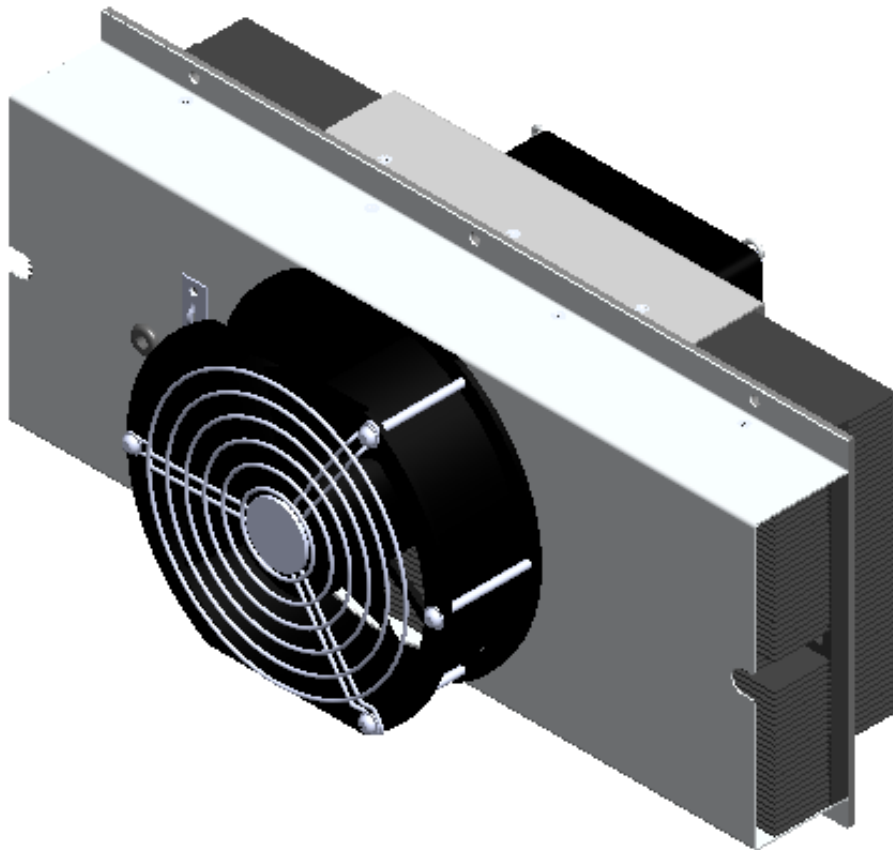


Service Manual

DPL20-200D TEC unit



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1. Introduction 简介

Purpose 目的

This Service Manual is addressed to the technical crew, who installs and maintains the TEC unit through all steps in its lifetime.

该用户/服务手册帮助工程师安装、维护和修理 TEC。

The manual includes descriptions of functionality, replacement of parts as well as how to carry out preventive maintenance.

此手册包括功能描述，零件更换和如何进行定期维护。

Usage of the product 产品使用

This unit is especially designed for cooling of electronic equipment, the unit will be installing on customer cabinet. The unit must under no conditions be used for other purposes and should be installed and placed according to the instructions in this manual.

此机器是专为电信设备设计的一款制冷装置，此设备将被安装在客户的机柜上，此机器不能用于其他目的，并且必须依照此手册的说明安装和更换。

Storage 存储

Under storage and transportation the unit must be kept in an upright position.

在存储和运输中，机器必须保持向上的位置放置。

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本手册会有所变动，恕不另行通知。未经丹腾空气系统（苏州）有限公司的书面允许，不得拷贝或部分拷贝本手册的内容。

Declaration of conformity 符合性申明

Dantherm Group declares, that the TEC unit is in accordance with the following directives and standards:

丹腾公司申明，TEC 依照如下指示和标准：

Directive 指示	Name / Area 名称/范围
2006/42/EF	Directive on the safety of machines
2006/95/EC	Low voltage directive
2004/108/EF	EMC directive
2002/95/EC	ROHS directive

Kristian Askegaard



General Manager, Dantherm Air handling (Suzhou) Co., Ltd.

2. Identification of the Unit 机器的识别



All units have a silver type plate label, where all the important information about the specific unit can be found. Also the Dantherm address and phone numbers are printed here so the contact can be made on the site.

所有机器都贴有标明机器规格的重要信息的标签。在标签上也有丹腾公司的地址和电话号码。

Serial number 序列号

Especially the serial number is important, and should always be mentioned when Dantherm is contacted about issues concerning the specific unit. Like below picture:

序列号尤其重要，当涉及到丹腾公司机器的细节问题时都会用到该序列号，如下图所示：

	
Model	DPL20-200D
Part NO.	366223
Voltage supply	48VDC
Max. Cooling output	200 W
Max. Cooling current	<8 A
Operation range	-20~+50 ℃
Size	400×180× 207
Serial NO.	SXXXXXX
Weight	8 kg
Dantherm Air Handling (Suzhou) Co.,Ltd No.855 Zhujiang Rd Suzhou 215129 Jiangsu, China Tel: +86 512 66678500	
	

3. Installation and start-up 安装和启动

Within this section the procedure of getting started is described from unpacking till start-up.

在这部分将描述拆包启动的程序。

Package 包装

The unit can be delivered in different packages depending on shipping method, but the most common solution is packed with film and protected with paper corners. If that is the case, the film should carefully be cut open with a cutting tool.

机器必须按运送方式用不同包装来运输，通常解决方法是一台机器用薄膜包住并用护角纸保护好。这种情况下，薄膜必须用切割工具小心切开。

Contents in the package 包装内容

The TEC unit is delivered with an installation kit with the following content:

此机器将依照以下内容包装运输：

Item description 项目描述	Quantity 数量	Unit 单位
TEC unit	1	PCS

Tools 工具

For installation:用于安装

- DC power supply (Rated Voltage :48 VDC, voltage range 38.4~57.6V DC)
直流电源（额定电压：48VDC，电压范围 38.4~57.6VDC）
- Small M5 screwdriver
- 一把小的 M5 规格螺丝起子

Mounting 装配

Mounting procedure 装配流程

The mounting procedure of this unit should follow these steps:

(See below pictures)

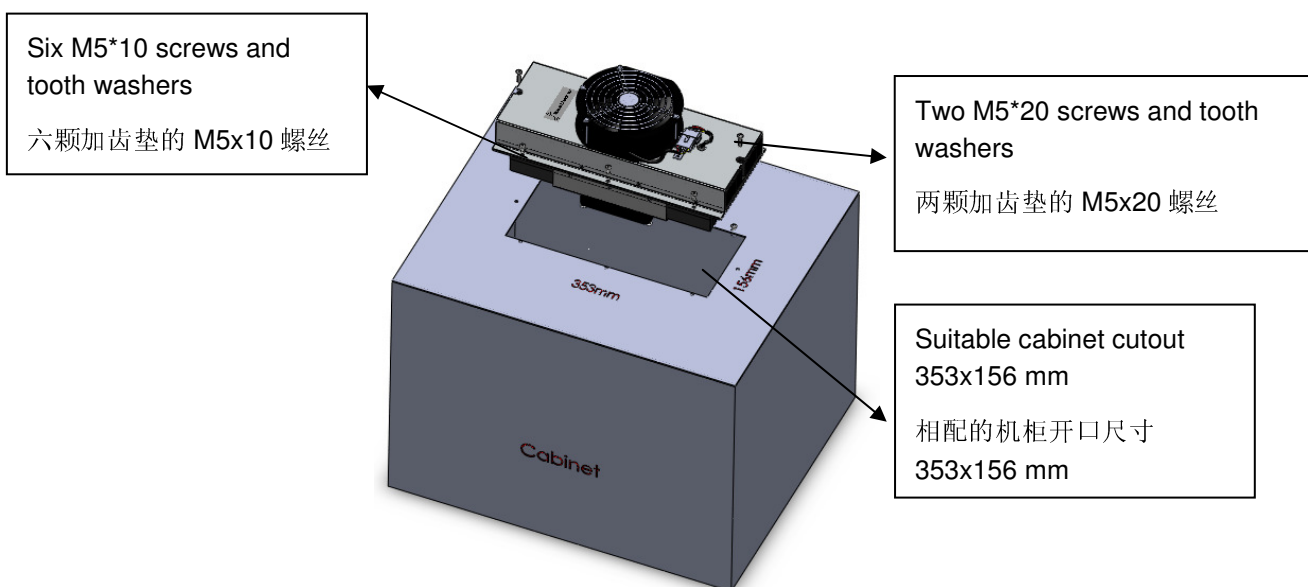
1. Demount the package and pick up the unit
2. Mount this unit in a cabinet with “warm side“ mounted externally
3. Suitable cabinet cutout is 353x156 mm
4. Fastened this unit with six M5*10 and two M5*20 screws and eight tooth washers
5. To be installed within 15° from horizontal direction of heat sink. (just for side mounting type)
6. Connect the power cable.

此机器必须按照如下步骤安装：（参照以下图片）

1. 卸下包装取出机器
2. 将机器以热侧朝外的形式安装在机柜上
3. 相配的机柜开口尺寸：353x156 厘米
4. 用 6 颗有垫片的 M5x10 和两颗 M5x20 螺丝将机器安装在机柜上
5. 安装时机器的散热片须与水平面保持 15 度（仅适用侧装类型）
6. 连接电源线

Picture 1: 图片 1:

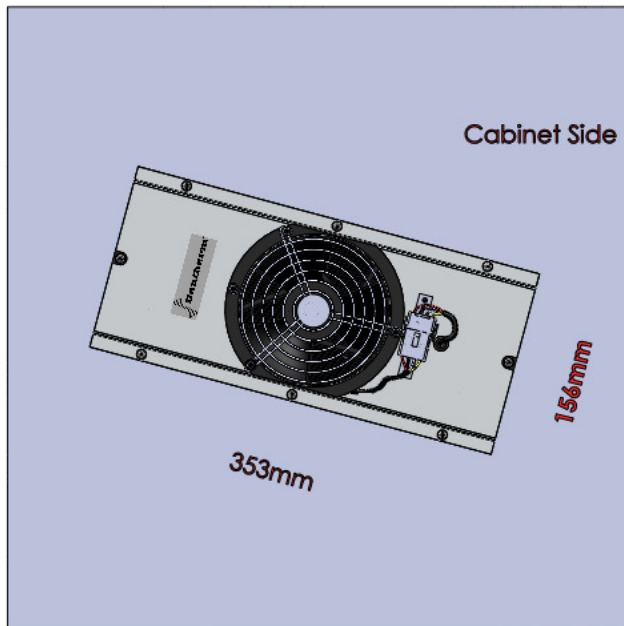
Top mounting type 顶装类型



Picture2 :图片 2:

Side mounting type 侧装类型

Horizontal line 水平线



Start-up 启动

Place the main power cable, and connect it to the DC power supply. Turn on the power and the unit will start running after several seconds.

放置并连接好直流电源线。开启电源，机器将在几秒钟后运转。

Demounting 拆卸

If the unit by any need should be demounted the steps below should be followed:

1. Uninstall the main power cable from power supply. (Make sure that the power supply is powered off!)
2. Unscrew the 8-M5 mounting screws. (Save the screws for reinstallation.)

在需要拆卸时，请按照下面的步骤拆卸：

1. 卸掉主电源线。（确保供电电源断掉）
2. 卸下 8 颗 M5 的螺丝和垫片。（保存好以便下次安装）

4. Description of functionality 功能描述

General description 总体描述

The TEC unit is a monoblock Heat Management System especially designed for heat management of electronic enclosures. The unit contains fans as well as some TEC module. The unit will work in extreme temperatures ranging from -20°C to +50°C.

TEC 是专为电信机柜热处理而设计的一款整体的热处理系统。此机器包括风扇和一些热电制冷模块。此机器的工作温度范围为-20°C ~+50°C。

Main parts 主要部件

The main parts that are controlled by the Control board are:

- TEC module
- Internal fan
- External fan
- Thermostat

控制板控制的主要零件有：

- 制冷片
- 内风扇
- 外风扇
- 温控

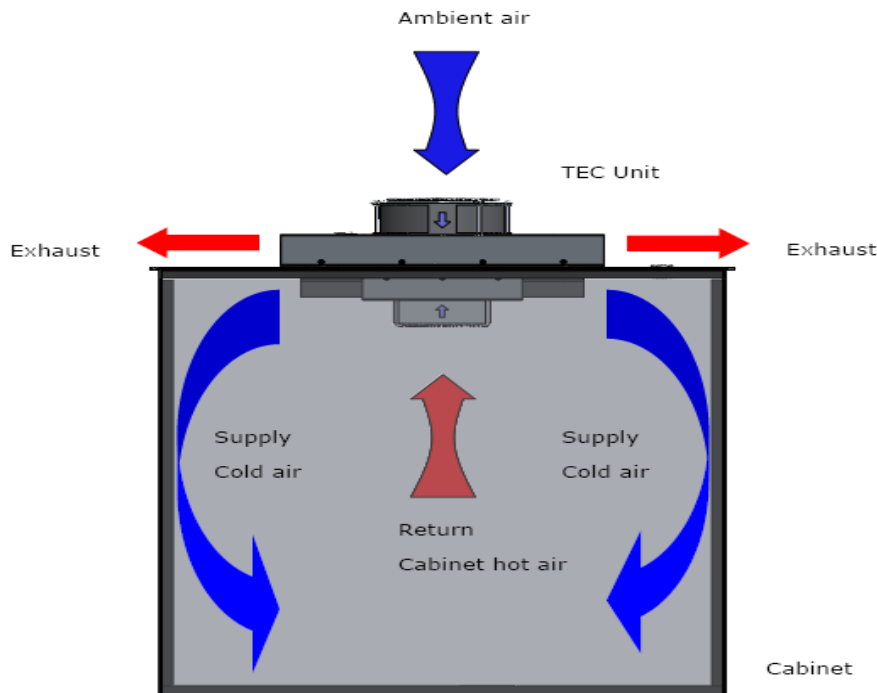
Temperature 温度

The following terms for temperatures are used in the following description (see below figure):

- Ambient temperature is the outside air temperature.
- Exhaust temperature is the temperature of the air leaving the external heat sink to the ambient.
- Return air temperature is the temperature of the air entering the unit from the electronic equipment.
- Supply Air temperature is the temperature of the air leaving the internal heat sink to cool down the electronic equipment.

下面几条是下述几种温度情况的描述（如下图）：

- 环境温度是外界的空气温度
- 排风温度是离开外侧散热片进入外界的风的温度
- 回风温度是从电器设备进入机器的风的温度
- 送风温度是离开内部散热片用于冷却电子设备的风的温度



Internal fan operation 内风扇运行

By supplying a low DC voltage to internal fan, the Internal fan is running.

给内风扇接通直流电源，内风扇运转。

External fan and TEC operation 外风扇和制冷片运行

External fan and TEC is running heat will be conducted to the radiator. The internal fan blow the return air onto the cool face of the aluminum extrusion, then the cooled air will flow into the cabinet to cool the calorific parts in the cabinet. The external fan blow the ambient air onto the face of the external aluminium extrusion and the air flow will bring the heat into the ambient.

外风扇和制冷片运行之后热量将被传递到散热片上。内风扇将热量吸至冷端的铝质散热片上，之后冷风将被输送至机柜内部用来冷却机柜内部的发热部件。外风扇将抽吸环境的风从而将外侧散热片的热量输送至环境中去。

Heat sink 散热片

To meet a high heat extracting requirement, In terms of performance, that must ensure maximum heat transfer while keeping size to a minimum. Heat sink will be made up of aluminum extrusion with extremely high quality, providing trouble-free performance throughout it lifetime at low manufacturing costs.

为了满足高温提取的要求，在性能方面，必须确保在最小尺寸的前提下散热量达到最优化。散热片将由铝型材挤压成型具有极高的品质，在较低生产成本的同时提供使用寿命期间的无故障的性能。

5. Technical data 技术数据

Specification 规格	Unit 单位	Value 数值	Designation 指示
Cooling Capacity 制冷量	W	200	L32°C /L32°C
Power Consumption 功耗	W	450	L32°C /L32°C
Normal Operation Temperature 正常运行温度	°C	-20~50	
Airflow Volume, Internal Circuit 内循环风量	m ³ /h	316	
Airflow Volume, External Circuit 外循环风量	m ³ /h	695	
Rated Voltage 额定电压	VDC	48	±20%
Rated Current 额定电流	A	8.2	
Acoustic Noise 噪音	dBA	70	
TEC Module, Life Expectancy 制冷片寿命	h	50000	35°C
Internal Circuit Fan, Life Expectancy 内风扇寿命	h	70000	40°C
External Circuit Fan, Life Expectancy 外风扇寿命	h	70000	40°C
Outer Dimensions(LXWXH) 外形尺寸	mm	400x180x207	
SMP Material 钣金材质		Aluminium 铝	
Heat Sink Type 散热片类型		Aluminium Extrusion 铝型材挤压	

6. Replacement of spare parts 更换部分零件

When to replace 何时更换

No components in the TEC unit are to be replaced regularly. This section is therefore only describing how to replace the spare parts if they are not running smoothly – so only replace if they component is faulty!

机器中没有零件是经常更换的。因此这部分只描述部分零件没有平缓运行时如何更换它们所以只更换有毛病的零件！

Before the demounting the old spare part it is very important to order the new spare part at Dantherm. To do this most effectively the product version and serial number should be checked so this information can be passed on when ordering. This information can be found on the silver type plate on the cabinet.

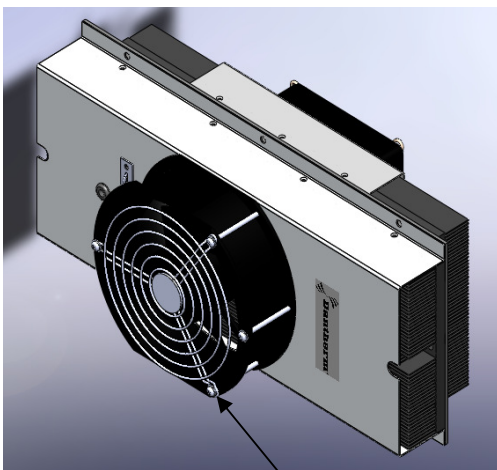
在拆卸旧零件前向丹腾公司订购新的零件。为了最有效的完成此过程，请检查产品的版本和序列号并在订购前传递给丹腾公司。这个信息可以在箱体上的银色型号标签上找到。

Replacing the external fan 更换外风扇

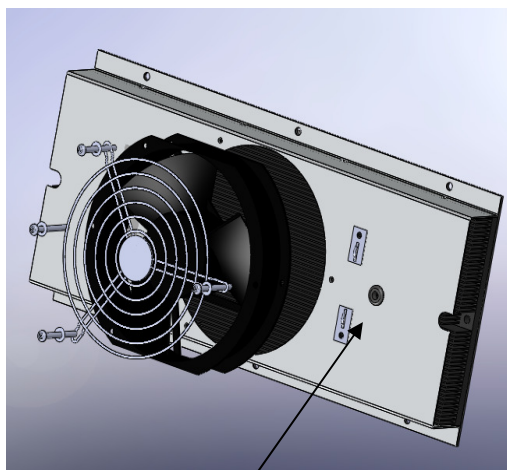
Tools 工具:

1. M4 crossed screwdriver M4 十字螺丝起子
2. Diagonal cutting pliers 斜口钳

Step 步骤	Action 行动
1	Remove 4-M4X60 screws and 4 flat washers on the external fan bracket, and then replace the external fan. 移除外风扇支架上的 4 颗 M4 螺丝和平垫，然后更换外风扇。



Remove 4-M4X60 screws and 4 flat washers
移除 4 颗 M4x60 的螺丝和 4 颗平垫



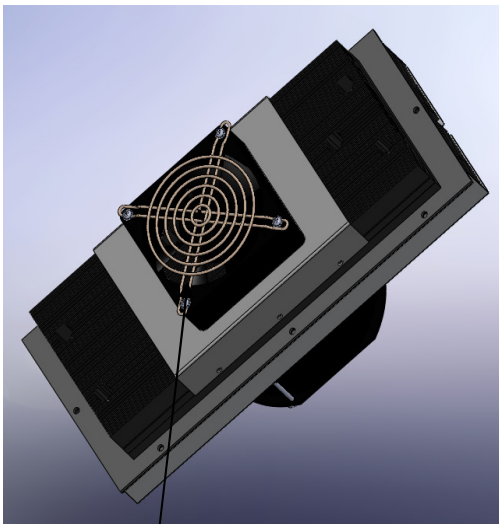
External fan Bracket
外风扇支架

Replacing the internal fan 更换内风扇

Tools 工具:

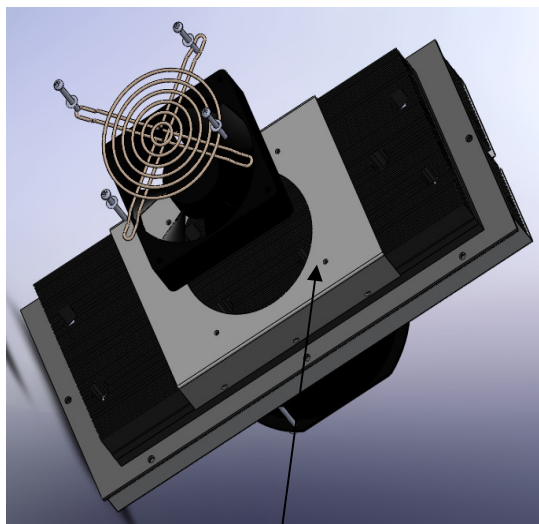
1. M4 crossed screwdriver M4 十字螺丝起子
2. Diagonal cutting pliers 斜口钳

Step 步骤	Action 行动
1	Remove 4-M4X45 screws 4 flat washers on the internal fan bracket, and then replace the internal fan. 移除内风扇支架上的 4 颗 M4X45 的螺丝和 4 颗平垫，然后更换内风扇。



Remove 4-M4X45 screws and 4 flat washers

移除 4 颗 M4x45 的螺丝和 4 颗平垫



Internal fan bracket

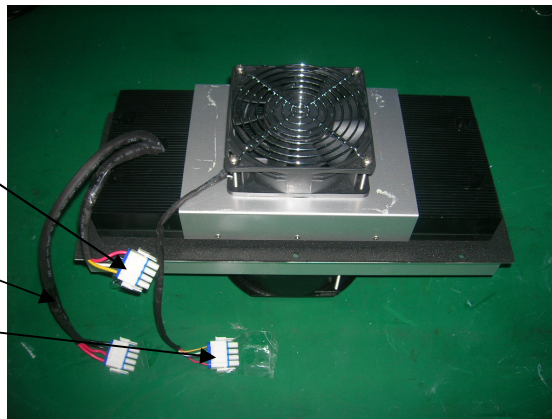
内风扇支架

7. Maintenance 维护

- ◆ Fan impellers and heat sinks must be cleaned on regular intervals to reduce risk for overheating and reduction of cooling function. The interval may vary depending on environment.
- ◆ Check that connector seals (blue silicon) are well pushed into the connectors.
- ◆ 风扇叶轮和散热片必须定期清理以避免因过热而造成的性能降低。间隔时间应外部环境而有所不同。
- ◆ 检查连接器的密封垫（蓝色硅质）是否完好。

8. Connector and cable colours 连接器和电线的颜色

1. External fan cable 外风扇线
2. TEC cable 制冷片线
3. Internal fan cable 内风扇线



Cable colours 线色

- ◆ 1. Pin1: +: RED 红
Pin2: -: BLACK 黑
Pin3: NC 空置
Pin4: NC 空置
- ◆ 2 Pin3&4: +: RED(2) 红
Pin1&2: -: BLACK(2) 黑
- ◆ 3 Pin1: +: RED 红
Pin2: -: BLACK 黑
Pin3: NC 空置
Pin4: NC 空置

Connector type 连接器类型

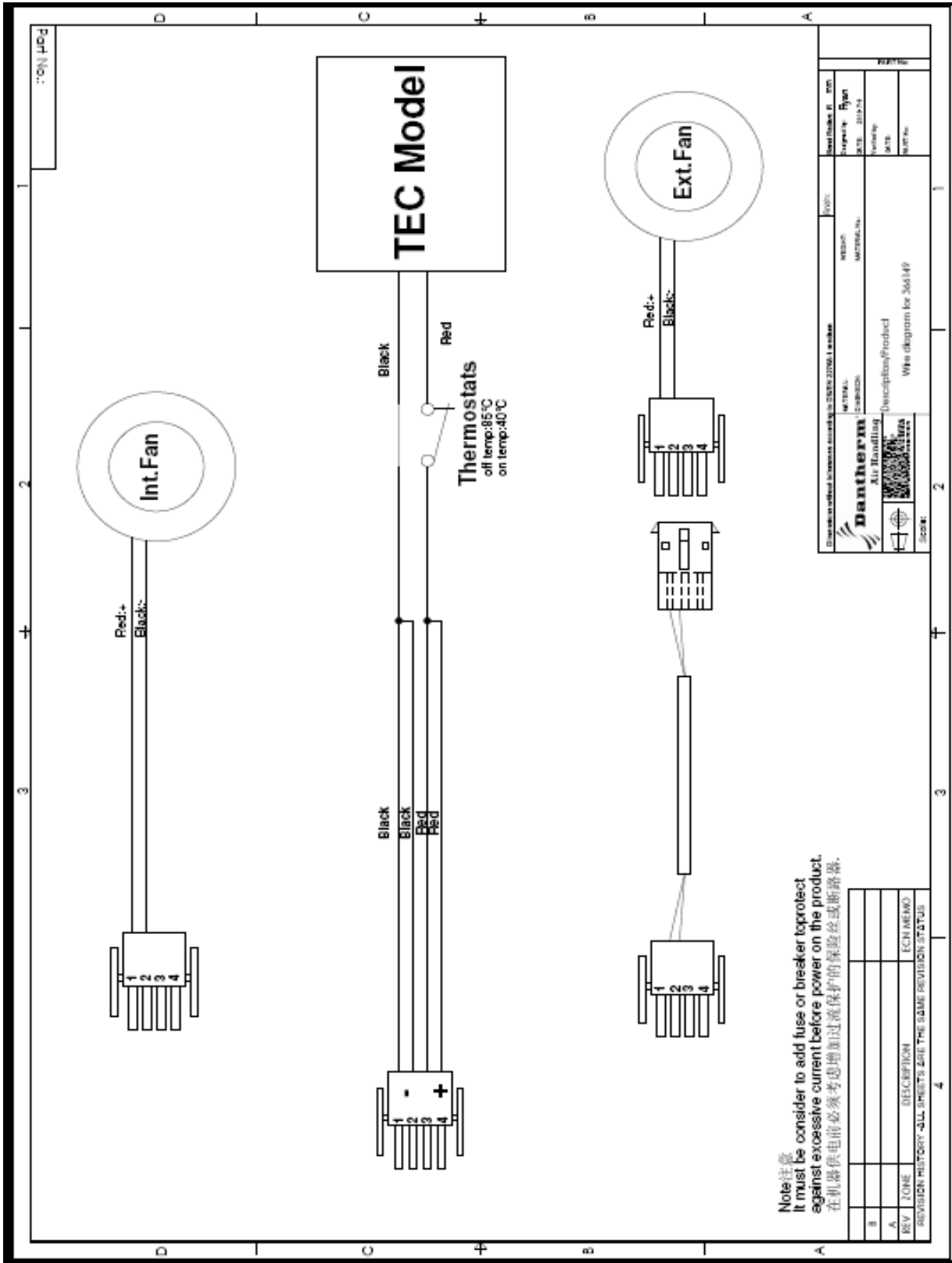
Fan and TEC cable terminal is 02-08-1001(AMP/Tyco)

Fan and TEC cable housing is 50-84-1045(AMP/Tyco)

风扇和制冷片线的端子型号是 02-08-1001(AMP/Tyco)

风扇和制冷片线的机架型号是 50-84-1045(AMP/Tyco)

9. Wire diagram 接线图



10. Scrapping 报废

Introduction 介绍

The TEC is designed to last for a number of years. When the time comes that the unit needs to be scrapped the following precautions should be taken to protect our environment.

TEC 的寿命能持续若干年，当机器到了报废的时候，要注意以下几点以保护我们的环境。

Please note that the guidelines are general – local rules and procedures may overrule these guidelines and should be observed and followed carefully.

请注意总的指导方针是遵循当地的法规和程序。

Main components 主要部件

The main components of the unit are:

- ◆ TEC modules
- ◆ Heat sink
- ◆ DC fans
- ◆ SMP
- ◆ Screws, washer, rivets etc.

机器的主要部件有：

- ◆ 制冷片
- ◆ 散热片
- ◆ 直流风扇
- ◆ 钣金
- ◆ 螺丝、垫片、铆钉等

