

敏维<sup>®</sup>

TS1M

多功能迷你焊台

Multi-Function Mini Soldering Station

本手册基于TS1M DFU V1.0, APP V1.0

## NOTICE

This appliance is intended for use by persons from 14 years and above and persons with reduced physical, sensory or mental capabilities or a lack of experience and knowledge if they have been given or instructed concerning use of the appliance in a safe way and understand the hazards involved. Before use, please familiarize yourself with the safe operating methods and potential hazards of this product.

Children should be supervised to ensure that they do not play with the appliance. It must only be supplied at safety extra low voltage corresponding to the marking on the appliance.



### **WARNING:**

When using this tool, please place it on a stable desktop or table, or use other methods to fix it. Please store it properly when not in use.

## 产品合格证

Product Certificate

**本产品经检验合格，准予出厂。**

This product has passed the quality inspection.

检验员QC: \_\_\_\_\_



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## (01) 安全说明

使用产品前请仔细阅读用户手册，用户手册中含有安全使用信息，并请妥善保存，以备日后查阅。用户可访问我司网站了解用户手册更新情况。

### 1.1 警告事项

使用TS1M多功能迷你焊台（以下简称“TS1M”）时，请务必遵守以下事项：

- 使用结束或离开前，务必关闭电源。设备完全冷却前，请勿覆盖易燃物，以防引发火灾。
- 电源接通时，烙铁头温度可达到100 °C ~ 450 °C，请勿触碰烙铁头及高温部件，严防烫伤。
- 切勿将TS1M主机或手柄浸入水中，或双手湿水时操作设备，以防设备损坏及触电危险。
- 请使用具有良好接地保护的电源插座及电源线，以保障用电安全。

### 1.2 注意事项

- TS1M主机内部由精密元器件组成，避免跌落，以防损坏。
- TS1M在350 °C或更高温度下全功率连续使用约40分钟后，烙铁手柄温度可能升高至约50 °C ~ 60 °C。
- 首次使用时，因发热原件烘热，烙铁头可能轻微发烟，这属于正常现象。

### 1.3 静电防护

使用设备时，烙铁头可能会有感应电 / 静电，一般元器件焊接不会有问题，但是部分敏感器件可能会损坏，当需要焊接敏感器件时，可参考以下方案：

- 对于静电防护要求较高的场景，建议优先选用带接地保护功能的三脚DC电源，并确保电源的接地端已可靠连接至大地，或用移动电源供电。
- 若受条件限制需使用充电头，请使用专用接地线，将其一段可靠连接至充电头，将接地线的另一端可靠连接至大地接地点，同时须验证该接地电阻符合防静电标准要求，以确保形成稳定

的静电泄放回路。

## 1.4 操作环境

	工作状态		非工作状态
温度	+0 °C ~ +50 °C		-20 °C ~ +60 °C
相对湿度	高温	40 °C~50 °C 0%~60%RH	40 °C~60 °C 5%~60%RH
	低温	0 °C~40 °C 10%~90%RH	0 °C~40 °C 5%~90%RH

## 1.5 责任说明

- 凡因未遵循本手册中的内容（包括但不限于安全声明、操作环境、警告事项、注意事项、静电防护等）对产品进行操作而导致的任何特别、间接、附带或继起的损坏或损失，无论其原因或推测如何，本公司均不承担任何责任，该等损失或损坏的风险由使用者自行承担。
- 凡因私自拆装，改造产品而引起的损坏或损失，均由使用者自行承担。
- 请妥善保管本产品以免让儿童当作玩具，在无人看管的情况下使用本产品。

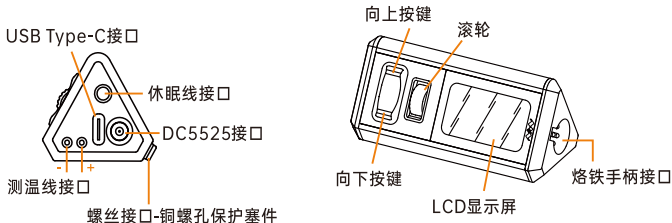
## (02) 产品概述

TS1M多功能迷你焊台支持双供电模式，兼容PD3.1快充协议（12-28V电压，最高140W功率）；使用DC供电时，最大功率可提升至200W（12-28V）。控温范围覆盖100-450 °C，适配多元焊接场景。设备支持外接热电偶测温功能，进一步拓展焊接与温度监测的应用场景。此外，TS1M兼容115系列、210系列、245系列及MINIWARE数字手柄系列，实现一机多用，满足长期使用需求。

TS1M多功能迷你焊台采用非传统造型设计，三角机身结构紧凑。边角经打磨处理，保留几何

线条感，握持手感良好。背部设通用螺丝接口，支持外接扩展。配备1.47英寸320×172像素真彩屏，界面简洁，温度实时显示。滚轮+双按键设计，操作简便易上手。内置简体中文 / 英文 / 俄文 / 德文多语言，同一固件可自由切换，适配不同地区用户。屏幕支持翻转，适配左右手使用习惯。此外，设备可通过电脑固件升级，并支持在TXT文档修改参数，提升使用灵活性。

## 2.1 按键与接口介绍



## 2.2 产品参数

屏 幕	LCD 320*172 像素	
USB接口	USB Type-C	
电源接口	DC5525、USB Type-C	
工作电压	12-28V	
最大功率	DC5525（内正外负）	200W
	USB Type-C	140W（PD3.1）

外形尺寸	长：79mm 宽：33.5mm 高：35.9mm
重 量	54.40g

## 2.3 工作参数


工作电压	12-28V
最高功率	115系列：35W
	210系列：100W
	245系列：200W
温度范围	100 °C ~ 450 °C
温度稳定	±3%
烙铁头 对地电阻	115系列 < 2 Ω
	210系列 < 2 Ω
	245系列 < 2 Ω

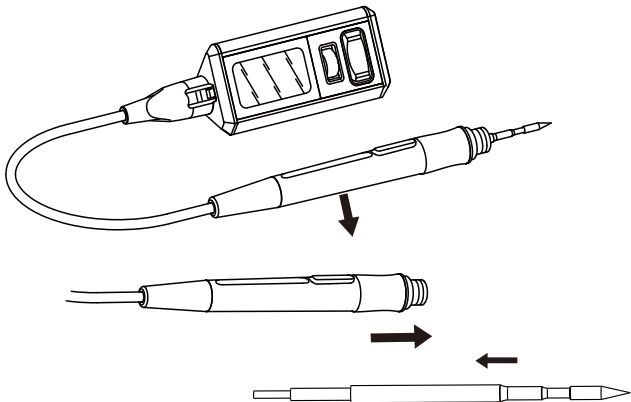
烙铁手柄类型	最大功率	工作电压	工作电流	从室温升至300度最小时间
245系列	200W	28V	7.14A	3S
210系列	100W	28V	3.57A	2S
115系列	35W	28V	1.25A	2S

备注：以上均为MINIWARE实验室内部数据，仅供参考！

### (03) 安装说明

- 将烙铁头插入烙铁手柄，再将烙铁手柄连接端插入TS1M控制端；
- 如需测温或休眠，请连接测温线或休眠线；
- 将USB Type-C电源线或者DC电源线与TS1M控制端的电源接口连接（注意两种供电方式不可同时使用），接通电源，并按屏幕提示操作。

注意：通电后如果TS1M提示 “”，表示烙铁头未安装牢固，请重新安装烙铁头或者烙铁手柄。

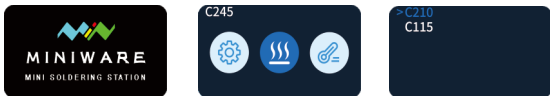


## (04) 操作说明

### 4.1 界面介绍

#### 4.1.1 待机界面

接通电源后，TS1M显示屏将依次示产品logo与待机界面。



当插入210或115系列烙铁手柄时，系统会自动弹出手柄类型选择界面，用户需根据实际型号进行确认；若插入其他兼容手柄（如245系列等），主机将自动识别并完成匹配，无需手动操作。

#### 4.1.2 加热界面

进入工作状态后，加热界面默认为波形显示模式，短按滚轮键可一键切换波形显示与纯数字显示模式。



加热界面参数释义：

参数符号	参数名称	含义说明
P	功率 (Power)	当前工作功率

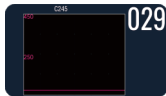
参数符号	参数名称	含义说明
V	电压 (Voltage)	当前工作电压
R	阻抗 (Resistance)	发热芯当前阻抗
CAL	温度补偿 (Calibration)	温度校准补偿值
Tk	外部测温 (External Temp)	外部传感器测量温度
Tr	冷端温度 (Reference Temp)	温度测量的冷端参考点温度

#### 4.1.3 测温界面

长按上键：退出测温模式，返回上级界面。

短按滚轮键：暂停 / 恢复波形实时更新。

长按滚轮键：清空当前波形图数据。



#### 4.1.4 菜单界面

从待机界面进入设置菜单：

滚动滚轮：在待机界面下，滚动滚轮选中“设置”图标。

进入菜单：短按滚轮键或下键确认，进入设置菜单。

在设置菜单中导航与修改：

滚动选择：滚动滚轮浏览菜单选项，选择要修改的项目。

进入调整：短按下键或短按滚轮键确认选择，进入该项目的参数调整界面。

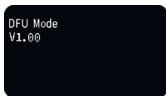
> 预设温度	1
工作温度1	100°C
工作温度2	200°C
工作温度3	300°C
快捷温度	400°C

## 4.1.5 DFU界面

进入DFU模式：

- 1.准备操作：持续按住滚轮键。
- 2.连接电脑：在保持按住滚轮键时，将设备通过USB Type-C数据线连接至电脑。
- 3.模式确认：成功进入DFU模式后，TS1M屏幕显示“DFU Mode”标识。  
( 我的电脑显示“TS1M\_DFU”，如下图 )。

退出DFU模式：断开设备电源，不按任何按键，重新连接电源后，设备将自动进入待机模式。



TS1M\_DFU (E:)

点击以选择要对可移动驱动器进行的操作

## 4.2 基本操作

### 4.2.1 升温操作

从待机界面启动加热：

- 1.选择加热功能：在待机界面下，滚动滚轮选中“加热”图标。
- 2.启动控温模式：短按滚轮键或下键确认，设备进入温控模式，并自动升温至预设温度。
- 3.退出加热（控温模式）：在温控模式下，长按上键约3秒，设置将停止加热并返回待机界面。

从设置菜单快速启动加热：

快捷入口：在设置主菜单界面下，长按滚轮键约3秒，可直接进入温控模式（设备同样开始升温至预设温度）。

## 4.2.2 调温操作

在温控模式下调整模板温度：

- 1.切换预设温度档位：短按下键或上键可切换预设温度档位（如工作温度1/2/3）
- 2.档位状态指示：当前选中的档位以橙色显示，未选中的档位以灰色显示。
- 3.临时温度调整：向上拨动滚轮可临时提高目标温度，向下拨动滚轮可临时降低目标温度。
- 4.温度显示：临时设定的目标温度值以橙色显示，当前实际工作温度以白色显示。
- 5.切换显示模式：短按滚轮键可在波形显示界面与纯数字显示界面间一键切换。

在设置菜单中修改预设温度值：

- 1.进入预设温度调整：在设置菜单中，滚动滚轮选中目标预设温度（如“工作温度1”、“工作温度2”或“工作温度3”），短按下键或滚轮键确认，进入该项目的温度调整界面。
- 2.调整预设温度值：在调整界面中，向上拨动滚轮增加预设温度值，向下拨动滚轮降低预设温度值。
- 3.确认或取消修改：  
确认修改：短按上键或滚轮键确认保存当前设定值。  
取消修改：长按上键或滚轮键约3秒，放弃修改并恢复本次调整前的温度值。  
自动保存：退出该菜单项（无论是确认或取消退出）后，设备自动保存所有生效的预设温度值。

## 4.2.3 参数设置

1.从待机界面进入设置并修改参数：

- 1) 进入设置菜单：在待机界面下，滚动滚轮选中“设置”图标，短按滚轮键或下键确认，进入设置菜单。
- 2) 选择设置项：滚动滚轮浏览菜单选项，移至目标设置项，短按下键或滚轮键确认，进入该项目参数调整界面。
- 3) 调整参数值：在参数调整界面中，向上拨动滚轮：增加参数数值，向下拨动滚轮：减少参数

数值。

#### 4) 确认或取消修改：

确认修改：短按上键或滚轮键确认保存当前设定值。

取消修改：长按上键或滚轮键约3秒，放弃修改并恢复本次调整前的参数值。

#### 5) 退出设置菜单与保存：在任意菜单层级，长按上键约3秒，可退出整个设置菜单并返回待机界面。自动保存机制：退出设置菜单后，设备自动保存所有已确认修改的参数值。

#### 6) 智能状态记忆：返回待机界面时，系统将优先返回“加热”图标，方便用户快速启动加热。在加热界面下长按滚轮键约3秒，可直接进入设置主菜单。

### 4.2.4 测温仪功能

#### 使用步骤：

1.连接测温探头：将外接热电偶测温探头插入 TS1M设备的对应接口。

2.启动测温模式：在待机界面下，滚动滚轮选中“测温”图标，短按下键或滚轮键确认，设备进入测温模式，界面显示实时温度波形 / 数据。

#### 3.测温模式操作：

退出测温：在测温界面中，长按上键约3秒，设备将退出测温模式并返回待机界面。

暂停 / 恢复波形更新：短按滚轮键可暂停波形实时更新；再次短按滚轮键可恢复更新。

清空波形数据：长按滚轮键约3秒，可清空当前显示的波形图数据（暂停状态下亦可操作）。

### 4.2.5 休眠状态操作

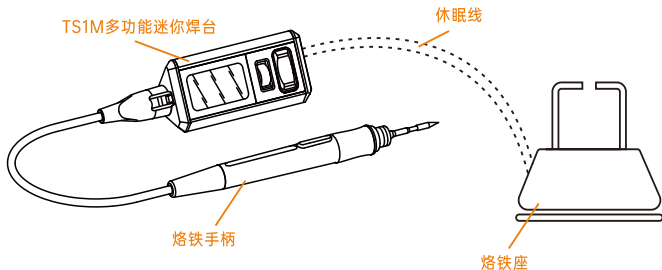
#### 1.基础休眠与恢复（适用于所有兼容手柄）：

进入休眠：在温控状态下，将烙铁手柄放入烙铁座，设备将自动进入休眠状态，烙铁头温度直降至预设休眠温度。

退出休眠恢复工作：将手柄从烙铁座中取出时，设备将自动退出休眠状态，恢复温控模式，并升温至设定温度。

休眠超时进入待机：在休眠状态下，若设备持续静置且达到预设待机时间，将自动进入待机状态。

注意：使用产品包装中附带的休眠连接线，将TS1M控制器和烙铁座连接，然后将烙铁手柄放入已连接的烙铁座中，才可实现休眠功能。



## 2. 数字手柄自动休眠：

适用于MINIWARE数字手柄（非115、210、245系列模拟手柄）：

自动进入休眠：在控温模式下，若手柄长时间未操作且达到预设休眠时间，设备将自动进入休眠（无需放置休眠座），界面切换至休眠界面。

休眠超时进入待机：在自动休眠状态下持续静置达到预设待机时间，设备将自动进入待机状态。

## 4.2.6 校准

TS1M采用热电偶测温与校准功能，为确保测量准确性，需规范使用测温线：将烙铁头表面均匀铺满焊锡，外接热电偶的测温端需完全嵌入锡层并与被测物料表面 / 内部充分接触，方可实现精准测温。

### 1.手动校准操作流程

- 1）进入温控模式后，预设目标温度设为350 °C；
- 2）在烙铁头表面均匀涂抹一层焊锡（确保热传导均匀）；
- 3）将外接热电偶测温端紧密贴合烙铁头，等待温度稳定（约10-20秒）；
- 4）观察屏幕右下角实时温度值，计算其与设定值350 °C的差值；
- 5）进入设备设置菜单，选择「温度校准」功能，根据差值输入手动补偿值完成校准。

### 2.自动校准操作说明

- 1）确保外接热电偶测温端与烙铁头紧密贴合，且在烙铁头表面均匀涂抹焊锡；
- 2）待设备状态稳定后，短按滚轮键切换至数字界面。并长按下键（具体时长以设备提示为准），主机将自动执行温度校准，请保持姿态平衡，直至显示“校准成功”；如显示“校准失败”请重新校准；
- 3）进行自动校准后，补偿温度不能手动修改，如需清除自动校准的补偿温度，建议恢复出厂设置。

**注意：**4mm香蕉插头是休眠线接口，无接地功能，请勿接错！

## 4.2.7 个性化界面

当主机从休眠状态自动切换至待机状态时，系统将检查是否存在用户自定义图片文件。若根目录中存在名为 TS1Mback.BMP 的图片，系统将自动加载并显示该自定义图片为待机界面；若未检测到TS1Mback.BMP文件，则显示默认出厂的敏维 Logo 动画界面。

## 4.2.8 息屏

TS1M处于待机模式下，持续10分钟（默认设置，不可修改）无用户操作，将自动进入息屏状态；或设备显示个性化logo界面后，持续10分钟无用户操作，将自动进入息屏状态。

### 4.3 菜单释义

参数名称	释义	出厂设置	可调范围
预设温度	进入升温时，预期工作档位	1	1 ~ 3
工作温度1	工作温度 1	300 °C	100 °C ~ 450 °C
工作温度2	工作温度 2	350 °C	100 °C ~ 450 °C
工作温度3	工作温度 3	380 °C	100 °C ~ 450 °C
快捷温度	数字手柄一键升温目标温度（插入数字手柄才有此选项菜单）	400 °C	100 °C ~ 450 °C
休眠温度	进入休眠模式时，烙铁头的温度	100 °C	100 °C ~ 180°C
温度校准	根据外接热电偶测得烙铁头的温度和显示温度的差值，进行补偿	0 °C	- 60 °C ~ 20 °C
休眠时间	烙铁无使用时，进入休眠模式的等待时长	180 S	100 S ~ 1800 S
待机时间	在休眠模式时，退回待机界面的等待时长	10 m	10 m ~ 100 m
温度步进	调整温度时的步进值	5	1 ~ 30
背景亮度	屏幕的亮度	8	1 ~ 10
功率设置	不同型号的烙铁升温的功率设定	245: 140 W	30 W ~ 200 W
		210: 65 W	30 W ~ 100 W

参数名称	释义	出厂设置	可调范围
功率设置	不同型号的烙铁升温的功率设定	115: 35 W	25 W ~ 35 W
温度类型	温度显示单位, 摄氏度和华氏度	0	0: °C、1: °F
音量	蜂鸣器声音大小	3	0 - 5
语言选择	显示的语言类型	中文	中、英、德、俄
低压保护	DC供电下, 不同型号的烙铁升温的最低电压限制	245: 11 V	11 V ~ 21 V
		210: 6 V	6 V ~ 21 V
		115: 6 V	6 V ~ 21 V
翻转检测	屏幕显示、按键反向检测	开启	开启、关闭
烙铁类型	245自动识别 ( 210、115手动选中 )		
信息	显示烙铁型号、电阻值、电压、温度、软件版本、硬件版本		
恢复出厂	恢复出厂设置		取消、确认

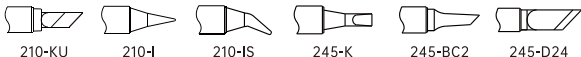
#### 4.4 配置文件

参数名称	释义	出厂设置	可调范围
Default Temp	默认温度档	1	1 ~ 3
Work Temp 1	预设工作温度 1	300 °C	°C : 100 ~ 450 °F : 212 ~ 842
Work Temp 2	预设工作温度2	350 °C	°C : 100 ~ 450 °F : 212 ~ 842
Work Temp 3	预设工作温度3	380 °C	°C : 100 ~ 450 °F : 212 ~ 842
Boost Temp	快捷温度	350 °C	°C : 100 ~ 450 °F : 212 ~ 842

参数名称	释义	出厂设置	可调范围
Sleep Temp	休眠温度	100 °C	°C : 100 ~ 180 °F : 212 ~ 356
Sleep Time	休眠时间	180 S	0 ~ 1800 S
Idle Time	待机时间	10 min	10 ~ 120 min
Temp Step	温度步进	5	1 ~ 30
Back Light	背景亮度	8	1 ~ 10
Temp Type	温度类型	0	0 : °C 1 : °F
Beep Volume	音量	3	0 ~ 5
Language	语言	1	0 ~ 4 ( 0 : 英, 1 : 中, 2 : 德, 3 : 俄 )
Low Vol Protect	低压保护	6 V	6 V ~ 21 V
Flip Over	翻转检测	1	0 ~ 1 ( 0 : 关闭检测, 1 : 开启检测 )
Max Pow_245	245 限制功率	140 W	30 W ~ 200 W
Max Pow_210	210 限制功率	65 W	30 W ~ 100 W
Max Pow_115	115 限制功率	35 W	25 W ~ 35 W
Calibra Val_245	245 温度手动校准值	0	°C : - 60 ~ 20 °F : - 76 ~ 68
Calibra Val_210	210 温度手动校准值	0	°C : - 60 ~ 20 °F : - 76 ~ 68
Calibra Val_115	115 温度手动校准值	0	°C : - 60 ~ 20 °F : - 76 ~ 68

## (05) 烙铁头

### 5.1 烙铁头选择



### 5.2 烙铁头保养

- 1) 长时间不用时，建议让烙铁头适量上锡，防止氧化。
- 2) 请勿让烙铁头长时间处于高温加热状态，避免干烧。
- 3) 在焊接时，请勿给烙铁头施加太大压力摩擦焊点，避免烙铁头受损。
- 4) 绝对不允许使用粗糙的材料或锉刀清洁烙铁头。
- 5) 如果烙铁头表面已氧化不沾锡，用户可视需要使用600 ~ 800目的金钢砂布小心摩擦并用乙醇或相等的溶液清洁。
- 6) 加温至200 °C后立即沾锡以防止氧化。
- 7) 请勿使用含氯、酸过高的助焊剂，仅使用合成树脂或已活性化的树脂助焊剂。

## (06) 技术支持

欢迎访问 [www.miniware.com.cn](http://www.miniware.com.cn) 获取产品支持，包括用户手册、固件更新、使用技巧及最新动态。

### 6.1 常见问题处理

**问题 1: 屏幕没有显示。**

检查 1: 电源是否已插好或连接线损坏。

检查 2: 连接电脑时是否出现可移动硬盘。

## 问题 2 : 电烙铁自动重启。

检查 1 : 电源是否没有插好。

检查 2 : 电压是否过低。（可查看配置文件里设置的最低电压）

## 问题 3 : 烙铁头间歇加热或温度跳动。

检查 1 : 烙铁头是否第一次使用。

检查 2 : 电源线是否接触不良。

检查 3 : 烙铁头是否温度过高，设定一个合适的温度。

检查 4 : 铁头已经清理好了吗，参考“烙铁头保养与使用”。

## 问题 4 : 待机屏幕显示 " "。

检查 1 : 烙铁头温度是否超过50 °C，如果温度降低到50 °C 以下，系统将自动退出报警状态。

## 问题 5 : 待机屏幕显示 " "。

检查 1 : 电压是否过低，（电压 < 低压保护），看是否需要更换电源。

## 问题 6 : 待机屏幕显示 " "。

检查 1 : 烙铁头是否接触有问题，是否已经稳固插好。

检查 2 : 如果检查 1 通过，则需更换烙铁头。

## 问题 7 : TS1M正常使用时，返回到待机画面。

检查 1 : 电压是否低于低压保护的电压，待电压回升高于低压保护的电压以上，即可正常使用。

## 问题 8 : 烙铁头不沾锡。

检查 1 : 烙铁头温度是否超过400°C。

检查 2 : 烙铁头是否未适当加锡。

## 问题 8：烙铁头不沾锡。

检查 3：在焊接、除锡、修理、补焊等作业中是否缺少助焊剂。

检查 4：是否曾使用含硫量高或干燥的海绵或碎布擦拭烙铁头。

检查 5：是否接触到有机物如塑胶料、矽（硅）质油脂及其它化学品。

检查 6：是否使用不纯洁和低含锡量的焊锡。

## 6.2 服务与升级

### 6.2.1 固件更新

1. 下载固件：访问官网 [www.miniware.com.cn](http://www.miniware.com.cn)，下载适用于TS1M的固件文件，并将其保存至电脑。
2. 进入DFU模式：按住TS1M的滚轮按键，同时使用USB线将TS1M与电脑连接，此时，TS1M屏幕上将显示“DFU MODE”，表示设备已成功进入DFU模式。同时，电脑会识别出一个名为“TS1M\_DFU”的可移动磁盘。
3. 完成固件升级：将下载好的 hex 固件文件拷贝到“TS1M\_DFU”磁盘的根目录下。当TS1M屏幕显示“Update completed”时，表示固件升级已完成。此时，你可以安全地断开USB连接，设备将自动重启并应用新固件。



## 6.2.2 售后与服务

TS1M多功能迷你焊台控制端在非人为损坏的情况下，提供一年免费保修服务。如需享受保修服务，请联系销售商进行处理。需注意，烙铁手柄和烙铁头属于易损耗件，非质量问题一经使用，将不予退换。

### (07) 法规标识



此设备符合美国联邦通讯委员会FCC规则第15部分中的规范。操作设备须符合以下两个条件：（1）本设备不得引发干扰；（2）本设备必须能承受其收到的任何干扰，包括可能导致意外操作的干扰。



CE 标记是欧洲共同体的注册商标。此CE标记表示产品符合所有相关的欧洲法律规定。



UKCA ( United Kingdom Conformity Assessed ) 标记是英国合格认定的认证标识。本设备符合电子电气产品进入英国市场需要通过的英国法规下的标准测试认证。



本产品内包含电池和 / 或可回收电子部件。弃置产品时请勿与生活垃圾一起丢弃。请根据当地法律和法规进行处理。



RoHS 标记是符合欧盟合格认证的标识，表明该产品符合欧盟关于限制在电气电子设备中使用某些有害物质的法规。

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## **01** Safety Instructions

Please read the user manual carefully before using the product. The user manual contains information on safe use and please keep it properly for future reference. Users can visit our website to learn about updates to the user manual.

### **1.1 Warnings**

When using the TS1M multi-function mini soldering station (hereinafter referred to as "TS1M"), please be sure to observe the following matters:

- Be sure to turn off the power when you finish using it or before leaving. Before the device is completely cooled. Do not cover flammable materials to prevent fire.
- When the power is on, the temperature of the soldering iron tip can reach 100°C ~ 450°C. Do not touch the soldering iron tip and high-temperature parts to prevent burns.
- Do not immerse the TS1M host or handle in water, or operate the device with wet hands to prevent damage to the device and the risk of electric shock.
- Please use a power socket and power cord with good grounding protection to ensure electrical safety.

### **1.2 Precautions**

- The TS1M control terminal is composed of precision components. Avoid dropping it to prevent damage.
- After the TS1M is used continuously at full power for about 40 minutes at 350 °C or higher, the temperature of the soldering iron handle may rise to about 50 °C ~ 60 °C.
- When used for the first time, the soldering iron tip may emit slight smoke due to the heating element, which is normal.

### **1.3 Electrostatic protection**

When using the equipment, the soldering iron tip may have induced electricity / static electricity. Generally, there will be no problem with soldering components, but some sensitive components may be damaged. When soldering sensitive components, you can refer to the

following solutions:

- For scenarios with high requirements for electrostatic protection, it is recommended to use a three-pin DC power supply with grounding protection function, and ensure that the ground terminal of the power supply is reliably connected to the ground. Or use a mobile power supply for power supply.
- If the conditions limit the use of a charging head, please use a dedicated grounding wire, reliably connect one end of it to the charging head, and reliably connect the other end of the grounding wire to the grounding point. At the same time, it is necessary to verify that the grounding resistance meets the anti-static standard requirements to ensure the formation of a stable electrostatic discharge circuit.

## 1.4 Operating Environment

	Working State		Non-working State
Temperature	+0 °C ~ +50 °C		-20 °C ~ +60 °C
Relative Temperature	High Temperature	40 °C~50 °C 0%~60%RH	40 °C~60 °C 5%~60%RH
	Low Temperature	0 °C~40 °C 10%~90%RH	0 °C~40 °C 5%~90%RH

## 1.5 Liability Statements

- The company shall not be liable for any special, indirect, incidental or consequential damage or loss caused by failure to follow the contents of this manual ( including but not limited to safety statements, operating environment, warnings, precautions, electrostatic protection, etc. ) to operate the product, regardless of the cause or speculation, and the risk of such loss or damage shall be borne by the user.
- Any damage or loss caused by unauthorized disassembly and modification of the product shall be borne by the user.
- Please keep this product properly to prevent children from using it as a toy without supervision.

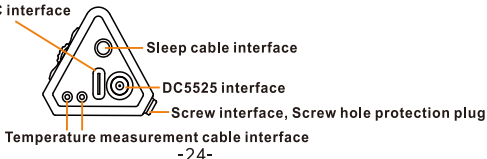
## 02 Product Overview

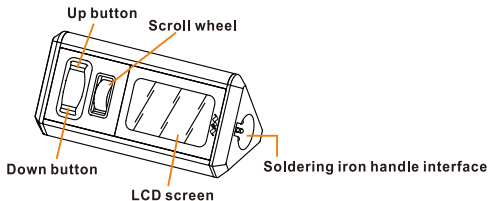
The TS1M multi-function mini soldering station supports dual power supply mode and is compatible with the PD3.1 fast charging protocol ( 12-28V voltage, maximum 140W power ) ; when using DC power supply, the maximum power can be increased to 200W ( 12-28V ). The temperature control range covers 100-450°C, which is suitable for multiple Soldering scenarios. The device supports external thermocouple temperature measurement function, further expanding the application scenarios of welding and temperature monitoring. In addition, TS1M is compatible with the 115 series, 210 series, 245 series and MINIWARE digital handle series, realizing one machine for multiple uses and meeting long-term use needs.

The TS1M multi-function mini soldering station adopts a non-traditional design with a compact triangular body structure. The edges and corners are polished to retain the sense of geometric lines and have a good grip. A universal screw interface is set on the back to support external expansion. Equipped with a 1.47-inch 320×172 Pixel true color screen, the interface is simple, and the temperature is displayed in real time. The scroll wheel + double button design is easy to use. Built-in simplified Chinese / English / Russian / German multi-language, the same firmware can be switched freely to adapt to users in different regions. The screen supports flipping to adapt to left-handed usage habits. In addition, the device can be upgraded through computer firmware, and supports modifying parameters in TXT documents to improve usage flexibility.

### 2.1 Interface and button introduction

USB Type-C interface





## 2.2 Product Parameters

<b>Screen</b>	LCD 320*172 Pixel	
<b>USB Interface</b>	USB Type-C	
<b>Power Interface</b>	DC5525, USB Type-C	
<b>Working Voltage</b>	12-28V	
<b>Max Power</b>	DC5525 ( Positive inside and negative outside )	200W
	USB Type-C	140W ( PD 3.1 )
<b>Dimension</b>	Length: 79mm; Width: 33.5mm; Height: 35.9mm	
<b>Weight</b>	54.40g	

## 2.3 Working Parameters

<b>Working voltage</b>	12 - 28V
<b>Max Power</b>	115 Series: 35W
	210 Series: 100W
	245 Series: 100W


<b>Temperature control range</b>	100°C - 450°C
<b>Temperature stability</b>	±3%
<b>Soldering tip to ground resistance</b>	115 Series: < 2Ω
	210 Series: < 2Ω
	245 Series: < 2Ω

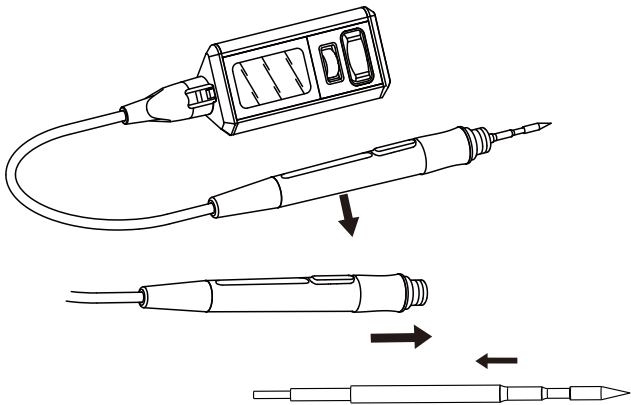
<b>Soldering Handle Type</b>	<b>Max Power</b>	<b>Working Voltage</b>	<b>Working Current</b>	<b>Minimum time from room temperature to 300 degrees</b>
245 Series	200W	28V	7.14A	3S
210 Series	100W	28V	5.37A	2S
115 Series	35W	28V	1.25A	2S

**Note:** The above data are internal data of MNIWARE laboratory and are for reference only !

## (03) Installation Instructions

- Insert the soldering iron tip into the soldering iron handle, and then insert the soldering iron handle connection end into the TS1M control end;
- If you need to measure temperature or sleep, please connect the temperature measurement cable or sleep cable;
- Connect the USB Type-C power cable or DC power cable to the power interface of the TS1M control end ( note that the two power supply methods cannot be used at the same time ), turn on the power, and follow the on-screen prompts.

**Note:** If TS1M prompts "  " after power-on, it indicates that the soldering iron tip is not installed firmly. Please reinstall the soldering iron tip or soldering iron handle.

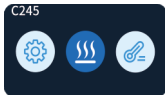


## 04 Operation

### 4.1 Interface

#### 4.1.1 Standby interface

After the power is turned on, the TS1M will display the product logo and the standby interface in sequence.



When a 210 or 115 series soldering iron handle is inserted, the system will automatically pop up the handle type selection interface, and the user needs to confirm according to the actual model; if other compatible handles ( such as 245 series, etc. ) are inserted, the host will automatically identify and complete the matching without manual operation.

#### 4.1.2 Heating interface

After entering the working state, the heating interface defaults to waveform display mode. Short press the scroll wheel button to switch between waveform display and pure digital display mode with one click.



#### Heating interface parameter interpretation

Parameter symbol	Parameter name	Meaning description
P	Power	Current working power
V	Voltage	Current working voltage
R	Resistance	Current impedance of heating core
CAL	Calibration	Temperature calibration compensation value

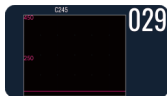
Parameter symbol	Parameter name	Meaning description
Tk	External Temp	External sensor measurement temperature
Tr	Reference Temp	Cold end reference point temperature

### 4.1.3 Temperature measurement interface

**Long press the up button:** exit the temperature measurement mode and return to the upper interface.

**Short press the scroll wheel button:** pause / resume real-time waveform update.

**Long press the scroll wheel button:** clear the current waveform data.



### 4.1.4 Menu interface

**Enter the settings menu from the standby interface:**

**Roll the wheel:** In the standby interface, roll the wheel to select the "settings" icon.

**Enter the menu:** Short press the wheel button or the down button to confirm and enter the settings menu.

**Navigate and modify in the settings menu:**

**Roll to select:** Roll the wheel to browse the menu options and select the item to be modified.

**Enter adjustment:** Short press the down button or short press the wheel button to confirm the selection and enter the parameter adjustment interface of the item.

```

>DefWork 1
WorkTmp1 300°C
WorkTmp2 350°C
WorkTmp3 380°C
SlpTmP 100°C

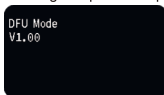
```

### 4.1.5 DFU interface

#### Enter DFU mode:

1. **Preparation:** Keep pressing the scroll wheel button.
2. **Connect to computer:** While keeping pressing the scroll wheel button, connect the device to the computer via USB Type-C data cable.
3. **Mode confirmation:** After successfully entering DFU mode, the TS1M screen displays the "DFU Mode" logo.

**Exit DFU mode:** Disconnect the device power supply without pressing any buttons. After reconnecting the power supply, the device will automatically enter standby mode.



TS1M\_DFU (E:)

## 4.2 Basic Operation

### 4.2.1 Heating operation

#### Start heating from the standby interface

1. **Select the heating function:** In the standby interface, scroll the wheel to select the "Heating" icon.
2. **Start the temperature control mode:** Short press the scroll wheel or the down button to confirm, the device enters the temperature control mode and automatically heats up to the preset temperature.
3. **Exit heating ( temperature control mode ) :** In the temperature control mode, press and hold the up button for about 3 seconds, the setting will stop heating and return to the standby interface.

#### Quickly start heating from the settings menu:

**Quick entry:** In the settings main menu interface, press and hold the scroll wheel for about 3 seconds to directly enter the temperature control mode ( the device also starts to heat up to the preset temperature ) .

## 4.2.2 Temperature control operation

### Adjust the preset temperature in temperature control mode:

1. Switch the preset temperature gear: **Short press the down button or the up button** to switch the preset temperature gear ( such as working temperature 1 / 2 / 3 ).
2. **Gear status indication:** The currently selected gear is displayed in **orange**, and the unselected gear is displayed in **gray**.
3. **Temporary temperature adjustment:** Turn the wheel **up** to temporarily increase the target temperature, and **turn the wheel down** to temporarily lower the target temperature.
4. **Temperature display:** The temporarily set target temperature value is displayed in **orange**, and the current actual working temperature is displayed in **white**.
5. **Switch display mode:** **Short press the wheel button** to switch between the waveform display interface and the pure digital display interface with one click.

### Modify the preset temperature value in the settings menu:

1. **Enter the preset temperature adjustment:** In the settings menu, scroll the wheel to select the target preset temperature ( such as "Working Temperature 1", "Working Temperature 2" or "Working Temperature 3" ), **short press the down button or the scroll wheel to confirm**, and enter the temperature adjustment interface of this item.
2. **Adjust the preset temperature value:** In the adjustment interface, **turn the scroll wheel up** to increase the preset temperature value, and **turn the scroll wheel down** to decrease the preset temperature value.
3. **Confirm or cancel the modification:**  
**Confirm the modification:** **Short press the up button or the scroll wheel** to confirm and save the current setting value  
**Cancel the modification:** **Long press the up button or the scroll wheel for about 3 seconds** to abandon the modification and restore the temperature value before this adjustment.  
**Automatic save:** After exiting this menu item ( whether confirming or canceling the exit ) , the device automatically saves all effective preset temperature values.

### 4.2.3 Parameter settings

1. Enter the settings and modify parameters from the standby interface:

1) Enter the settings menu: In the standby interface, scroll the wheel to select the "Settings" icon, **short press the scroll wheel or the down button to confirm**, and enter the settings menu.

2) **Select the setting item**: Scroll the wheel to browse the menu options, move to the target setting item, **short press the down button or the scroll wheel** to confirm, and enter the parameter adjustment interface of the item.

3) **Adjust the parameter value**: In the parameter adjustment interface, **turn the wheel up**: increase the parameter value, **turn the wheel down**: decrease the parameter value;

4) **Confirm or cancel the modification**:

**Confirm the modification**: **Short press the up button or the scroll wheel** to confirm and save the current setting value.

**Cancel the modification**: Long press the up button or the **scroll wheel for about 3 seconds** to **abandon** the modification and restore the parameter value before this adjustment.

5) **Exit the settings menu and save**: At any menu level, long press the **up button for about 3 seconds** to exit the entire settings menu and return to the standby interface.

**Automatic save mechanism**: After exiting the settings menu, the device automatically saves all confirmed modified parameter values.

6) **Intelligent state memory**: When returning to the standby interface, the system will prioritize returning to the "heating" icon, allowing users to quickly start heating.

In the heating interface, press and hold the **scroll wheel for about 3 seconds** to directly enter the main settings menu.

### 4.2.4 Thermometer function

**Usage steps**:

1. **Connect the temperature probe**: insert the external thermocouple temperature probe into the corresponding interface of the TS1M device.

**2. Start the temperature measurement mode:** In the standby interface, scroll the wheel to select the "temperature measurement" icon, **short press the down button or the scroll wheel button to confirm**, the device enters the temperature measurement mode, and the interface displays the real-time temperature waveform / data.

**3. Temperature measurement mode operation:**

**Exit temperature measurement:** In the temperature measurement interface, **press and hold the up button for about 3 seconds**, the device will exit the temperature measurement mode and return to the standby interface.

**Pause / resume waveform update:** **Short press the scroll wheel button** to pause the real-time update of the waveform; short press the scroll wheel button again to resume the update. **Clear waveform data:** Long press the **scroll wheel button for about 3 seconds** to clear the currently displayed waveform data ( can also be operated in the pause state ).

#### **4.2.5 Sleep state operation**

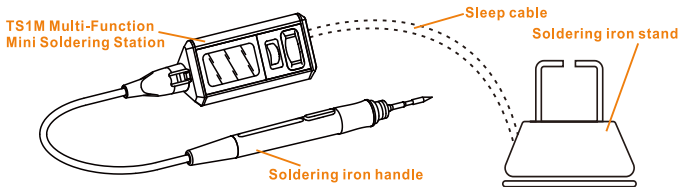
**1. Basic sleep and recovery (applicable to all compatible handles):**

**Enter sleep:** In the temperature control state, put the soldering iron handle **into the soldering iron stand**, the device will **automatically enter the sleep state**, and the temperature of the soldering iron tip will drop directly to the preset sleep temperature.

**Exit sleep and resume work:** When the handle is **taken out of the soldering iron stand**, the device will **automatically exit the sleep state**, restore the temperature control mode, and heat up to the set temperature.

**Enter standby after sleep timeout:** In the sleep state, if the device continues to be stationary and reaches the preset standby time, it will **automatically enter the standby state**.

**Note:** Use the sleep connection cable included in the product package to connect the TS1M controller and the soldering iron stand, and then put the soldering iron handle into the connected soldering iron stand to realize the sleep function.



## 2. Automatic sleep of digital handle

Applicable to **MINIWARE digital handle (not 115, 210, 245 series analog handle)**:

**Automatically enter sleep:** In temperature control mode, if the handle is **not operated for a long time** and reaches the preset sleep time, the device will **automatically enter sleep ( no need to place the sleep seat )** , and the interface will **switch to the sleep interface**.

**Sleep timeout enters standby:** In the automatic sleep state, if it is left still for a preset standby time, the device will automatically enter standby state.

### 4.2.6 Calibration

TS1M uses thermocouple temperature measurement and calibration functions. To ensure measurement accuracy, the temperature measuring wire must be used in a standardized manner: the surface of the soldering iron tip must be evenly covered with solder, and the temperature measuring end of the external thermocouple must be completely embedded in the tin layer and fully in contact with the surface/interior of the material being measured to achieve accurate temperature measurement.

#### 1. Manual calibration operation process

- 1) After entering the temperature control mode, set the preset target temperature to 350°C;
- 2) Apply a layer of solder evenly on the surface of the soldering iron tip ( to ensure uniform heat conduction ) ;

- 3) Fit the external thermocouple temperature measuring end tightly to the soldering iron tip and wait for the temperature to stabilize ( about 10-20 seconds ) ;
- 4) Observe the real-time temperature value in the lower right corner of the screen and calculate the difference between it and the set value of 350°C;
- 5) Enter the device setting menu, select the "Temperature Calibration" function, and enter the manual compensation value according to the difference to complete the calibration.

## 2. Instructions for automatic calibration

- 1) Ensure that the external thermocouple temperature measuring end fits tightly with the soldering iron tip, and evenly apply solder on the surface of the soldering iron tip;
- 2) After the device status is stable, short press the wheel button to digital interface and long press the down button (the specific duration is subject to the device prompt), the host will automatically perform temperature calibration, please keep the posture balanced until " Calibration successful " is displayed; If " Calibration failed " is displayed, please recalibrate;
- 3.) After automatic calibration, the compensation temperature cannot be manually modified. If you need to clear the compensation temperature of automatic calibration, it is recommended to restore the factory settings.

**Note:** The 4mm banana plug is a sleep cable interface and has no grounding function. Please do not connect it incorrectly!

### 4.2.7 Personalized interface

When the host **automatically switches from sleep mode to standby mode**, the system will check whether there is a user-defined image file. If there is an image named TS1Mback.BMP in the root directory, the system will **automatically load and display the custom image as the standby interface**; If the TS1Mback.BMP file is not detected, **the default MINIWARE Logo animation interface will be displayed.**

### 4.2.8 Screen off

When TS1M is in standby mode, if there is no user operation for 10 minutes ( default setting, unmodifiable ), it will automatically enter the screen-off state; or after the device displays the personalized logo interface, if there is no user operation for 10 minutes, it will automatically enter the screen-off state.

### 4.3 Menu Explanation

Parameter name	Interpretation	Factory settings	Adjustable range
Def Work	When heating up, the default working position	1	1 ~ 3
Work Tmp 1	Operating temperature 1	300 °C	100 °C ~ 450 °C
Work Tmp 2	Operating temperature 2	350 °C	100 °C ~ 450 °C
Work Tmp 3	Operating temperature 3	380 °C	100 °C ~ 450 °C
Boost temperature	Use the digital handle to boost temperature(This option menu will only appear if you insert a digital handle)	400 °C	100 °C ~ 450 °C
Slp Tmp	When entering sleep mode, the temperature of the soldering	100 °C	100 °C ~ 180 °C
Tmp Cal	Temperature calibration compensation value	0 °C	-60 °C ~ 20 °C
Slp Tme	When the soldering iron is not in use, the waiting time to enter the sleep mode.	180 S	100 S ~ 1800 S
Standby	In sleep mode, the waiting time to return to the standby interface	10 m	10 m ~ 100 m
Tmp Stp	Step value when adjusting temperature	5	10 ~ 30

Parameter name	Interpretation	Factory settings	Adjustable range
Bk Lght	Screen brightness	8	1 ~ 10
Pwr Set	Power settings for heating up different types of soldering irons	245: 140 W	30 W ~ 200 W
		210: 65 W	30 W ~ 100 W
		115: 35 W	25 W ~ 35 W
Tmp Typ	Temperature display units, Celsius and Fahrenheit	0	0: °C , 1: °F
Vol	Buzzer sound volume	3	0 ~ 5
Lang Sel	The language type displayed	CN	CN, EN, DE, RU
LVP	The minimum voltage limit for different types of soldering to heat up under DC power supply	245: 11 V	11 V ~ 21 V
		210: 6 V	6 V ~ 21 V
		115: 6 V	6 V ~ 21 V
Flip Det	Screen display, button reverse detection	ON	ON; OFF
TipTyp	C245 automatic identification ( C210, C115 manual selection )		
Info	Display soldering iron model, resistance value, voltage, temperature, software version, hardware version		
Rst Fac	Factory Reset		Cancel, Confirm

## 4.4 Config file

Parameter name	Interpretation	Factory settings	Adjustable range
Default Temp	Default temperature position	1	1 ~ 3
Work Temp 1	Operating temperature 1	300 °C	°C: 100 ~ 450 °F: 212 ~ 842

Parameter name	Interpretation	Factory settings	Adjustable range
Work Temp 2	Operating temperature 2	350 °C	°C: 100 ~ 450 °F: 212 ~ 842
Work Temp 3	Operating temperature 3	380 °C	°C: 100 ~ 450 °F: 212 ~ 842
Boost Temp	Boost temperature	350 °C	°C: 100 ~ 450 °F: 212 ~ 842
Sleep Temp	Sleeping temperature	100 °C	°C: 100 ~ 180 °F: 212 ~ 356
Sleep Time	Sleeping time	180 S	0 ~ 1800 S
Idle Time	Standby time	10 min	10 min ~ 120 min
Temp Step	Temperature step	5	1 ~ 30
Back Light	Background brightness	8	1 ~ 10
Temp Type	Temperature Type	0	0: °C, 1: °F
Beep Volume	Volume	3	0 ~ 5
Language	Language	1	0 ~ 4 ( 0: EN, 1:CN, 2:DE, 3:RU )
Low Vol Protect	Low voltage protection	6 V	6 V ~ 21 V
Flip Over	Flip	1	0~1 ( 0: Turn off detection, 1: Turn on detection )
Max Pow_245	245 Power Limit	140 W	30 W ~ 200 W
Max Pow_210	210 Power Limit	65 W	30 W ~ 100 W
Max Pow_115	115 Power Limit	35 W	25 W ~ 35 W
Calibra Val_245	245 Temperature calibration value	0	°C : - 60 ~ 20 °F : - 76 ~ 68
Calibra Val_210	210 Temperature calibration value	0	°C : - 60 ~ 20 °F : - 76 ~ 68
Calibra Val_115	115 Temperature calibration value	0	°C : - 60 ~ 20 °F : - 76 ~ 68

## 05 Soldering Tip

### 5.1 Soldering Tip Selection



210-KU



210-I



210-IS



245-K



245-BC2



245-D24

### 5.1 Tip Maintenance

- 1) When not in use for a long time, it is recommended to tin the soldering tip appropriately to prevent oxidation.
- 2) Do not keep the soldering tip in a high temperature state for a long time to avoid dry burning.
- 3) When soldering, do not apply too much pressure to the soldering tip to rub the solder joint to avoid damage to the soldering tip.
- 4) It is absolutely not allowed to use rough materials or files to clean the soldering tip.
- 5) If the surface of the soldering tip has oxidized and does not stick to tin, the user can use 600~800 mesh diamond cloth to carefully rub and clean it with ethylene propylene alcohol or an equivalent solution as needed.
- 6) After heating to 200°C, immediately tin it to prevent oxidation.
- 7) Do not use flux containing too much chlorine or acid, only use synthetic resin or activated resin flux.

## 06 Technical Support

Welcome to [www.miniware.com.cn](http://www.miniware.com.cn) for product support, including user manuals, firmware updates, usage tips and the latest news.

### 6.1 Common Problem Solving

**Problem 1: The screen does not display.**

Check 1: Is the power plugged in properly or is the cable damaged.

Check 2: Does the removable hard disk appear when connected to the computer.

**Problem 2: The soldering iron automatically restarts.**

Check 1: Is the power supply not properly plugged in.

Check 2: Is the voltage too low. ( You can check the minimum voltage set in the configuration file )

**Question 3: Is the soldering iron tip intermittently heated or the temperature fluctuates.**

Check 1: Is the soldering iron tip used for the first time.

Check 2: Is the power cord in poor contact.

Check 3: Is the soldering iron tip too hot. Set a suitable temperature.

Check 4: Has the soldering iron tip been cleaned. Refer to "Soldering Iron Tip Care and Use" .

**Question 4: Standby screen display “”**

Check 1: Is the temperature of the soldering iron tip above 50°C. If the temperature drops below 50°C, the system will automatically exit the alarm state;

**Question 5: Standby screen display “”**

Check 1: Is the voltage too low. ( Voltage < low voltage protection ) to see if the power supply needs to be replaced.

**Question 6: Standby screen displays “”**

Check 1: Is there any problem with the soldering iron tip. Is it firmly plugged in.

Check 2: If Check 1 passes, the soldering iron tip needs to be replaced.

**Question 7: When the TS1M is in normal use, it returns to the standby screen.**

Check 1: Is the voltage lower than the low voltage protection voltage. When the voltage rises back to above the low voltage protection voltage, it can be used normally.

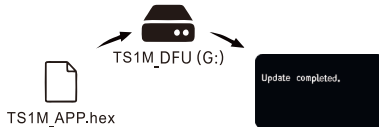
### Question 8: The soldering iron tip is not tinned.

1. Is the temperature of the soldering iron tip over 400°C.
2. Is the soldering iron tip not properly tinned.
3. Is there a lack of flux during soldering, detinning, repair, and re-soldering.
4. Has a sponge or rag with high sulfur content or dryness been used to wipe the soldering iron tip.
5. Has it been exposed to organic matter such as plastics, silicone grease and other chemicals.
6. Has impure and low-tin solder been used.

## 6.2 Service & Upgrades

### 6.2.1 Firmware Update

1. Download the firmware: Visit the official website [www.miniware.com.cn](http://www.miniware.com.cn), download the firmware file for TS1M, and save it to your computer.
2. Enter DFU mode: Press and hold the scroll wheel button of TS1M and connect TS1M to the computer using a USB cable. At this time, "DFU MODE" will be displayed on the TS1M screen, indicating that the device has successfully entered DFU mode. At the same time, the computer will recognize a removable disk named "TS1M\_DFU".
3. Complete the firmware upgrade: copy the downloaded hex firmware file to the root directory of the "TS1M\_DFU" disk. When the TS1M screen displays "Update completed", it means the firmware upgrade is complete. At this point, you can safely disconnect the USB connection and the device will automatically reboot and apply the new firmware.



### 6.2.2 After-sales Service

The TS1M multi-function mini soldering station controller provides a one-year free warranty service in the case of non-human damage. If you need to enjoy the warranty service, please contact the seller for processing. Please note that the soldering iron handle and soldering iron tip are consumable parts. Once used, they will not be returned or exchanged unless there is a quality problem.

## (07) Legal Statements

This device complies with the regulation in the 15th part of FCC regulation.

Operation of the devices is subject to the following two conditions:



- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including the interference that may cause undesired operation.



The CE mark is a registered trademark of European Community.

This CE mark indicates that the product complies with all the relevant European Legal Directives.



UKCA ( United Kingdom Conformity Assessed ) mark is a certification mark for UK conformity.

This device complies with the testing standard and certification under British regulations required for electrical and electronic products to enter the British market.



This product contains batteries and / or recyclable electronic parts.

Do not dispose of the product together with household waste.

Please handle it in accordance with your local laws and regulations.



RoHS is a mark of conformity, indicating that the product complies with EU regulations on restricting the use of certain hazardous substances in electrical and electronic equipment.



## 保修卡 Warranty Card

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产品名称 Product Name:

**TS1M Multi-Function Mini Soldering Station**

客户信息 User File:

买家姓名 Buyer Name \_\_\_\_\_

邮箱 Email \_\_\_\_\_

联系电话 Contact Number \_\_\_\_\_

购买日期 Purchase Date \_\_\_\_\_

产品故障 Product Malfunctions \_\_\_\_\_

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