

**Installation, Operation and
Maintenance Manual
For
Heating Systems on
Poly Processing Company
Storage Tanks**

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Chapter One

System Overview

SPX Tank Heating Systems are specifically designed for temperature maintenance on Poly Processing's polyethylene tanks. SPX Tank Heating Systems maintain the desired product temperature, not to exceed 100°F. Each heating system consists of tank heating pad(s) and a temperature controller.

The quantity and type of SPX Tank Heating Pads required is determined by the size of the tank, desired temperature maintenance and environmental conditions. Tanks are available with standard heating systems with a delta-T of 30, 60 and 100°F. The delta-T is the difference between the product temperature and the minimum ambient temperature. For example if you wanted to maintain 60°F in a 0°F ambient a heating system with a 60°F delta-T would be selected.

Tanks are typically supplied with the heating panels and a controller installed by Poly Processing. The only field connection required is supply power to the heating system.

Chapter Two

General Information

2.1 System Design

SPX Tank Heating Systems are manufactured by HTD Heat Trace specifically for use on Poly Processing's polyethylene storage tanks. Each tank heating system is specifically designed to suit a specific tank based on desired maintenance temperature and environmental conditions.

2.2 Thermal Insulation

All tanks must be thermally insulated for SPX Tank Heating Systems to be effective. Do not operate the SPX Tank Heating System without thermal insulation installed over the entire surface area of the tank. Tanks supplied by Poly Processing Company are normally supplied to the end user with 2" of polyurethane insulation installed at the factory.

Chapter Three

Heating Pad Installation

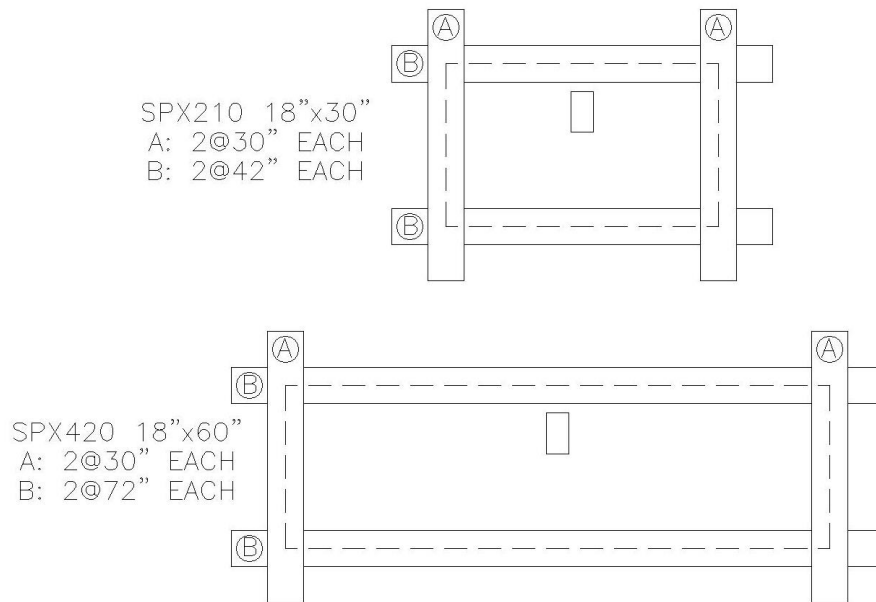
Heating pad and controller installation is normally completed by Poly Processing prior to supply to the end user. Installation information is provided only to give an overview of the total heating system.

3.1 Preparation

- 1) Determine the heating panel Locations for the style and type of tank. Heaters should be located towards the bottom of the tank approximately 6” up from the bottom on a vertical tank.
- 2) Determine control package location, making sure heating pad cold leads reach the control package.
- 3) Ensure that the tank surface is clean, dry and free of dirt, grease, oil, or any other substance that may interfere with the self-adhesive bonding material on the heating pad.

3.2 Installation Tasks

- 1) Remove a heating pad from the shipping box and carefully peel back the protective backing to expose adhesive surface.
- 2) Affix the heating pad to the tank surface in the position determined in step 1.
- 3) Beginning at the end of a heating pad, carefully press the heating pad to the surface of the tank. Apply sufficient pressure to the back of the heating pad so the first 6 to 8” of the heating pad adheres to the tank surface.
- 4) With continuing pressure and smooth hand strokes to the back of the heating pad, adhere the next several inches of the heating pad to the tank. Use firm pressure to ensure that no creases, bubbles, or air gaps are present between the heating pad and surface of the tank. Repeat this process until the total inner pad surface is bonded to the tank surface.
- 5) Use 3” aluminum wide tape to secure cold leads to the tank, and seal the outer edges of the heating pad to prevent ingress of dirt, moisture and other contaminants. Cut the tape in the required lengths as shown on figure 1.



Aluminum Tape Requirements for Heating Pad Installation

Figure 1

- 6) Apply the aluminum tape as shown.
- 7) Repeat Steps 1 through 6 for each additional heating pad.

Chapter Four

Heating System Controller

4.1 Overview

SPX Tank Heating Systems are available with a choice of two controllers. The 2SPCP is for use in electrically unclassified (non-hazardous) areas and the 2HSPCP controller for use in electrically classified (hazardous) areas.

The controller is provided mounted on the tank with the heaters connected. The customer/end user must provide power to the controller.

4.2 Control Location

Both the 2SPCP and 2HSPCP are rated NEMA4 and suitable for indoor and outdoor installation. Where possible the controller should be mounted out of direct sunlight to provide maximum visibility for the heater on/off light.

4.3 Unclassified (Non-hazardous) Areas

The 2SPCP controller is for use in ordinary, non-hazardous areas. The controller has two electronic thermostats one for process temperature control and one for over temperature protection. The process thermostat should be set to the desired process temperature, but limited to a maximum of 100°F.

The over temperature setting protects the tank or product from high heater temperatures. If the heating pad reaches the over temperature setting the heating system is shut off to avoid high tank or product temperatures. The over temperature thermostat is factory locked to 150°F, 175°F for double wall Safe Tanks.

4.4 Classified (Hazardous) Areas

The 2HSPCP controller is suitable for use in hazardous Class I, Division 2, Groups B, C, D and Class II, Division 2 areas. The 2HSPCP uses two explosion-proof thermostats one for process temperature and one for over temperature with a general purpose junction box for heater connection.

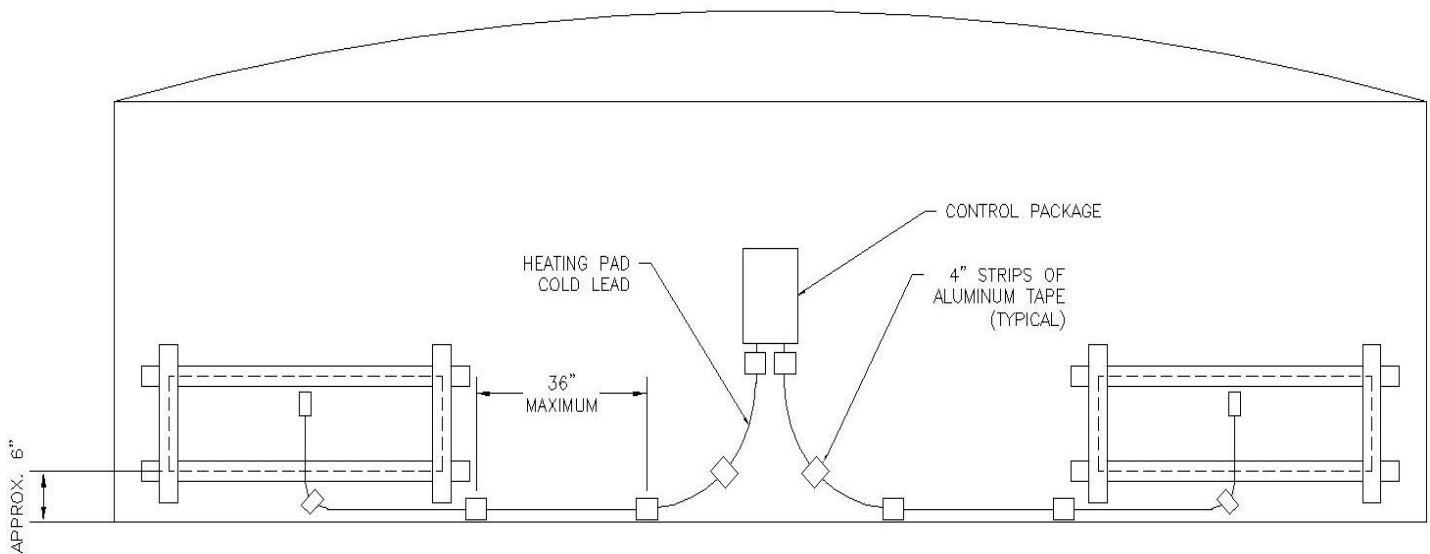
The 2HSPCP controller is provided with the process temperature thermostat factory set to 60°F. The process temperature thermostat should be set to the desired product temperature. The over temperature thermostat is factory set to 150°F (175°F for double wall Safe Tanks) this setting should not be changed.

Chapter Five

Controller Installation

5.1 Physical Installation

- 1) Mount the control package in the location determined during the heating pad installation.
- 2) Run the cold leads from each heating pad to a common point below the control package. Cold leads should be secured to the tank with 4" long strips of aluminum tape as shown in fig 2.



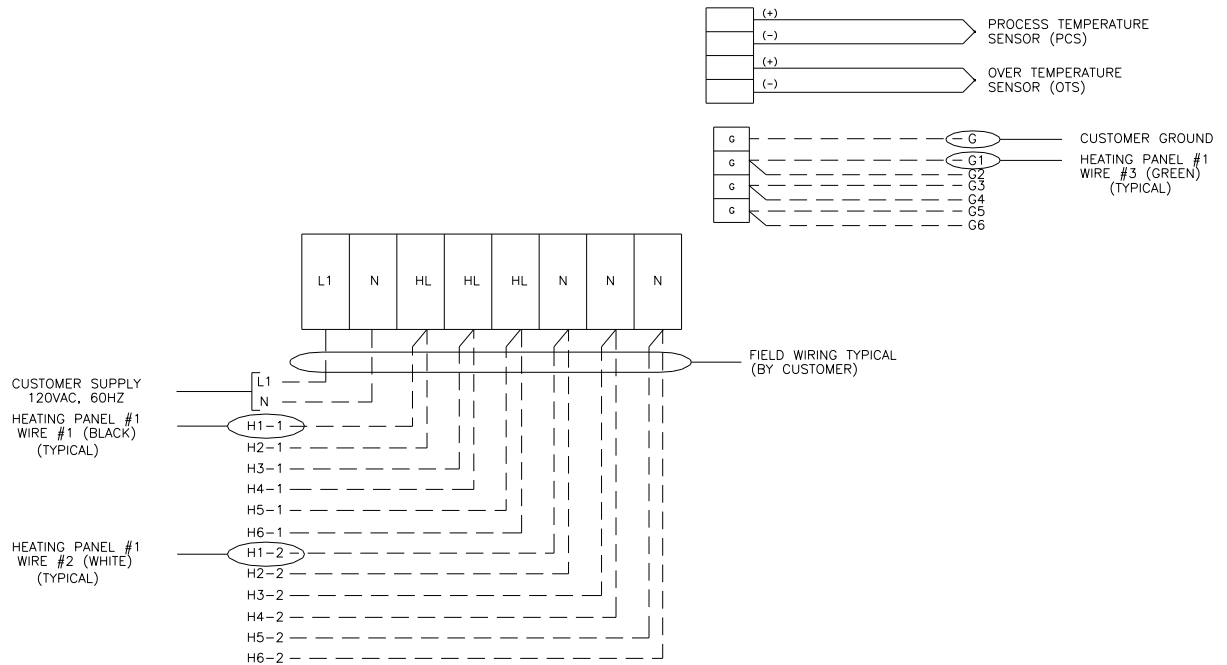
Cold Lead Routing

Figure 2

- 3) Install one entry fitting on each cold lead and install the entry fitting into one of the holes on the base of control package. Allow approximately 6" of cold lead for termination inside the control package. Seal any unused holes.

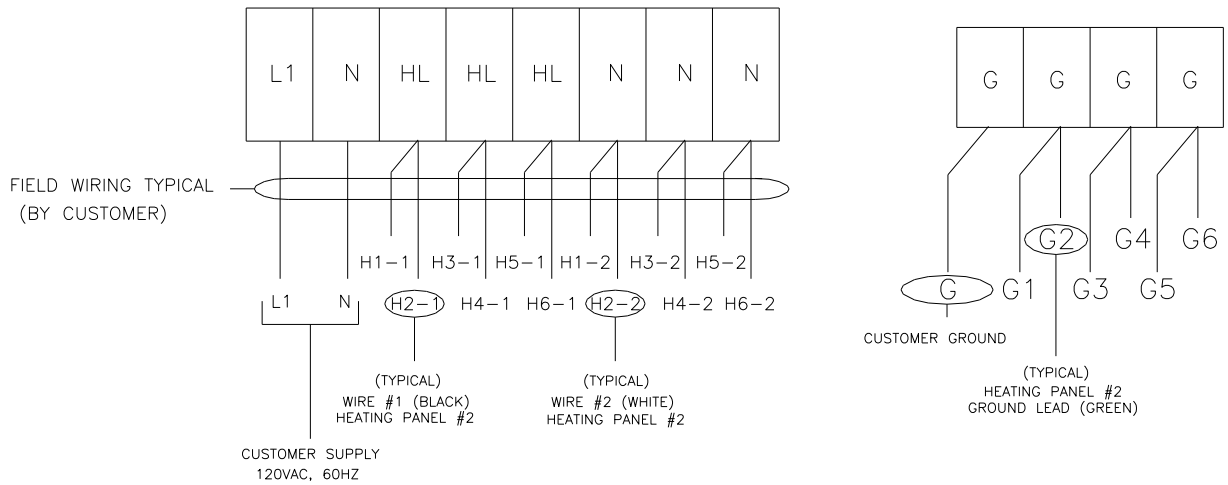
5.2 Heater Connection

- 1) Connect each heating pad into the heater terminal blocks as shown in either figure 3 or 4. An additional wiring diagram is included inside each control box. Ensure all connections are tight.



2SPCP Heater Connection

Figure 3



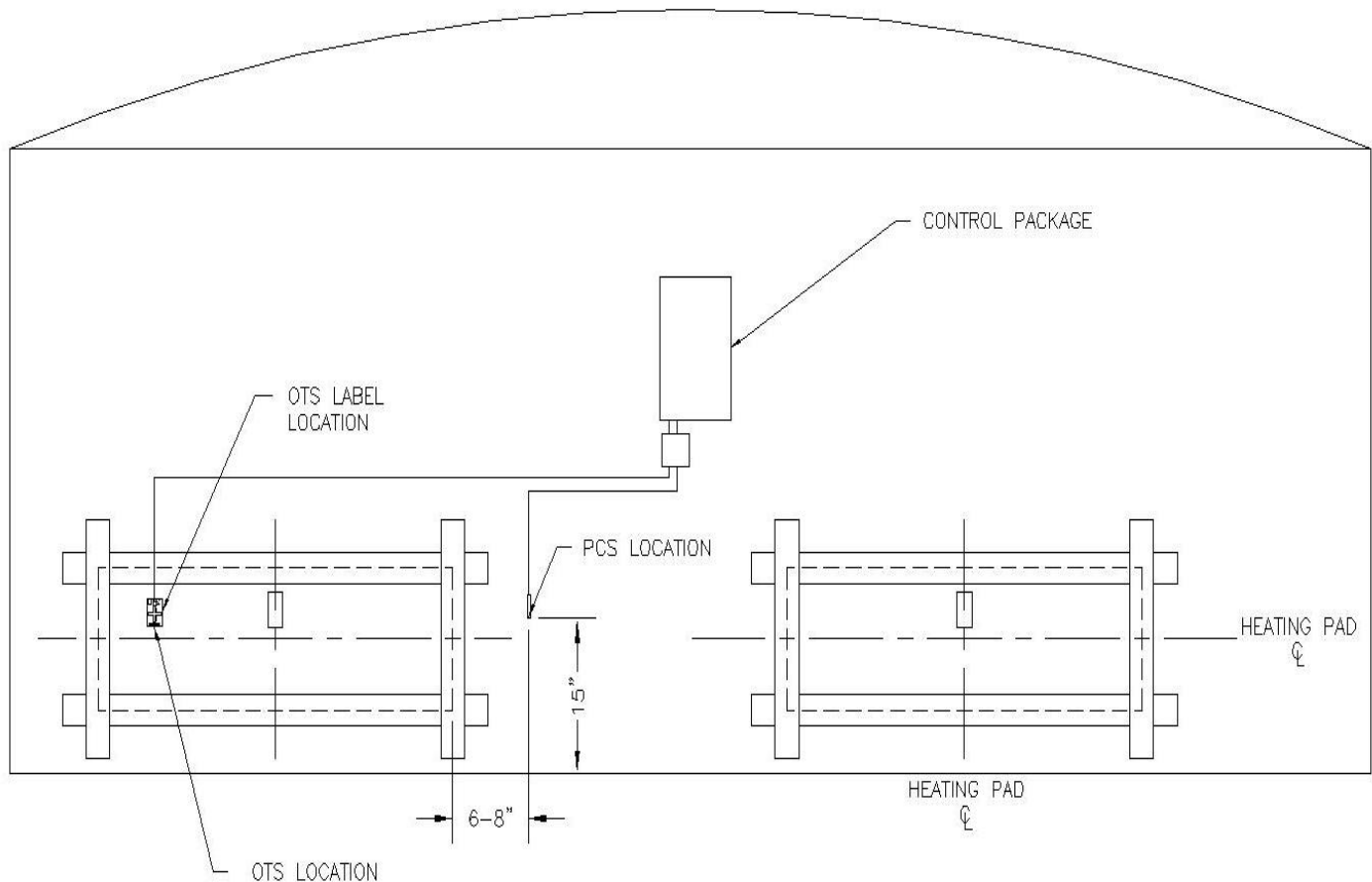
2HSPCP Heater Wiring Diagram

Figure 4

- 2) The black (hot) lead and the white (neutral) lead on each SPX heater are supplied with factory installed ring terminals. Connect ring terminals to designated terminal blocks as per wiring diagram. The green (ground) lead should be connected to the grounding bar as per wiring diagram.
- 3) After connecting customer supply in Chapter 6, test the heaters as shown on Chapter 8.

5.3 Sensor Location

- 1) The temperature sensor designated as “PCS” inside the control package must be located as per fig 5 and installed on the tank surface using aluminum tape.



Sensor Location
Figure 5

- 2) The temperature sensor that is designated “OTS” must be located on the SPX pad that is highest up on the tank wall in the designated OTS location and installed directly onto the selected heating pad using sufficient lengths of aluminum tape. The OTS sensor must be located in the cross of the OTS sticker
- 3) Route the leads/capillary tubes from the sensors as shown in fig 5 using 4” strips of aluminum tape. Excess sensor lead or capillary should be coiled neatly under the control package and protected.

Chapter Six

Power Supply Connection

6.1 Power Supply Requirements

The required customer power supply to the controller is 120 VAC, 60HZ, with the current sized to match the heating system. Heating systems range in size from 210 watts to 2,520 watts depending upon the heating system supplied. The controller is labeled “120VAC, 26A Service” reflecting the maximum rating of the controller. The incoming supply should be sized to fit the specific heating system supplied.

The heating pads are available in two wattages and three standard types. The available heaters are shown in table 1.

SPX Pad Size	Part#	Watts	Volts
18”x30”	SPX210	210	120
18”x60”	SPX420	420	120
18”x60”	SPX420-16	420	120

SPX Heating Pad Types

Table 1

The NEC (Section 427-22) requires that all heat tracing systems be ground fault protected. Circuit breakers are commonly available to provide ground fault protection. Circuit breakers for protection of tank heating systems should be 30 mA trip units such as Square D type QO-EPD. *GFI type breakers with a 5 mA trip are not suitable for this type of protection and can cause nuisance tripping.*

Circuit Breaker Sizing Criteria:

1. Determine the power of the heating system.
2. Divide the heating system power by 120 VAC to determine the nominal current.
3. Size the circuit breaker at 125% of the heating load minimum or as required by voltage drop calculations.
4. Choose the circuit breaker that most closely matches the calculation, see example.

Example:

1. A heating system with 2 heating pads has a power of 840 watts.
2. By dividing the power by 120 VAC the nominal current is 7 A.
3. Sizing the circuit breaker at 125% requires a circuit breaker of 8.75 A or greater.
4. Pick the closest circuit breaker that is not less than 125% of the nominal load. The lowest commonly available circuit breaker trip rating is 15 A. Use a 15A, 120VAC, 30mA ground fault protected circuit breaker such as Square D part# QO115EPD.

6.2 Customer Connection

Each controller is provided with a cord grip for incoming power suitable for 10 AWG, SJO flexible cable. Suitability of flexible cable should be evaluated by the customer based on the specific application and applicable codes. Where required the cord grip can be removed and supply connection completed using conduit connections supplied by the end user or installer. Conduit is recommended where physical protection is required.

Chapter Seven

Controller Operation

7.1 General Information

The type 2SPCP and 2HSPCP controllers have two temperature settings. The PCS sensor is for control of the process temperature and the OTS for over temperature protection. The heating system is energized when the process temperature drops below the set point. The heating system stays energized until the process temperature exceeds the set point. In this manner the desired tank temperature is maintained by cycling the heating system on and off as required.

The OTS sensor shuts off the heating system if a heating pad temperature exceeds the over temperature thermostat setting. This protects the tank and/or product from over temperature caused by upset conditions, such as low liquid level.

Heating system status indication is provided via the power on to heaters light. When heat is required and the heaters are energized the power on to heaters light is illuminated.

7.2 Temperature Settings

- 1) The PCS controller/thermostat is factory set to 60°F. This setting can be adjusted for the desired maintenance temperature of the specific application. The process knob in the 2SPCP is limited to a maximum of 100°F. Under no circumstances should the process setting for the 2SPCP or 2HSPCP be set in excess of 100°F.
- 2) The OTS controller/thermostat is factory set to 150°F. In the 2SPCP the over temperature thermostat knob is locked at 150°F. This setting should not be adjusted regardless of the application. *Do not operate the SPX Tank Heating System with the OTS Controller/Thermostat set point at any temperature other than 150 °F (175°F for double wall Safe Tanks).*

7.3 Heating System On/Off Indication

SPX Tank Heating control packages are supplied with a “Power On to Heaters” indicating light. This light will stay illuminated only when the OTS Controller/Thermostat is permitting safe operation of the system and the PCS Controller/Thermostat is calling for heat. This light will not be illuminated when:

- a. The tank and tank contents have reached the desired maintenance temperature and the PCS controller is not calling for heat.
- b. The OTS controller has sensed unusually high heating pad temperatures and has switched off the heating system.
- c. There is no power to the system.
- d. The bulb inside the “Heat On” indicating light has failed and requires replacing.

Items “c” and “d” will require on site attention before safe operation of the system can resume.

Chapter Eight

Post Installation Testing and Setup

Some testing requires exposure to electrically live components and should only be completed by an electrician or other qualified personnel.

8.1 Testing

- 1) Use an Ohmmeter to check the resistance of each heating pad. Compare your reading with the acceptable Ω range in Table 2. Do not proceed with any heating pad that is outside the tolerance bands shown on table 2.

SPX Pad Size	Part #	Watts	Volts	Nom Ω	Acceptable Ω Range
18"x30"	SPX210	210	120	68.6	61.7 to 75.5
18"x60"	SPX420	420	120	34.3	30.9 to 37.7
18"x60"	SPX420-16	420	120	34.3	30.9 to 37.7

SPX Heating Pad Resistance Tolerances

Table 2

- 2) Using a 500 VDC Megger, measure the insulation resistance (IR) value between the heating element and the ground. All values below 20 M Ω are unacceptable. Do not proceed with any tank heating pad that has an unacceptable Megger reading.

8.2 Customer Power

- 1) Turn on customer power supply to the heating system.
- 2) Verify 120 VAC is present between terminals L1 & N in the controller.
- 3) Correct power wiring if necessary.

8.3 Controller

- 1) Once presence of customer power is verified proceed to step 2.
- 2) Raise the process temperature setting until the "power on to heaters" light illuminates. Verify 120 VAC is present on HL & N.
- 3) Verify correct current out from the HL terminal, determined by the total current for the system using the values listed below.
 - 1.75 Amps for each SPX210
 - 3.5 Amps for each SPX420 or SPX420-16
- 4) Decrease the process and verify 120 VAC is not present on HL & N.

8.4 Setup

- 1) After testing proper operation of the heating system and controller complete the following two steps.
- 2) Set the Process Temperature knob to the desired tank maintenance temperature.
- 3) Verify proper setting of the over temperature setting, not to exceed 150°F (175°F for double wall Safe Tanks).

Chapter Nine

System Maintenance

9.1 SPX Maintenance Schedule

Procedure	Frequency	Recommendations
Visual inspection of outer coating and thermal insulation.	Monthly	1) Repair all damage to the outer coating and/or thermal insulation.
Resistance Check (ohmmeter)	Every 6 Months	2) Disconnect any SPX Tank Heating Pad that shows a resistance value outside the tolerance figures (table 2). Remove and replace the heating pad at the earliest opportunity.
Insulation Resistance (IR) Test or Megger® Test	Every 6 Months	3) Disconnect any SPX tank heating pad with an IR value of less than 20MΩ. Remove and replace the pad at the earliest opportunity.
Voltage Check (voltmeter)	Every 6 Months	4a) Reduced voltages should be evaluated to determine decreased power levels and the potential impact on the performance of the tank heating system. 4b) Operating voltages above 130 VAC are not acceptable. De-energize the system and investigate cause of over-voltage. Do not re-energize the system until the cause of excess voltage is eliminated.
Current Check* (ammeter)	Every 6 Months	5a) Any reduction in operating current should be evaluated based on the values for 2 and 4a above. Reduced current resulting from a damaged or failed heating pad(s) requires heating pad replacement. 5b) Increased current readings resultant from 2 and 4b may be normal and acceptable. Maximum acceptable current readings for SPX Heaters are: SPX210 - 2.0 Amps SPX420 - 4.0 Amps <i>Do not operate any SPX Heating Pad Above These Values</i>

Table 3

*Some clamp on ammeters may give unreliable readings at these operating currents.

Chapter Ten

Troubleshooting and Spare Parts

10.1 SPX Troubleshooting Guide

Problem	Probable Cause	Possible Solution
Heaters do not energize	a. No incoming power b. Blown fuse c. Incorrect Heater Connections d. Failed SSR e. Failed or damaged Thermocouple f. Failed Thermostat	Switch on/reset Replace Correct wiring Replace Replace Replace
“Power on to Heaters” light does not illuminate	a. Heating not required to maintain temp. b. No incoming power c. Blown fuse d. Incorrect temp. controller settings e. Burnt out light bulb f. Failed or damaged Thermocouple g. Failed Thermostat	Heat not required Switch on/reset Replace fuse Correct settings Replace bulb Repair wiring Replace
Low tank Temp.	a. No incoming power b. Blown fuse c. Incorrect temp. controller settings d. Low incoming product temp. e. Damaged/missing thermal insulation f. Low tank liquid level g. Damaged/failed heating pad h. Incorrect heater connections i. Failed SSR j. Failed or damaged Thermocouple k. Failed Thermostat l. Maintenance temp. too high	Switch on/reset Replace fuse Correct temp. controller settings Wait for product heat up (can take a very long time) Repair or replace insulation Fill Tank Repair or replace Correct wiring Replace Replace Replace Lower process temp. setting
High Tank Temp.	a. Incorrect temp. settings b. Failed SSR	Correct Replace
Customer supplied breaker trips	a. Damaged wiring b. Damaged heater c. Incorrect heater connection	Repair or replace Repair replace Correct wiring

Table 4

10.2 Spare Parts List

Note: The Spare Parts list is a set of available parts that can be purchased. They are not necessarily included in the standard system.

<u>HTD Part#</u>	<u>Item</u>
H01020	2SPCP Fuse
H05703	4 pt Power Terminal
H01013	Solid State Relay 50A, 480VAC
H01038	Thermocouple Terminals
H01010	Thermocouple
G01034	Heater Cord grip assembly (including sealing ring and nut)
G01024	Thermocouple Cord grip assembly (including sealing ring and nut)
G01035	Customer Power Cord grip assembly (including sealing ring and nut)
H05220	Electronic Thermostat 50-175°F for controllers Supplied 2006 and earlier (Contact HTD for options)
H05220A	Electronic Thermostat 50-175°F for controllers Supplied 2007 and later
H05808A	Light Bulb (120 VAC, 3W)
H05834	2SPCP Pilot Light assembly 22mm
H05808	2HSPCP 30mm Light Assembly
H01009	Silcopad Cold Lead
H05120	Thermostat, Hazardous Rated, N7, N9, 480VAC, 22A, 10' Bulb and capillary.

Table 5

Chapter Eleven

Component Details

11.1 Components

A detailed control panel parts list can be seen on drawing 2028742P for the 2SPCP or 2028744 for the 2HSPCP. This list includes HTD part numbers. Most common spare parts are listed in Chapter 10, table 6.

11.2 Replacing Components

WARNING!!!!

The interior of the Control Panel must not be accessed while energized. Remove power to the control panel using the customer supplied disconnect switch or circuit breaker.

Replacement of components or panel repair should only be attempted by qualified personnel. ***Incorrect wiring can cause injury to personnel and/or damage to components, heaters and/or the tank. If there are any questions or concerns contact HTD Heat Trace before commencing any work.***

To replace a component it is first necessary to note all the wiring connections and the corresponding location on the component. All these connections can also be seen on the associated drawings. Disconnect the wires and remove the component from the sub-panel or front door. Care must be taken to make sure that the mounting screws and washers do not fall into other components.

Mount the new component and reconnect the wires. Vacuum any debris out of the enclosure especially around the new component. Double-check the wire connections to insure they are correct. Close the enclosure and energize the control panel. Test the operation of the new component to insure it functions correctly.

Chapter Twelve

HTD Heat Trace Contact Information

12.1 General Contact Information

HTD Heat Trace can be contacted via any of the methods listed below:

Address

HTD Heat Trace, Inc.
8 Bartles Corner Road
Flemington, NJ 08822

Phone

Telephone: 908 788-5210
Fax: 908 788-5204

E-mail: support@htdheattrace.com

12.2 Technical Support

Technical support is available from 8:00 am to 5:00 PM EST Monday through Friday at 908 788-5210 option 2.



8 Bartles Corner Road, Unit 104, Flemington, NJ 08822 • 908 788-5210 • Fax 908 788-5204

Appendix A

SPX Tank Heater Sales Literature



PLASTIC TANK HEATER PAD



**WATERPROOF, ADHESIVE-BACKED HEATER PADS
FOR PLASTIC AND OTHER HEAT-SENSITIVE TANKS**



SPX

**For freeze protection
and process heating
applications
on Plastic Tanks**

PLASTIC TANK HEATER PAD

SPX

- ♦ **Specifically designed for safe operation on polyethylene, polypropylene and other types of heat-sensitive tanks**
- ♦ **Two sizes and power outputs fit horizontal, vertical and conical tanks**
- ♦ **Proven epoxy-glass laminate platform performance, with thousands of major installations worldwide**
- ♦ **Will not overheat or burn out**
- ♦ **Adhesive backing makes installation quick, simple and effective**
- ♦ **FM Approved for use in unclassified, hazardous and corrosive environments for the United States and Canada**

SPX heater pads are specifically designed to provide the unique product and system features essential for the safe and reliable application of heat to the surface of plastic tanks and other types of heat-sensitive, non-metallic tanks. SPX heater pads are most commonly used on polyethylene and polypropylene tanks for freeze protection and temperature maintenance applications up to 120° F (48.9°C). When used on metal or FRP tanks, SPX heating systems can be designed for temperature maintenance applications up to 150° F (65.6°C).

The total construction of the SPX heater pad is completely waterproof. Each SPX heater is supplied with a rugged, encapsulated, factory made power termination complete with over-braided cold leads in standard lengths of 10 or 16 Ft and custom lengths to suit your application from 2 to 50 feet.

The SPX heater pad uses a proprietary multi-path, parallel circuit heating element with continuously spot welded connections. This proprietary heating element is laminated into multiple layers of NEMA grade G-10 / FR-4 flame retardant, epoxy-glass composite to form a flexible, lightweight heater pad that is easily and quickly installed.

The gentle heat output of 0.39 w/sq.in will not harm a plastic tank or its contents. Additional security is also incorporated into every SPX heater by the inclusion of a preset, automatic over-temperature safety switch that is built directly into the pad. This factory installed device completely eliminates all potential for overheating the tank, even if the heating system should remain energized while the tank is empty.

The SPX heater construction also includes an internal aluminum ground shield for full compliance with the latest requirements of the National Electric Code. Factory applied adhesive backing is used to bond the heater pad directly to the tank surface, allowing one person to complete a simple and effective installation in a matter of just a few minutes.



SPX tank heaters are extremely safe, reliable and cannot overheat or burnout.



SPX HEATER PAD

ADVANCED HEATING ELEMENT DESIGN

The SPX Tank Heater pad incorporates a proprietary, multi-path heating element that provides an evenly distributed flow of current across many **parallel connected paths**. See Figure 1 opposite.

If one or more element paths are broken or damaged, *the current flow is instantaneously, automatically and evenly re-routed around the damaged area into the remaining undamaged element paths*. See Figure 2 opposite.

This uniform redistribution of current prevents the development of hot spots and burn outs that would normally result in the total failure of a heater pad. Hot spots and localized overheating are also potentially disastrous failure modes that can significantly damage the structure and integrity of any heat-sensitive tank, or scald any heat-sensitive products contained within a tank.

The parallel connected, multi-path circuit design unique to the SPX heater pad offers a durable, robust, safe and *reliable heat source* that is clearly superior to all types of series circuit designs.

Thermal aging, electrical stress, mechanical stress and destruction testing of the epoxy/glass laminate platform have shown that *over 70% of the circuit paths within the element must be completely destroyed and broken before total heater failure can occur*.

SPX

PLASTIC TANK HEATER PAD

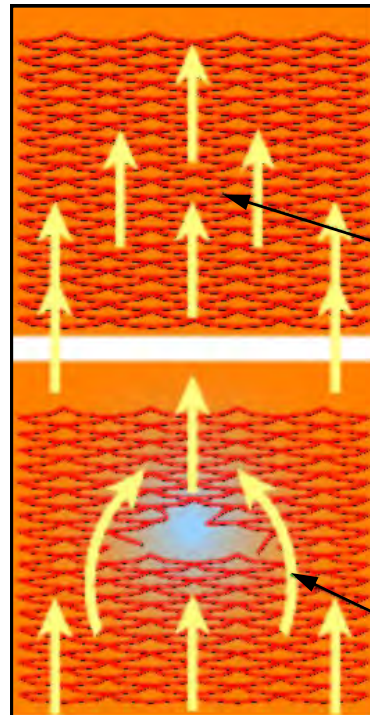


Figure 1

Multi-path heating element construction provides a uniform flow of current across many parallel connected circuit paths.

Figure 2

Current is automatically and evenly re-routed around damaged area. Integrity of the heating circuit remains intact and the heater pad continues to function normally.

SPX heater pads are the safest and most reliable form of tank heater available.



PRODUCT SPECIFICATIONS

PHYSICAL, ELECTRICAL & THERMAL

PLASTIC TANK HEATER PAD

SPX

PRODUCT FAMILY	SPX	
PRODUCT REFERENCES	SPX210 & SPX420	
SIZES	SPX210	18 x 30 in (457 x 762 mm)
	SPX420	18 x 60 in (457 x 1524mm)
PAD THICKNESS	0.05 inches (1.27 mm)	
WEIGHTS	SPX210	2.2 lbs. (1 kg)
	SPX420	4 lbs. (1.81 kg)
POWER RATINGS	SPX210	210 watts
	SPX420	420 watts
POWER DENSITY	0.39 watts/inch ² (605 watts/m ²)	
OPERATING VOLTAGE	120 VAC 240 VAC options available, contact HTD	
NOMINAL CURRENT	SPX 210	1.75 A
	SPX 420	3.50 A
LEAKAGE CURRENT ON 120VAC	SPX 210	0.9 mA
	SPX 420	1.8 mA
TYPICAL MAXIMUM APPLICATION TEMPERATURES	Polyethylene	120° F (49°C)
	Polypropylene	120° F
	PVC	140° F(60°C)
	CPVC	150° F(65.5°C)
	FRP	150° F
	Steel	150° F

The above maximum application temperatures are only typical for the materials listed. Service temperature ratings for each tank material depend upon operating pressure and may be lower. Maximum permissible operating temperatures for each specific type of tank must be determined by the Tank Manufacturer and/or End User.

T-RATING:	T4A
MAXIMUM EXPOSURE TEMPERATURE	220° F (105°C)
MINIMUM TEMPERATURE DURING INSTALLATION	40°F (4.4°C)
MINIMUM BENDING RADIUS	15 in (381 mm)
MINIMUM TANK DIAMETER	30 in (762 mm)

ACCESSORIES

SEALING TAPE	Use type IAAT 3 adhesive backed aluminum tape to seal the four edges of each SPX heater pad to the tank surface. This simple procedure prevents infiltration of thermal insulation between the tank surface and the heater pad.
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CONSTRUCTIONAL

HEATING ELEMENT	Proprietary multi-path, heating element with continuously spot-welded connections
HEATING ELEMENT DESIGN	Parallel circuit
DIELECTRIC MATERIALS	Multi-ply epoxy/glass composite
DIELECTRIC STRENGTH TEST	1.48KV for one minute
INTEGRAL GROUND PLANE	Expanded aluminum sheet
TERMINATION BOX	4.5 x 2.5 inch (114 x 65 mm) polycarbonate enclosure
COLD LEAD CABLE	3 conductor # 16 AWG tinned copper with TPE insulation and tinned copper over-braid
STANDARD COLD LEAD LENGTHS	SPX210 10 Ft (3m) SPX210 -16 16 Ft (4.88m) SPX420 10 Ft (3m) SPX420-16 16 Ft (4.88m)
INSTALLATION METHOD	Factory applied adhesive backing with release liner

APPROVALS

Factory Mutual approved to IEEE standard 515 and CSA standard C22.2 no.130-03 for use in the following areas:
Unclassified
Class I Div.2 Groups B,C,D
Class II Div.2 Group F,G
Class III Div.2



CONTROLS

The recommended controller for unclassified, non-hazardous area installations is type 2SPCP with dual electronic thermostats for process control and high temperature cut out.

Use type 2HSPCP controller to provide the same features on all hazardous area installations.



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Appendix B

SPX Tank Heater Datasheet

SPX

**For freeze protection
and process heating
applications
on Plastic Tanks**

SPX

PLASTIC TANK HEATING PAD

- ◆ Specifically designed for safe, reliable operation on heat sensitive plastic storage tanks
- ◆ Proven epoxy-glass laminate platform performance, with thousands of major installations worldwide
- ◆ Ultra low watt density, high efficiency, flexible heating pads with adhesive backing.
- ◆ FM Approved for use in unclassified, hazardous and corrosive environments for the United States and Canada
- ◆ Quick, simple, low cost, one person installation
- ◆ Two pad sizes and power outputs for conventional, small and custom-shaped tanks.



PROPRIETARY MULTI - PATH,
PARALLEL CIRCUIT HEATING
ELEMENT WITH CONTINUOUSLY
SPOT WELDED CONNECTIONS

WATERPROOF
EPOXY
ENCAPSULATED
POLYCARBONATE
TERMINATION
ENCLOSURE

INTERNAL ALUMINUM
GROUNDING SHIELD TO
COMPLY WITH NEC ARTICLE
427 23(b) REQUIREMENTS



The HTD Heat Trace SPX heater pad is the latest step in the improvement of the SilcoPad range of heaters for plastic tanks.

The SPX epoxy/glass composite construction was first developed and used in the Eagle Panel range of products for heating FRP tanks. This rugged construction has been re-engineered for performance on heat-sensitive tanks, resulting in a new, ultra-low watt density, highly flexible, waterproof heating pad that includes adhesive backing for quick and simple installation.

The SPX tank heater pad has been specifically designed for temperature maintenance and freeze protection on heat-sensitive polyethylene and polypropylene tanks. These tanks require ultra-low watt density, evenly applied heat.

The SPX heater pad provides this with the added safety feature of an internal over-temperature thermostat. This extra feature ensures that the pad cannot operate above the maximum permissible temperature of the tank.

Being completely waterproof, the new SPX heater pad will continue to operate as designed even if rain, flooding or tank overflow infiltrates between the tank and the thermal insulation.

The new HTD Heat trace SPX 210 and SPX 420: engineered for efficiency, long life and safety.

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SPECIFICATIONS

SPX

PLASTIC TANK HEATING PAD

PRODUCT FEATURES

ULTRA-LOW WATT DENSITY

SPX Tank Heater pads have a power rating of 0.39 w/sq.in(603 w/m²) for ultra-safe operation and reliability on heat-sensitive applications

LAMINATED CONSTRUCTION WITH PEEL AND STICK APPLICATION

With its laminated, epoxy composite construction, the SPX heater pad is superbly qualified to meet the rigorous requirements for use in all industrial and climatic environments. It is extremely rugged, completely waterproof, dust-tight and corrosion-resistant.

MULTI-PATH PARALLEL CIRCUIT HEATING ELEMENT

SPX heater pads are built with unique multi-path, parallel circuit heating elements that are significantly safer and more reliable than the series type heating elements used in competitors products.

PRODUCT REFERENCES, RATINGS AND SIZES

SPX 420

420 Watts (0.39 w/sq.in)
60" long by 18" wide (457 x 762 mm)

SPX 210

210 Watts (0.39 w/sq.in)
30" long by 18" wide (457 x 1524 mm)

APPLICATIONS AND USAGE

TANK MATERIAL	APPLICATION RANGES	SPX 420	SPX 210
Polyethylene, Polypropylene	Up to 120° F (49°C)	YES	YES
FRP	Up to 150° F (66°C)	YES	YES
Steel, Stainless Steel	Up to 150° F (66°C)	YES	YES

DESIGN RATINGS

MAX MAINTAIN TEMP 150°F (66°C)

MAX EXPOSURE TEMP 220°F (104° C)

MIN INSTALLATION TEMP 40° F (4.4°C)

MINIMUM BENDING 15" (381 mm) Do not install SPX pads on any tank that is less than 30" (762 mm) diameter 120 VAC

VOLTAGE RATINGS

*Consult HTD for 240 VAC applications

CONSTRUCTION

HEATING ELEMENTS Multi-path, parallel circuitry

CIRCUIT CONNECTIONS Stainless steel bridge pieces continuously spot welded with triple welding passes

DIELECTRIC CONSTRUCTION Multi-layer glasscloth composite

LAMINATE PROPERTIES Density - 0.069 lbs/cu.in
Rockwell Hardness - 115
Flexural Strength - 50,000 psi
Dielectric Strength - 550 vpm
Flammability Rating - UL-94.V.O

GROUND SHIELD 5 mil thick aluminum mesh

TERMINATION METHOD Epoxy encapsulated polycarbonate termination box

COLD LEAD CABLE 3-16 AWG conductors with TPE outer jacket and Tin-Plated Copper over-braid

COLD LEAD LENGTHS Standard lengths:
SPX 210
SPX 420 10 FT (3 m)
SPX 210-16
SPX 420-16, 16 FT (4.87 m)
Custom cold lead lengths available to suit your application.
2 Ft. min., 50 Ft. max.

T-RATING: T4A

APPROVALS

Factory Mutual approved to IEEE standard 515 and CSA standard C22.2 no.130-03 for use in the following areas:
Unclassified
Class I Div.2 Groups B,C,D
Class II Div.2 Group F,G
Class III Div.2



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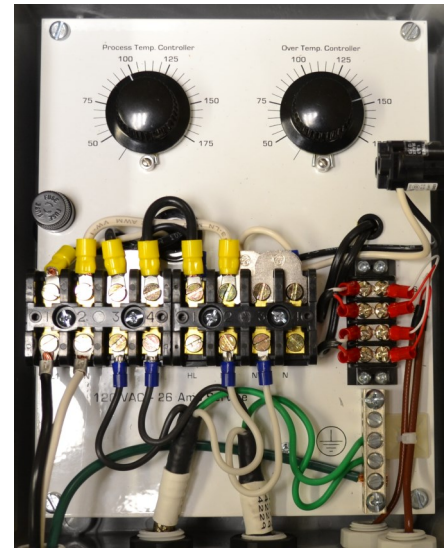
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Appendix C

2SPCP Controller Datasheet



TYPE 2SPCP DUAL ELECTRONIC-THERMOSTAT TANK HEATING SYSTEM CONTROLLER



The type 2SPCP controller is designed specifically for tank heating applications that require both process and over-temperature control features. Such applications involve the control of EGLX and SPX tank heaters installed on FRP, polyethylene, polypropylene and other forms of heat sensitive applications. Dual electronic thermostats, switching the heaters via a solid state relay (SSR) provide accurate, efficient temperature and power control. Type "J" thermocouples are supplied for accurate temperature sensing and each 2SPCP can handle up to 26 amps of operating load.

System Capability: 120 VAC – 26 A Max. (208-480 VAC options available)

Enclosure size: 10 x 8 x 6 inches

Enclosure rating: NEMA 4X

Process thermostat: 50 to 175° F

Over temperature thermostat: 50 to 175° F

Solid State Relay: 50A, 480 VAC, 90 to 280 VAC input

Thermocouples: Type "J" with 10 ft long with SS braid and FEP over-jacket

Terminal Block: 4 point, screw type, 30A 600 VAC

Heater On Light: NEMA 4X, 22 mm full voltage LED pilot light

Optional controller mounting pad: 14" x 24" expanded PVC with LSE adhesive and hardware

Approvals:



Intertek

Unclassified (nonhazardous) locations

Conforms to ANSI/UL 508

Certified to CAN/CSA STD 22.2 NO 14



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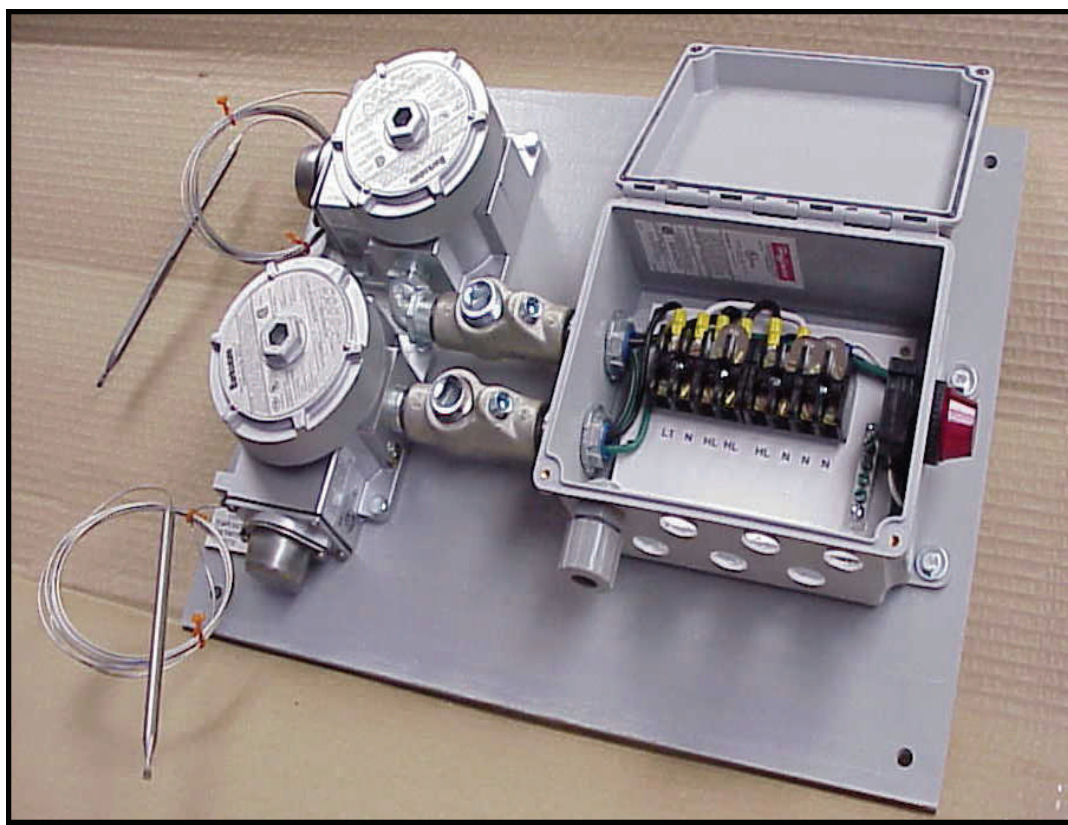
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Appendix D

2HSPCP Controller Datasheet

TYPE 2HSPCP

Class 1, Div 2 hazardous area controller



The type 2HSPCP controller has been designed specifically for hazardous area tank heating applications.

The control package consists of two NEMA 7 thermostats for process temperature control and over-temperature control, factory pre wired to a NEMA 4X heater junction box that can accommodate up to 6 heaters. All inter wiring between thermostats and heater junction box is completed in rigid conduit and sealed as per NEC regulations. All components are mounted to an FRP mounting plate to form one, modular control unit that can be installed on or adjacent to the tank surface

Controller Specification.

System Capability	120Vac – 2.6 kW (240Vac also available)
Process thermostat	NEMA 7, 25 to 325° F
Over temperature thermostat	NEMA 7, 25 to 325° F
Thermostat switch rating	22A, 480 Vac
Capillary	10 ft long Stainless steel
Heater junction box rating	NEMA 4X
Enclosure size	8 x 6 x 4 inches
Terminal block	4 point, screw type, 30A 600 Vac
Heater On light	30 mm, full voltage pilot light
Mounting plate	0.375 inch thick FRP
Mounting plate size	20 x 15 inches