



Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
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Date: 2/4/2025

Return Request: 2/14/2025

Project: City Of Sherwood Public Works (Maintenance Building)

Supplier: Fluid Solutions

Manufacturer: Nelson

Submittal: Heat Trace

Submittal Number: 23 05 33-01

Drawing # and Installation: Mechanical Drawings

ARCHITECT

Cromwell
1300 East 6th Street
Little Rock, AR 72202
501-372-2900

ENGINEER

Cromwell
1300 East 6th Street
Little Rock, AR 72202
501-372-2900

GENERAL CONTRACTOR

Baldwin & Shell
1000 W. Capitol Ave.
Little Rock, AR 72201
501-374-8677

MECHANICAL SUBCONTRACTOR

Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

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CSUSA PROJECT NO.

24-6084

sean@comfortar.com

9924 Landers Rd.
No. Little Rock, AR 72117



SUBMITTAL DATA

Date: December 5, 2024
Project: Sherwood Public Works
Contractor: Comfort Systems

HEAT TRACE

Nelson LT heat trace including thermostat, power connection kit, wrapping tape, and warning signs.

6815 Dewaffelbaker Dr., Maumelle, AR 72113

Phone (501) 663-8886 • Fax (501) 663-8738

www.fluidsolutionsinc.com

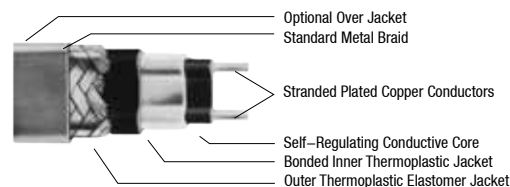
Type LT Self-Regulating Heater Cable

For use in Ordinary and Hazardous (Classified) Locations

UL: -CB, JT or -J options: Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class I, Zone 1, AEx e II	UL: -D1 option: Class I, Division 1, Groups B, C, D; Class II, Division 1, Groups E, F, G; Class III	CSA: -CB, -JT or -J options: Class I, Division 2, Groups B, C, D; Class II, Division 2, Groups E, F, G; Class III; Class 1, Zone 2, Group IIB+H2	CSA: -J option: Class I, Division 1, Groups B, C, D; Class II, Division 1, Groups E, F, G; Class I, Zone 1, Group IIB, Zone 1, Ex e II T6 (T5)	FM: -CB, -JT or -J options: Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class III	FM: -J option: Class I, Zone 1 AEx e II; Group IIC	FM: -D1 option: Class I, Division 1, Groups B, C, D
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Operating Principle

- The parallel bus wires apply voltage along the entire length of the heater cable.
- The conductive core provides an infinite number of parallel conductive paths permitting the cable to be cut to any length in the field with no dead or cold zones developing.
- The heater cable derives its self regulating characteristic from the inherent properties of the conductive core material.
- As the core material temperature increases, the number of conductive paths in the core material decrease, automatically decreasing the heat output.
- As the temperature decreases, the number of conductive paths increase, causing the heat output to increase.
- This occurs at every point along the length of the cable, adjusting the power output to the varying conditions along the pipe.
- The self regulating effect allows the cable to be overlapped without creating hot spots or burnout.
- As the cable self-regulates its heat output, it provides for the efficient use of electric power, producing heat only when and where it is needed, and also limiting the maximum sheath temperature.



Accessories

- Nelson AX Series Connection Kits for Power, Splice, Tee Splice, Powered Splices and End Terminations
- Nelson HASK Series Division 1 Connection Kits for Power, Splice, Tee Splice and End Terminations
- Nelson EX Series Zone 1 Connection Kits for Power, Splice, Tee Splice and End Terminations
- Nelson TA, TH, TE and HC Series Thermostats and Contactors
- Junction Boxes, Tapes and Warning Signs
- Custom Control, Monitoring and Power Panels

Description

- Nelson Type LT self-regulating heater cable is a parallel circuit electric heater strip.
- An irradiation cross-linked conductive polymer core material is extruded over the multi stranded, tin-plated, 16 gauge copper bus wires.
- The conductive core material increases or decreases its heat output in response to temperature changes.
- Two jackets provide extra dielectric strength, moisture resistance, and protection from impact and abrasion damage.
- The inner thermoplastic jacket is extruded over and bonded to the core material.
- A thermoplastic elastomer over jacket is then extruded over the inner jacket.
- A stranded tinned copper metal braid is supplied on all heaters.
- An optional over jacket (fluoropolymer or modified polyolefin) can be specified when the heater cable is to be installed in wet or corrosive environments.
- The base product is supplied with a tinned copper metal braid that may be used in both general applications and in dry, non corrosive hazardous (classified) areas.

Application

- Nelson's Type LT self regulating heater cable is ideal for use in maintaining fluid flow under low ambient conditions.
- Freeze protection and low watt density process temperature systems such as product pipelines, fire protection, process water, dust suppression systems, lube oil, condensate return, hot water and structure anti-icing are typical applications for this product.

Type LT Self-Regulating Heater Cable

For use in Ordinary and Hazardous (Classified) Locations

UL:
-CB, -JT or -J
options: Class I,
Division 2, Groups
A, B, C, D; Class II,
Division 2, Groups
F, G; Class I, Zone
1, AEx e II

UL:
-D1 option: Class I,
Division 1, Groups
B, C, D; Class II,
Division 1, Groups
E, F, G; Class III

CSA:
-CB, -JT or -J
options: Class I,
Division 2, Groups
B, C, D; Class II,
Division 2, Groups
E, F, G; Class III;
Class 1, Zone 2,
Group IIB+H2

CSA:
-J option: Class I,
Division 1, Groups
B, C, D; Class II,
Division 1, Groups
E, F, G; Class I,
Zone 1, Group IIB,
Zone 1, Ex e II T6
(T5)

FM:
-CB, -JT or -J
options: Class I,
Division 2, Groups
A, B, C, D; Class II,
Division 2, Groups
F, G; Class III

FM:
-J option: Class
I, Zone 1 AEx e II;
Group IIC

FM:
-D1 option: Class I,
Division 1, Groups
B, C, D

Performance Rating

Service Voltage	Maximum Maintenance Temperature °C (°F)	Maximum Intermittent Exposure °C (°F)	Watts/M (Watts/Ft)	T-Rating ①
120	65 (150)	85 (185)	10 (3)	T6
240				
120	65 (150)	85 (185)	16 (5)	T6
240				
120	65 (150)	85 (185)	26 (8)	T5
240				
120	65 (150)	85 (185)	33 (10)	T5
240				

Circuit Breaker Selection

Max. Length in Meters (Feet) Vs. Circuit Breaker Size										
Watts/M (Watts/Ft)	Start-Up Temp. °C (°F)	120 VAC				240 VAC				
		15A	20A	30A	40A	15A	20A	30A	40A	50A
10 (3)	10 (50)	100 (320)	115 (370)	115 (370)	115 (370)	190 (630)	225 (740)	225 (740)	225 (740)	225 (740)
	-18 (0)	65 (220)	90 (290)	115 (370)	115 (370)	140 (465)	175 (580)	225 (740)	225 (740)	225 (740)
	-29 (-20)	60 (195)	80 (260)	115 (370)	115 (370)	115 (385)	155 (515)	225 (740)	225 (740)	225 (740)
16 (5)	10 (50)	65 (220)	85 (280)	85 (280)	85 (280)	135 (445)	170 (560)	170 (560)	170 (560)	170 (560)
	-18 (0)	45 (150)	60 (200)	85 (280)	85 (280)	90 (300)	120 (400)	170 (560)	170 (560)	170 (560)
	-29 (-20)	40 (135)	55 (175)	80 (265)	85 (280)	80 (265)	105 (350)	160 (525)	170 (560)	170 (560)
26 (8)	10 (50)	45 (150)	65 (205)	70 (225)	70 (225)	90 (300)	120 (400)	135 (450)	135 (450)	135 (450)
	-18 (0)	30 (105)	45 (140)	65 (215)	70 (225)	65 (210)	85 (285)	130 (425)	135 (450)	135 (450)
	-29 (-20)	30 (95)	40 (125)	60 (190)	70 (225)	60 (190)	80 (255)	115 (380)	135 (450)	135 (450)
33 (10)	10 (50)	40 (125)	50 (165)	60 (200)	60 (200)	75 (250)	100 (335)	120 (400)	120 (400)	120 (400)
	-18 (0)	25 (90)	40 (125)	55 (185)	60 (200)	55 (185)	75 (245)	110 (365)	120 (400)	120 (400)
	-29 (-20)	25 (85)	35 (110)	50 (165)	60 (200)	50 (165)	65 (220)	100 (330)	120 (400)	120 (400)

① Electrical equipment T rating codes define the maximum surface temperature that equipment will reach. It is used in hazardous (classified) area applications.

Notes

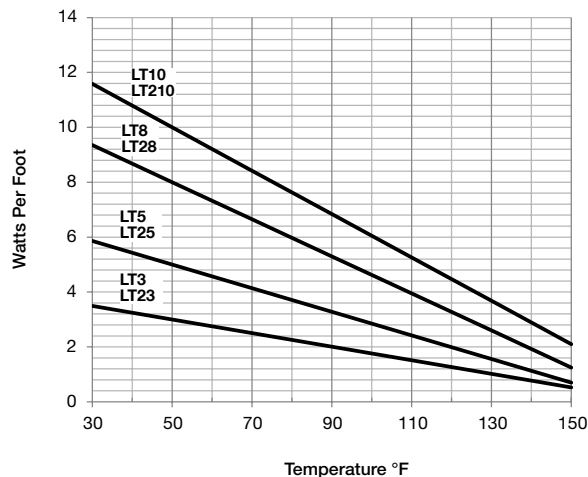
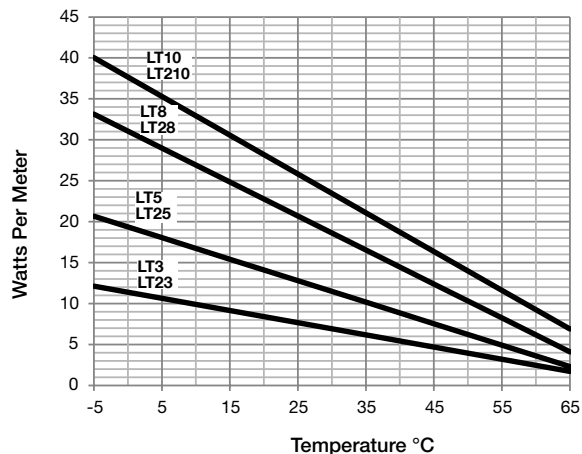
1. Circuit breakers are sized per national electrical codes.
2. When using 240 volt product at 208, 220 or 277 volts, use the circuit adjustment factors shown in the Voltage Adjustment Table.
3. When using 2 or more heater cables of different wattage ratings in parallel on a single circuit breaker, use the 15A column amperage of 15 amps, divide it by the maximum footage to arrive at an amps/foot figure for each cable. You can then calculate circuit breaker sizes for these combination loads. These amps foot factors include the 125% sizing factor.
4. National electrical codes require ground-fault equipment protection for each branch circuit supplying electric heating equipment. Exceptions to this requirement can be found in the N.E.C.
5. Heater cables with D1 optional construction require the use of ground fault interrupter/ground leakage device with a trip setting no greater than 30mA.

Type LT Self-Regulating Heater Cable

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UL: -CB, JT or -J options: Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class I, Zone 1, AEx e II	UL: -D1 option: Class I, Division 1, Groups B, C, D; Class II, Division 1, Groups E, F, G; Class III	CSA: -CB, -JT or -J options: Class I, Division 2, Groups B, C, D; Class II, Division 2, Groups E, F, G; Class III; Class 1, Zone 2, Group IIB+H2	CSA: -J option: Class I, Division 1, Groups B, C, D; Class II, Division 1, Groups E, F, G; Class I, Zone 1, Group IIB, Zone 1, Ex e II T6 (T5)	FM: -CB, -JT or -J options: Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class III	FM: -J option: Class I, Zone 1 AEx e II; Group IIC	FM: -D1 option: Class I, Division 1, Groups B, C, D
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Power Output Rating



Type LT Self-Regulating Heater Cable

For use in Ordinary and Hazardous (Classified) Locations

UL: -CB, JT or -J options: Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class I, Zone 1, AEx e II	UL: -D1 option: Class I, Division 1, Groups B, C, D; Class II, Division 1, Groups E, F, G; Class III	CSA: -CB, -JT or -J options: Class I, Division 2, Groups B, C, D; Class II, Division 2, Groups E, F, G; Class III; Class 1, Zone 2, Group IIB+H2	CSA: -J option: Class I, Division 1, Groups B, C, D; Class II, Division 1, Groups E, F, G; Class I, Zone 1, Group IIB, Zone 1, Ex e II T6 (T5)	FM: -CB, -JT or -J options: Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class III	FM: -J option: Class I, Zone 1 AEx e II; Group IIC	FM: -D1 option: Class I, Division 1, Groups B, C, D
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Selection Table

Service Voltage	Maximum Segment Length Meters (Feet)	Description	Catalog Number
120	115 (370)	Tinned Copper Braid	LT3-CB
		Tinned Copper Braid and Fluoropolymer	LT3-J
		Tinned Copper Braid and Modified Polyolefin	LT3-JT
		Class 1, Division 1, Groups B, C and D	D1-LT3
240	225 (740)	Tinned Copper Braid	LT23-CB
		Tinned Copper Braid and Fluoropolymer	LT23-J
		Tinned Copper Braid and Modified Polyolefin	LT23-JT
		Class 1, Division 1, Groups B, C and D	D1-LT23
120	85 (280)	Tinned Copper Braid	LT5-CB
		Tinned Copper Braid and Fluoropolymer	LT5-J
		Tinned Copper Braid and Modified Polyolefin	LT5-JT
		Class 1, Division 1, Groups B, C and D	D1-LT5
240	170 (560)	Tinned Copper Braid	LT25-CB
		Tinned Copper Braid and Fluoropolymer	LT25-J
		Tinned Copper Braid and Modified Polyolefin	LT25-JT
		Class 1, Division 1, Groups B, C and D	D1-LT25
120	70 (225)	Tinned Copper Braid	LT8-CB
		Tinned Copper Braid and Fluoropolymer	LT8-J
		Tinned Copper Braid and Modified Polyolefin	LT8-JT
		Class 1, Division 1, Groups B, C and D	D1-LT8
240	135 (450)	Tinned Copper Braid	LT28-CB
		Tinned Copper Braid and Fluoropolymer	LT28-J
		Tinned Copper Braid and Modified Polyolefin	LT28-JT
		Class 1, Division 1, Groups B, C and D	D1-LT28
120	60 (200)	Tinned Copper Braid	LT10-CB
		Tinned Copper Braid and Fluoropolymer	LT10-J
		Tinned Copper Braid and Modified Polyolefin	LT10-JT
		Class 1, Division 1, Groups B, C and D	D1-LT10
240	120 (400)	Tinned Copper Braid	LT210-CB
		Tinned Copper Braid and Fluoropolymer	LT210-J
		Tinned Copper Braid and Modified Polyolefin	LT210-JT
		Class 1, Division 1, Groups B, C and D	D1-LT210

Type LT Self-Regulating Heater Cable

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Voltage Adjustment ①

Absolute Max Length Meters (Feet)	Adjustment Multiplier						Product
	208 VAC		220 VAC		277 VAC		
	Power	Length	Power	Length	Power	Length	
225 (740)	0.76	0.93	0.85	0.96	1.27	1.07	LT23
170 (560)	0.79	0.93	0.87	0.96	1.24	1.07	LT25
135 (450)	0.84	0.93	0.90	0.96	1.19	1.08	LT28
120 (400)	0.86	0.93	0.92	0.96	1.16	1.09	LT210

① Use of Self-Regulating heater products at other than rated voltages require minor adjustments in power and maximum circuit lengths.

Nelson's PLT Series non-metallic connection kits are Factory Mutual, Underwriter's Laboratory and Canadian Standards Association approved for use in ordinary and Division 2 hazardous areas when used with approved. PLT Series connection kits are approved for use with all Nelson LT, HLT and NC Series field-fabricated heating cables. Enclosures supplied in PLT Series connection kits are rated NEMA 4X.



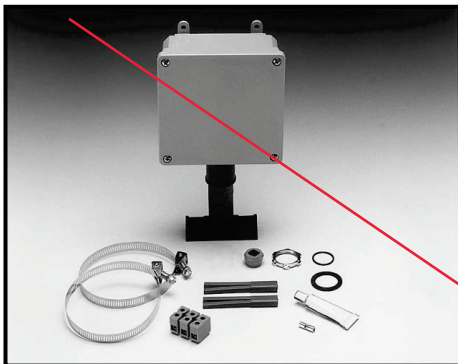
PLT-BC Power Connection Kit:

The PLT-BC Power Connection Kit is suitable for connecting up to two heating cables to customer supplied power wiring.

Kit Contents:

- 1 Universal Base, Box Adapter, Sealing Gasket, O-Ring and Locknut
- 1 Junction Box with Sealing Gasket and Cover
- 1 Sealing Grommet (Specify Cable Construction*)
- 1 Power Termination and Cable End Seal with Adhesive Sealant
- 1 3-Point Floating Terminal Block
- 1 Ground Connection Splice
- 2 Stainless Steel Pipe Clamps (Specify Pipe Size)

* Selection of -U grommet includes (1) additional power termination and (1) additional end seal for multiple cable entry.

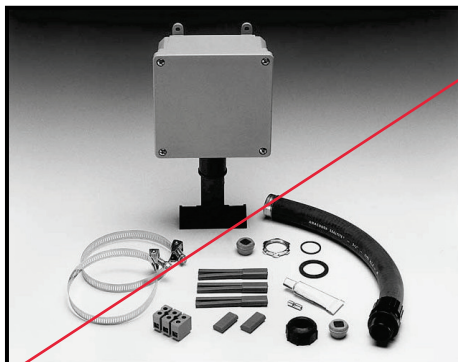


PLT-BS Splice Connection Kit:

The PLT-BS Splice Connection Kit is designed for connecting two heating cables in an in-line splice configuration.

Kit Contents:

- 1 Universal Base, Box Adapter, Sealing Gasket, O-Ring and Locknut
- 1 Junction Box with Sealing Gasket and Cover
- 1 Universal Sealing Grommet
- 2 Power Terminations with Adhesive Sealant
- 1 3-Point Floating Terminal Block
- 1 Ground Connection Splice
- 2 Stainless Steel Pipe Clamps (Specify Pipe Size)



PLT-BY Tee Connection Kit:

The PLT-BY Tee Connection Kit is designed for connecting three heating cables in a tee splice configuration.

Kit Contents:

- 1 Universal Base, Box Adapter, Sealing Gasket, O-Ring and Locknut
- 1 Junction Box with Sealing Gasket and Cover
- 1 Watertight Connection Fitting and Hi-Temp Flexible Tubing
- 1 Sealing Grommet (Specify Cable Construction)
- * Power Terminations and Cable End Seals with Adhesive Sealant
- 1 3-Point Floating Terminal Block
- 1 Ground Connection Splice
- 2 Stainless Steel Pipe Clamps (Specify Pipe Size)
- * Number of cable terminations based on standard usage of tee splice configuration; (3) power terminations and (2) end seals.

PLT-

[illegible]

EGS
Electrical Group

**NELSON
HEAT TRACE**

NELSON™ HEAT TRACING SYSTEMS

TF4X40 THERMOSTAT

SPECIFICATION / APPLICATION
INSTALLATION

DESCRIPTION



These thermostats are used for controlling heat tracing systems in ordinary locations. The capillary bulb should be mounted on the side of the pipe.

ENCLOSURE

Molded Fiberglass Polyester

CLASSIFICATIONS

NEMA Type 4X IP66

TEMPERATURE RANGE

Fixed Range

4.4°C (40°F)

CAPILLARY

Length

0.9m (3ft.)

Material

Copper

Max. Bulb Temp.

71°C (160°F)

ELECTRICAL DATA

CSA Rating

22 amp Resistance 480VAC

UL Rating

22 amp Resistance 480VAC

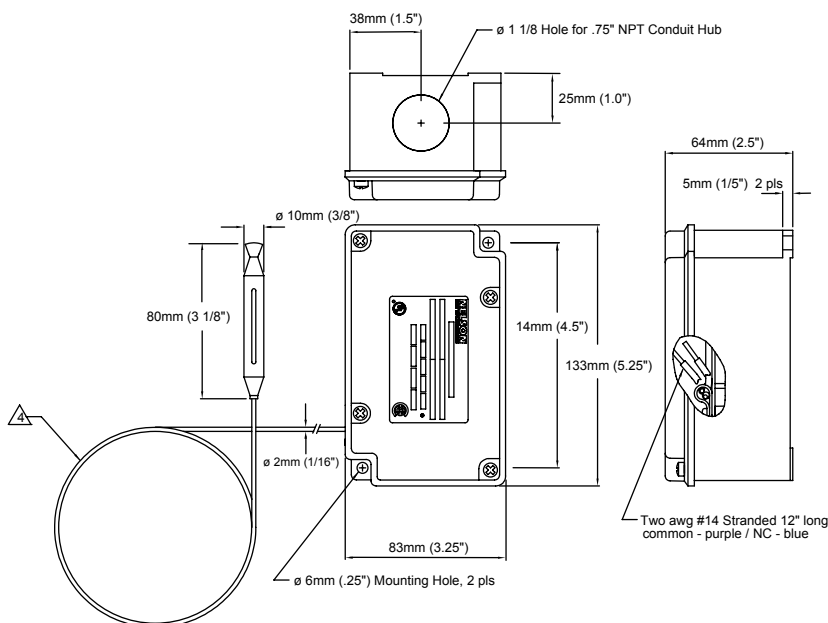
CALIBRATION ACCURACY

2.2°C (4°F)

SWITCH TYPE

Single Pole Single Throw

OUTLINE



Annual Maintenance:

1. Remove cover.
2. Spray a coat of lubricant and rust preventative such as CRC Stor & Lube, electrical grade, on the thermostat body.
3. Replace cover.

Approvals:

General Locations

UL - E50023 CSA - LR52088-4 CE

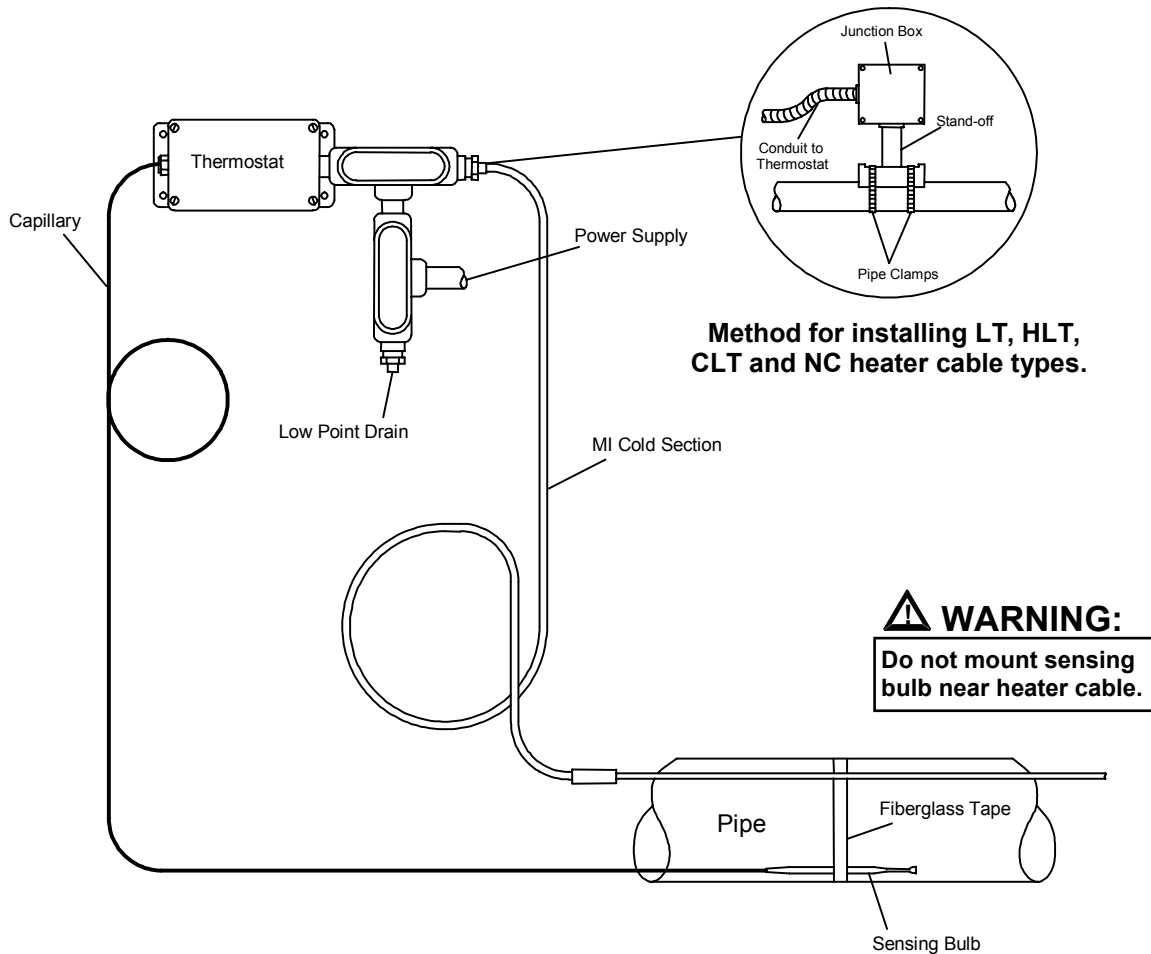
NELSON™ HEAT TRACING SYSTEMS

TF4X40 THERMOSTAT

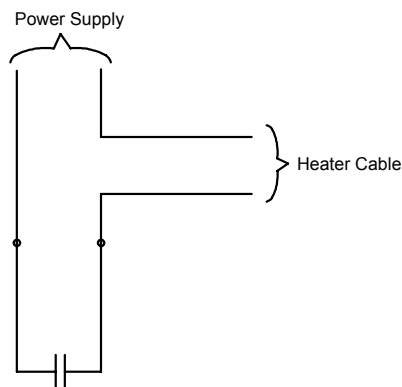
SPECIFICATION / APPLICATION

INSTALLATION

INSTALLATION



WIRING DIAGRAM



Nelson Heat Tracing Systems products are supplied with a limited warranty. Complete Terms and Conditions may be found on Nelson's website at www.nelsonheaters.com.

Accessories for Field Fabricated Heater Cables

General Accessories

General Accessories for use with Type LT, HLT, XLT, CLT Self-Regulating Heating Cables

Molded Silicone Terminations

- LT-MP (-LLT for Type LLT heating cable)
 - Molded Silicone Power End Termination Kit with Adhesive. Used for terminating field-fabricated heater cables inside the power connection box. Each kit makes 5 complete terminations.
- LT-ME (-LLT for Type LLT heating cable)
 - Molded Silicone End Seal Termination Kit with Adhesive. Used for terminating the ends of field-fabricated heater cables. Each kit makes 5 complete terminations.

Quick-Connect End Seal Terminations

- CES Push-On End Seal Kit (Type CLT heating cable)
 - Quick connect SR End Seal Kit. Used for terminating the ends of field-fabricated heating cables and can be used on all 3, 5 and 8-watt CLT heating cables. Easy push-on design allows for quick installation, forming a permanent connection. Used without heat gun for portability on job site. Indoor/Outdoor approved for wet/dry Pipe Trace and Roof & Gutter applications. Each kit includes two (2) water-resistant End Seals.

Heat Shrinkable Terminations

- LT-SP (Type LT/CLT)
- LT-HSP (Type HLT)
 - LT-NSP (Type NC)
Heat-Shrinkable Power End Termination Kit. Used for terminating field-fabricated heater cables inside the power connection box. Approved for use with Braided (-CB) product, in ordinary (unclassified) areas. (Exception: LT-SP kits may also be used with Over Jacketed (-JT) product.) Each kit makes 5 complete terminations.
- LT-SE (Type LT/CLT)
- LT-HSE (Type HLT)
- LT-NSE (Type NC)
 - Heat-Shrinkable End Seal Termination Kit. Used for terminating the ends of field-fabricated heater cables. Approved for use with Braided (-CB,) product, in ordinary (unclassified) areas. (Exception: LT-SE kits may also be used with Over Jacketed (-JT) product.) Each kit makes 5 complete terminations.

Pipe and Tank Adapters

- LT-P
 - Pipe Adapter Kit. Used to mount the base of PLT Series connection kits on small diameter (0.875" and below) pipe or tubing.
- LT-T
 - Tank Adapter Kit. Used to mount the base of PLT Series connection kits directly to the wall of a tank or vessel.
- HC-SPA
 - Pipe Adapter Kit. Used to mount the base of AX/EX Series connection kits on small diameter (1.315" and below) pipe or tubing.

End of Circuit Lights

- PLK-120, PLK-208, PLK-240, PLK-277
 - End of Circuit Light Assembly. Used with Nelson PLT-L connection kits.
- LB6R
 - Spare Replacement Bulb. For PLK series light assemblies.

Conduit Entry Seals

- ES-B (Braided Heater)
- ES-J (Over Jacketed Heater)
- ES-U (Multiple (2) Cable Entry or Special Constructions)
 - Waterproof Conduit Entry Seal, 0.5" NPT. Used for terminating field-fabricated heater cables when standard connection kits are not utilized.

Pipe Clamps

- PC-03 (3.0" Diameter and below)
- PC-12 (3.5" – 12.0" Diameter)
- PC-20 (12.5" – 20.0" Diameter)
 - Pipe Clamps, stainless steel. Used to attach connection kits to pipe.

Terminal Blocks

- TB-1 (3-Point)
- TB-4 (4-Point)
 - Floating Terminal Block. Used in any enclosure to provide positive, sure electrical connections. Rated 40 Amps at 440 Vac, requires no lugs.

Universal Grommets

- PLT-U
 - Universal Grommet with Adhesive. Used with Nelson PLT-B kits for multiple (2) cable entry or special heater constructions.

Junction Box

- JB552
 - Non-Metallic Junction Box, 5" x 5" x 2", NEMA 4X. Used for terminating field-fabricated heating cables.

Warning Sign

- WS-100
 - Weatherproof Warning Sign. Used for cautioning maintenance personnel of the presence of electric heat tracing cable under the insulation. Attached to the outside of pipe insulation in frequent intervals. Black Lettering with Yellow background.

Tape

- GT-60 (60 Yards)
- GT-6 (20 Yards)
 - Fiberglass Tape, 0.5" wide. Used to attach heater cables to pipe or to attach temperature sensors to the pipe when corrosive conditions prevent the use of aluminum tape.
- AT-50 (50 Yards)
 - Aluminum Foil Tape, 2.0" wide. Used to attach heater cable to vessels to dissipate heat on non-metallic surfaces or to attach thermostat sensing bulbs to pipes.