



Tank Heating Solutions

Our products do more in a wide range of applications. **Expect More.**

Introduction 3-4

Storage Tank Heaters - For large tanks or heat sensitive materials.

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Open coil pipe insert heater	12

Controls - Cost effective, remote contactor and SCR control panels up to (2) 48 amp circuits.

Quickship control panel	13
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Protherm Electric Storage Tank Heaters are used to maintain or raise the temperature of gases and fluids in tanks from -300°F to 1000°F for a variety of applications and industries. These heaters are designed with low watt density, open coil heating elements for uniform heating of even the most temperature sensitive materials. The open coil heating element consists of heavy gauge nickel-chromium alloy wire supported by ceramic insulators that are fastened to a strip of heavy sheet metal. The open coil heating element can be replaced without draining the tank.

The heating elements are installed in 3" NPS pipes of sufficient wall thickness to prevent the pipe from distorting from the heat generated. Multiple pipes are provided as required. The heater is mounted to the tank by one of three methods: ANSI flange mount, adapter box mount or with a custom rectangular flange.

Additionally this style heater often features built-on controls for a complete heater system.

kW & Sizing

When specifying a Storage Tank Heater you must first determine whether the application requires that the temperature be maintained or if the temperature needs to be raised. Below are the calculations for each application. You can also visit our website and utilize our online calculator; look for the free calculator link near the top of the page.

Maintain Temperature

To calculate the kW required to maintain the temperature of a tank you will need to determine the tank's surface area, process temperature to be maintained, minimum ambient temperature and the R-value of the insulation.

Surface area:

Round tank —

$$A \text{ (ft}^2\text{)} = (2 \times p \times r \times h) + (2 \times p \times r^2)$$

p = 3.14

r = radius (ft)

h = height (ft)

Rectangular tank —

$$A \text{ (ft}^2\text{)} = 2 \times [(l \times w) + (l \times h) + h \times w]$$

l = length (ft)

w = width (ft)

h = height (ft)

After determining the tank's surface area the maintain kW can be calculated as follows:

$$kW = (A \times (1/R) \times \Delta T(^{\circ}F) \times SF)/3412$$

A = surface area

R = R-value of the insulation

- Use 0.5 as the R-value of an uninsulated steel tank
- See the chart below for typical examples
- R-value = thickness (in.)/k-factor

ΔT = difference between the process set point temperature and lowest ambient temperature

SF = safety factor, recommended 1.2

3412 = conversion of BTU to kW

Insulation Type	R-Value/inch of thickness
Fiberglass	3.0
Mineral fiber	3.7
Calcium silicate	2.0
Open-cell polyurethane foam	3.6
Closed-cell polyurethane foam	6.0
Polyisocyanurate spray foam	6.0

Example:

A 42' diameter x 40' tall crude oil tank with R-6 insulation needs to be maintained at 75°F given a minimum ambient temperature of 10°F.

$$A = (2 \times 3.14 \times 21 \times 40) + (2 \times 3.14 \times 21^2)$$

$$A = 8044.68 \text{ ft}^2$$

$$kW = (8044.68 \times 1/6 \times 65 \times 1.2)/3412$$

$$kW = 30.65$$

Raise Temperature

The kW calculation to raise the temperature of a material in a tank (heat-up) starts with the same information required in the maintain application. Additionally we'll need the weight of the material to be heated, the specific heat of the material and the time required to heat the material from its start temperature to its end temperature. The kW calculation to raise the temperature is as follows:

$$kW_{\text{total}} = kW_{\text{heat-up}} + kW_{\text{maintain}}$$

$$kW_{\text{heat-up}} = [(M \times Cp \times \Delta T \times SF)/3412]/t$$

M = weight of the material in pounds
 Cp = Specific Heat, see examples in the chart
 ΔT = difference between the process set point (end) temperature and the start temperature
 SF = safety factor, recommended 1.2
 3412 = conversion of BTU to kW
 t = time in hours

$$kW_{\text{maintain}} = (A \times (1/R) \times \Delta T(^{\circ}\text{F}) \times SF)/3412$$

A = surface area
 R = R-value of the insulation
 • Use 0.5 as the R-value of an uninsulated steel tank

ΔT = difference between the process set point temperature and lowest ambient temperature
 SF = safety factor, recommended 1.2
 3412 = conversion of BTU to kW

Example:

A 4' x 6' x 12' tank with 1800 gallons of water needs to be heated from 60°F to 95°F in 3 hours. The tank has R-4 insulation and the minimum ambient temperature is 0°F.

To begin we need to convert the gallons of water to pounds:

$$\text{lbs} = G \times D_1$$

G = gallons
 D₁ = lbs per gallon from the chart below

$$\begin{aligned} \text{lbs} &= 1800 \times 8.34 \\ \text{lbs} &= 15,012 \end{aligned}$$

If the volume of the tank is stated in cubic feet (ft³) the formula looks like this:

$$\text{lbs} = C \times D_2$$

C = Cubic feet of material
 D₂ = lbs per ft³ from the chart next column

Material	D ₁ lbs/gallon	D ₂ lbs/ft ³	Specific Heat
water	8.34	62.4	1
#1 fuel oil	6.8	50.5	0.47
#2 fuel oil	7.2	53.9	0.44
#3,4 fuel oil	7.5	55.7	0.425
#5,6 fuel oil	7.9	58.9	0.41
Bunker C	8.15	61	0.5
SAE 10-50 weight oil	7.4	55.4	0.43
ethylene glycol	9.4	70	0.55
50% ethylene glycol/water	8.8	65.8	0.76

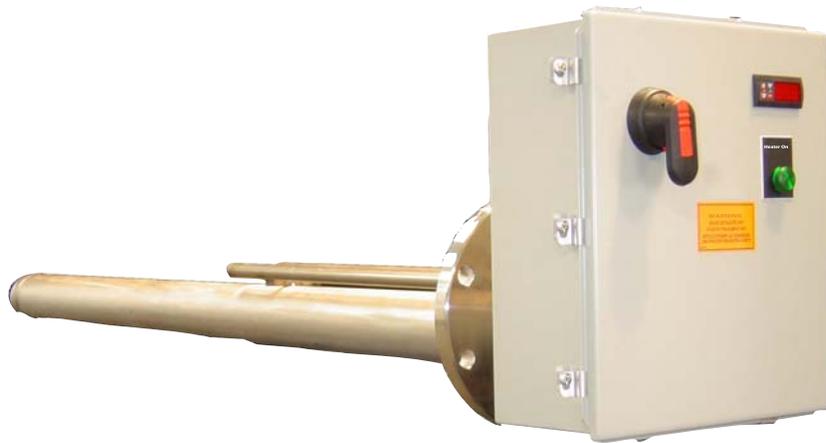
$$\begin{aligned} kW_{\text{heat-up}} &= [(M \times Cp \times \Delta T \times SF)/3412]/t \\ kW_{\text{heat-up}} &= [(15,012 \times 1 \times 35 \times 1.2)/3412]/3 \\ kW_{\text{heat-up}} &= 61.6 \end{aligned}$$

plus

$$\begin{aligned} kW_{\text{maintain}} &= (A \times (1/R) \times \Delta T(^{\circ}\text{F}) \times SF)/3412 \\ kW_{\text{maintain}} &= (288 \times 1/4 \times 95 \times 1.2)/3412 \\ kW_{\text{maintain}} &= 2.4 \end{aligned}$$

$$kW_{\text{total}} = 64$$

Flange mounted heater with controls

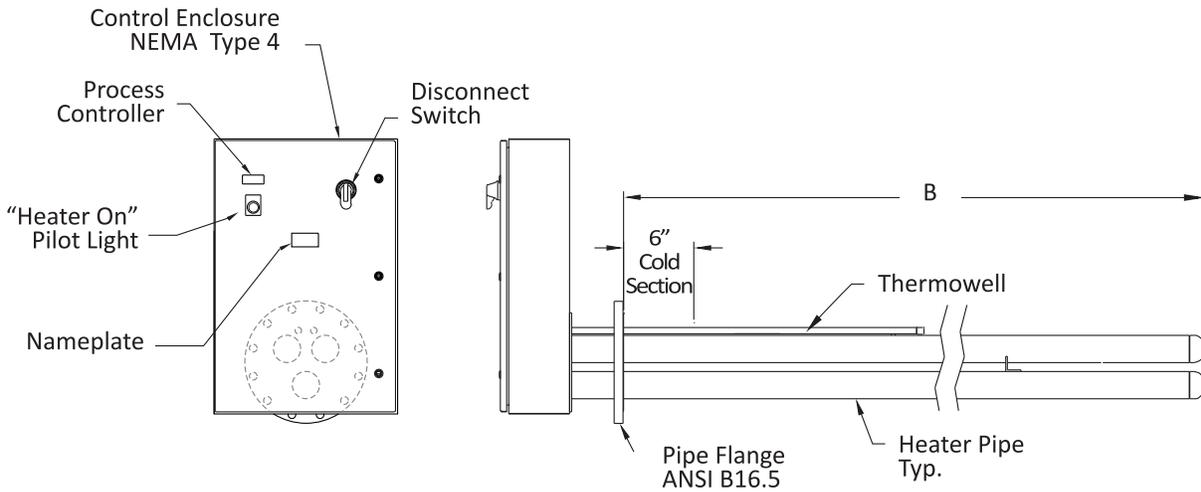


Construction features:

Heaters bolt to the tank via 150# ANSI raised face flange, rectangular flange or welded adapter box. Heating elements slide into a 3" Schedule 40 pipe and utilize our cost effective open coil pipe insert heaters. Heavy pipe wall provides up to 0.125" corrosion allowance. Available with several control and high limit protection options (see page 11 for more details). Heating element can easily be replaced without draining the tank.

304 SS Wetted Parts - 12 w/in² - With Built-on Controls

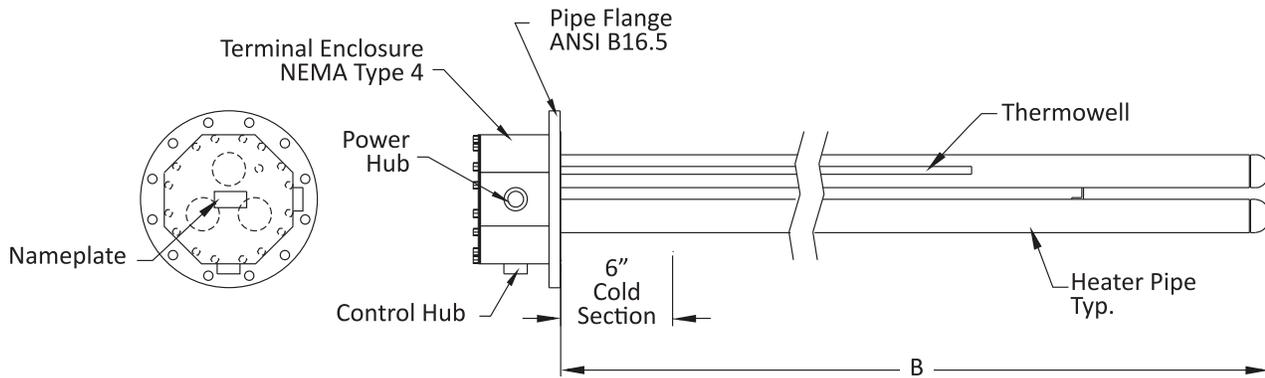
ANSI Flange Size	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
6	1	781-0060F1A412T5B2*	6	51	C	J	T	D	K	U
		781-0140F1A412T5B2*	14	112	—	—	T	—	—	U
		781-0240F1A412T5B2*	24	118	—	—	—	—	—	U
8	1	781-0140F1B412T5B2*	14	112	—	—	T	—	—	U
		781-0240F1B412T5B2*	24	118	—	—	—	—	—	U
8	2	781-0120F2B412T5B2*	12	51	C	J	T	D	K	U
		781-0280F2B412T5B2*	28	112	—	—	T	—	—	U
		781-0320F2B412T5B2*	32	127	—	—	—	—	—	U
		781-0480F2B412T5B2*	48	188	—	—	—	—	—	U
10	2	781-0280F2C412T5B2*	28	112	—	—	T	—	—	U
		781-0320F2C412T5B2*	32	127	—	—	—	—	—	U
10	3	781-0180F3C412T5B2*	18	51	C	J	T	D	K	U
		781-0420F3C412T5B2*	42	112	—	—	T	—	—	U
		781-0480F3C412T5B2*	48	127	—	—	—	—	—	U
		781-0720F3C412T5B2*	72	188	—	—	—	—	—	U
12	3	781-0420F3D412T5B2*	42	112	—	—	T	—	—	U
		781-0720F3D412T5B2*	72	188	—	—	—	—	—	U
12	4	781-0240F4D412T5B2*	24	51	C	J	T	D	K	U
		781-0560F4D412T5B2*	56	112	—	—	T	—	—	U
		781-0640F4D412T5B2*	64	127	—	—	—	—	—	U
		781-0960F4D412T5B2*	96	188	—	—	—	—	—	U



Carbon Steel Wetted Parts - 3 w/in² - With Built-on Controls

ANSI Flange Size	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
6	1	781-0015F1AC03T5B2*	1.5	51	C	J	T	D	K	U
		781-0045F1AC03T5B2*	4.5	142	C	J	T	D	K	U
		781-0060F1AC03T5B2*	6	188	C	J	T	D	K	U
8	1	781-0045F1BC03T5B2*	4.5	142	C	J	T	D	K	U
		781-0060F1BC03T5B2*	6	188	C	J	T	D	K	U
8	2	781-0030F2BC03T5B2*	3	51	C	J	T	D	K	U
		781-0090F2BC03T5B2*	9	142	C	J	T	D	K	U
		781-0120F2BC03T5B2*	12	188	C	J	T	D	K	U
		781-0140F2BC03T5B2*	14	218	—	J	T	D	K	U
10	2	781-0090F2CC03T5B2*	9	142	C	J	T	D	K	U
		781-0120F2CC03T5B2*	12	188	C	J	T	D	K	U
10	3	781-0045F3CC03T5B2*	4.5	51	C	J	T	D	K	U
		781-0135F3CC03T5B2*	13.5	142	C	J	T	D	K	U
		781-0180F3CC03T5B2*	18	188	C	J	T	D	K	U
		781-0210F3CC03T5B2*	21	218	—	J	T	D	K	U
12	3	781-0135F3DC03T5B2*	13.5	142	C	J	T	D	K	U
		781-0180F3DC03T5B2*	18	188	C	J	T	D	K	U
12	4	781-0060F4DC03T5B2*	6	51	C	J	T	D	K	U
		781-0180F4DC03T5B2*	18	142	C	J	T	D	K	U
		781-0240F4DC03T5B2*	24	188	C	J	T	D	K	U
		781-0280F4DC03T5B2*	28	218	—	J	T	D	K	U

Flange mounted heater without controls



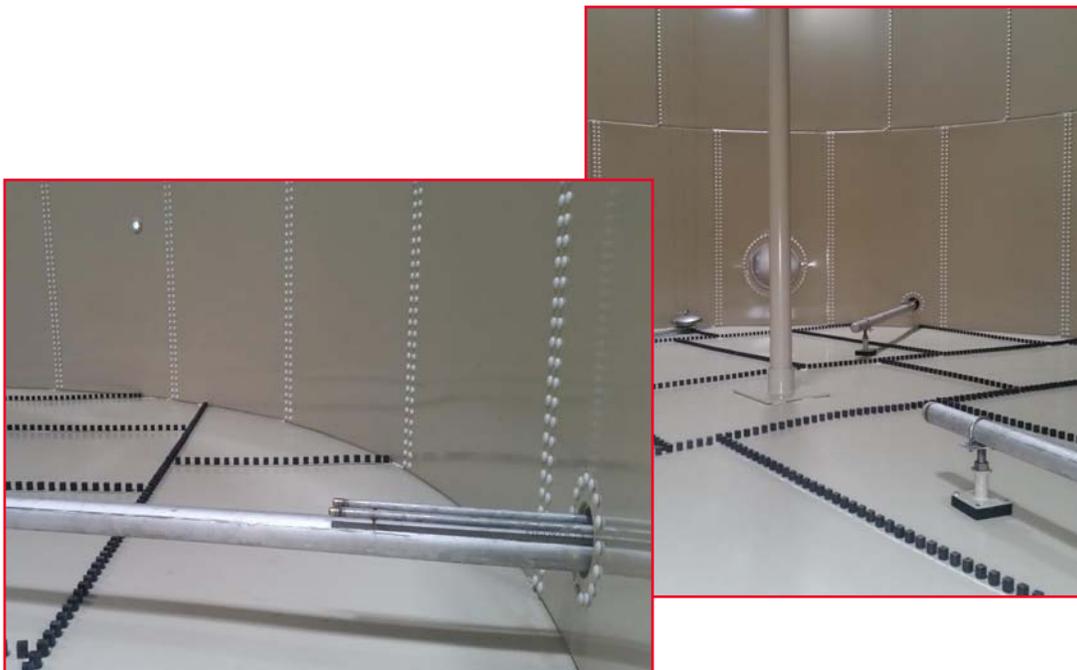
304 SS Wetted Parts - 12 w/in² - With No Controls

ANSI Flange Size	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
6	1	781-0060F1A412W1W1*	6	51	C	J	T	D	K	U
		781-0140F1A412W1W1*	14	112	-	-	T	-	-	U
		781-0240F1A412W1W1*	24	188	-	-	-	-	-	U
8	1	781-0140F1B412W1W1*	14	112	-	-	T	-	-	U
		781-0240F1B412W1W1*	24	188	-	-	-	-	-	U
8	2	781-0120F2B412W1W1*	12	51	C	J	T	D	K	U
		781-0280F2B412W1W1*	28	112	-	-	T	-	-	U
		781-0320F2B412W1W1*	32	127	-	-	-	-	-	U
		781-0480F2B412W1W1*	48	188	-	-	-	-	-	U
10	2	781-0280F2C412W1W1*	28	112	-	-	T	-	-	U
		781-0320F2C412W1W1*	32	127	-	-	-	-	-	U
10	3	781-0180F3C412W1W1*	18	51	C	J	T	D	K	U
		781-0420F3C412W1W1*	42	112	-	-	T	-	-	U
		781-0480F3C412W1W1*	48	127	-	-	-	-	-	U
		781-0720F3C412W1W1*	72	188	-	-	-	-	-	U
12	3	781-0420F3D412W1W1*	42	112	-	-	T	-	-	U
		781-0720F3D412W1W1*	72	188	-	-	-	-	-	U
12	4	781-0240F4D412W1W1*	24	51	C	J	T	D	K	U
		781-0560F4D412W1W1*	56	112	-	-	T	-	-	U
		781-0640F4D412W1W1*	64	127	-	-	-	-	-	U
		781-0960F4D412W1W1*	96	188	-	-	-	-	-	U

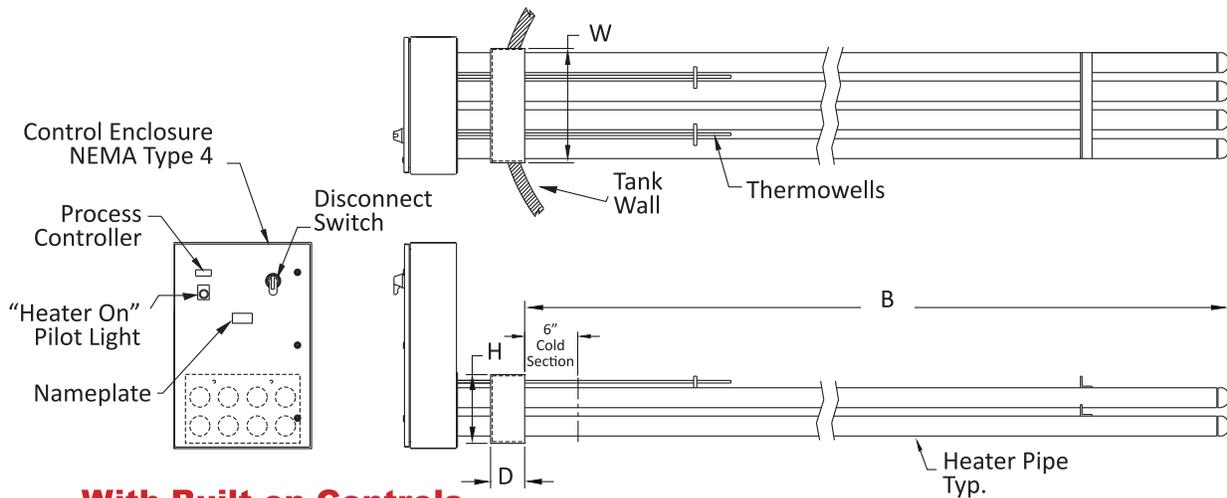
Carbon Steel Wetted Parts - 3 w/in² - With No Controls

ANSI Flange Size	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
6	1	781-0015F1AC03W1W1*	1.5	51	C	J	T	D	K	U
		781-0045F1AC03W1W1*	4.5	142	C	J	T	D	K	U
		781-0060F1AC03W1W1*	6	188	C	J	T	D	K	U
8	1	781-0045F1BC03W1W1*	4.5	142	C	J	T	D	K	U
		781-0060F1BC03W1W1*	6	188	C	J	T	D	K	U
8	2	781-0030F2BC03W1W1*	3	51	C	J	T	D	K	U
		781-0090F2BC03W1W1*	9	142	C	J	T	D	K	U
		781-0120F2BC03W1W1*	12	188	C	J	T	D	K	U
		781-0140F2BC03W1W1*	14	218	—	J	T	D	K	U
10	2	781-0090F2CC03W1W1*	9	142	C	J	T	D	K	U
		781-0120F2CC03W1W1*	12	188	C	J	T	D	K	U
10	3	781-0045F3CC03W1W1*	4.5	51	C	J	T	D	K	U
		781-0135F3CC03W1W1*	13.5	142	C	J	T	D	K	U
		781-0180F3CC03W1W1*	18	188	C	J	T	D	K	U
		781-0210F3CC03W1W1*	21	218	—	J	T	D	K	U
12	3	781-0135F3DC03W1W1*	13.5	142	C	J	T	D	K	U
		781-0180F3DC03W1W1*	18	188	C	J	T	D	K	U
12	4	781-0060F4DC03W1W1*	6	51	C	J	T	D	K	U
		781-0180F4DC03W1W1*	18	142	C	J	T	D	K	U
		781-0240F4DC03W1W1*	24	188	C	J	T	D	K	U
		781-0280F4DC03W1W1*	28	218	—	J	T	D	K	U

Typical tank arrangement with multiple heaters in a large tank



Adapter Box Mounted Heater



With Built-on Controls

304SS Wetted Parts - 12 w/in²

Adapter Box Size D x H x W	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
5" x 8" x 20"	4	781-0240A14412T5B2*	24	51	C	J	T	D	K	U
		781-0960A14412T5B2*	96	188	—	—	—	—	—	—
5" x 15" x 20"	8	781-1120A24412T5B2*	112	112	—	—	T	—	—	U
		781-1920A24412T5B2*	192	188	—	—	—	—	—	U
5" x 22" x 20"	12	781-1680A34412T5B2*	168	112	—	—	T	—	—	U
		781-2880A34412T5B2*	288	188	—	—	—	—	—	U

Carbon Steel Wetted Parts - 3 w/in²

Adapter Box Size D x H x W	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
5" x 8" x 20"	4	781-0180A14C03T5B2*	18	142	C	J	T	D	K	U
		781-0300A14C03T5B2*	30	233	—	—	T	D	K	U
5" x 15" x 20"	8	781-0360A24C03T5B2*	36	142	C	J	T	D	K	U
		781-0600A24C03T5B2*	60	233	—	—	T	D	K	U
5" x 22" x 20"	12	781-0540A34C03T5B2*	54	142	C	J	T	D	K	U
		781-0900A34C03T5B2*	90	233	—	—	T	D	K	U

Without Controls

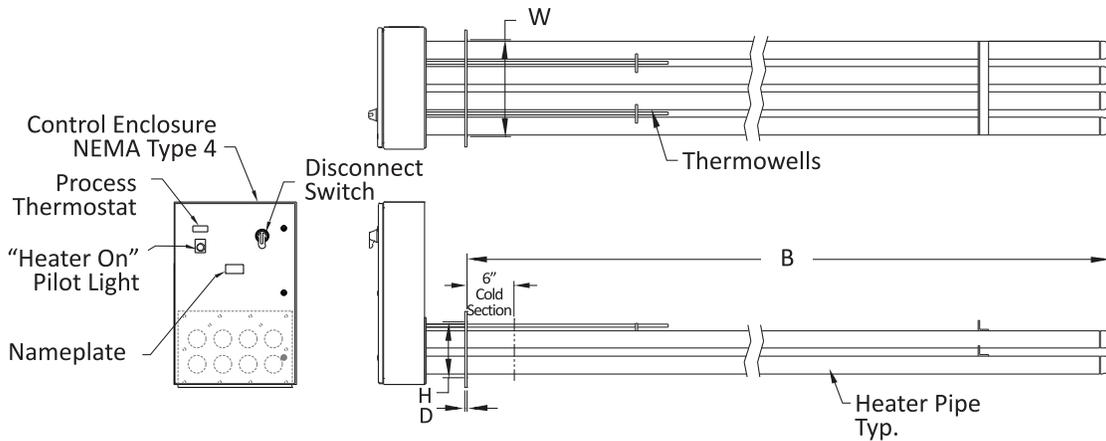
304SS Wetted Parts - 12 w/in²

Adapter Box Size D x H x W	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
5" x 8" x 20"	4	781-0240A14412W1W1*	24	51	C	J	T	D	K	U
		781-0960A14412W1W1*	96	188	—	—	—	—	—	—
5" x 15" x 20"	8	781-1120A24412W1W1*	112	112	—	—	T	D	K	U
		781-1920A24412W1W1*	192	188	—	—	—	—	—	—
5" x 22" x 20"	12	781-1680A34412W1W1*	168	112	—	—	T	—	—	U
		781-2880A34412W1W1*	288	188	—	—	—	—	—	—

Carbon Steel Wetted Parts - 3 w/in²

Adapter Box Size D x H x W	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
5" x 8" x 20"	4	781-0180A14C03W1W1*	18	142	C	J	T	D	K	U
		781-0300A14C03W1W1*	30	233	—	—	T	D	K	U
5" x 15" x 20"	8	781-0360A24C03W1W1*	36	142	C	J	T	D	K	U
		781-0600A24C03W1W1*	60	233	C	J	T	D	K	U
5" x 22" x 20"	12	781-0540A34C03W1W1*	54	142	C	J	T	D	K	U
		781-0900A34C03W1W1*	90	233	—	J	T	D	K	U

Rectangular Flange Mounted Heater



With Built-on Controls

304SS Wetted Parts - 12 w/in²

Rectangular Flange Size D x H x W Opening	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
1/2" x 8" x 20"	4	781-0240P14412T5B2*	24	51	C	J	T	D	K	U
		781-0960P14412T5B2*	96	188	—	—	—	—	—	—
1/2" x 15" x 20"	8	781-1120P24412T5B2*	112	112	—	—	T	—	—	U
		781-1920P24412T5B2*	192	188	—	—	—	—	—	U
1/2" x 22" x 20"	12	781-1680P34412T5B2*	168	112	—	—	T	—	—	U
		781-2880P34412T5B2*	288	188	—	—	—	—	—	U

Carbon Steel Wetted Parts - 3 w/in²

Rectangular Flange Size D x H x W Opening	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
1/2" x 8" x 20"	4	781-0180P14C03T5B2*	18	142	C	J	T	D	K	U
		781-0300P14C03T5B2*	30	233	—	—	T	D	K	U
1/2" x 15" x 20"	8	781-0360P24C03T5B2*	36	142	C	J	T	D	K	U
		781-0600P24C03T5B2*	60	233	—	—	T	D	K	U
1/2" x 22" x 20"	12	781-0540P34C03T5B2*	54	142	C	J	T	D	K	U
		781-0900P34C03T5B2*	90	233	—	—	T	D	K	U

Without Controls

304SS Wetted Parts - 12 w/in²

Rectangular Flange Size D x H x W Opening	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
1/2" x 8" x 20"	4	781-0240P14412W1W1*	24	51	C	J	T	D	K	U
		781-0960P14412W1W1*	96	188	—	—	—	—	—	—
1/2" x 15" x 20"	8	781-1120P24412W1W1*	112	112	—	—	T	—	—	U
		781-1920P24412W1W1*	192	188	—	—	—	—	—	U
1/2" x 22" x 20"	12	781-1680P34412W1W1*	168	112	—	—	T	—	—	U
		781-2880P34412W1W1*	288	188	—	—	—	—	—	U

Carbon Steel Wetted Parts - 3 w/in²

Rectangular Flange Size D x H x W Opening	Number of Pipes	Catalog Number (*add the appropriate voltage code)	kW	"B" dim. (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
1/2" x 8" x 20"	4	781-0180P14C03W1W1*	18	142	C	J	T	D	K	U
		781-0300P14C03W1W1*	30	233	—	—	T	D	K	U
1/2" x 15" x 20"	8	781-0360P24C03W1W1*	36	142	C	J	T	D	K	U
		781-0600P24C03W1W1*	60	233	—	—	T	D	K	U
1/2" x 22" x 20"	12	781-0540P34C03W1W1*	54	142	C	J	T	D	K	U
		781-0900P34C03W1W1*	90	233	—	—	T	D	K	U

Storage Tank Heater Catalog Numbering System

7	8	1	-	0075	F1A	4	12	T1	B2	U
---	---	---	---	------	-----	---	----	----	----	---

Heater kW rating
(round to nearest 0.1 kW)
0075 = 7.5 kW

Mounting

Type	Code	Size
ANSI FLANGE*	F1A	6-150# (1 pipe)
ANSI FLANGE*	F1B or F2B	8-150# (1 or 2 pipes)
ANSI FLANGE*	F1C, F2C, F3C	10-150# (1, 2, or 3 pipes)
ANSI FLANGE*	F1D, F2D, F3D, or F4D	12-150# (1-4 pipes)
Adapter box	A14	1 row, 4 pipes/row
Adapter box	A26	2 rows, 6 pipes/row
Rect mtg plate	P18	1 row, 8 pipes/row
Rect mtg plate	P24	2 rows, 4 pipes/row

* Replace "F" with "G" for 300# flange rating

Wetted Materials (mounting flange and pipes)

C= carbon steel
4= 304/304L SST
6= 316/316L SST

Watt Density (03-12 max)

03= 3 watts/sq inch (standard for heavy oils/pitch)
09= 9 watts/sq inch (light oils and misc fluids)
12= 12 watts/sq inch (for water applications)

Control Method

00= no controls	JT= no controls, type J process T/C only
B1= ON/OFF bulb&cap tstat 0-100° F	KT= no controls, type K process T/C only
B2= ON/OFF bulb&cap tstat 60-250° F	T1= ON/OFF - digital thermostat type J T/C
B5= ON/OFF bulb&cap tstat 200-550° F	T2= ON/OFF - digital thermostat type K T/C
E0= SCR w/customer suppl 3-32 VDC pulse	T3= ON/OFF - 1/16 DIN ctrlr type J T/C
E1= SCR w/1/16 DIN ctrlr - type J T/C input	T4= ON/OFF - 1/16 DIN ctrlr type K T/C
E2= SCR w/1/16 DIN ctrlr - type K T/C input	T5= ON/OFF - digital thermostat with thermistor
E3= SCR Customer supplied 4-20mA input	W1= thermowell for customer sensor (1/2NPS sch 40 pipe)
E4= SCR Customer supplied 0-10VDC input	

Over-temperature options

00= no over-temperature control
B1= ON/OFF bulb&cap tstat 0-100° F (process sensor)
B2= ON/OFF bulb&cap tstat 60-250° F (process sensor)
B5= ON/OFF bulb&cap tstat 200-550° F (process sensor)
JH= type J process high limit T/C (sheath sensor)
KH= type K process high limit T/C (sheath sensor)
S1= Limit Ctrlr (32-999° F) type J T/C input (sheath sensor)
S2= Limit Ctrlr (32-999° F) type K T/C input (sheath sensor)
S3= DIN Limit Ctrlr (32-1600° F) type J T/C input (sheath sensor)
S4= DIN Limit Ctrlr (32-1600° F) type K T/C input (sheath sensor)
W1= thermowell for customer sensor - process sensor (1/2NPS sch 40 pipe)
W2= thermowell for customer sensor - sheath sensor (1/2NPS sch 40 pipe)

Voltage Code

A = 115/1
B = 120/1
C = 208/1
D = 208/3
E = 220/1
F = 220/3
G = 230/1
H = 230/3
J = 240/1
K = 240/3
N = 277/1
T = 480/1
U = 480/3
W = 575/1
X = 575/3
Y = 600/1
Z = 600/3

Pipe Insert Heater

Open Coil Pipe Insert Heaters are designed to insert into a horizontal 3" pipe (pipe supplied by others) mounted just above the anticipated sludge level in the tank and below the expected minimum operational fluid level. These units provide a low watt density over a large surface area and can be used to heat sensitive fluids. Advantages include the ability to change the element without draining the tank and to provide up to a Schedule 80 pipe wall in mildly corrosive fluids.

Pipe Insert Heater Catalog Number System

7	9	7	-	0075	-	12	-	12	-	U
---	---	---	---	------	---	----	---	----	---	---

Heater kW rating
(round to nearest .1 kW)
0075 = 7.5 kW

Watt Density (03-12 max)

- 03= 3 watts/sq inch (standard for heavy oils/pitch)
- 09= 9 watts/sq inch (light oils and misc fluids)
- 12= 12 watts/sq inch (for water applications)

Cold length (inches)

- 06 = 6" cold length, standard for heater with NO CONTROLS (pg 7&8)
- 12 = 12" cold length, standard for heater with WITH CONTROLS (pg 5&6)

Voltage Code

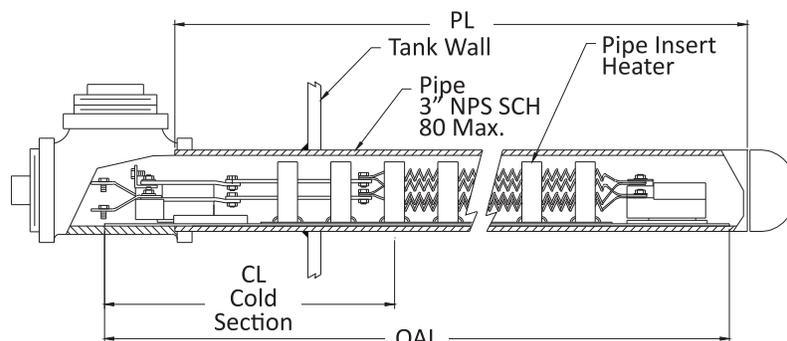
- C = 208/1
- D = 208/3
- J = 240/1
- K = 240/3
- U = 480/3
- T = 480/1

Insert Heaters for use in Tank Heaters WITH Built-in Controls (pg 5&6)

Catalog Number (*add the appropriate voltage code)	kW	"CL" Cold Length	Heater "B" Dim (inches)	Pipe "PL" dim (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
12 w/in²										
797-0060-12-12-*	6	12	51	49	C	J	T	D	K	U
797-0140-12-12-*	14	12	112	110	-	-	T	-	-	U
797-0160-12-12-*	16	12	127	125	-	-	-	-	-	U
797-0240-12-12-*	24	12	188	186	-	-	-	-	-	U
3 w/in²										
797-0015-03-12-*	1.5	12	51	49	C	J	T	D	K	U
797-0045-03-12-*	4.5	12	142	140	C	J	T	D	K	U
797-0060-03-12-*	6	12	188	186	C	J	T	D	K	U
797-0070-03-12-*	7	12	218	216	-	J	T	D	K	U

Insert Heaters for use in Tank Heaters WITHOUT Built-in Controls (pg 7&8)

Catalog Number (*add the appropriate voltage code)	kW	"CL" Cold Length	Heater "B" Dim (inches)	Pipe "PL" dim (inches)	Availability					
					1 Phase			3 Phase		
					208V	240V	480V	208V	240V	480V
12 w/in²										
797-0060-12-06-*	6	6	51	49	C	J	T	D	K	U
797-0140-12-06-*	14	6	112	110	-	-	T	-	-	U
797-0160-12-06-*	16	6	127	125	-	-	-	-	-	U
797-0240-12-06-*	24	6	188	186	-	-	-	-	-	U
3 w/in²										
797-0015-03-06-*	1.5	6	51	49	C	J	T	D	K	U
797-0045-03-06-*	4.5	6	142	140	C	J	T	D	K	U
797-0060-03-06-*	6	6	188	186	C	J	T	D	K	U
797-0070-03-06-*	7	6	218	216	-	J	T	D	K	U



Quick Ship Control Panel



Quick Ship Control Panel - Provides fast shipment, compact packaging, and is pre-engineered for resistive load applications. Each panel is completely assembled, pre-wired, tested and ready for trouble free installation and operation.

Designed for use in industrial environments and outdoor installations.⁴

Standard Construction Features:

- Single or three phase loads
- 120 VAC control transformer
- UL Listed
- Wiring diagram permanently affixed to the inside of the cover
- Terminals for customer supplied remote interlock

Standard Contactor Panel Features:

- NEMA 4X fiberglass enclosure
 - 16" x 14" x 8" for 1 circuit (48 amps max.)
 - 20" x 16" x 8" for 2 circuits (96 amps max.)
- 50 amp contactor for resistive loads (per circuit)

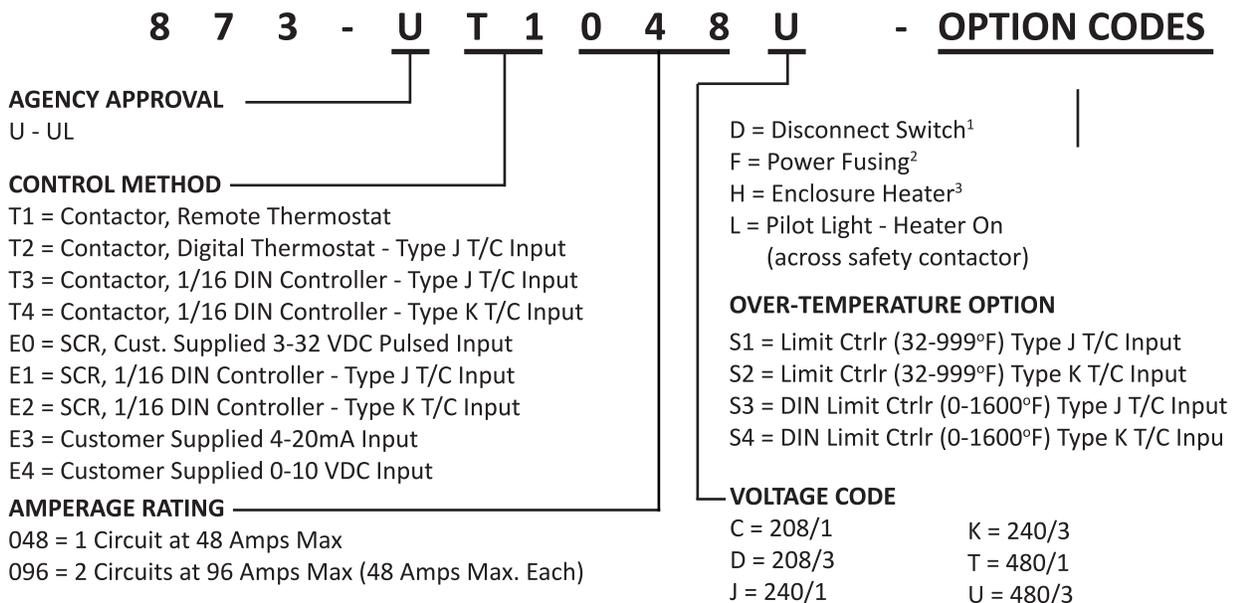
Standard SCR Panel Features:

- NEMA 4/12 painted, carbon steel enclosure
 - 20" x 16" x 8" for 1 circuit (48 amp max.)
 - 24" x 20" x 8" for 2 circuit (96 amps max.)
- 50 amp SCR power controller (per circuit)
- 50 amp safety contactor (per circuit)

Optional Features:

- Disconnect switch¹
- Power fusing²
- Enclosure heater³
- Pilot light to indicate heater "ON"
- Digital indicating thermostat (°F only) 32-999°F range
- Digital 1/16th DIN process controller with RS485 communications available (°F or °C) 0-1600°F range
- Digital indicating limit controller with manual reset (°F only) 32-999°F range
- Digital 1/16th DIN limit controller with manual reset (°F or °C) 0-1600°F range

Ordering Information, build your Quick Ship Controls Panel part number

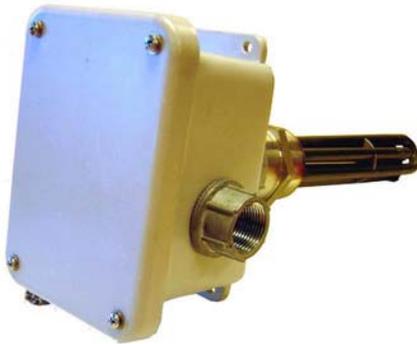


Note:

1. NEC code requires disconnecting means within sight of a heater.
2. Power fusing is required by NEC for panels greater than 48 amps.
3. Heater is recommended for outdoor panels in cold environments with ambient below 32°F.
4. Although designed and tested for use in outdoor locations, UL rating is Type 1 only.

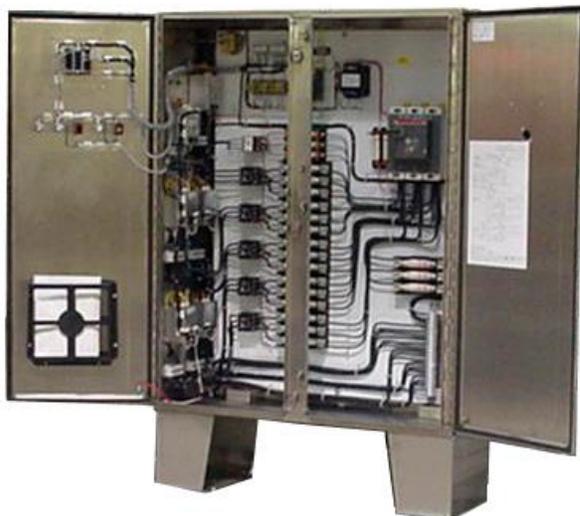
Additional Solutions

Flange Heater — Utilizes standard ANSI flanges with steel, 304 stainless steel, incoloy 800, or copper elements to heat a variety of fluids.



Pipe Thread Heater — Available in 1", 1-1/4", 2", 2-1/2" NPT with steel, 304 stainless steel, incoloy or copper elements to heat a variety of fluids.

Circulation Heater — Utilizing a pipe thread or flange heater with a pressure vessel, circulation heaters are designed to your specific application.



Heater Control Panel Protherm manufactures a control panel to complement every heater offered.



When you need more
than an off-the-shelf,
standardized product.

Ask **More.**