MINIWARE

TS21

Precision Soldering Iron

User Manual
【 Electronic version 】V1.0

EN》

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, place it on a stable desktop or workbench. When not in use, store it properly.

Table of Contents

1/ Safety Statement

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

1.1 General Safety ⚠

- Please only use power adapters specially designed for this product or certified by your country/region (please refer to P3 for detailed power standards).
- Do not operate in humid environments.
- Do not in flammable and explosive environments.
- Please keep the product surface clean and dry.

1.2 Warnings ⚠

- When using TS21: Please turn off the power when not in use or left unattended to prevent fire.
- After the power is turned on, the temperature of the soldering tip in operation will reach 100 ℃ ~ 450 ℃ (212°F ~ 842°F).
- Be careful to avoid burns. Do not soak TS21 in water or use it with wet hands to prevent electricity shock.
- Do not use DC and USB-C interfaces at the same time.

1.3 Precautions ⚠

- TS21 controller is composed of precision components, dropping shall be avoided.
- After 5 minutes of continuous operation at full power above 350 ℃, or 40 minutes of continuous use, the controller temperature will reach above 50 ℃.
- When using it for the first time, it is normal for the soldering tip to emit a small amount of smoke due to the heating of the electrical heating elements.

1.4 Liability Statements

- Any special, indirect, incidental or subsequent damage or loss caused by the operation of the product that does not follow the contents of this manual (including but not limited to the operating conditions, warnings, precautions, instructions etc .), the liability will belong to the user.

- The user shall be responsible for any damage or loss caused by unauthorized disassembly or modification of the product.
- Please keep this product in a safe place to prevent children from using this product without being supervised.
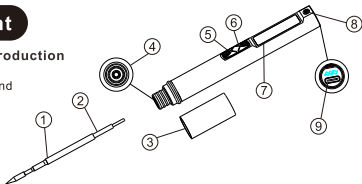
1.5 Operating Environment

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

2/ Safety Statement

2.1 Interfaces And Buttons Introduction

① Soldering Tip Heating End
② Soldering Tip Connection End
③ Anti-slip Cap
④ Soldering Tip Insertion End
⑤ Button A
⑥ Button B
⑦ OLED Screen
⑧ Ground Screw
⑨ USB Type-C Interface

2.2 Product Parameters

Screen	128*32, 0.91-inch monochrome OLED
USB Interface	USB Type-C
Dimension	109*15mm
Controller Weight	32 g

2.3 Working Parameters

Working voltage and power	DC 9V - 24V 60W MAX / PD 100W MAX
Temperature control range	100 ℃ - 450 ℃
Temperature stability	±3%

3/ Power Source Selection

Precision Soldering Iron TS21 supports two power inputs:

1. PD power source with USB Type-C interface (including charger, power bank, etc.) , powered by standard USB-C to USB-C power cable.

Power	30-300°C Warming time
100W	3s
60W	3s
40W	4s
27W	5s
18W	6s

2.DC power source (including power adapter, power supply, battery pack, etc.) via USB-C adapter (not included in delivery).
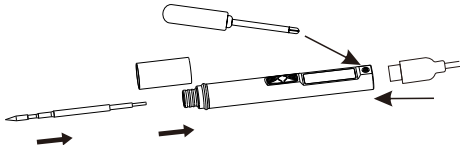
Working voltage	Working Current	Power	Time to warm from 30°C to 300°C
9V	4A	36W	5s
12V	4.5A	54W	4s
16V	3.5A	56W	4s
19V	3A	57W	3s
24V	2.5A	60W	3s

4 / How to use

4.1 Installation

1) Insert the soldering tip into the TS21 controller.
2) Fix the ground wire with the ground screw (depending on requirements)
3) Connect the USB Type-C power cable to the TS21 power source, turn on the power and follow the instructions on the screen.

Note: After the power is turned on, if TS21 shows " No tip ! ", it means that the soldering tip is not firmly installed, please reinstall the soldering tip.

When using the soldering iron, the anti-slip cap can effectively provide an anti-slip function, enhancing the grip comfort and operation stability.

Installation of anti-slip cap:

Installation and fixing: Put the anti-slip cap into the front end of the controller, and fix it with double-sided adhesive tape.

Heat shrink reinforcement: Set an appropriate temperature (150 - 200 ℃ is recommended) with a hot air gun, and evenly heat the anti-slip cap to make it shrink fully and fit closely with the handle of the soldering iron. After the installation is completed, the anti-slip cap will be more stable, enhancing the user experience.

4.2 Factory Settings

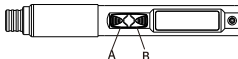| Preset temperature units		℃
Preset Temperature	T1 Temp	300 ℃
	T2 Temp	350 ℃
	T3 Temp	400 ℃
Sleep temperatur		100 ℃
Sleep time		1 min

4.3 Basic Operations

4.3.1 Screen Display

After the power is turned on, TS21 will first display the brand icon and then enter the standby state. If the temperature of the soldering tip exceeds the safe temperature (40 ℃) in the standby state, the screen will display the temperature as a warning to prevent burns.

MINIWARE	Brand icon		Standby interface
HW:v1.10 FW:v1.5.0	Software and hardware version number	Resistive: 2.1 Temp: 26 Volts: 20.1	Current status (tip internal resistance, input voltage, tip temperature)
280	Tip high temperature warning icon, the value indicates the current tip temperature		

4.3.2 Parameter Settings

1) In standby mode, short press B to enter setting mode.
2) In setting mode, press A/B to select the setting item that needs to be modified, long press A to enter the modification state, and press A/B to select the appropriate setting value. Wait for 5 seconds after selection, the parameter will be modified successfully and return to setting mode automatically. Other settings can be modified in the same way.
3) After the setting is completed, long press B to save the modification and return to the standby mode.
4) In standby state, press and hold A, TS21 screen will display the current internal resistance of the soldering tip.
5) In standby state, press and hold B, TS21 screen will display the current firmware version.

Note: In standby mode, TS21 will enter the off-screen state if it stands still for a long time. You can wake it up by shaking the controller to enter the standby state.

Menu Description:

First 1 Menu	First 2 Menu	Range	Menu Explanation
Power settings	Min Volt	DC, 3s - 6s, Default DC	Input selection
	Volt Set	2500 mV - 4200 mV, Default 3000 mV	Minimum voltage of a single battery when powered by a battery pack
	Max Power	20 - 100W, Default 60 W	Maximum power limit

First 1 Menu	First 2 Menu	Range	Menu Explanation
Welding Settings	Work Temp 1	100-450°C, Default 300°C	Preset temperature 1
	Work Temp 2	100-450°C, Default 350°C	Preset temperature 2
	Work Temp 3	100-450°C, Default 400°C	Preset temperature 3
	Boost temp	100-450°C, Default 400°C	Preset working temperature for boost mode
	Temp step	1-50, Default 10	Step length for each key operation during temperature adjustment
Idle Settings	Sleep Temp	100-highest working temperature, Default 100°C	Standby temperature in sleep state value is not higher than working temperature
	Sleep Time	Off, 10s-10m, Default 1m	Time to enter sleep state from working mode when stationary
	Idle Time	Off, 10s-10m, Default Off	Time to enter standby state from sleep mode
User settings	Temp unit	°C, °F, Default °C	Temperature display unit

First 1 Menu	First 2 Menu	Range	Menu Explanation
User Settings	Display Dir	Auto, Left, Right; Default Auto	Screen display direction, in different modes, the screen display direction is reversed, and the button function remains unchanged
	Animation Speed	Off, Slow, Medium, Fast; Default Medium	Menu animation display speed
	Back Light	1-10, Default 5	Screen display brightness
	Light	Off, On, Auto; Default Auto	Fill light switch
Advanced settings	Temperature compensation	-30 - +30, Default 0	Temperature compensation, set the temperature difference compensation between 300°C and actual temperature
	Restore Settings		Restore factory setting

4.3.3 Button Function:

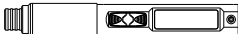| Contents	Button	Single Press	Long Press
Standby Interface	Button A	Start heating	Display current status
	Button B	Enter the menu option	Display hardware and software version
Menu interface	Button A	Left adjustment	Select to enter

Contents	Button	Single Press	Long Press
Menu interface	Button B	Right adjustment	Return to upper menu
Parameter adjustment interface	Button A	Left adjustment	Quick left adjustment
	Button B	Right adjustment	Quick right adjustment
Heating interface	Button A	Switch preset working temperature among T1 / T2 / T3	Quickly heating up
	Button B	Temporarily adjust the temperature (the value won't be saved after restarting)	Return to standby

Note:

TS21 will save the current settings and return to the menu interface after 5 seconds of no operation in the parameter adjustment interface.

TS21 will return to the standby state after 15 seconds of no operation in the menu interface.

4.3.4 Heating Operation

Heating operation: In standby mode, press A and TS21 will enter heating working mode. After the temperature is heated to the preset working temperature, TS21 will automatically maintain a constant temperature.

Boost operation: In the heating working state, press and hold A, TS21 will enter boost heating mode. The temperature of the soldering tip will rise to the boost heating temperature and maintain a constant temperature. When button A is released, the temperature will drop back to stay at the preset working temperature.

Long press B in heating mode to return to standby mode.

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Note:
If the power supply voltage is too low, the screen will show " Low volt ! ". Please replace the power source.

4.3.5 Temperature Adjustment

TS21 has two temperature adjustment methods: select preset temperature or directly adjust temperature.

1) Select preset temperature: In standby state, press A to select preset temperature T1 / T2 / T3. After selection, TS21 will heat up to the selected preset temperature and maintain a constant temperature.

2) Direct Temperature Adjustment: In heating state, press B to enter " Work Temp " menu of the working temperature setting. Press A/B to adjust the temperature. The setting will be automatically saved and returned to heating mode after 5 seconds of no operation, heated to the set temperature and then keep in the temperature (this modification is valid for one time setting, and will not be saved after power off).

4.3.6 Sleep and standby state

250°C 19V
zZ 250

In working mode, if TS21 will stand still for 60 seconds (factory default setting, which can be modified by " Sleep Time "), it will enter sleep mode, the " zZ " symbol will appear on the screen, and the soldering tip will cool down to sleep temperature (can be modified by " Sleep Time ").
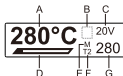
300°C 8.88V

When movement is detected, TS21 will exit the sleep mode and return to working mode automatically. The soldering tip will heat up to the working temperature before sleep mode.

TS21 can be set to return to the standby state after standing still for a certain period of time at the sleep temperature (factory default setting, can be modified by " Idle Time ") . Another 60 seconds in standby mode (factory default setting, can be modified by " Sleep Time ") , and the screen of TS21 will turn off.
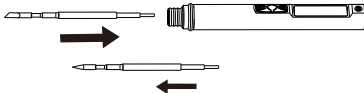
Interface Icon Description:

Screen Area	Display Content	Definition
A	Temperature value and unit	Instant working temperature of the soldering tip
B	🔥	Boost mode icon
	No display	Normal working state
C	Voltage value and unit	Current power source voltage
D	Solid line	Instant working power bar; the length of the power bar indicates the ratio of the current instant power to the maximum power
E	M	TS21 is in a moving state
	No display	TS21 is in a stationary state
F	T1 / T2 / T3	Preset temperature T1 - T3
	☾	TS21 in sleep mode
G	Numerical value	Current preset temperature

5/ Soldering Tips

5.1 Replace A Soldering Tip

1) Please replace the soldering tip after power off;

2) Pull out the original soldering tip and reinsert another iron tip;

3) Turn on the power again. If TS21 shows: " NO TIP ! ", it means that the soldering tip is not firmly installed. please reinsert the soldering tip.

5.2 Choose A Soldering Tip

There are 3 kinds of soldering tips to choose from.TS21-KU, TS21-I, TS21-IS.

TS21-KU   TS21-I   TS21-IS

5.3 Maintenance of Soldering Tip

1) When not in use for a long time: It is recommended that the soldering tip shall be properly tinned to prevent oxidation;

2) Do not let the soldering tip be heated at a high temperature for a long time to avoid dry burning;

3) When soldering, do not apply too much pressure on the soldering tip to rub the solder joints to avoid damage to the soldering tip;

4) Never use rough materials or files to clean the tip of the soldering iron.

5) If the surface of the soldering tip has been oxidized and does not stick to tin, the user can rub it with 600~800 mesh gold steel emery cloth and clean it with ethyl propanol or an equivalent solution to prevent oxidization by dipping it in tin immediately after heating it up to 200°C.

6) Do not use chlorine or acid-rich flux, only use synthetic resin or activated resin flux.

6 / FAQ

Questions	Checking
No display on TS21 screen after power on.	1. Check the power source and cable.
	2. 2.Check if TS121 can enter DFU mode after connecting to the computer and read the virtual disk.
The displayed temperature of the soldering iron jumps around the preset temperature.	1. Is the soldering tip used for the first time or stored in a humid environment? When the soldering tip is fully heated, the temperature can be maintained.
	2. Whether the soldering tip has been installed correctly.
	3.Whether the power cable is in poor contact.

Questions	Checking
Soldering iron restarts automatically or screen displays "⚡".	1. Whether the power supply is plugged in and powered on normally.
	2. Whether the power parameters meet the usage requirements.
The screen displays "✗⊸⊒".	1. Whether the soldering tip has been installed correctly.
	2. Whether the soldering iron tip burned out.
The soldering iron tip does not stick to the solder.	1. Whether the temperature of the soldering tip exceeds 400°C.
	2. Whether the soldering tip is not properly tinned.
	3. Whether there is a lack of flux or using solder with low purity or low tin.
	4. Whether you have ever wiped the soldering tip with a dry sponge or shredded with high sulfur content or dryness.
	5. Whether the tip has come into contact with organic substances such as plastics, silicon(silicon) grease or other chemicals.

7/ Service & Upgrades

7.1 After-sales Service

The soldering iron controller has a six-month free warranty service in case of non-artificial damage. Please contact the dealer for warranty service. Soldering tips are consumables. If there is no quality problem, once used, they will not be returned or exchanged.

7.2 Firmware Update

1) Visit www.miniware.com.cn to download the applicable soldering iron firmware to your computer.

2) Press and hold the button A of the TS21 and connect it to the computer via the USB Type-C cable. The TS21 will enter DFU mode, the screen displays " DFU:X.XX " , and a virtual disk appears on the computer.

3) Copy the prepared .hex firmware to the root directory of the disk. When the firmware suffix changes from .hex to .rdy, disconnect the USB connection to complete the firmware upgrade.

TS21APP.hex

TS21_DFU(G:)

TS21APP.rdy

Tips: The default firmware language of TS21 precision soldering iron is English. If you need to change to other languages (Chinese, Russian, German), please go to the official website to download and update the corresponding firmware.

8/ 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.