Digital-Control and Programmable DC Power Supply

KA3000-6000 Series User Manual

KORAD

User Manual

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KORAD KA3000/6000-Series User Manual

The information in this manual is correct when printing. However, KORAD will continuously improve products and reserve the rights to change specifications, equipment, and maintenance procedures at any time without notice.

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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 (for programmable models only)					
RS232, USB					
Accessories					
User manual *1, Power cord*1, USB cable (for programmable models KA3003P, KA3005P, KA6002P, KA6003P, KA6005P & KA3010P)					
Weight and Dimension					
110mm(W)*172mm(H)*305mm(D): KA6005x8kg & KA3010x8.3kg 110mm(W)*165mm(H)*265mm(D): KA3003x3.7kg, KA3005x4.3kg, KA6002x4.2kg & KA6003x4.55kg.					

SAFETY INSTRUCTION

This chapter contains important safety instructions that you must follow when operating the KA3000 & KA6000 series and when keeping it in storage. Read the following before any operation to insure your safety and to keep the best condition for the KA3000 & KA6000 series.

Safety Symbols

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

WARNING

DANGER High Voltage

Earth (ground) Terminal

General Introduction

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 Inut 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℃

Storage environment

- Location: Indoor
- Relative Humidity: <70%
- Temperature:-10-70℃

FUSE

Model	110/120V	220/230V
KA3003D/P	T4A/250V	T2A/250V
KA3005D/P	T5A/250V	T3A/250V
KA3010D/P	T10A/250V	T5A/250V
KA6002D/P	T5A/250V	T3A/250V
KA6003D/P	T5A/250V	T3A/250V
KA6005D/P	T10A/250V	T5A/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.

Specifications

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

Models	KA3003D/P	KA3005D/P	KA3010D/P	KA6003D/P	KA6005D/P
Voltage Range	0-30V	0-30V	0-30V	0-60V	0-60V
Current Range	0-3A	0-5A	0-10A	0-3A	0-5A
Load Regulation					
Voltage	≤0. 01%+2mv	≤0. 01%+2mv	≤0. 01%+3mv	≤0. 01%+2mv	≤0. 01%+2mv
Current	≤0. 1%+5mA	≤0. 1%+10mA	≤0. 1%+20mA	≤0. 1%+5mA	≤0. 1%+10mA
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℃+-5℃)					
Voltage	≤0.5%+20mV	≤0.5%+20mV	≤0.5%+20mV	≤0.5%+30mV	≤0.5%+30mV
Current	≤0.5%+5mA	≤0.5%+10mA	≤0.5%+20mA	≤0.5%+5mA	≤0.5%+10mA
Ripple(20-20M)					
Voltage	≤1mVrms	≤2mVrms	≤2mVrms	≤1mVrms	≤1mVrms
Current	≤3mArms	≤3mArms	≤5mArms	≤3mArms	≤3mArms
Temp. Coefficient					
Voltage	≤150ppm	≤150ppm	≤150ppm	≤150ppm	≤150ppm
Current	≤150ppm	≤150ppm	≤150ppm	≤150ppm	≤150ppm
Read Back Resolution					
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

FAQ

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

A1: The panel is locked. Press the button LOCK UNLOCK 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.

OVERVIEW

Models Introduction

Models	V Meter	A Meter	USB	Resolution
KA3003D	4digit	4digit	NO	10mV/1mA
KA3003P	4digit	4digit	Yes	10mV/1mA
KA3005D	4digit	4digit	NO	10mV/1mA
KA3005P	4digit	4digit	Yes	10mV/1mA
KA3010D	4digit	4digit	NO	10mV/1mA
KA3010P	4digit	4digit	Yes	10mV/1mA
KA6002/3D	4digit	4digit	NO	10mV/1mA
KA6002/3P	4digit	4digit	Yes	10mV/1mA
KA6005D	4digit	4digit	NO	10mV/1mA
KA6005P	4digit	4digit	Yes	10mV/1mA

Main Characteristics

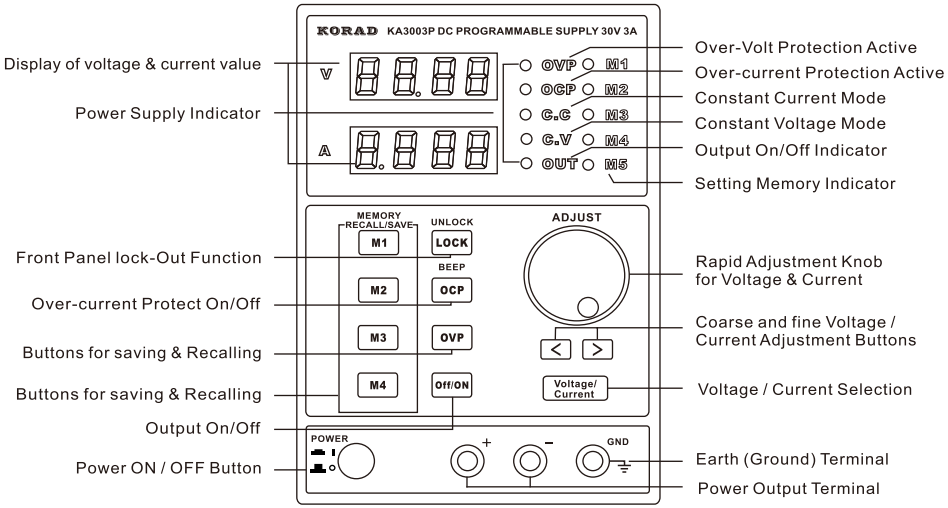
Performance
- Low noise: cooling fan controlled by heatsink temperature
- Compact size, light weight

Operation
- Constant voltage / constant
- Corrent operation
- Output On / Off control
- Digital panel control
- 4 pairs of panel setup save / recall
- Conarse and fine voltage / current control
- Software calibration
- Beep output
- Button lock function

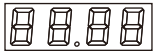
Protection
- Overload protection
- Reverse polarity protection

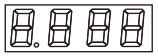
Interfaces
- USB/RS232 for remote control (only for KA3003P, KA3005P, KA6002P, KA6003P, KA6005P & KA3010P)

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.

Status Indication

● OVP OVP is the indicator of overvoltage protection. When overvoltage function is turned on, ● OVP 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 button OVP again, and the power supply recovers.

REMOTE CONTROL PROCEDURES

Entering the Remote Control Mode

1. Connect the USB cable.
2. The power supply will automatically connect. After normal connection, there will be a tweet from the power supply itself.
3. The panel buttons are locked, so the power supply can only controlled by the computer.

NOTE: KORAD software must be installed first.

Exiting from the Remote Control Mode

1.Close the remote control software.
2. Disconnect 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.

REMOTE CONTROL

Remote Control Setup

All the models with the suffix "P", such as KA3003P, KA3005P, KA6002P, 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 MTTTY (Multi-threaded TTY).
*IDN?
This should return the identification information:
Manufacturer, model name, software version.
KORAD KA3003P Vx.xx

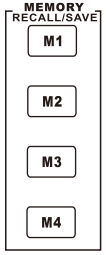
- OCP — OCP is OCP indicator. When overcurrent function is turned on, ● OCP indicator lights on.
- C.C — C.C is constant current indicator. When power supply is in the mode of constant current, this light is on.
- C.V — C.V is constant voltage indicator. When power supply is in the mode of constant voltage, 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 4 setups stored internally; When LOCK indication turns on, the front panel button operation is locked.

Brief Introduction of Panel Buttons



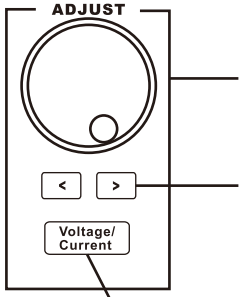
Saves or recalls panel settings. For settings, 1~4 are available. For save / recall details, see Page 13. For M5, press M4 and adjust the knob, then you will enter M5 mode.

Front panel LOCK function. For details, see Page 11.

Over-Current protect on/off. Pressing this button for more than 2 secends will make beep On/OFF.

Over-votage Protect On/Off.

Output On/Off.



Voltage-Current Setting Adjustment.

Digit Selector Buttons.

Selection Voltage / Current for Adjustment Pressing the button, the volt indicator starts to blink; pressing it again, the ampere indicator starts to blink. Then turn the ADJUST knob and the settings of voltage or current can be adjusted.

On / Off main power. For power up sequence, see Page 10.

outputs voltage and current.

Connects the ground (earth) terminal.

Recall Setup

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

Recalls panel settings. For settings, 1~4 are available.

○ M1
○ M2
○ M3
○ M4

Indication of saving and recalling 4 setups stored internally; Press one of the 1~4 Memory buttons, for example number 1. The panel settings saved in memory NO. 1 are recalled. The LED M1 turns on.

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

Output Setup

Panel Operation

1. Connecting the load to the front port, red(+), black(-).
2. Setting output voltage and current.
   Press the button 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 buttons to selsct the coarse mode or the fine mode.
3. Turning on the output and pressing the output button.
   The button LED turns on and displays CV or CC mode.

SAVE / RECALL SETUP

Save Setup

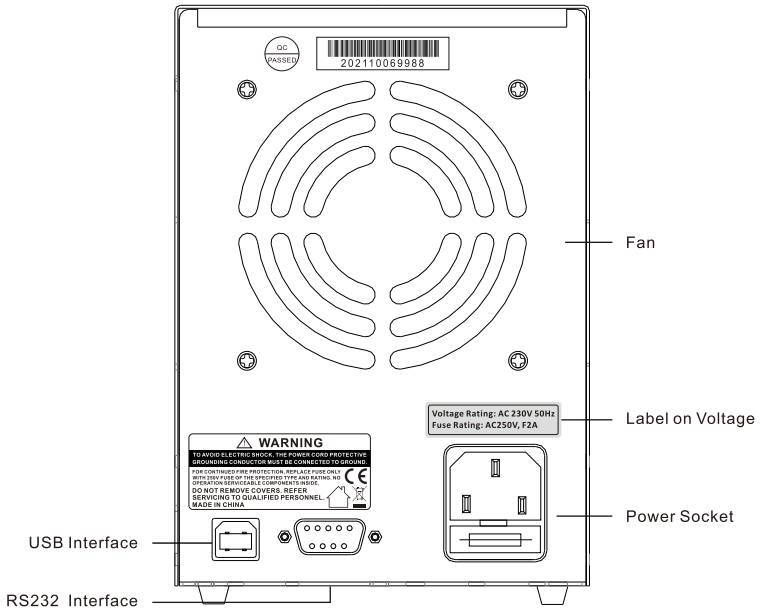
Background — The front panel settongs can be stored into one of the four internal memories.

Contents — The following list shows the setup contenes.

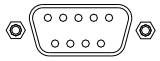
- Fine / coarse knob editing mode
- Beep on / off
- Output voltage / current level
  The following settings are always saved as"off"
- Output on / off
- Front panellock on / off

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 savde automatically once it stops blinking.

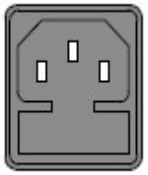
REAR PANEL INTRODUCTION



USB dependent interface based on remote control order (see Page 14); only for KAXXXXP series, such as KA3003P and so on.



RS232 dependent interface based on remote control order (see Page 14); only for KAXXXXP series, such as KA3003P and so on.

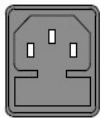


The power cord socket mainly accepts AC values: 115V / 230V, 50 / 60 Hz. Please refer to the fuse parameters on the back fuse label to replace the specified fuse.

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 turn power on. The display initializes, showing the model of the machine and then showing the setting last time.

power off

Press the power switch again to turn power off.

Output On / Off

Panel Operation — Press the output button to turn on output; and the button LED also turns on. Pressing the Output button again to turn off the output and the 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) button for 2 seconds. A beep comes out and the beep setting will be turned off. To enable the beep, press the OCP(BEEP) button again for 2 seconds.

Front Panel Lock

Panel Operation — Press the LOCK button to lock the front panel button operation. To unlock, press the LOCK button for 2 seconds.