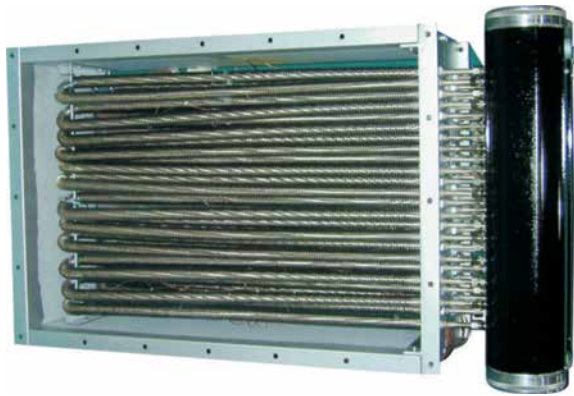


# RXDF Series Explosion-Proof Duct Heaters



## Application

Ruffneck™ RXDF duct heaters are designed for heating air or gases potentially containing explosive substances.

Designed for Application in Hazardous Environments, such as:

- Oil refineries
- Coal mines
- Pulp and paper mills
- Petrochemical plants
- Grain elevators
- Sewage treatment plants

RXDF heaters feature the unique Ruffneck™ approach to explosion-proof electric heater design which embodies safety, reliability and economic value. The RXDF heater is a factory pre-wired explosion-proof duct heater. Standard models are available in three duct sizes, with either a single or double bank of heating modules. RXDF heaters are available as standard units with a T2D, T3A or T3B hazardous area temperature codes.

## Construction

The RXDF explosion-proof duct heater utilizes heavy walled carbon steel finned tubular elements with nickel plated finish to provide safe, efficient, low temperature heat transfer. Standard units have a painted steel duct with mounting holes provided for attachment to the duct section.

RXDF heaters feature the unique copper free aluminum extruded **x-Max**® terminal housing (U.S. Pat. No. 5,798,910, CDN. Pat. No. 2,212,500). A track and trolley system and threaded covers at each end allow easy access to wiring terminal connections. Units are approved for mounting in a horizontal duct section.

## Wattage

Units are available in wattages up to 50 kW.

## Control Panels

Control panel options are shown in Control Packages, page 55

## Thermostats

Thermon Heating Systems, Inc. offers a wide variety of explosion-proof thermostats to suit most every need. All model RXDF heaters are available with remote externally adjustable thermostats which are field convertible to tamper-proof.

## Heater Selection

Standard Ruffneck™ RXDF duct heaters may be operated in hazardous areas where the ambient temperature does not exceed 104°F (40°C) and the maximum heater surface temperature does not exceed the temperature code rating.

Use the following steps for heater selection.

1. Determine temperature code rating Standard heaters are available for the T2D, T3A or T3B areas.
2. Determine kW rating Standard heaters are available up to 50 kW.
3. Determine duct size Three standard sizes are available and transition sections can be provided for other duct sizes.
4. Verify air flow requirements Table 29, page 53 lists the minimum air flow (SCFM) required for each heater type.
5. Verify temperature rise using the following formula:  
$$\frac{^{\circ}\text{F Temperature Rise}}{^{\circ}\text{F temp. rise} = \frac{\text{kW} \times 3000}{\text{SCFM}}}$$
$$\frac{^{\circ}\text{C Temperature Rise}}{^{\circ}\text{C temp. rise} = \frac{\text{kW} \times 47.2}{\text{m}^3/\text{min}}}$$
6. Determine power supply voltage and phase. Standard units are available in 208, 240, 480 or 600 V (3-phase). Optional 1-phase units also available.



Figure 15



## Standard Heater Features

- T2D, T3A or T3B temperature code
- Painted steel duct section
- Differential pressure switch
- Factory installed high limit sensing thermocouples

## Optional Features

- Transition sections
- Stainless steel duct section
- Mechanical temperature control
- Outlet air thermocouple
- Special temperature code
- Outlet air thermostat

## To Order Specify

- Quantity
- Catalog number
- Voltage
- Phase
- Wattage
- Hazardous location designation
- Temperature code
- Control package
- Optional Features

Table 28 – Dimensions

Duct Size		A		B		C		D		L	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
24 x 12	610 x 305	24.0	610	12.0	305	27.0	686	15.0	381	36.5	927
30 x 18	762 x 457	30.0	762	18.0	457	33.0	838	21.0	533	42.5	1080
36 x 24	914 x 610	36.0	914	24.0	610	39.0	991	27.0	686	48.5	1232

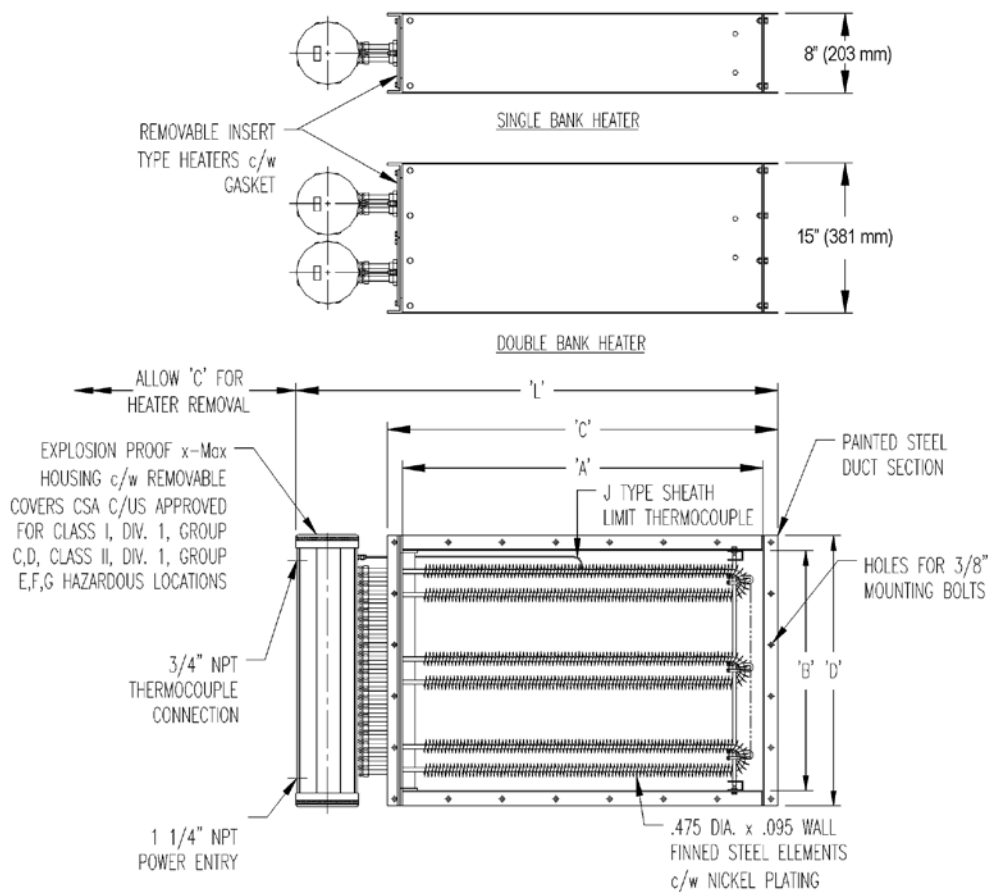


Figure 16

Table 29 – Heater Specifications for High Temperature Rise Units

Duct Size (A x B)		No. of Heating Banks	kW	Available Voltages		High Temperature Rise Units - T2D (482°F / 215°C)						Net Weight									
				208 V	240 V, 480 V, 600 V	Class I, Div. 1 & 2, Groups C, D															
						Temp. Code	Catalog No.	Max. Temp. Rise		Min. Air Flow	Min. Air Flow										
in	mm	3Ø	3Ø	°F	°C			SCFM	m³/min	lbs	kg										
24 x 12	610 x 305	1	2.5	✓	✓	T2D	RXDF1-24X12-025T2D	13.9	7.7	540	15.3	90	41								
			3.75				RXDF1-24X12-038T2D	20.8	11.6	540	15.3										
			5				RXDF1-24X12-050T2D	19.7	11.0	761	21.6										
			7.5				RXDF1-24X12-075T2D	18.0	10.0	1247	35.3										
		2	5				RXDF2-24X12-050T2D	27.8	15.4	540	15.3	160	73								
			7.5				RXDF2-24X12-075T2D	41.7	23.2	540	15.3										
			10				RXDF2-24X12-100T2D	39.4	21.9	761	21.6										
			15				RXDF2-24X12-150T2D	36.1	20.1	1247	35.3										
30 x 18	762 x 457	1	5	✓	✓	T2D	RXDF1-30X18-050T2D	14.8	8.2	1013	29.2	135	61								
			5.25				RXDF1-30X18-063T2D	18.5	10.3	1013	29.2										
			7.5				RXDF1-30X18-075T2D	22.2	12.3	1013	29.2										
			10				RXDF1-30X18-100T2D	19.6	10.8	1538	43.6										
			12.5				RXDF1-30X18-125T2D	18.9	10.5	1989	56.3										
			15				RXDF1-30X18-150T2D	18.4	10.2	2440	69.1										
		2	10				RXDF2-30X18-100T2D	29.5	16.5	1013	29.2	250	114								
			12.5				RXDF2-30X18-125T2D	37.0	20.6	1013	29.2										
			15				RXDF2-30X18-150T2D	44.5	24.7	1013	29.2										
			20				RXDF2-30X18-200T2D	39.0	21.7	1538	43.6										
			25				RXDF2-30X18-250T2D	37.7	21.0	1989	56.3										
			30				RXDF2-30X18-300T2D	36.9	20.5	2440	69.1										
			36 x 24				914 x 610	1	7.5	✓	✓			T2D	RXDF1-36X24-075T2D	13.9	7.7	1620	45.9	180	82
									10						RXDF1-36X24-100T2D	18.5	10.3	1620	45.9		
									12.5						RXDF1-36X24-125T2D	23.2	12.9	1620	45.9		
									15						RXDF1-36X24-150T2D	20.2	11.2	2230	63.1		
20	RXDF1-36X24-200T2D	19.3		10.7	3115	88.2															
25	RXDF1-36X24-250T2D	18.8		10.4	4000	113.3															
2	15	RXDF2-36X24-150T2D		27.8	15.4	1620		45.9	325			148									
	20	RXDF2-36X24-200T2D		37.0	20.6	1620		45.9													
	25	RXDF2-36X24-250T2D		46.3	25.7	1620		45.9													
	30	RXDF2-36X24-300T2D		40.4	22.4	2230		63.1													
40	RXDF2-36X24-400T2D	38.5	21.4	3115	88.2																
50	RXDF2-36X24-500T2D	37.5	20.8	4000	113.3																

Table 30 – Heater Specifications for Low Temperature Rise Units

Duct Size (A x B)		No. of Heating Banks	kW	Available Voltages		Low Temperature Rise Units T3A (356°F / 180°C) or T3B (329°F / 165°C)						Net Weight	
				208 V	240 V, 480 V, 600 V	Class I, Div. 1 & 2, Groups C, D Class II, Div. 1 & 2, Groups E, F Class II, Division 1 & 2, Group G (T3B Units Only)				Temp Code	Catalog No.		
in	mm		3Ø	3Ø			°F	°C	SCFM			m³/min	lbs
24 x 12	610 x 305	1	2.5	✓	✓	T3B	RXDF1-24X12-025T3B	6.8	3.8	1107	31.3	90	41
			3.75			T3B	RXDF1-24X12-038T3B	8.4	4.7	1334	37.8		
			5			T3B	RXDF1-24X12-050T3B	9.6	5.3	1562	44.2		
			7.5			T3A	RXDF1-24X12-075T3A	13.0	7.2	1728	48.9		
		2	5			T3B	RXDF2-24X12-050T3B	13.6	7.5	1107	31.3	160	73
			7.5			T3B	RXDF2-24X12-075T3B	16.9	9.4	1334	37.8		
			10			T3B	RXDF2-24X12-100T3B	19.2	10.7	1562	44.2		
			15			T3A	RXDF2-24X12-150T3A	26.0	14.6	1728	48.9		
30 x 18	762 x 457	1	5	✓	✓	T3B	RXDF1-30X18-060T3B	7.1	4.0	2109	59.7	135	61
			5.25			T3B	RXDF1-30X18-063T3B	8.0	4.5	2331	66.0		
			7.5			T3B	RXDF1-30X18-075T3B	8.8	4.9	2553	72.3		
			10			T3B	RXDF1-30X18-100T3B	10.0	5.6	2991	84.7		
			12.5			T3B	RXDF1-30X18-125T3B	10.9	6.1	3434	97.2		
			15			T3A	RXDF1-30X18-150T3A	13.5	7.5	3333	94.4		
		2	10			T3B	RXDF2-30X18-100T3B	14.2	7.9	2109	59.7	250	114
			12.5			T3B	RXDF2-30X18-125T3B	16.1	8.9	2331	66.0		
			15			T3B	RXDF2-30X18-150T3B	17.6	9.8	2553	72.3		
			20			T3B	RXDF2-30X18-200T3B	20.1	11.1	2991	84.7		
			25			T3B	RXDF2-30X18-250T3B	21.8	12.1	3434	97.2		
			30			T3A	RXDF2-30X18-300T3A	27.0	15.0	3333	94.4		
36 x 24	914 x 610	1	7.5	✓	T3B	RXDF1-36X24-075T3B	6.9	3.8	3256	92.2	180	82	
			10	✓	T3B	RXDF1-36X24-100T3B	8.1	4.5	3690	104.5			
			12.5	✓	T3B	RXDF1-36X24-125T3B	9.1	5.1	4125	116.8			
			15	✓	T3B	RXDF1-36X24-150T3B	9.9	5.5	4559	129.1			
			20	✓	T3B	RXDF1-36X24-200T3B	11.1	6.1	5428	153.7			
			25	-	T3A	RXDF1-36X24-250T3A	13.8	7.7	5427	153.7			
			2	15	✓	T3B	RXDF2-36X24-150T3B	13.8	7.7	3256			92.2
		20		✓	T3B	RXDF2-36X24-200T3B	16.3	9.0	3690	104.5			
		25		✓	T3B	RXDF2-36X24-250T3B	18.2	10.1	4125	116.8			
		30		✓	T3B	RXDF2-36X24-300T3B	19.7	11.0	4559	129.1			
		40		✓	T3B	RXDF2-36X24-400T3B	22.1	12.3	5428	153.7			
		50		-	T3B	RXDF2-36X24-500T3B	27.6	15.4	5427	153.7			
				-	T3A	RXDF2-36X24-500T3A	27.6	15.4	5427	153.7			

Note: For optional disconnect switch, add 'D' to end of catalog number.

# Control Packages

## Package #1 - Basic Unit (“ON/OFF” Control)

All standard features. Terminals are provided for connection to a remote “ON/OFF” temperature control and connection of differential air pressure switch.

## Package #2 - Built-in Temperature Controller

Same features as Package #1 except with factory installed digital temperature controller for control of outlet air temperature.

## Package #3 - SCR with Remote Temperature Controller

All standard features and a factory installed full load zero fired SCR with terminals provided for remote 4-20 mA temperature control signal and connection of differential air pressure switch.

## Package #4 - SCR with Built-in Temperature Controller

Same features as Package #3 except with factory installed digital temperature controller for control of outlet air temperature.

**Note:** Some amperage limits apply to packages #4 and #4 in E.P. Enclosure. Consult factory for details.

Table 31 – Control Panel Specifications: Type 4 Moisture Resistant

No. of Circuits	kW	Package #1 Basic Unit without Disconnect				Catalog No.			
		208 V 3Ø	240 V 3Ø	480 V 3Ø	600 V 3Ø	Package #1	Package #2	Package #3	Package #4
1	2.5	✓				RCPXD1-025R	RCPXD1-025TR	RCPXD1-025SR	RCPXD1-025STR
	3.75	✓				RCPXD1-038R	RCPXD1-038TR	RCPXD1-038SR	RCPXD1-038STR
	5	✓				RCPXD1-050R	RCPXD1-050TR	RCPXD1-050SR	RCPXD1-050STR
	6.25	✓				RCPXD1-063R	RCPXD1-063TR	RCPXD1-063SR	RCPXD1-063STR
	7.5	✓				RCPXD1-075R	RCPXD1-075TR	RCPXD1-075SR	RCPXD1-075STR
	10	✓	✓		✓	RCPXD1-100R	RCPXD1-100TR	RCPXD1-100SR	RCPXD1-100STR
	12.5	✓				RCPXD1-125R	RCPXD1-125TR	RCPXD1-125SR	RCPXD1-125STR
	15	✓				RCPXD1-150R	RCPXD1-150TR	RCPXD1-150SR	RCPXD1-150STR
	20	✓				RCPXD1-200R	RCPXD1-200TR	RCPXD1-200SR	RCPXD1-200STR
	25	-				RCPXD1-250R	RCPXD1-250TR	RCPXD1-250SR	RCPXD1-250STR
2	5	✓	✓	✓	✓	RCPXD2-050R	RCPXD2-050TR	RCPXD2-050SR	RCPXD2-050STR
	7.5	✓	✓	✓	✓	RCPXD2-075R	RCPXD2-075TR	RCPXD2-075SR	RCPXD2-075STR
	10	✓	✓	✓	✓	RCPXD2-100R	RCPXD2-100TR	RCPXD2-100SR	RCPXD2-100STR
	12.5	✓	✓	✓	✓	RCPXD2-125R	RCPXD2-125TR	RCPXD2-125SR	RCPXD2-125STR
	15	✓	✓	✓	✓	RCPXD2-150R	RCPXD2-150TR	RCPXD2-150SR	RCPXD2-150STR
	20	✓	✓	✓	✓	RCPXD2-200R	RCPXD2-200TR	RCPXD2-200SR	RCPXD2-200STR
	25	-	✓	✓	✓	RCPXD2-250R	RCPXD2-250TR	RCPXD2-250SR	RCPXD2-250STR
	30	-	-	-	-	RCPXD2-300R	RCPXD2-300TR	RCPXD2-300SR	RCPXD2-300STR
	40	-	-	-	-	RCPXD2-400R	RCPXD2-400TR	RCPXD2-400SR	RCPXD2-400STR
	50	-	-	-	-	RCPXD2-500R	RCPXD2-500TR	RCPXD2-500SR	RCPXD2-500STR

**Note:** For optional disconnect switch, add 'D' to end of catalog number.

# Control Packages

## Package #1 - Basic Unit (“ON/OFF” Control)

All standard features. Terminals are provided for connection to a remote “ON/OFF” temperature control and connection of differential air pressure switch.

## Package #2 - Built-in Temperature Controller

Same features as Package #1 except with factory installed digital temperature controller for control of outlet air temperature.

## Package #3 - SCR with Remote Temperature Controller

All standard features and a factory installed full load zero fired SCR with terminals provided for remote 4-20 mA temperature control signal and connection of differential air pressure switch.

## Package #4 - SCR with Built-in Temperature Controller

Same features as Package #3 except with factory installed digital temperature controller for control of outlet air temperature.

Table 32 – Control Panel Specifications: Explosion-Proof Class I, Group C, D, Class II, Group E, F, G

No. of Circuits	kW	Package #1 Basic Unit without Disconnect				Catalog No.			
		208 V 3Ø	240 V 3Ø	480 V 3Ø	600 V 3Ø	Package #1	Package #2	Package #3	Package #4
1	2.5	✓	✓			CPXD1-025X	CPXD1-025TX	CPX1-025SX	CPXD1-025STX
	3.75	✓	✓			CPXD1-038X	CPXD1-038TX	CPX1-038SX	CPXD1-038STX
	5	✓	✓			CPXD1-050X	CPXD1-050TX	CPX1-050SX	CPXD1-050STX
	6.25	✓	✓			CPXD1-063X	CPXD1-063TX	CPX1-063SX	CPXD1-063STX
	7.5	✓	✓			CPXD1-075X	CPXD1-075TX	CPX1-075SX	CPXD1-075STX
	10	✓	✓	✓	✓	CPXD1-100X	CPXD1-100TX	CPX1-100SX	CPXD1-100STX
	12.5	✓	✓			CPXD1-125X	CPXD1-125TX	CPX1-125SX	CPXD1-125STX
	15	✓	✓			CPXD1-150X	CPXD1-150TX	CPX1-150SX	CPXD1-150STX
	20	✓	✓			CPXD1-200X	CPXD1-200TX	CPX1-200SX	CPXD1-200STX
	25	-	-			CPXD1-250X	CPXD1-250TX	CPX1-250SX	CPXD1-250STX
2	5	✓	✓	✓	✓	CPXD2-050X	CPXD2-050TX	CPX2-050SX	CPXD2-050STX
	7.5	✓	✓	✓	✓	CPXD2-075X	CPXD2-075TX	CPX2-075SX	CPXD2-075STX
	10	✓	✓	✓	✓	CPXD2-100X	CPXD2-100TX	CPX2-100SX	CPXD2-100STX
	12.5	✓	✓	✓	✓	CPXD2-125X	CPXD2-125TX	CPX2-125SX	CPXD2-125STX
	15	✓	✓	✓	✓	CPXD2-150X	CPXD2-150TX	CPX2-150SX	CPXD2-150STX
	20	✓	✓	✓	✓	CPXD2-200X	CPXD2-200TX	CPX2-200SX	CPXD2-200STX
	25	-	✓	✓	✓	CPXD2-250X	CPXD2-250TX	CPX2-250SX	CPXD2-250STX
	30	-	-	-	✓	CPXD2-300X	CPXD2-300TX	CPX2-300SX	CPXD2-300STX
	40	-	-	-	-	CPXD2-400X	CPXD2-400TX	CPX2-400SX	CPXD2-400STX
	50	-	-	-	-	CPXD2-500X	CPXD2-500TX	CPX2-500SX	CPXD2-500STX

Note: For optional disconnect switch, add ‘D’ to end of catalog number.

# Wiring Diagrams

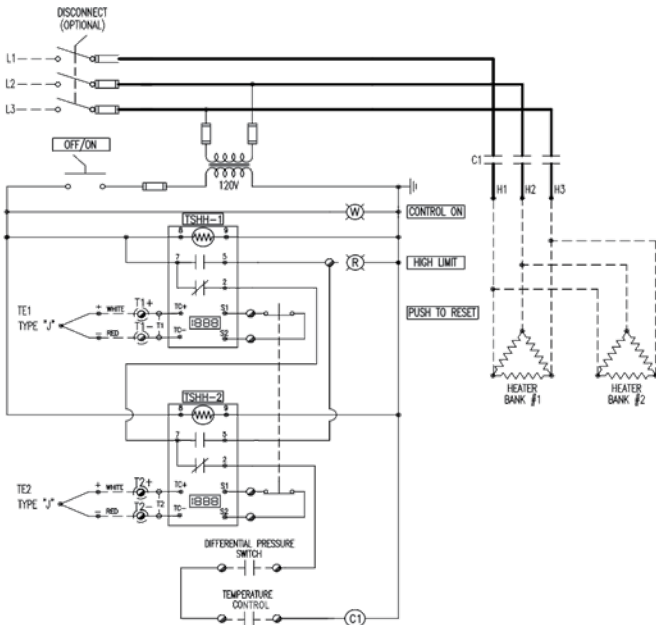


Figure 17 – Package #1 Basic Unit (“ON/OFF” Control)

**Note:**

One high limit control provided on single bank heaters.  
Two high limit controls provided on double bank heaters.

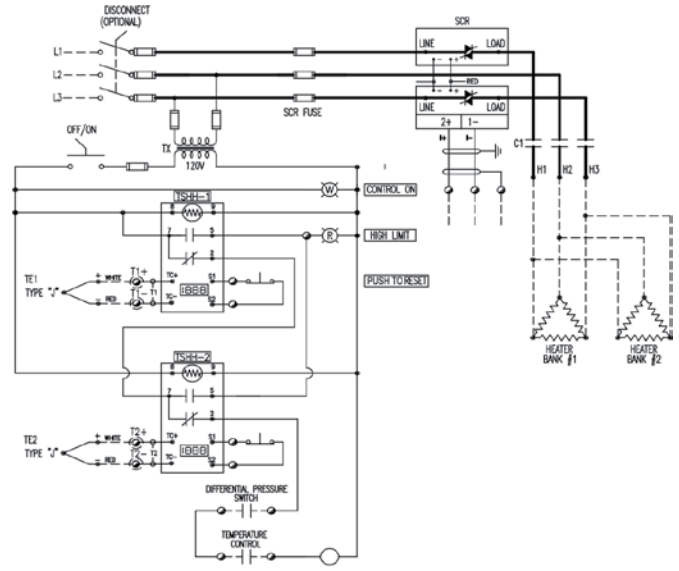


Figure 19 – Package #3 SCR with Remote Temperature Controller

**Note:**

One high limit control provided on single bank heaters.  
Two high limit controls provided on double bank heaters.

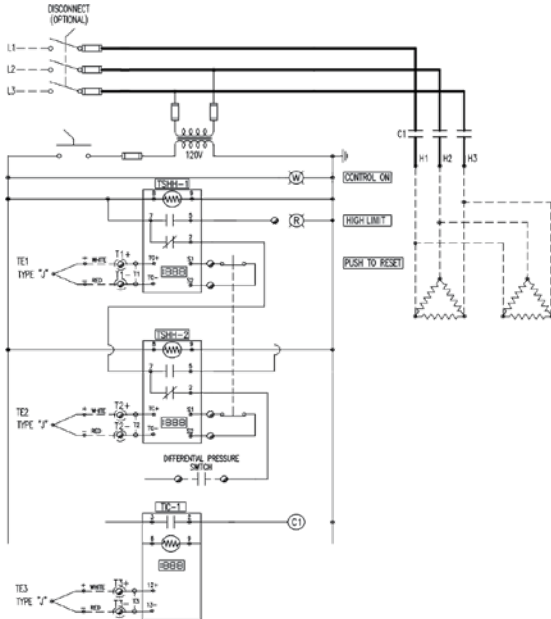


Figure 18 – Package #2 Built-in Temperature Controller

**Note:**

One high limit control provided on single bank heaters.  
Two high limit controls provided on double bank heaters.

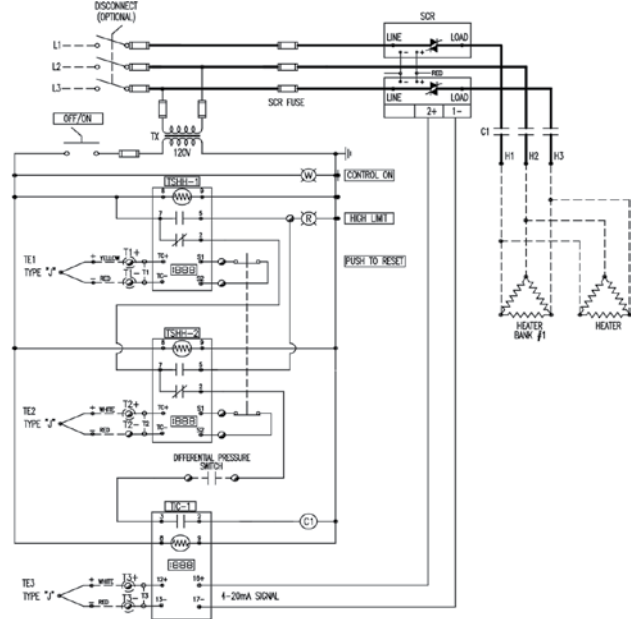


Figure 20 – Package #4 SCR with Built-in Temperature Controller

**Note:**

One high limit control provided on single bank heaters.  
Two high limit controls provided on double bank heaters.

# RXDF Series Specification Sheet

## Scope

Electric explosion-proof duct heaters shall be Caloritech™ type XDF, from Thermon Heating Systems, Inc., complete with all standard equipment and optional features as specified in this section.

## General

1. The heater is to be c\_CSA<sub>US</sub> certified with ratings as specified in Specifications & Rating below.
2. The heater shall be provided with standard features and optional features as outlined in: Standard Features - Duct Heater and Optional Features & Equipment below and on the next page.

## Specifications & Ratings

1. The duct heater shall be designed to heat air at:  
\_\_\_\_\_SCFM from \_\_\_\_\_°F to \_\_\_\_\_°F ( \_\_\_\_\_°C to \_\_\_\_\_°C)
2. The heater shall be of the explosion-proof, duct type, catalog number\_\_\_\_\_, rated \_\_\_\_\_V, \_\_\_\_\_Ø, \_\_\_\_\_Hz, \_\_\_\_\_kW.  
 Class \_\_\_\_\_, Division \_\_\_\_\_, Groups; \_\_\_\_\_,  
 Class \_\_\_\_\_, Division \_\_\_\_\_, Groups; \_\_\_\_\_,
3. The duct heater shall be marked with a \_\_\_\_\_ temperature code, or maximum surface temperature of \_\_\_\_\_.
4. The minimum rated airflow through the duct heaters shall be \_\_\_\_\_SCFM.
5. The maximum outlet temperature of the duct heater shall not exceed \_\_\_\_\_°F (\_\_\_\_\_°C).
6. The duct heater is to be mounted in a horizontal duct section:  
 Downstream  
 Upstream from the customer supplied blower.
7. The duct heater shall be suitable for operation in a -40°F (-40°C) min. to 104°F (40°C) max. ambient temperature.

## Standard Features - Duct Heater

1. The duct heater shall be supplied with a:  
\_\_\_\_\_ " (W) x \_\_\_\_\_ " (H) x \_\_\_\_\_ " (L), or  
\_\_\_\_\_ mm (W) x \_\_\_\_\_ mm (H) x \_\_\_\_\_ mm (L) carbon steel duct section with 1" (25 mm) wide mounting flange and painted ASA61 gray epoxy outside and high temperature aluminium inside.
2. The heating elements shall be (0.475"/12 mm) dia., extra heavy wall (0.095"/2.4 mm) finned tubular steel with nickel plated finish. Fins are to be fully brazed to the element sheath for maximum performance and efficiency.
3. The heating elements shall extend through Thermon Heating Systems Inc. certified explosion-proof compression fittings in a patented **x-Max**® explosion-proof, extruded copper-free aluminium terminal housing(s) with \_\_\_\_\_" NPT power conduit entry and \_\_\_\_\_" NPT conduit entry for high limit thermocouple connection.



## Standard Features - Duct Heater (cont'd)

4. The heating elements shall be mounted as \_\_\_\_\_ removable heating bank(s) and wired to terminal blocks for \_\_\_\_\_ x \_\_\_\_\_ kW, \_\_\_\_\_ V, \_\_\_\_\_ phase heating circuits to be
  - Fully SCR controlled
  - "ON/OFF" control.
5. The duct heater shall be supplied with \_\_\_\_\_ 'J' type sheathed thermocouples welded or brazed to the element sheath for connection to:
  - Customer supplied
  - Factory installed certified high limit controllers. High limit set points will be factory preset.
6. Explosion-proof differential pressure switch shall be factory installed on the heater to prove that air is moving. Customer must ensure that the minimum airflow is maintained at all times. The differential pressure switch is to be:
  - Field wired to the remote control panel
  - Factory mounted onto the heater
7. The duct heater shall be mounted in a horizontal duct section with the terminal box(es) at the side.
8. The approximate weight of the duct heater shall be \_\_\_\_\_ lbs (\_\_\_\_\_ kg).

## Standard Features - Control Package

1. Enclosure type (check one):
  - Type 4 - moisture proof
  - Explosion-proof
2. Temperature control (check one):
  - Basic unit - customer supplied temperature control signal
  - Built-in temperature controller
  - SCR controller - customer supplied 4-20 mA control signal
  - SCR controller with built-in temperature controller

## Optional Features & Equipment (check as desired):

- Stainless steel duct section
- Transition sections to \_\_\_\_\_" (W) x \_\_\_\_\_" (H) duct or \_\_\_\_\_" round duct, or \_\_\_\_\_ mm (W) x \_\_\_\_\_ mm (H) duct or \_\_\_\_\_ mm round duct
- Special temperature code of \_\_\_\_\_