

Pipe Freeze Protection



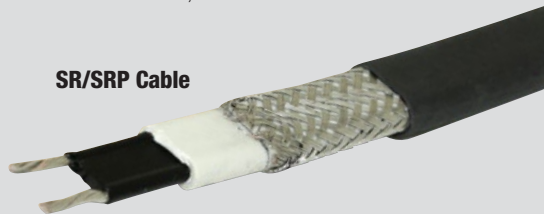
Pipe Freeze Protection Systems

King's Pipe Freeze Protection systems ensure that your pipes remain clear of ice and water continues to flow all winter long. Easy installation makes the process go quickly so you can be prepared long before winter arrives. Perfect for residential, commercial or industrial applications.

SRP Series Self-Regulating Pre-Assembled Heating Cable is designed for a variety of pipe freeze protection applications. The cable is constructed so that it will not burn out or overheat when overlapped and can be used on metal and plastic pipes. The cable is pre-terminated with a 30 inch cold lead.

SR Series Self-Regulating Heating Cable is designed for commercial and industrial pipe trace applications. The cable is constructed so that it will not burn out or overheat when overlapped, and can be used on metal and plastic pipes. The cable is available in 100 and 250 ft coils and also 500 and 1,000 ft reels.

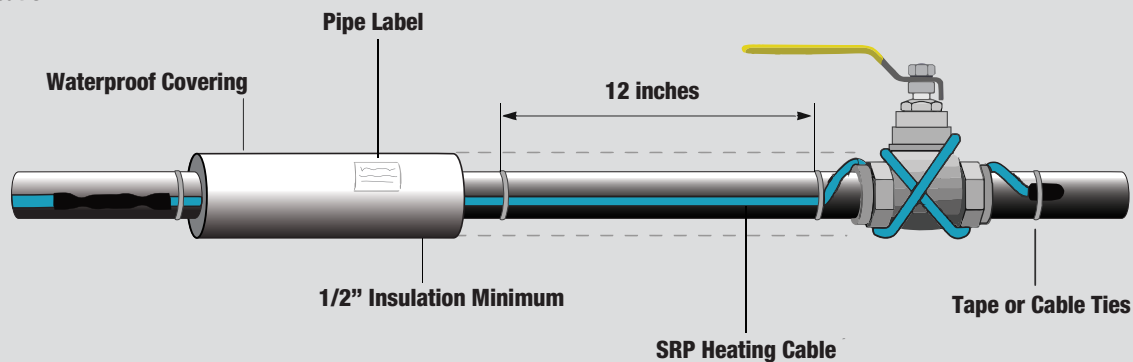
SR/SRP Cable



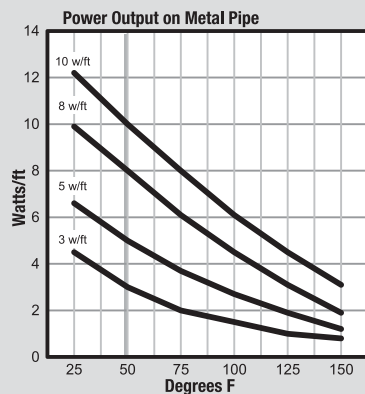
Cable Construction Table

Outer Jacket	Rugged Polyolefin UV Jacket
Outer Jacket (-CT)*	Fluoropolymer jacket
Ground Braid	Tinned copper
Inner Jacket	Flame retardent thermoplastic
Core	Self-regulating semi-conductive core
Bus Wire	16 gauge tinned copper
Bending Radius	1" (24mm)

SR/SRP Application



CT Self-Regulating Pipe Trace Cable



1,000 ft. Reel

Model Code:

SR	12	3	-1000	CT
A	B	C	D	E
A: Self Regulating Cable				
B: 12 - 120V				
24 - 240V				
C: Watts per foot				
D: Linear Length in feet				
E: FluoroPolymer Jacket				

Hazardous Locations

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

**Zone Approvals**

T5 or T6

CT self-regulating heating cables are designed for industrial and commercial freeze protection and process-temperature maintenance applications. CT cables maintain process temperatures up to 150°F (65°C) and can withstand intermittent exposure to temperatures up to 185°F (85°C). The heating cables are configured for use in nonhazardous and hazardous locations, including areas where corrosives may be present.

CT Self-Regulating Heating Cable Features

- For both hazardous and non-hazardous locations
- Stops pipe and valve freeze down to -40F

- Cable will not overheat or burn out when overlapped
- Suitable for use on metal and plastic pipes
- 10 year warranty

AVAILABLE LENGTHS

	VOLTS	PIPE RATING** WATTS/FT.	1000 FT. LENGTH MODEL / UPC	WEIGHT/FT.
120V	120	3	SR123-1000-CT / 40375	0.080 LBS./FT.
	120	5	SR125-1000-CT / 40377	0.080 LBS./FT.
	120	8	SR128-1000-CT / 40379	0.080 LBS./FT.
	120	10	SR1210-1000-CT / 40428	0.080 LBS./FT.
240V	240*	3	SR243-1000-CT / 40376	0.080 LBS./FT.
	240*	5	SR245-1000-CT / 40378	0.080 LBS./FT.
	240*	8	SR248-1000-CT / 40380	0.080 LBS./FT.
	240*	10	SR2410-1000-CT / 40382	0.080 LBS./FT.

*Approved for 208, 220, 240, 277 volt operation, refer to wattage adjustment tables for output rating. (See Page 19, Table 4)

**Wattage rating for pipe freeze protection application is determined at 50°F (10°C).

***Also rated for Roof/Gutter De-Icing. Wattage rating is 8 w/Ft determined at 32°F (0°C).

Controls and thermostats should always be used with King heating cable systems.

CT ACCESSORIES FOR NON HAZARDOUS APPLICATIONS

SRK00	Hard wired power connection kit, includes end seal
SRK02	connection kit, includes end seal
SRK03	Pipe trace tape (66 ft) and 10 labels per pack
SRK04	2.5" x 50 yards 2 Mil foil tape
SRK08	Plug in 120V connection kit with GFEP device, includes end seal
SRK10	Weatherproof splice/tee kit, includes end seal
SRK12	End seal kit (2 per package)
SRK17	11 & 13mm Gel end seal
SRK18	Lighted end seal, 85-277V

CT ACCESSORIES FOR HAZARDOUS APPLICATIONS

CT-9002	CT square box
CT-9003	CT splice connection
CT-9004	CT tee connection
CT-9005	CT end seal



CT-9002



CT-9003



CT-9004



CT-9005

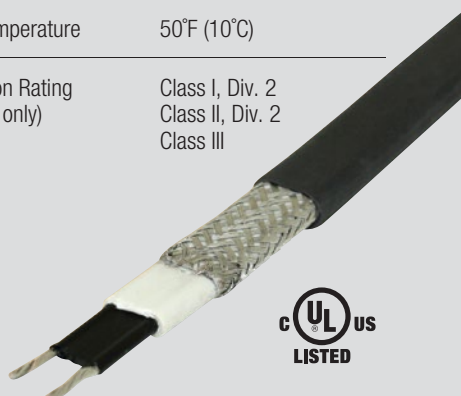


Charts & Tables SR Pipe Trace Cable

Technical Data Table

Maximum operating temperature	150°F (65°C)
Maximum exposure temperature	185°F (85°C)
Minimum installation temperature	-40°F (-40°C)
Minimum bending radius	1" (24mm)
Dimensions	0.496" x 0.236" (12.6mm x 6mm)
Service Voltage	110V-120V, 208V-277V
Wattage rating temperature	50°F (10°C)
Hazardous Location Rating (-CT Outer Jacket only)	Class I, Div. 2 Class II, Div. 2 Class III

For Pipe Freeze Protection



Heating Cable Selection for Pipe Freeze Protection

Pipe	Type	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	60'	65'	70'	75'	80'	85'	90'	95'	100'	125'	150'	175'	200'
1/2"	M	A	B	C	D	E	E	E	F	F	F	G	G	H	H	H	I	I	J	J	J	K	L	M	N
	P	A	B	C	D	E	E	F	F	F	G	G	H	H	H	I	I	J	J	J	K	L	M	N	-
1"	M	A	B	C	D	E	E	E	F	F	F	G	G	H	H	H	I	I	J	J	J	K	L	M	N
	P	B	B	C	D	E	E	F	F	F	G	G	H	H	H	I	I	J	J	J	K	L	M	N	-
1 1/2"	M	A	B	C	D	E	E	E	F	F	F	G	G	H	H	H	I	I	J	J	J	K	L	M	N
	P	B	C	D	E	E	F	F	F	G	G	H	H	H	I	I	J	J	J	K	K	M	N	-	-
2"	M	A	B	C	D	E	E	E	F	F	G	G	H	H	H	I	I	J	J	J	K	L	M	N	-
	P	B	C	E	E	F	G	H	H	I	J	J	K	K	L	L	L	M	M	M	N	-	-	-	-
2 1/2"	M	A	C	C	D	E	F	F	F	G	G	H	H	I	I	J	J	K	K	K	K	L	N	-	-
	P	B	D	E	F	G	H	I	J	K	K	L	L	M	M	N	N	-	-	-	-	-	-	-	-

A	B	C	D	E	F	G	H	I	J
SRP126-6	SRP126-12	SRP126-18	SRP126-24	SRP126-37.5	SRP126-50	SRP126-62.5	SRP126-75	SRP126-87.5	SRP126-100
SRP246-6	SRP246-12	SRP246-18	SRP246-24	SRP246-37.5	SRP246-50	SRP246-62.5	SRP246-75	SRP246-87.5	SRP246-100
						K	L	M	N
						SRP126-125	SRP126-150	SRP246-175	SRP246-200
						SRP246-125	SRP246-150		

M = Metal Pipe / P = Plastic Pipe

Add 1 foot to the cable length for each valve or spigot.

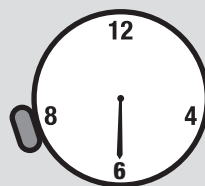
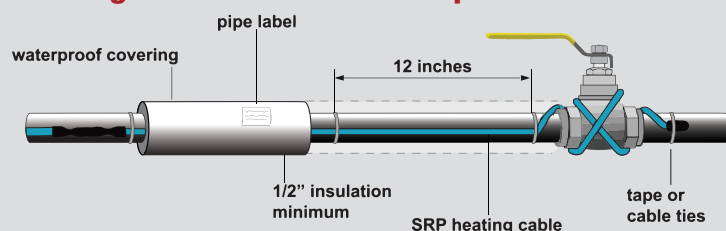
Chart is based on the lowest outside temperature of 0°F (-18°C)

with a minimum of 1/2" thick fiberglass insulation. Use 1" insulation for protection down to -20°F (-29°C).

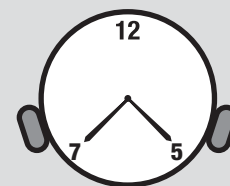


Charts & Tables SR Pipe Trace Cable

Heating Cable Selection for Pipe Freeze Protection



Single Cable Location



Double Cable Location

For a single cable, run it straight along the bottom of the pipe in the 4 or 8 o'clock position. If two cables are required, attach them at the 4 and 8 o'clock positions as shown in the figure above.

Use Table 1 to select the cable size for metal pipes and use Table 2 for plastic pipes. Read across the table to find the pipe size, then drop down to the row corresponding to the design air temperature and the thickness of the insulation that will be used. The cell that intersects will give the power (watts/ft.) of the heating cable required, it may also have a (2) in the cell which means 2 cables are required.

Table 1 - SR Cable Selection for Metal Pipes (w/ft.)¹

Lowest Air Temp.	Insulation Thickness	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"
0°F (-18°C)	1/2"	3	3	3	3	5	5	5	5	8	8	10
	1"	3	3	3	3	3	3	3	5	5	8	8
	1-1/2"	3	3	3	3	3	3	3	3	5	5	5
	2"	3	3	3	3	3	3	3	3	3	5	5
-20°F (-29°C)	1/2"	3	5	5	5	5	5	8	8	10	10	*
	1"	3	3	3	3	3	5	5	5	8	8	10
	1-1/2"	3	3	3	3	3	3	3	5	5	8	8
	2"	3	3	3	3	3	3	3	3	5	5	8
-40°F (-40°C)	1/2"	5	5	5	5	8	8	10	(2) 8	(2) 8	(2) 10	*
	1"	3	3	3	5	5	5	8	8	8	10	(2) 8
	1-1/2"	3	3	3	3	3	5	5	5	8	8	10
	2"	3	3	3	3	3	3	3	5	5	8	8
	3"	3	3	3	3	3	3	3	3	3	5	5

Table 2 - SR Cable Selection for Plastic Pipes (w/ft.)¹

Lowest Air Temp.	Insulation Thickness	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"
0°F (-18°C)	1/2"	3	5	5	5	8	8	8	10	(2) 8	(2) 10	*
	1"	3	3	3	5	5	5	5	5	5	8	8
	1-1/2"	3	3	3	3	3	3	5	8	8	8	10
	2"	3	3	3	3	3	3	3	5	5	8	8
-20°F (-29°C)	1/2"	5	5	8	8	10	10	(2) 8	(2) 8	(2) 10	*	*
	1"	3	3	5	5	5	8	8	8	10	(2) 8	(2) 10
	1-1/2"	5	5	5	5	5	5	5	8	8	10	(2) 8
	2"	3	3	3	3	3	5	5	5	8	8	10
-40°F (-40°C)	1/2"	8	8	8	8	10	10	(2) 8	(2) 10	*	*	*
	1"	5	5	5	8	8	8	10	10	(2) 8	*	*
	1-1/2"	5	5	5	5	5	8	8	8	10	(2) 8	(2) 10
	2"	5	5	5	5	5	5	5	8	8	10	(2) 8
	3"	3	3	5	5	5	5	5	5	5	8	10

1. Tables are based on using fiberglass insulation or equivalent while maintaining a 40°F (4°C) pipe temperature with a 10% safety factor and 20 mph wind speed.

*Contact King for proper cable selection.

Charts & Tables SR Pipe Trace Cable

SR Heating Cable Selection and Design

CALCULATE THE TOTAL HEATING CABLE LENGTH

$$\text{Cable length} = A+B+C+D+E+F$$

- A. Pipe length x number of cables
- B. 4 ft. x number of valves
- C. 2 ft. x number of flanges, supports, etc.
- D. 1 ft. for each power connection
- E. 2 ft. for each splice connection
- F. 3 ft. for each tee connection

= Total heating cable length

MAXIMUM CIRCUIT LENGTH ALLOWED

Ensure that your circuits do not exceed the maximum circuit length listed in table 3. If necessary, use additional shorter circuits

EXAMPLE

Pipe Size: 2" metal pipe

Lowest air temp: -20°F

Insulation thickness: 1"

Cable selection: (1) 5w/ft. (from table 1)

Pipe length: 80 ft.

Valves: 2

Pipe supports: 12

Power connections: 1

Splice connections: 1

HEATING CABLE REQUIRED

A. Pipe length x number of cables

B. 4 ft. x number of valves

C. 2 ft. x number of flanges, supports, etc.

D. 1 ft. for each power connection

E. 2 ft. for each splice connection

F. 3 ft. for each tee connection

80 ft. x 1 = 80 ft.

4 ft. x 2 = 8 ft.

2 ft. x 12 = 24 ft.

1 ft. x 1 = 1 ft

1 ft. x 1 = 1 ft

3 ft. x 0 = 0 ft

= Total heating cable length

114 ft.

Table 3 - Maximum Single Cable Length

Model	Volts	Watts/ft	Maximum Single Run Length
SR123	120V	3 w/ft.	318 ft. (96M)
SR243	240V	3 w/ft.	636 ft. (193M)
SR125	120V	5 w/ft.	246 ft. (75M)
SR245	240V	5 w/ft.	499 ft. (152M)
SR128	120V	8 w/ft.	197 ft. (60M)
SR248	240V	8 w/ft.	394 ft. (120M)
SR1210	120V	10 w/ft.	174 ft. (53M)
SR2410	240V	10 w/ft.	344 ft. (104M)

Table 4 - Wattage Adjustment (w/ft.)

Model	240V	208V	220V	277V
SR243	3.0	2.5	2.7	3.4
SR245	5.0	4.3	4.6	5.5
SR248	8.0	7.0	7.44	8.6
SR2410	10.0	9.0	9.4	10.5

The maximum length of a single cable run is noted in Table 3 and cannot be exceeded. If the application requires a longer cable run, then multiple cables and additional power circuits must be used.

When using 240 volt SR cable on 208, 220 or 277 volt applications, the power output (wattage) must be adjusted. Refer to Table 4 for the adjusted watts/ft. of the cable when operated at a voltage other than 240 volt.

Circuit protection depends on the length of cable required and the start-up temperature since the cable will draw more power (wattage) when cold. Multiple cables can be run from a single power circuit up to a maximum combined length as noted in Table 5. Larger amperage circuit breakers can handle longer combined cable lengths, but the maximum length for a single cable run does not change. The NEC requires the use of ground fault protection breakers for heating cable.

NOTE: 240 volt cable lengths in Table 5 are also good for 208, 220 and 277 volt.

Table 5 - Circuit Protection Per Combined Cable Length for Pipe Freeze Protection

Cable	Volts	Start up Temp.	15 Amp (ft.)	20 Amp (ft.)	30 Amp (ft.)	40 Amp (ft.)
SR123 3 w/ft.	120V	50°F (10°C)	318	318	318	318
		0°F (-18°C)	265	274	274	274
		-20°F (-29°C)	258	258	258	258
SR125 5 w/ft.	120V	50°F (10°C)	246	246	246	246
		0°F (-18°C)	199	218	218	218
		-20°F (-29°C)	175	205	205	205
SR128 8 w/ft.	120V	50°F (10°C)	164	197	197	197
		0°F (-18°C)	126	167	173	173
		-20°F (-29°C)	112	148	162	162
SR1210 10 w/ft.	120V	50°F (10°C)	120	160	174	174
		0°F (-18°C)	92	122	153	153
		-20°F (-29°C)	83	109	146	146
SR243 3 w/ft.	240V	50°F (10°C)	636	636	636	636
		0°F (-18°C)	548	548	548	548
		-20°F (-29°C)	515	515	515	515
SR245 5 w/ft.	240V	50°F (10°C)	499	499	499	499
		0°F (-18°C)	398	437	437	437
		-20°F (-29°C)	351	410	410	410
SR248 8 w/ft.	240V	50°F (10°C)	328	394	394	394
		0°F (-18°C)	252	334	345	345
		-20°F (-29°C)	225	296	325	325
SR2410 10 w/ft.	240V	50°F (10°C)	240	320	344	344
		0°F (-18°C)	184	244	306	306
		-20°F (-29°C)	166	219	292	292

SR/SRP Pipe Freeze Protection Accessories



SRK00 Hard Wire Power Connection Kit

Contains labels, pipe mounting bracket, box connector, wire nuts and heat shrink tubing to make electrical supply connection to a metal junction box. Includes one end seal.



SRK02 Connection Kit

Contains heat shrink tubing and woven braid
Also includes one end seal.



SRK10 Splice and Tee Kit

Contains heat shrink tubing and other materials to make one splice or one tee connection
Also includes one end seal.



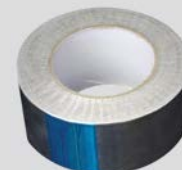
SRK08 Plug in 120V Connection Kit with GFCI Device

Contains labels, GFCI protection device with 120V plug, cable ties, crimp type connectors, heat shrink tubing and labels.
Includes one end seal.



SRK12 End Seal Kit

Contains heat shrink tubing and other materials to make two end seals.



SRK04

2.5" x 50 yards 2 mil foil tape.



SRK03 Tape

Pipe trace tape and labels.



IFC12

Plug in fixed thermostat



TRF115-005

Freeze Protection Thermostat



SRK17

11 & 13mm Gel end seal



SRK18

Lighted end seal

MODEL	UPC	DESCRIPTION	WEIGHT
SRK00	40462	Hard wired power connection kit, includes end seal	0.3 lbs.
SRK02	40461	Connection kit, includes end seal	0.3 lbs.
SRK03	40464	Pipe trace tape (66ft) and 10 labels per package	1.0 lbs.
SRK04	61713	2.5" x 50 yards 2 mil foil tape	1.6 lbs.
SRK08	40466	Plug in 120V connection kit with GFCI device, includes end seal	1.0 lbs.
SRK10	40468	Weatherproof splice/tee kit, includes end seal	0.2 lbs.
SRK12	40470	End seal kit (2 per package)	0.1 lbs.
SRK17	40477	11 & 13mm Gel end seal	0.1 lbs.
SRK18	40512	Lighted end seal, 85-277V	0.3 lbs.
IFC12	40490	Plug in fixed thermostat, 120V, 15 amp, on at 35°F off at 45°F (12/case)	0.3 lbs.
TRF-115-005	40486	Freeze protection thermostat, weatherproof with 5 ft. remote bulb & capillary, 25 amp at 120/208/240V, 22 amp at 277V, adjustable temp 0°F, suitable for 24 VAC operation (w/Power-On indicator light)	0.3 lbs.

PYRO Freeze Protection Controller

PYRO FPC Freeze Protection Controller



FPC-02-120



PYRO FPC Freeze Protection Controller

Freeze Protection Controller and a Power panel for heat tracing, ice and snow melt applications.

When the temperature drops below the pre-defined, adjustable set-points, the contactor is activated energizing the heating elements. The Technician Settings mode enables an installer, or a technician to adjust the parameters for customized installations using the electronic controller installed in the front panel.

- Up to 30A & 120/240V outputs to the heaters
- Hold-On (Time delay) adjustable range of up to 99 hours
- Temperature input from the provided temperature sensor (10 m. / 30 feet long) and also from a 3rd party aquastat
- Integrated electronic controller with backlit LCD display
- Integral 30mA GFEP allows manual reset from the front panel
- Adjustable Set-points, Hold ON/OFF Time delay and manual ON duration
- Manual and Automatic modes, selected by a button
- Testing/commissioning mode for easy and fast system test, all year long (even during summer or at high temperature condition)
- Multiple sensors input-optional
- ETL listed

MODEL	UPC	Item	Description
FPC-02-120	19112	Pyro FPC Freeze Protection Controller	Freeze Protection Controller 120V, 30A, w/GFEP
FPC-02-240	19113	Pyro FPC Freeze Protection Controller	Freeze Protection Controller 240V, 30A, w/GFEP

**Controls and thermostats should always be used with King heating systems.



PYRO Pipe Trace System



**Innovative Zone Based Control System For Pipe Trace Heating Cable.
The Ultimate Controller For Industrial, Commercial and Residential.**



PYROBOX3C/19-TRACE



PYROCON19-TRACE

PYRO Pipe Trace System

The unique staggering feature of the PYRO TRACE control keeps pipes from freezing, without the need to upgrade the power supply on site. Use a high demand heating system on a limited power supply by controlling up to 3 different zones. The modular design allows customers to choose the right configuration for the specific property needs.

Enables use of high demand heating system on a limited power supply source. Modular: Up to 3 circuits/contactors. Up to 600v & 300A Sequence of zoning 1/2 + auxiliary (such as gutter sensor). Suitable for parallel, star & triangle connection. North American consideration operating algorithm.

- Adjustable temperature sensor
- Interface provided for B.M.S. and SmartHome using Bacnet or ModBus over RS485 communication wires
- Adjustable cycle time between zones
- Adjustable delay (Hold on Time)
- Adjustable on and off
- Logical setting for installer / set up & service
- Second input for temperature switch
- User friendly programming and adjusting
- Integrated Fault Detector. GFCI non class A
- Adjustable trip setting
- Non obtrusive adjustable snow sensor
- Electrical and Hydronic freezing applications
- Manual mode

MODEL	UPC	Item	Description
PYROBOX3C/19-TRACE	33768	Power Box 3C/19 Trace	2 Zone Controller, 2-50A/3P Contactors, 3-Phase, 600V Max +1 Zone Aux Controller, 1-30A/2P Contactor, 1-Phase, 300V Max
PYROCON19-TRACE	33763	Main Controller	Controller and User Interface panel

PYROBOX units are complete with PYROCON12 TRACE controller and PYROULS.

**Controls and thermostats should always be used with King heating systems.