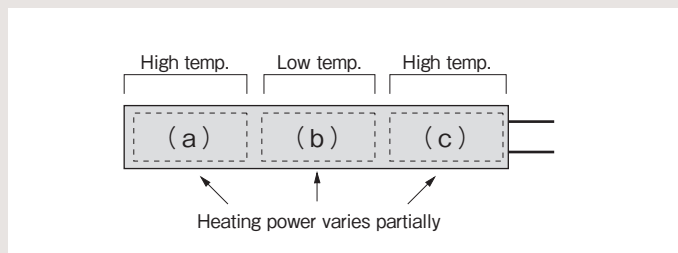
Classification	Shape	Features and application
<b>Vacuum application</b>	Hermetic system	Hermetic part is used in the terminal. It can be used in vacuum. Please use it for applications such as mold heating in vacuum.
<b>Water resistant type</b>	Metal collar	Metal collar is welded to the terminal to protect the terminal from external environment. It is suitable for use in humid environment, heat sealer that gets dusty easily, or metal molds that are exposed to oil, water, resin etc.
	Silicone tube	The heater terminal is protected from water droplets or humid environments using a simple design. Please operate with a terminal temperature of 150°C and below.
	Molded	Designed to protect the heater terminal from water droplets or condensations. Highly reliable waterproof performance is assured. Depending on the type of rubber material used, 2 types of operating temperature, 60°C and 150°C, are available. Suitable for outdoor anti-freezing, localized heating of freezer equipments, water heating or steam heating.
<b>Metal cap type</b>	Right angle	Metal cap is attached to the terminal to fully protect it. Suitable for metal molds with rapid movements, parts that might be exposed to resin, or applications where appearance are considered. This design is also suitable for metal molds that require frequent heater replacement.
	Straight	
<b>Hollow type</b>		Heater with an internal hollow pipe. The hollow pipe can be used for sensor insertion or cooling. Heater with 2 internal hollow pipes are also available.
<b>Balanced type</b>		The cartridge heater's heating distribution can be design freely to match the operating conditions. Request for design, simulation and testing are supported.



# HYBRID CARTRIDGE HEATERS

## ■ Hybrid cartridge heaters

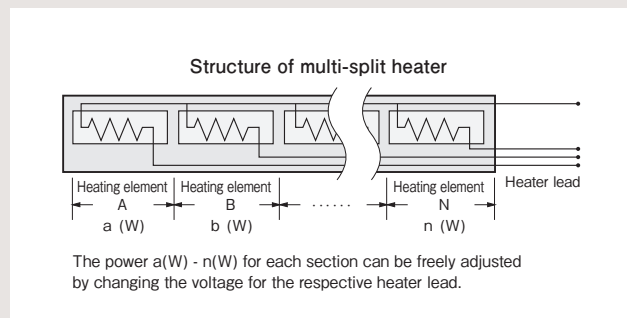
Conventional cartridge heater's heating wire is uniformly wound inside the sheath, which can only produce uniform heating power. For hybrid cartridge heater, the heating power can be partially adjusted within one heater.



There will be large heat loss from the sides of heating applications such as hot plate. By using hybrid cartridge heater with higher heating power at both ends [in the figure above, the heating power for (a) and (c) is larger than (b)], the higher heat loss can be compensated to produce a more uniform temperature distribution. Hakko's uniform hot plate uses hybrid cartridge heaters. Also, the heater surface can be coated with Hakko's Hilex coating to provide uniform heating for oven applications. Hakko's far infrared conveyor oven uses Hilex hybrid cartridge heaters.

## ■ Multi-split heater

Multi-split heater has multiple separated heating element that can be controlled independently. It can produce any temperature distribution as you please in addition to uniform heating. Temperature control of wide area can be carried out with multiple combinations.

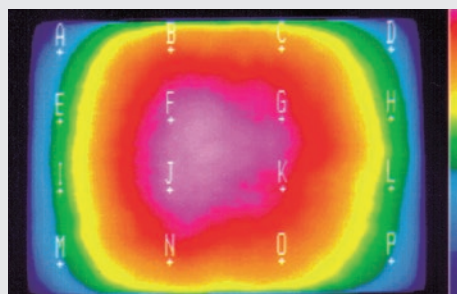


It is ideal for hot plates or furnaces that require temperature gradient. It is also suitable for uniform temperature hot plate. Hilex coated type can also be manufactured.

### Comparison for a hot plate using conventional cartridge heaters and hybrid cartridge heaters (same hot plate with only the heaters replaced).

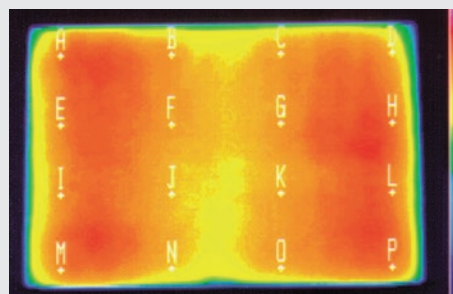
Hot plate dimension	500 × 300 × t50
Hot plate material	SUS304
Rated power	5.7kW
Heater dimension	φ14 × L 500, 7 cartridge heaters
Hot plate set temperature	200°C
Temp. measurement method	Infrared thermometer
Measurement points	16 points
Surrounding environment	23°C, 67%RH, still air

### Using conventional cartridge heaters



Max. temperature (Max)	: 195°C
Min. temperature (Min)	: 178°C
Average temperature ( $\bar{X}$ )	: 186.5°C
Deviation ( $\delta_{n-1}$ )	: 6.1°C
Temperature difference (Max - Min)	: 17°C

### Using hybrid cartridge heaters



Max. temperature (Max)	: 202°C
Min. temperature (Min)	: 200°C
Average temperature ( $\bar{X}$ )	: 201.5°C
Deviation ( $\delta_{n-1}$ )	: 0.7°C
Temperature difference (Max - Min)	: 2°C

The contents published is as of October 2020. For improvements, specifications are subject to change without notice. Updates are also posted on our homepage. [www.hakko.co.jp](http://www.hakko.co.jp)

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