

Digital-Control and Programmable DC Power Supply

Models: 72-2535, 72-2540, 72-2545, 72-2550 & 72-10480

User Manual

TENMA[®]

User Manual

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SAFETY SYMBOLS

This chapter contains important safety instructions that you must follow when operating the Tenma power supply and when keeping it in storage. Read the following before any operation to insure your safety and to keep the best condition for the Tenma power supply.

Safety Symbols

These safety symbols may appear in this manual or on the series.



WARNING



DANGER High Voltage.



Earth (ground) Terminal

SAFETY INSTRUCTION

Safety Guidelines

- Do not block or obstruct the cooling fan vent opening.
- Avoid severe impacts or rough handling that leads to damage.
- Do not discharge static electricity .
- Do not disassemble unless you are qualified as service personnel.

AC INPUT



- AC Input Voltage: 110V / 120V / 220V / 230V , 50 / 60 Hz
- Connect the protective grounding conductor of the AC power cord to an earth ground, to avoid electrical shock.

Operation Environment

- Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (note below)
- Relative Humidity: < 80%
- Altitude: < 2000m
- Temperature: 0-40°C

Storage environment

- Location: Indoor
- Relative Humidity: < 70%
- Temperature: -10-70°C -

FUSE



Model	110/120V	220/230V
72-10480	T4A/250V	T2A/250V
72-2535	T5A/250V	T3A/250V
72-2540	T5A/250V	T3A/250V
72-2545	T5A/250V	T3A/250V
72-2550	T5A/250V	T3A/250V

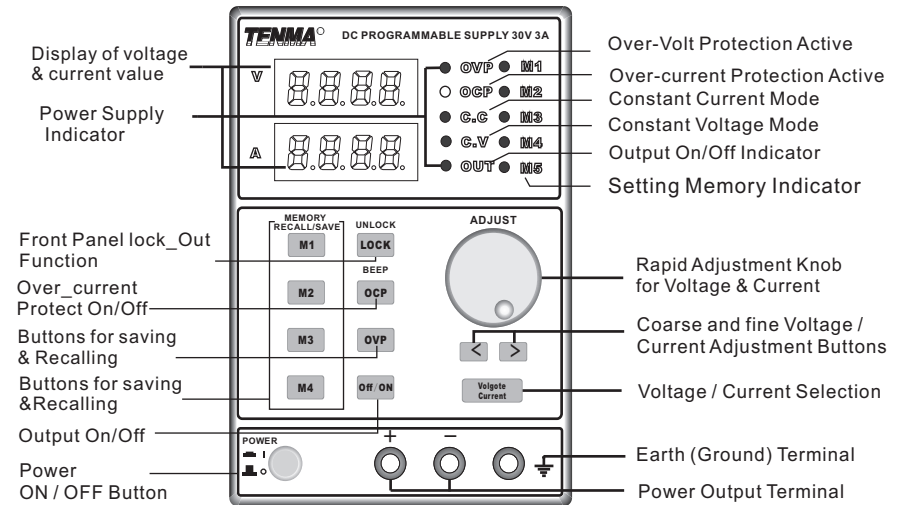
- To ensure fire protection, replace the fuse only with the specified type and rating.
- Disconnect the power cord before fuse replacement .
- Make sure the cause of fuse blowout is fixed before fuse replacement .

Series Lineup/Main Features

Model	V Meter	A Meter	USB	Resolution
72-10480	4digit	4digit	NO	10mv/1mA
72-2535	4digit	4digit	Yes	10mv/1mA
72-2540	4digit	4digit	Yes	10mv/1mA
72-2545	4digit	4digit	Yes	10mv/1mA
72-2550	4digit	4digit	Yes	10mv/1mA

- Performance**
 - Low noise: cooling fan controlled by heatsink temperature;
 - Compact size, light weight.
- Operation**
 - Constant voltage / constant current operation
 - Output On / Off Control
 - Digital panel control
 - 4 pairs of panel setup save / recall
 - Coarse and fine Voltage / Current control
 - Software calibration
 - Beep output
 - Key lock function
- Protection**
 - Overload protection
 - Reverse polarity protection
- Interfaces**
 - USB/RS232 for remote control (only for 72-2535,72-2540,72-2545, 72-2550)

Front Panel Overview



DISPLAY

- Voltage level** **v** Voltmeter displays the setup value of output voltage .
- Current level** **A** Displays the setup value of output current .

Condition Indication

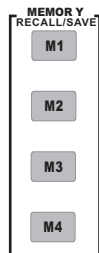
- **@V/P** OVP is the indicator of overvoltage protection. When overvoltage function is turned on, ● **@V/P** indicator lights on; when output voltage is higher than protection setup value due to unexpected conditions, output cuts off and OVP indicator flickers; Press the key OVP again, and the power supply recovers.

- OCP OCP is OCP indicator. When overcurrent function is turned on, ○ OCP indicator lights on.
- C.C C.C is constant current indicator. When power supply is in the mode of constant current, this light is on.
- C.V C.V is constant voltage indicator. When power supply is in the mode of constant voltage, this light is on.
- OUT OUT is output indicator. If light on, there is voltage output in the output terminal.

Storage Indication

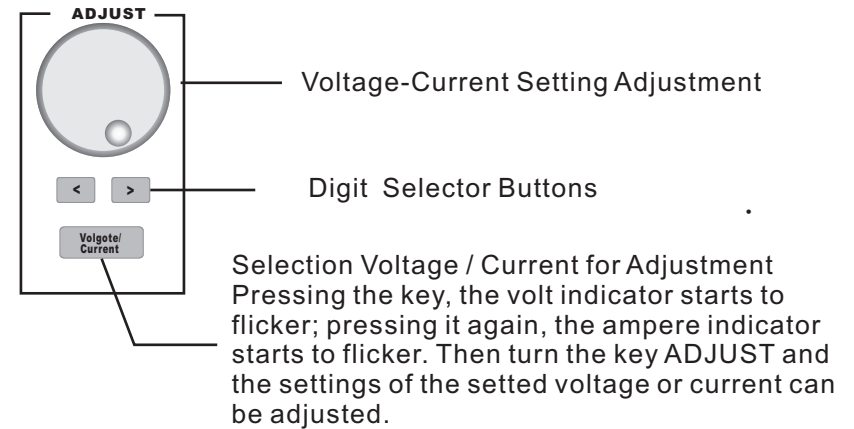
- M1
 - M2
 - M3
 - M4
 - M5
- Indication of saving and recalling 5 setups stored internally;

Brief Introduction of Panel Operation

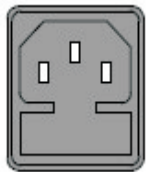
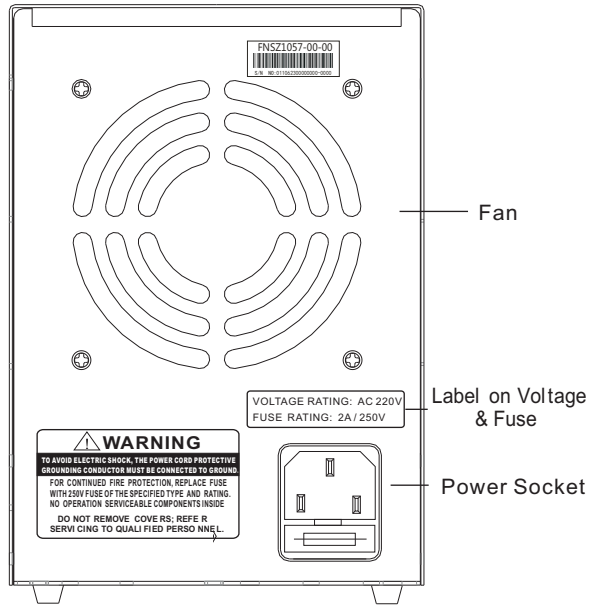


Saves or recalls panel settings. For settings, 1 ~ 4 are available. For save / recall details, see Page 13.

- UNLOCK**
- LOCK — Front panel lock_out function. For details, see Page 11.
- BEEP**
- OCF — Over-Current protect on/off, Pressing this key for more than 2 seconds will make beep On/OFF.
- OVP — Over-voltage Protect On/Off
- Off / ON — Output On/Off.



- POWER — On / Off main power. For power up sequence, see Page 10.
- + — outputs voltage and current.
- — outputs voltage and current.
- ⏚ — Connects the ground (earth) terminal.



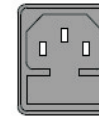
The power cord socket mainly accepts AC values: 115V / 230V, 50 / 60 Hz. Please refer to the fuse parameters on the back fuse label to replace the specified fuse.



Make sure the correct type of fuse is installed before power up

OPERATION

Connect AC power cord



Connecting AC power cord and selecting the corresponding AC voltage according to the back label on voltage; then connecting the AC power cord to the socket on the back panel

power on



Press the power switch to make power on. The display initializes, showing the model of the machine and then showing the setting level recalled the last time.

power off



Press the power switch again to make power off.

Output On / Off

Panel Operation Pressing the Output key to turn on output; and the key LED also turns on. Pressing the Output key again to turn off the output and the key LED.

Note: If there are any of the following conditions, the output will automatically turn off.

1. OVP turns on and there are unusual OVP on the output terminal.
2. The setting voltage is more than that of the OVP.
3. Recalling other setups from the memory.

Beep On / Off

Panel Operation By default, the beep sound is enabled. To turn off the beep, press the OCP(BEEP) key for 2 seconds. A beep comes out and the beep setting will be turned off. To enable the beep, press the OCP(BEEP) key again for 2 seconds.

Front Panel Lock

Panel operation

Press the LOCK key to lock the front panel key operation. The key LED turns on. To unlock, press the LOCK key for 2 seconds.

Output Set

Panel operation

1. Connecting the load to the front port, CH 1 + / - .
2. Setting output voltage and current.

Press the key Voltage/Current selection to switch voltage adjustment and current adjustment. Adjusting voltage and current with Voltage / Current Adjustment knob. By default, the Voltage and Current knob work in the coarse mode. To activate the fine mode, press the keys to select the coarse mode or the fine mode.
3. Turning on the output and pressing the output key.

The key LED turns on and displays CV or CC mode.

SAVE / RECALL SETUP

Save Setup

Background The front panel settings can be stored into one of the four internal memories.

Contents The following list shows the setup contents.

- Fine / coarse knob editing mode
- Beep on / off

● Output voltage / current level

The following settings are always saved as "off".

- Output on / off
- Front panel lock on / off

Panel operation Press one of the 4 buttons (M1, M2, M3, M4) and the LED light turns on accordingly. After you adjust the value, it is saved automatically once it stops blinking.

Recall Setup

The front panel settings can be recalled from one of the four internal memories.



Press any button of M1 to M4, and take M1 for example; the memory of panel settings is recalled in M1. After you recall M4, rotate the shuttle knob and then M5 is recalled.

- M1
- M2
- M3
- M4
- M5

It means the current memory is recalled that the memory indicator on the panel lights on accordingly.

Note When a setting is recalled, the output automatically turns off.

REMOTE CONTROL

Remote Control Setup

All the models 72-2535, 72-2540, 72-2545, 72-2550 etc. can be connected to the PC through interfaces USB/RS232 on the back of the machine and controlled by the remote control.

COM setting Set up the COM port inside the PC according to the following list.

- Baud rate: 9600
- Parity bit: None
- Data bit: 8
- Stop bit: 1
- Data flow control: None

Functionality check Run this query command via the terminal application such as MTTY (Multi-threaded TTY).
*IDN?
This should return the identification information: Manufacturer, model name, serial number.
72-10480 SN:xxxxxxx Vx.xx

REMOTE CONTROL PROCEDURES

Entering the Remote Control Mode


1. Connecting USB
2. The power supply will automatically connect. After normal connection, there will be a tweet from the power supply itself.
3. The panel keys are locked, so the power supply can only rely on the remote control.

Exiting from the Remote Control Mode

1. Closing the remote control software.
2. Disconnecting USB from the back.
3. The power supply disconnects; a tweet from the beep with the hint that the remote control is over.
4. The power supply automatically comes into the panel control mode.

FAQ

Q1: The panel buttons don't work when power on.

A1: The panel is locked. Press the key  for over 2 seconds, and then the panel will unlock.

Q2: Pressing ON/OFF, there is no output when power on.

A2: Current setup is 0.

Q3: Output voltage rises slowly when output button is on.

A3: Current setup is too small.

Q4: Making OCP on and pressing output switch; and then the output is automatically shut off.

A4: Current protection value setup is too small. You could press output switch and then make OCP on.

Specifications

Note: The specifications below are tested under the conditions of temperature 25°C+-5°C and the warm-up for 20 minutes.

Models	72-10480	72-2535	72-2540	72-2545	72-2550
Voltage Range	0-30V	0-30V	0-30V	0-60V	0-60V
Current Range	0-3A	0-3A	0-5A	0-2A	0-3A
Load Regulation					
Voltage	≤0.01%+2mv	≤0.01%+2mv	≤0.01%+2mv	≤0.01%+2mv	≤0.01%+2mv
Current	≤0.1%+5mA	≤0.1%+10mA	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Line Regulation					
Voltage	≤0.01%+3mv	≤0.01%+3mv	≤0.01%+3mv	≤0.01%+3mv	≤0.01%+3mv
Current	≤0.1%+3mA	≤0.1%+3mA	≤0.1%+3mA	≤0.1%+3mA	≤0.1%+3mA
Setup Resolution					
Voltage	10mV	10mV	10mV	10mV	10mV
Current	1mA	1mA	1mA	1mA	1mA
Setup Accuracy (25°C+-5°C)					
Voltage	≤0.5%+20mV	≤0.5%+20mV	≤0.5%+20mV	≤0.5%+30mV	≤0.5%+30mV
Current	≤0.5%+5mA	≤0.5%+5mA	≤0.5%+10mA	≤0.5%+5mA	≤0.5%+5mA
Ripple(20-20M)					
Voltage	≤1mVrms	≤1mVrms	≤2mVrms	≤1mVrms	≤1mVrms
Current	≤3mA _{rms}	≤3mA _{rms}	≤3mA _{rms}	≤3mA _{rms}	≤3mA _{rms}
Temp. Coefficient					
Voltage	≤150ppm	≤150ppm	≤150ppm	≤150ppm	≤150ppm
Current	≤150ppm	≤150ppm	≤150ppm	≤150ppm	≤150ppm
Read Back Accuracy					
Voltage	10mV	10mV	10mV	10mV	10mV
Current	1mA	1mA	1mA	1mA	1mA
Read Back Temp. Coefficient					
Voltage	≤150ppm	≤150ppm	≤150ppm	≤150ppm	≤150ppm
Current	≤150ppm	≤150ppm	≤150ppm	≤150ppm	≤150ppm

Reaction Time					
Voltage Rise	≤100mS	≤100mS	≤100mS	≤100mS	≤100mS
Voltage Drop	≤100mS (10% Rated load)	≤100mS (10% Rated load)	≤100mS (10% Rated load)	≤100mS (10% Rated load)	≤100mS (10% Rated load)
Interface					
Optional Interfaces (for programmable models only): RS232, USB					
Accessories					
User manual 1 PC ; Power cord: 1xUK power cord and 1x Euro power cord					
Weight and Dimensions(mm)					
110(W)*156(H)*260(D), 72-10480/72-2535x3.6Kg, 72-2540, 72-2545x4.3Kg, 72-2550x4.8Kg					