MI Heating Cable — Alloy 825

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0AT0
011A

Visit www.tycothermal.com for more information on our ten-year extended warranty.

Alloy 825 sheathed mineral insulated heating cable

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

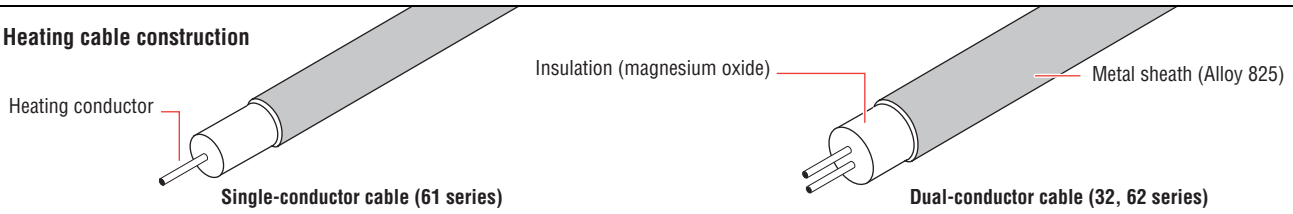
Pyrotenax brand MI heating cables provide solutions for industrial freeze protection and process-temperature maintenance applications. MI heating cable is also used where high power output, high exposure temperatures, or extreme resistance to environmental corrosives is needed.

MI heating cables can provide up to 61 watts per foot (200 watts per meter) of power output with area classification and design approvals. The maximum maintain temperature for MI heating cable is 1022°F (550°C) and the maximum exposure temperature for the heating cable is 1200°F (650°C). Higher temperature capabilities are available; please contact Tyco Thermal Controls for additional information.

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

For additional information, contact your Tyco Thermal Controls representative or call Tyco Thermal Controls at (800) 545-6258.

Heating cable construction



Application

Heat tracing in hazardous and nonhazardous areas for freeze protection and process temperature maintenance.

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)	61 W/ft (200 W/m)
	62 series (dual conductor, max. 600 V)	61 W/ft (200 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 TraceCalc Pro design software or contact Tyco Thermal Controls for design assistance. Higher power capabilities may also be available depending on the application. Contact Tyco Thermal Controls.

Temperature Rating

Maximum exposure temperature*

1200°F (650°C) Heating cable

1022°F (550°C) Hot/cold lead connection and splices

* Higher temperature capabilities are available; contact Tyco Thermal Controls for additional information.

Temperature ID number (T-Rating)

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

Approvals

Nonhazardous and Hazardous Locations

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

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

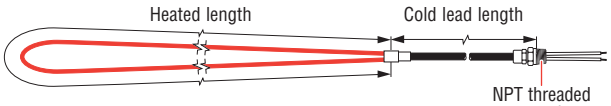
Zone 2

IEx
09-IEx-0010X
BR-Ex e II T1

Basic Heating Cable Design Configurations

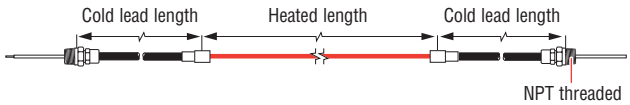
Heating cables are supplied as complete factory-fabricated assemblies consisting of a heated section joined to a length of nonheating cold lead section, preterminated and ready to fasten into a junction box with an NPT-threaded connector.

Design A



Design A: Single conductor cable (61 series only)

Design B

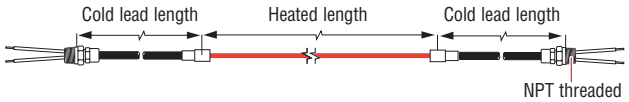


Design B: Single conductor cable (61 series only)

Design D

Design D: Dual conductor cable (32, 62 series only)

Design E



Design E: Dual conductor cable (32, 62 series only)

Heating Cable Catalog Number

To order an MI heating cable, it is important to understand the format of our catalog number.

A/61SA2200/40/538/208/7/S25A/X/N12

- Gland size (see Table 2)
- Cold joint "X" is standard for Alloy 825 heating cables
- Cold lead code (see Table 2)
- Cold lead length (in feet)
- Heating cable voltage
- Heating cable wattage
- Heating cable length (in feet)
- Heating cable reference (see Tables 3, 4, 5)
- Heating cable design configuration (A, B, D, E)

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/S25A/X/N12
Conversion from English to Metric units is: L(ft) x 0.3048 = L(m)
Conversion from Metric to English units is: L(m) x 3.2808 = L(ft)
For hazardous areas, specify class, group, and division.

Options

Add suffix "/PE" at the end of the catalog number for pulling eye (Design D cables only).

Add suffix "/RG1" at the end of the catalog number for 1" NPT reverse gland (used to make a watertight seal) for Designs A and D cables. Design D cables also available with 1/2" or 3/4" NPT reverse gland ("/RG34" for 3/4" or "/RG12" for 1/2").

Examples

D/62SQ3100/200/9920/480/3/S25A/X/N12
- 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 (0.9 m)
- Cold lead code is S25A
- 1/2-in NPT gland connector

E/32SQ3200/25.0M/870/120/2.1M/LS23A/X/N12
- 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 m (82 ft)
- Heating cable wattage is 870 W at 120 V
- Cold lead length is 2.1 m (7 ft)
- Cold lead code is LS23A
- 1/2-in NPT gland connector

Table 1 Heating Cable Reference Decoding

6 2 S F 2 2 0 0

Digit 1 2 3 4 5 6 7 8

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	A, B, C, F, P, Q, or T
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)	2200 = 2.00 Ω/cable foot at 20°C

Table 2 Alloy 825 Sheathed Cold Leads

Cold lead code for catalog number	Maximum voltage (V)	Maximum current (A)	Gland size (NPT)	Gland size reference for catalog number	Tail size (AWG)
Design A, D, E					
S25A	600	25	1/2"	N12	14
LS23A	300	23	1/2"	N12	14
S34A	600	34	3/4"	N34	10
S49A	600	49	3/4"	N34	8
S65A	600	65	3/4"	N34	6
Design B					
S29A	600	29	1/2"	N12	12
S40A	600	40	1/2"	N12	10
S48A	600	48	1/2"	N12	8
S66A	600	66	1/2"	N12	6
S86A	600	86	1/2"	N12	4

Table 3 Series 61 MI Heating Cable Specifications (600 V, Single Conductor)

Heating cable reference	Nominal cable resistance at 20°C		Approximate cable diameter		Maximum unjointed cable length		Nominal weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000 m
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	0.157	4.0	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	0.177	4.5	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	0.185	4.7	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	0.181	4.6	1100	335	59.9	89.1
61SP4467	0.0467	0.153	0.185	4.7	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	0.181	4.6	1122	342	60.4	89.9
61SP4183	0.0183	0.0600	0.184	4.7	1080	329	61.2	91.1

Table 3 Series 61 MI Heating Cable Specifications (600 V, Single Conductor)

Heating cable reference	Nominal cable resistance at 20°C		Approximate cable diameter		Maximum unjointed cable length		Nominal weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000 m
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	0.193	4.9	1002	305	68.7	102.2
61SC5409	0.00409	0.0134	0.201	5.1	962	293	72.1	107.3
61SC5258	0.00258	0.00846	0.220	5.6	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

Note: All Alloy 825 cold leads are terminated with stainless steel gland and 12-inch tails unless otherwise specified.
Other configurations available on request.

Table 4 Series 32 MI Heating Cable Specifications (300 V, Dual Conductor)

Heating cable reference	Nominal cable resistance at 20°C		Approximate cable diameter		Maximum unjointed cable length		Nominal weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000 m
32SF1110	11.0	36.1	0.126	3.2	2170	661	30.3	45.1
32SF2900	9.0	29.5	0.140	3.6	1900	579	35.1	52.2
32SF2750	7.5	24.6	0.154	3.9	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	0.177	4.5	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	0.185	4.7	1125	343	57.5	85.6
32SQ3374	0.374	1.23	0.185	4.7	1125	343	57.7	85.9
32SQ3293	0.293	0.961	0.185	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	0.181	4.6	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	0.181	4.6	1060	323	58.8	87.5

Table 5 Series 62 MI Heating Cable Specifications (600 V, Dual Conductor)

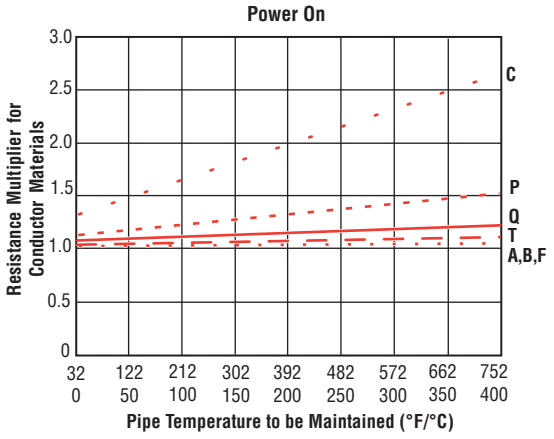
Heating cable reference	Nominal cable resistance at 20°C		Approximate cable diameter		Maximum unjointed cable length		Nominal weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000 m
62SF1110	11.0	36.1	0.205	5.2	718	219	80.0	119.1
62SF2900	9.00	29.5	0.215	5.5	820	250	80.2	119.4
62SF2600	6.00	19.7	0.215	5.5	820	250	80.6	119.9
62SA2414	4.14	13.6	0.228	5.8	665	203	88.9	132.3
62SF2200	2.00	6.56	0.248	6.3	580	177	106.7	158.8
62ST2115	1.15	3.77	0.224	5.7	665	203	89.5	133.2
62SB3700	0.700	2.30	0.268	6.8	535	163	125.6	186.9
62SQ3505	0.505	1.66	0.224	5.7	640	195	85.5	127.2
62SQ3286	0.286	0.938	0.236	6.0	628	191	95.1	141.5
62SQ3200	0.200	0.656	0.248	6.3	615	187	106.0	157.7
62SQ3150	0.150	0.492	0.248	6.3	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	0.252	6.4	540	165	111.6	166.1
62SP4561	0.0561	0.184	0.264	6.7	480	146	123.5	183.8
62SP4402	0.0402	0.132	0.280	7.1	443	135	138.7	206.4
62SP4281	0.0281	0.0922	0.295	7.5	390	119	158.7	236.2
62SC4200	0.0200	0.0656	0.295	7.5	460	140	146.1	217.4
62SC4130	0.0130	0.0427	0.311	7.9	370	113	169.4	252.1
62SC5818	0.00818	0.0268	0.343	8.7	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

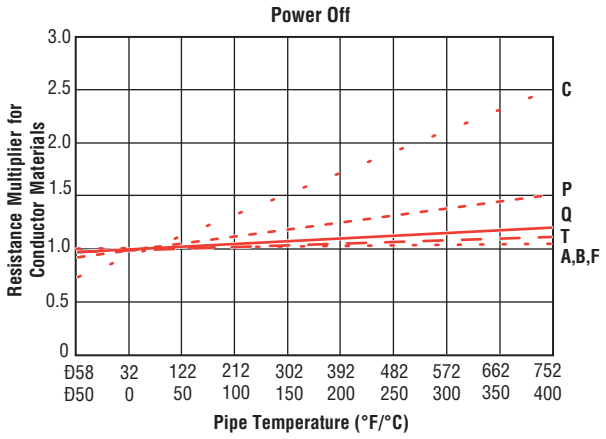
Ground-Fault Protection

To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with the requirements of Tyco Thermal Controls, agency certifications, and national electrical codes, ground-fault equipment protection must be used on each heating cable branch circuit. Arcing may not be stopped by conventional circuit protection. Many DigiTrace control and monitoring systems meet the ground-fault protection requirement.

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 TraceCalc Pro 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/ft²-hr-°F (W/m-C)		High temperature resistance +1000°F (+540°C)		Corrosion resistance **G-E** = Good to excellent **A** = Acceptable **NR** = Not recommended **X** = Check for specific data									
		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

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