



Alloy 825 sheathed mineral insulated heating cable

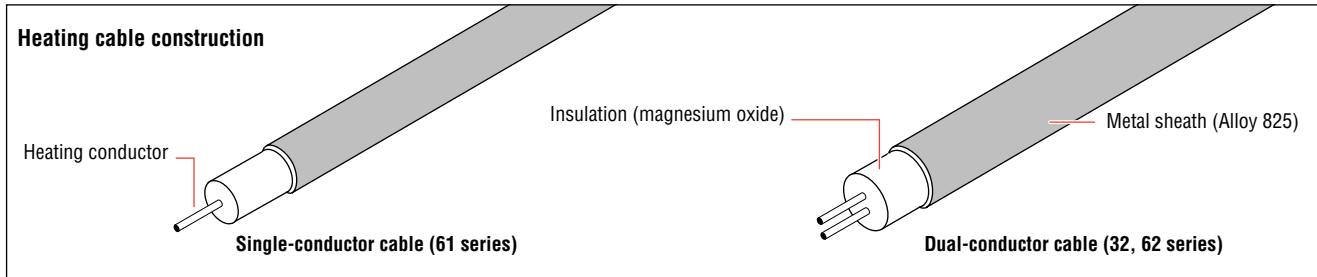
Electrical freeze protection and process-temperature maintenance for both nonhazardous and hazardous locations.

Pyrotenax® brand MI heating cables provide solutions for industrial freeze protection and process-temperature maintenance applications. MI is also used where high power output, high exposure temperatures, or extreme resistance to environmental corrosives are needed.

MI heating cables can provide up to 82 watts per foot (269 watts per meter) of power output with area classification and design approvals. The maximum application temperature for heating units is 1022°F (550°C) and the maximum exposure temperature for the heating cable is 1238°F (670°C). Higher temperatures are available; please contact Tyco Thermal Controls for additional information.

MI heating cables are constructed and approved for use in nonhazardous and hazardous (classified) locations.

For additional information, contact your Tyco Thermal Controls representative or call Tyco Thermal Controls at (800) 545-6528.



Application

Area classification: Nonhazardous and hazardous locations

Power Output

Maximum allowed cable load	32 series (dual conductor, max. 300 V)	60 W/ft (197 W/m)
	61 series (single conductor, max. 600 V)	64 W/ft (210 W/m)
	62 series (dual conductor, max. 600 V)	82 W/ft (269 W/m)
Actual values are application specific and may be lower. In hazardous locations, the values may also be lower to ensure that the maximum sheath temperature does not exceed the autoignition temperature of the area. Use our design software or contact Tyco Thermal Controls for design assistance.		

Temperature rating

Maximum exposure temperature*	1238°F (670°C) Heating cable
	1022°F (550°C) Cold lead connection, splices, and termination
* Higher temperatures available; please contact Tyco Thermal Controls for additional information.	

Temperature ID number (T-rating)

To be established by calculating the maximum sheath temperature. Use our design software or contact Tyco Thermal Controls for assistance.

Approvals

Hazardous Locations



Class I, Div. 1 and 2, Groups B, C, D
Class II, Div. 2, Groups F, G
Class III, Div. 1 and 2



Class I, Div. 1 and 2, Groups A, B, C, D
Class II, Div. 1 and 2, Groups E, F, G

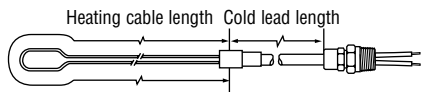


Class I, Div. 2, Groups A, B, C, D

Basic Heating Cable Design Configurations

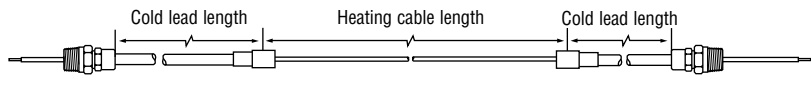
Heating cable units are supplied as complete factory-fabricated assemblies consisting of the heated section joined to a length of nonheating MI power cable, preterminated and ready to fasten into a junction box with an NPT-threaded connector.

Design A



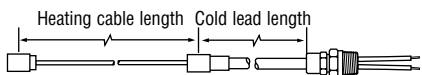
Design A: for single conductor cables only (61 series)

Design B



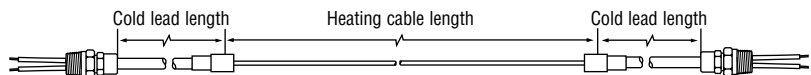
Design B: for single conductor cables only (61 series)

Design D



Design D: for dual conductor cables only (32, 62 series)

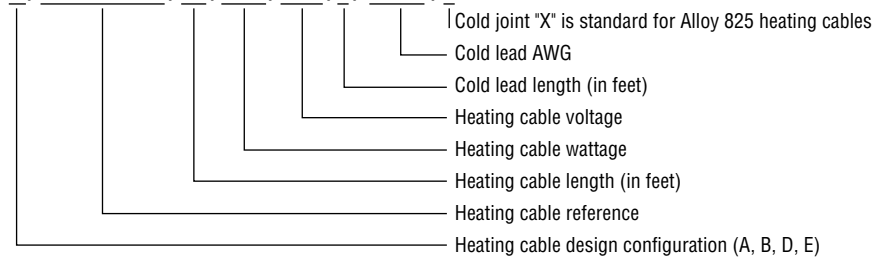
Design E



Design E: for dual conductor cables only (32, 62 series)

Heating Cable Catalog Number

A/61SA2200/40/538/208/7/12NS/X



In the above heating cable catalog number, the length of the heated section and the cold lead is in feet. For metric lengths, the heating cable catalog number would include a suffix "M" after the length, as follows: **A/61SA2200/12.2M/538/208/2.1M/12NS/X**

Conversion from Imperial to Metric units is: $L(\text{ft}) \times 0.3048 = L(\text{m})$

Conversion from Metric to Imperial units is: $L(\text{m}) \times 3.2808 = L(\text{ft})$

For hazardous areas, specify class, group, and division.

Specials

Add -P to catalog number for pulleye (Design D only)

Add -RG1/2" (or 3/4" or 1") to catalog number for Reverse Gland (Designs A and D only)

Examples

D/62/SQ3100/200/9920/480/3/10NS/X

- Heating cable configuration is Design D
- 600 V-rated dual conductor cable, resistance at 20°C is 0.100 Ω/ft (0.328 Ω/m)
- Heating cable length is 200 ft (61 m)
- Heating cable wattage is 9920 W at 480 V
- Cold lead length is 3 ft (.92 m) (10 AWG)

E/32SQ3200/25.0M/1066/120/2.1M/12LS/X

- Heating cable configuration is Design E
- 300 V-rated dual conductor cable, resistance at 20°C is 0.2 Ω/ft (0.656 Ω/m)
- Heating cable length is 25.0 m (82 ft)
- Heating cable wattage is 1066 W at 120 V
- Cold lead length is 2.1 m (6.9 ft) (12 AWG)

Table 1 Heating Cable Reference Decoding

Digit Number	Description	
1	Maximum voltage rating	3 = 300 V, 6 = 600 V
2	Number of conductors	1 or 2
3	Sheath material	S = Alloy 825
4	Conductor material	
5	Move decimal point to left indicated number of places	1, 2, 3, 4, 5, or 6 places
6 to 8	Cable resistance to 3 whole numbers (use with digit 5)	4400 = 0.0400 Ω/cable foot at 20°C

6 2 S A 2 2 0 0
Digit 1 2 3 4 5 6 7 8

Table 2 Alloy 825 Sheathed Cold Leads

Cold Lead Size AWG	Max. Voltage (V)	Cold Lead Ref. (1 conductor)	Cold Lead Ref. (2 conductor)	Design A, D, E		Design B	
				Max. Current (Amps)	Gland Size (NPT)	Max. Current (Amps)	Gland Size (NPT)
14	600	1/14NS	2/14NS	15	1/2"	20	1/2"
12L	300	—	2/12LS	20	1/2"	—	—
12	600	1/12NS	2/12NS	20	1/2"	25	1/2"
10	600	1/10NS	2/10NS	30	3/4"	40	1/2"
8	600	1/8NS	2/8NS	50	3/4"	70	1/2"

Note: All Alloy 825 cold leads terminated with nickel-plated brass gland, 6" tails, unless otherwise specified. Other configurations available on request.

Table 3 Series 61 MI Cable Specifications (600 V, single conductor)

Heating Cable Reference	Nominal Cable Resistance at 20°C		Approximate Cable Diameter		Maximum Unjointed Cable Length		Weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000m
61SA2200	2.00	6.56	0.146	3.7	1719	524	35.5	52.8
61SA2160	1.60	5.25	0.163	4.1	1400	427	45.2	67.3
61SA2130	1.30	4.27	0.160	4.1	1200	366	45.4	67.6
61SA2100	1.00	3.28	0.160	4.1	1475	450	45.7	68.0
61SA3850	0.850	2.79	0.170	4.3	1166	355	51.8	77.1
61SA3700	0.700	2.30	0.160	4.1	1475	450	46.4	69.1
61SA3500	0.500	1.64	0.180	4.6	1160	354	59.2	88.1
61ST3280	0.280	0.919	0.183	4.6	1142	348	58.5	87.1
61SB3200	0.200	0.656	0.180	4.6	1160	354	59.6	88.7
61SB3150	0.150	0.492	0.180	4.6	1160	354	60.9	90.6
61SQ3118	0.118	0.387	0.183	4.6	1060	323	58.1	86.5
61SQ4732	0.0732	0.240	0.184	4.7	1070	326	59.4	88.4
61SQ4581	0.0581	0.191	0.184	4.7	1100	335	59.9	89.1
61SP4467	0.0467	0.153	0.183	4.6	1010	308	58.5	87.1
61SP4366	0.0366	0.120	0.184	4.7	1020	311	59.4	88.4
61SP4290	0.0290	0.0951	0.184	4.7	1040	317	59.9	89.1
61SP4231	0.0231	0.0758	0.184	4.7	1122	342	60.4	89.9
61SP4183	0.0183	0.0600	0.184	4.7	1080	329	61.2	91.1
61SP4145	0.0145	0.0476	0.184	4.7	1122	342	61.9	92.1
61SP4113	0.0113	0.0371	0.186	4.7	1008	307	64.5	96.0
61SC5651	0.00651	0.0214	0.187	4.7	1002	305	68.7	102.2
61SC5409	0.00409	0.0134	0.191	4.9	962	293	72.1	107.3
61SC5258	0.00258	0.00846	0.215	5.5	805	245	89.9	133.8
61SC5162	0.00162	0.00531	0.273	6.9	502	153	144.2	214.6
61SC5102	0.00102	0.00335	0.253	6.4	592	180	132.8	197.6
61SC6640	0.00064	0.00210	0.319	8.1	376	115	209.0	311.0

Table 4 Series 32 MI Cable (300 V, dual conductor)

Heating Cable Reference	Nominal Cable Resistance at 20°C		Approximate Cable Diameter		Maximum Unjointed Cable Length		Weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000m
32SF1110	11.0	36.1	0.130	3.3	2170	661	30.3	45.1
32SF2900	9.00	29.5	0.140	3.6	1900	579	35.1	52.2
32SF2750	7.50	24.6	0.157	4.0	1510	460	44.2	65.8
32SA2600	6.00	19.7	0.135	3.4	2040	622	33.1	49.3
32SA2400	4.00	13.1	0.146	3.7	1775	541	38.3	57.0
32SA2275	2.75	9.02	0.146	3.7	1775	541	38.9	57.9
32SA2200	2.00	6.56	0.180	4.6	1160	354	59.3	88.2
32SA2170	1.70	5.58	0.167	4.2	1010	308	51.0	75.9
32SB2114	1.14	3.74	0.184	4.7	1147	350	59.0	87.8
32SB3700	0.700	2.30	0.160	4.1	1475	450	48.0	71.4
32SQ3472	0.472	1.55	0.183	4.6	1125	343	57.5	85.6
32SQ3374	0.374	1.23	0.183	4.6	1125	343	57.7	85.9
32SQ3293	0.293	0.961	0.184	4.7	1122	342	58.7	87.4
32SQ3200	0.200	0.656	0.146	3.7	1775	541	39.4	58.6
32SQ3150	0.150	0.492	0.160	4.1	1458	444	47.9	71.3
32SQ3100	0.100	0.328	0.180	4.6	1160	354	61.6	91.7
32SP4734	0.0734	0.241	0.184	4.7	1122	342	60.4	89.9
32SP4583	0.0583	0.191	0.184	4.7	1122	342	61.3	91.2
32SP4458	0.0458	0.150	0.185	4.7	1110	338	63.2	94.1
32SC4324	0.0324	0.106	0.184	4.7	1060	323	58.8	87.5

Table 5 Series 62 MI Cable Specifications (600 V, dual conductor)

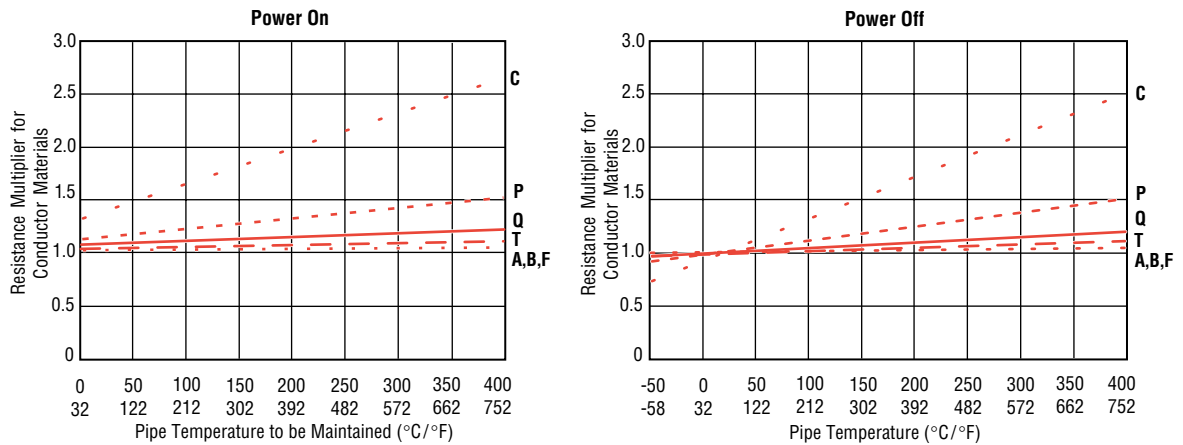
Heating Cable Reference	Nominal Cable Resistance at 20°C		Approximate Cable Diameter		Maximum Unjointed Cable Length		Weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000m
62SF1110	11.0	36.1	0.215	5.5	718	219	80.0	119.1
62SF2900	9.00	29.5	0.215	5.5	820	250	80.2	119.4
62SF2600	6.00	19.7	0.215	5.5	820	250	80.6	119.9
62SA2414	4.14	13.6	0.239	6.1	665	203	88.9	132.3
62SF2200	2.00	6.56	0.245	6.2	580	177	106.7	158.8
62ST2115	1.15	3.77	0.239	6.1	665	203	89.5	133.2
62SB3700	0.700	2.30	0.265	6.7	535	163	125.6	186.9
62SQ3505	0.505	1.66	0.234	5.9	640	195	85.5	127.2
62SQ3286	0.286	0.938	0.246	6.2	628	191	95.1	141.5
62SQ3200	0.200	0.656	0.245	6.2	615	187	106.0	157.7
62SQ3150	0.150	0.492	0.245	6.2	630	192	107.0	159.2
62SQ3100	0.100	0.328	0.265	6.7	520	158	127.3	189.4
62SP4775	0.0775	0.254	0.265	6.7	540	165	111.6	166.1
62SP4561	0.0561	0.184	0.278	7.1	480	146	123.5	183.8
62SP4402	0.0402	0.132	0.293	7.4	443	135	138.7	206.4
62SP4281	0.0281	0.0922	0.312	7.9	390	119	158.7	236.2
62SC4200	0.0200	0.0656	0.285	7.2	460	140	146.1	217.4
62SC4130	0.0130	0.0427	0.304	7.7	370	113	169.4	252.1
62SC5818	0.00818	0.0268	0.331	8.4	345	105	199.7	297.2
62SC5516	0.00516	0.0169	0.364	9.2	270	82	246.8	367.3
62SC5324	0.00324	0.0106	0.402	10.2	228	69	314.5	468.0
62SC5204	0.00204	0.00669	0.496	12.6	151	46	474.8	706.6
62SC5128	0.00128	0.00420	0.543	13.8	125	38	562.5	837.1

Ground-Fault Protection

Tyco Thermal Controls and national electrical codes require both ground-fault protection of equipment and a grounded metallic covering on all heating cables. The code makes an exception for MI cables which are fully embedded in concrete or sand (and asphalt in Canada). However, it is good practice and Tyco Thermal Controls strongly recommends that ground-fault protection be provided even when the code does not require it. Following are some of the ground-fault breakers that satisfy this equipment protection requirement: Square D Type QOB-EPD or QO-EPD; Raychem®/Square D Type GFPD EHB-EPD (277 Vac); Cutler Hammer (Westinghouse) Type QBGFEF.

Resistance Correction Factor

Various conductor materials behave differently. Use the graphs below for approximate adjustment of power and resistance as a function of temperature. For detailed design, use our design software or contact Tyco Thermal Controls for further assistance.



Alloy 825 Quick Reference Guide*

Alloy	Description	Nominal chemical composition, % (major elements)				Thermal conductivity Btu-in/ft ² -hr-°F (W/m-C)		High temperature resistance +1000°F (+540°C)		Corrosion resistance												
		Nickel (+Cobalt)	Iron	Chromium	Other	70°F (20°C)	1500°F (815°C)	Oxidation	Carburization	Sulfuric acid	Hydrochloric acid	Hydrofluoric acid	Phosphoric acid	Nitric acid	Organic acid	Alkalis	Salts	Seawater	Chloride cracking			
INCOLOY Alloy 825 nickel-iron-chromium	Excellent resistance to a wide variety of corrosives. Resists pitting and intergranular type corrosion, reducing acids and oxidizing chemicals	42.0	30.0	21.5	Mo 3.0 Cu 2.2	77 (11.1)	164 (23.6)	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E			

*From Huntington Alloys Publication 78-348-2