Programmable DC Power Supply

Operating Manual

OPE Series

ODA TECHNOLOGIES

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CONTENTS

1. General Information

1-1. Feature

ODA Technologies's OPE-Series Dual & Multiful Output products are high performance programmable DC power supply with RS232C or RS485 interface based on SCPI (Standard Commands for Programmable Instruments) protocol and the combination of bench-top and system features in these power supplies provides versatile solutions for your design and test requirements in the industiral fields, R&D institute center and education fields.

General Feature

- Dual & Multiful Output + Fixed 2Channel Output(5V/2A, 15V/1A)
- Tracking Output.
- Easy-to-use knob control settings
- 2-Line * 16Character LCD Display(Voltage/Current Display of Channel 1 and Channel 2)
- Output ON/OFF key
- Alarm beep when events occure
- Excellent load and line regulation and low ripple and noise
- Operating state store and recall
- Small Size(2U * 19inch Half-Rack compatibility)
- Safety power down mode when detecting system malfunction

Remote Interface

- RS232C or RS485 interface
- SCPI(Standard Commands for Programmable Instruments) compatibility
- High speed setting & measument
- Abundant Commands
- I/O setup easily done from front-panel
- Insulation from instrument and floating logic embodiment
- Built-in SCPI programming error check function

Calibration

- Software calibration, no internal adjustments required
- Easy calibration by using PC interface

1-2. Accessories and Options

Accessories

- Operationg Manuals 1pc, AC Input Cord 3P-Wire 1pc, Output Test Wire 2sets. When the currnet is over 50A, no supplies of output test wire.

Options

- RS485 Module
- RS485 to RS232 Convertor
- RS232C Cross Cable 1M, 2M, 4M, 10M
- USB-RS232C Converter
- Rack Mount Shelf
- Rear Output Terminal
- Remote V-Sensing(Rear attach)
- Analog Signal Input Control(By PLC, Arbituary Function Generator)
- Output ON/OFF Signal Control
- Display Resolution Upgrade(To 4 digit from 3 digit)
- Last state memory recall function
- Warranty extension
- Window Application for Buyer's Request
- RS232C Cross Cable 1M, 2M, 4M, 10M
- 100V, 110V, 115V, 230V ± 10% , 50~60Hz AC Power input and 3Phase.

Homepage and Reference(www.odacore.com)

- Windows application demo version included manual
- National instrument company's LabView VI supply

1-3. Check

When you receive your power supply, inspect it for any obvious damage that may have occurred during shipment. If any damage is found, notify the carrier and the nearest ODA Sales Office immediately. Warranty information is shown in the front of this manual. Keep the original packing materials in case the power supply has to be returned to ODA Technologies in the future. If you return the power supply for service, attach a tag identifying the owner and model number. Also include a brief description of the problem.

Mechanical Check

- Check the broken key, encoder switch, power switch.
- Check the broken output terminals.
- Check the panel surfaces are free of dents and scratches.
- Check the cabinet is free of scratches.
- Check the LDC display is not scratched or cracked.

Electrical Check

- When turning on the power, it shows instrument model and ODA website at first.
- Check the model Number is matched with displayed model number.
- After, it shows "**OUTPUT OFF**" message, verifies to a high level of confidence that the power supply is operating in accordance with its specifications.

Note

Service Center : 82-32-623-5454
Home page : www.odacore.com

1-4. Operating Conditions

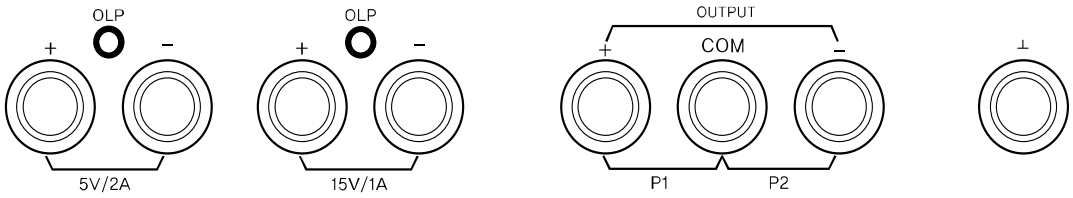
This instrument is designed for following environmental conditions in other to use optimized condition

- Environmental Temperature : 0 ~ 40℃
- Relative Humidity : ≦80% RH
- Operating altitude : <2000m.pollution degree II
- No vibration.
- Avoid the electricmagnetic field.

1-5. Check Before Power On

Output Terminal Check

▌Check the front panel two fixed outputs two variable output terminals and GND terminal.



WARNING

Floating the power supply output more than ±60 Vdc from the chassis presents an electric shock hazard to the operator.

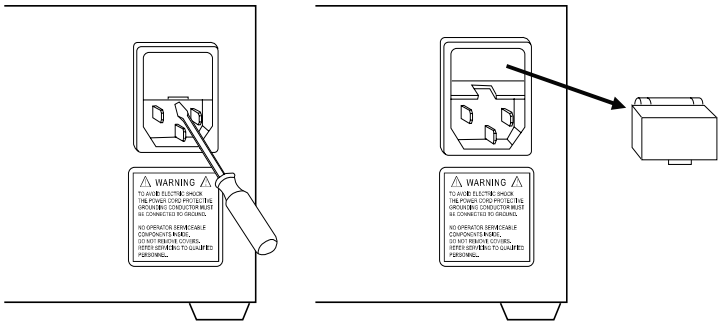
Power Cord Check

▌Your power supply is equipped with a 3-wire grounding type power cord; the third conductor being the ground. The power supply is grounded only when the power-line cord is plugged into an appropriate receptacle. Do not operate your power supply without adequate cabinet ground connection.

Input Power Line Check

▌You can operate your power supply from a nominal 198~242 V single phase ac power source at 47 to 63 Hz. AC100V, 110V, 115V, 230V input power is optional.
Refer to chapter "1-2. Accessories & Options"

▌In other to prevent the instrument severe damage from overload, fuse is installed in inlet case. If the fuse is also repeatedly when power turns on, check the input power line or broken braker and then call to nearest ODA Technologies A/S Center Input power connection is following.



1-6. Check After Power On

When turning on the power switch, the front-panel display will light up briefly while the instrument performs its power-on default value setting. And also keep the ex-remote interface setting mode, voltage value is zero and current value is max value.

Display Procedure on the LCD

- Display "OPE-□□□□S v1.0" and website adresss.
  Visit ODA Technologies website. Get the manuals, windows application software demo, and upgrade information & technical support.
- Display "**output off**"
- By using front panel key and encoder switch, set the voltage/current and functions.

Default Setting Values

- Output Voltage : 0V
- Cursor location : Default voltage.
- Output Current : Limit setting max value
- Output Select : P1(Positive channel)
- Tracking : OFF
- Remote Interface : ex-remote interface setting mode
- After standby mode : display "**OUTPUT OFF**"

Note1

The RS232C is attached in the instrument when the power supply is shipped from the factory for remote interface configuration and baudrate is set 9600bps at first time.
In case of choosing RS485 interface, address no. is 05 when this is shipped from the factory.

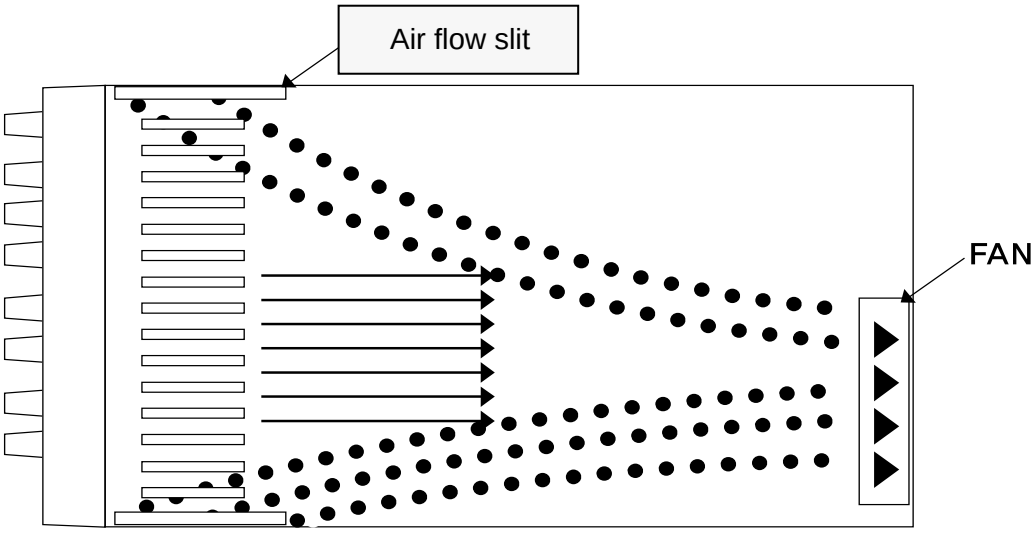
Note2

This has the option function that is last setup stated memory & recall. This function, when you turn down the instrument, the device store the last state(voltage, current and state) and after then the operator turn on again, this starts from last state.

1-7. Installation

Cooling

▌The power supply can operate without loss of performance within the temperature range of 0 °C to 40 °C, and with derated output current from 40 °C to 55 °C. A fan cools the power supply by drawing air through the rear panel and exhausting it out the sides. Using an ODA rack mount will not impede the flow of air.



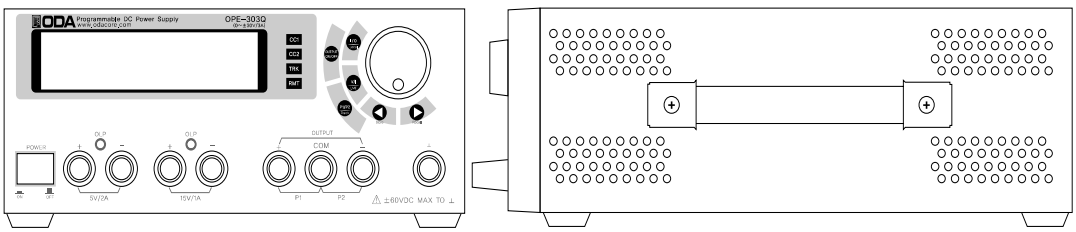
<figure Bottom view>

Bench Operation

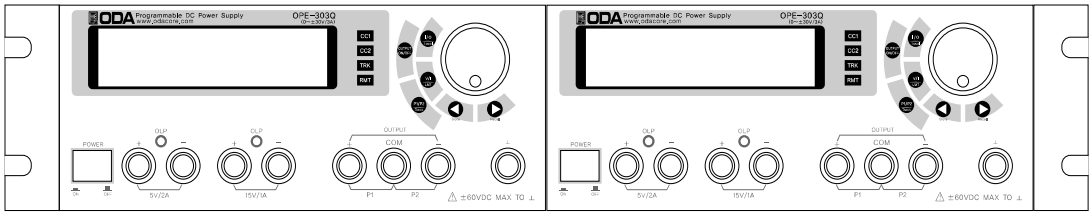
▌Your power supply must be installed in a location that allows sufficient space at the sides and rear of the power supply for adequate air circulation.

Rack Mounting

Your power supply must be installed in a location that allows sufficient space at the sides and rear of the power supply for adequate air circulation.



▌Below drawing is example of rack attached style. Rack bracket(option) ordering no. is OM-2U19-FS.



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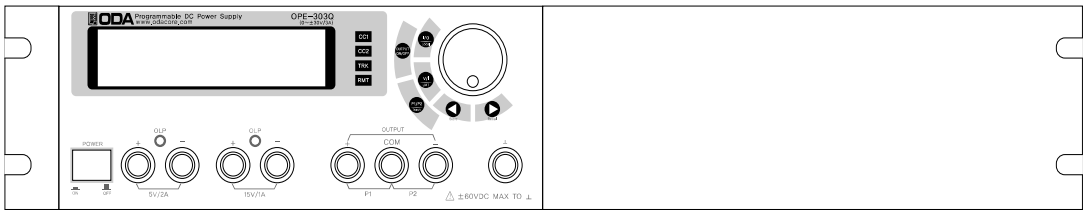
▌Below rack bracket(option) ordering no. is OM-2U19-FS.



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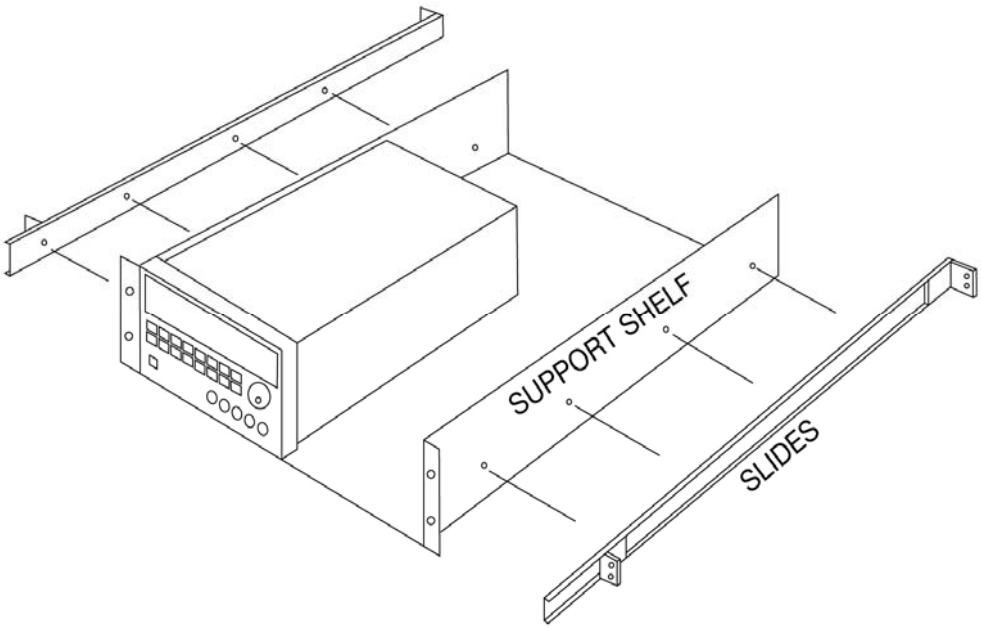
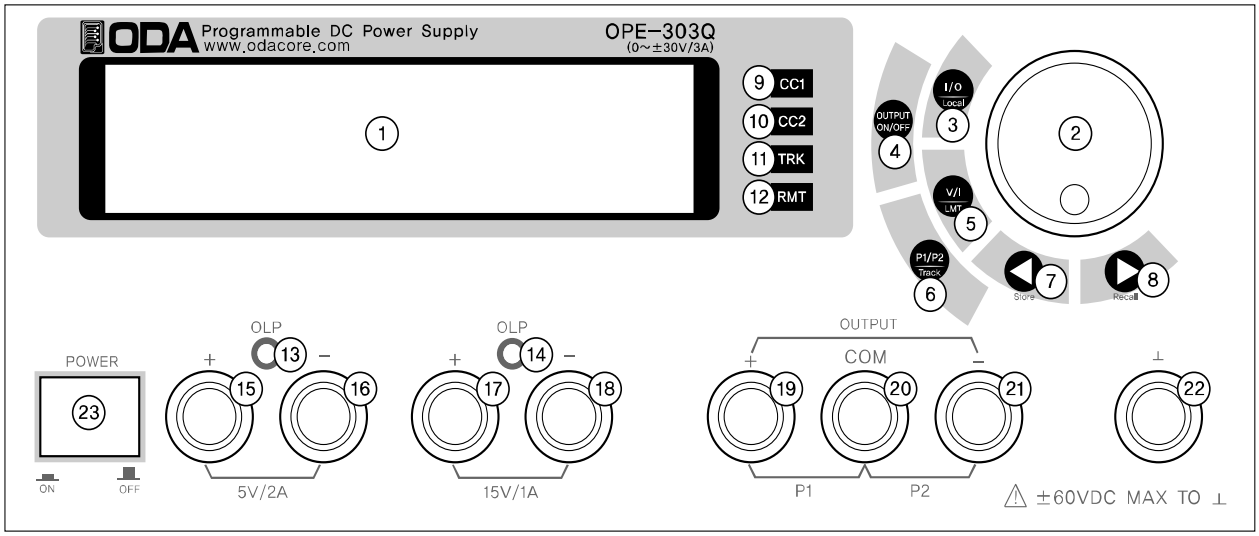
▌It is very easy to install the instrument when you use the built-in type cabinet & slider as following drawing. Ordering no. is OM-2U19-SS.(option)



2. Front Panel, Rear Panel Composition & Function

2-1. Front-Panel

Front-Panel at a glance



1	LCD (Volt/Curr and Message Display module)	13	5V/2A(Fixed) Over Load Protection Lamp
2	Encoder S/W for changing Volt/Curr	14	15V/1A(Fixed) Over Load Protection Lamp
3	I/O or LOCAL key	15	5V 2A(Fixed) + Output Terminal
4	Output ON/OFF key	16	5V 2A(Fixed) - Output Terminal
5	Volt/Curr select or limit display key	17	15V 1A(Fixed) + Output Terminal
6	Output channel select or tracking key	18	15V 1A(Fixed) - Output Terminal
7	Volt/Curr Cursor or menu change key	19	P1 + Output Terminal(Positive Output)
8	Volt/Curr Cursor or menu change key	20	P1 & P2 Output COM Terminal
9	P1 Constant Current mode indicate lamp	21	P2 - Output Terminal(Negative Output)
10	P2 Constant Current mode indicate lamp	22	Earth GND Terminal
11	P1, P2 channel tracking mode indicate lamp	23	Main Power ON/OFF Switch
12	Remote Interface mode indicate lamp		

1. LCD (Voltage, current and message display window)

Voltage/current and , all kinds menu/message display

2. Voltage/current Changing Encoder Switch.

Increases or decreases the value of the blinking digit by turning clockwise or counter clockwise.

3. I/O or LOCAL Key

Configures the power supply for remote interfaces. Set baudrate of RS232C. If remote interface is RS485, it can be used for setting baudrate & address. Also under Remote Interface situation, in other to recover bench top using, this key operate to local from remote.

4. Output ON/OFF

Enables or disables the power supply output. This key toggles between on and off.

5. Voltage/Current select or Limit Display Key

Shows voltage and current limit values on the display and allows knob adjustment for setting limit values.

6. Output channel select or tracking key

Channel select key between P1 & P2. When pressing once , it changes to P1 from P2 or vice versa. When Pressing this key during 1second more, it changes to tracking mode.

7. Voltage/Current Cursor or menu changing Key

Move the blinking digit to the left.
In menu mode, it can change menu tree.
Under the "**OUTPUT OFF**" mode, this key work on store key.

8. Voltage/Current Cursor or menu changing Key

Move the blinking digit to the right.
In menu mode, it can change menu tree.
Under the "**OUTPUT OFF**" mode, this key work on recall key.

9. P1 Constant Current mode indicate lamp

The power supply is in constant current mode.
if it turns off, the power supply is in constant voltage mode.

10. P2 Constant Current mode indicate lamp

The power supply is in constant current mode.
if it turns off, the power supply is in constant voltage mode.

11. P1, P2 Tracking mode indicate lamp

When the power supply is in tracking mode of P1 & P2 channel, it turns on

12. Remote Interface mode indicate lamp

Power supply is in remote interface mode.(PC Interface or Remote Interface)
All key is locked except "I/O & Local" key.

13. 5V/2A(Fixed) Over Load Protection Lamp

It turns on when fixed channel(5V/2A) is under the OLP state.

14. 15V/1A(Fixed) Over Load Protection Lamp

It turns on when fixed channel(5V/2A) is under the OLP state.

15. 5V 2A(Fixed) + Output Terminal

16. 5V 2A(Fixed) - Output Terminal

17. 15V 1A(Fixed) + Output Terminal

18. 15V 1A(Fixed) - Output Terminal

19. P1 + Output Terminal(Positive Output)

20. P1 & P2 Output COM Terminal

21. P2 - Output Terminal(Negative Output)

22. Earth GND terminal

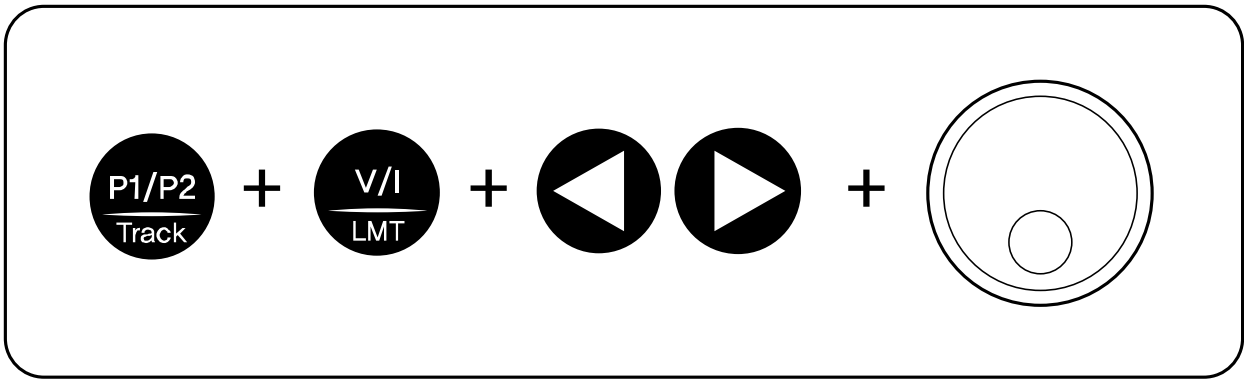
GND terminal, it is able to connect to earth terminal of the DUT

23. Main power ON/OFF Switch.

The power supply is turned on or off by this switch. It is adopted by following power supply's capacity.

2-2. Front-Panel Setting

You can set the voltage and current limit values from the front panel using the following method.



1. Confirm the display of "OUTPUT OFF" on the LCD after turning on the power supply
2. Press the V/I LMT key to show the limit values on the display.
3. Press the V/I LMT key once time more to select between voltage and current.
4. In other to select the digit cursor about increase or decrease, presss ◀ or ▶ on other to move desired resolution digit cursor.
6. In other to increase limit value, turn the encoder clockwise.
   In other to decrease limit value, turn the encoder counter clockwise.
7. Confirm the change of setting value at LCD display
8. In other to output the setting voltage & current, press OUTPUT ON/OFF key.

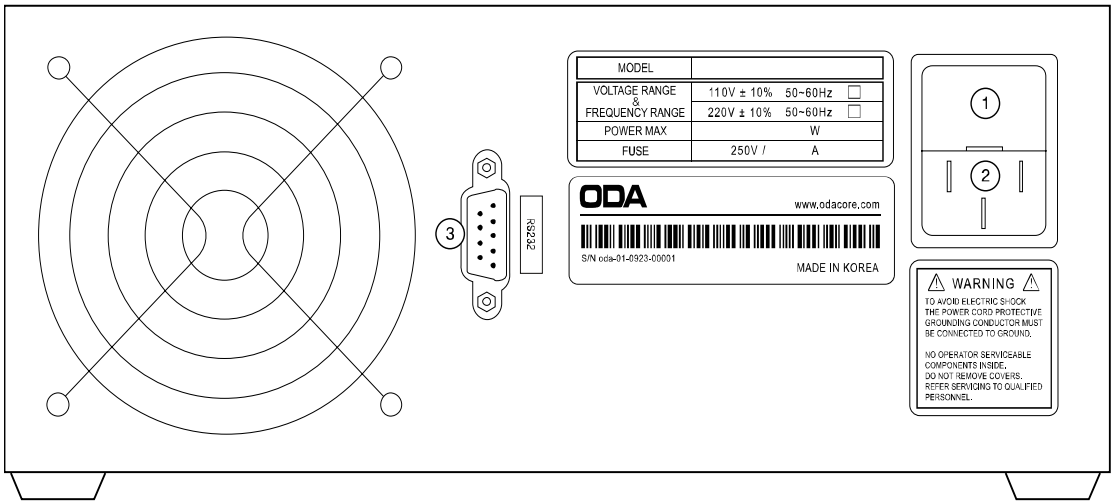
Note1

When press V/I LMT key, disappear the message of "**OUTPUT OFF**" and then change to limit display state, and cursor is blinking. At that time, if let the display time-out after 3 seconds, "**OUTPUT OFF**" display at the LCD.

Note2

If it is under remote control, key and encoder switch on the front panel won't operate.
If turning to local mode from remote control, press I/O Local key to change to local mode.

2-3. Rear Panel Composition



1	Fuse Holder	Power-line module
2	AC inlet	
3	RS-232C interface connector	

PC Interface Method

Press I/O Local key on the front panel in other to set PC interface.

("Refer to chapter 3-3. I/O Config & LOCAL")

2-4. Output Check

The following procedures check to ensure that the power supply develops its rated outputs and properly responds to operation from the front panel. For complete performance and verification tests, refer to belows procedure.

Voltage Output Check

▌ The following steps verify basic voltage functions with no load.

1. Turn on the power supply
2. The output is disabled (the OUTPUT OFF annunciator turns on)
3. In other to measure the voltage, connect the DVM to output terminals properly
4. Press the OUTPUT ON/OFF key in other to output the voltage.
5. Press the V/I LMT key and move the blinking cursor to voltage value.
6. Press the ◀ ▶ key and select the voltage resolution what you want.
7. In other to increase or decrease, turn on the ◎ switch CW or CCW.
8. Compare between LCD display real voltage value and DVM annunciator.

Current Output Check

▌ The following steps check basic current functions with a short across the power supply's output.

1. Turn on the power supply
2. The output is disabled (the OUTPUT OFF annunciator turns on)
3. Press the OUTPUT ON/OFF key in other to output the voltage.
4. Press the V/I LMT key and move the blinking cursor to voltage value.
5. Press the ◀ ▶ key and select the voltage resolution what you want.
6. Set the voltage upto 5V by using encoder switch clockwise.
7. Press the V/I LMT key in other to output the voltage.
8. Press the ◀ ▶ key and select the current resolution what you want.
9. In other to change to "**OUTPUT OFF**" Mode, press OUTPUT ON/OFF key.
10. In other to measure current, connect the test leads to output terminals properly.
11. Press the OUTPUT ON/OFF key in other to output the current.
12. Compare between LCD display real current value and DAM annunciator.

3. Front-Panel Operating

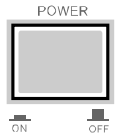
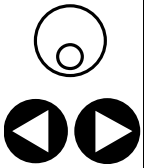
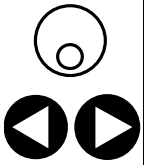
So far you have learned how to install your power supply and perform initial operation. During the initial operation, you were briefly introduced to operating from the front panel as you learned how to check basic voltage and current functions. This chapter will describe in detail the use of these front panel keys and show how they are used to accomplish power supply operation.

Overview

1. **Constant Voltage Operation(CV)**
   Explain constant voltage output mode operation.
2. **Constant Current 동작(CC)**
   Explain constant current output mode operation.
3. **I/O & LOCAL**
   Explain remote interface setting and recovering to local mode.
4. **STORE**
   Explain 『user memory』store.
5. **RECALL**
   Explain how to use & apply the stored 『user memory』store.
6. **OUTPUT ON/OFF**
   Explain the output disable or enable.
7. **P1/P2 Select and TRACKING**
   Explain the output channel selection and P1 & P2 tracking mode
8. **V/I & LMT DISPLAY**
   Explain voltage/current select or limit display.

3-1. Constant Voltage Operating(CV)

To set up the power supply for constant voltage (CV) operation, proceed as follows.

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**". ▌Connect the DUT to output terminals.
	▌In other to set the limit value, press the LMT Key.
	▌Adjust the knob & resolution button for the desired voltage limit.
	▌Move the cursor to current.(Press the V/I Key one more time.)
	▌Adjust the knob & resolution button for the desired current limit.
	▌Enable the output.(Press the output ON/OFF key.) After about 2.5 seconds later, power supply changes to readback display from limit display.
	▌Check the CC annunciator turn off. If the CC annunciator is lit, choose a higher current limit.

≫ Related remote interface command

VOLT <voltage>

CURR <current>

OUTP {OFF|ON}

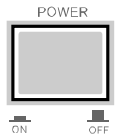
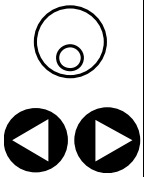
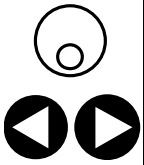
Application :	*OUTP OFF*	*disable the output*
	INST OUTP1	*select channel P1*
	VOLT 10	*set the voltage to 10V*
	CURR 5	*set the current to 5A*
	OUTP ON	*enable the output*

Note

1. You can use the resolution selection keys(cursor key) to move the blinking digit to the right or left when setting value.
2. ReadBack Display means? The state of outputting of real voltage/current display value.

3-2. Constant Current Operating(CC)

To set up the power supply for constant current (CC) operation, proceed as follows.

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**". ▌Connect the DUT to output terminals.
	▌In other to set the limit value, press the LMT Key.
	▌Adjust the knob & resolution button for the desired voltage limit.
	▌Move the cursor to current.(Press the V/I Key one more time.)
	▌Adjust the knob & resolution button for the desired current limit.
	▌Enable the output.(Press the output ON/OFF key.) After about 2.5 seconds later, power supply changes to readback display from limit display.
	▌Check the CC annunciator is lit If the CC annunciator turn off or twincle, choose a higher voltage limit.

≫ Related remote interface command

VOLT <voltage>

CURR <current>

OUTP {OFF|ON}

Application :

OUTP OFF	*disable the output*
INST OUTP1	*select channel P1*
VOLT 10	*set the voltage to 10V*
CURR 5	*set the current to 5A*
OUTP ON	*enable the output*

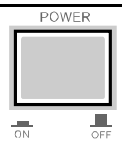
3-3. I/O & LOCAL

To configure the power supply for the RS-232 and RS485 interface, proceed as follows.
RS232C interface is standard, in case of RS485, it is optional and remove the RS232C module.
If interface is RS485 when it is shipped, address default is no. 05.
Baud rate default is 9600bps and setting of RS232C & RS485 is able to set on front panel.

- The RS-232 baud rate and parity selections are stored in non-volatile memory, and does not change when power has been off or after a remote interface reset.
- If remote interface works, the lamp of RMT on front panel lits and power supply is remotely controlled preferentially.
- If you want to control power supply on local mode, at first finish remote nterface and then press the "I/O & LOCAL" key. Lamp of "RMT" turn off and you can contorol.

RS232C Seting

RS232C setting procedure.

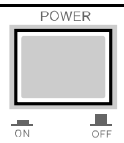
	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌Press "I/O" key in other to set RS232C interface. LCD Display 1 raw [baud -rate] 2 raw [3: 9600bps]
	▌When press the left & right cursor key, you can change the Baud-Rate. ▌Baud rate consist of 1200bps, 2400bps, 9600bps, 19200bps and it must be matched between PC nterface Baud rate. For examples, in other to select 19200bps, press right cursor key. LCD Display 1 raw [baud -rate] 2 raw [4: 19200bps]
	▌In other to finish the I/O setting, press the "I/O" key. LCD Display 1 raw [baud -rate] 2 raw [done]

Note

bps? The initial of Bit per Second, data transmission unit of 1bit per one second.

RS485 Setting(Option)

RS485 setting procedure.

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌Press "I/O" key in other to set RS485C interface. LCD Display 1 raw [address> 0x05] 2 raw [speed> 9600bps]
	▌In other to change the address, turn the encoder switch CW or CCW. ▌HEX value Displays variable range of address is from 00 to FF(total 256). For examples, turn right one click in other to select address no. 06 LCD Display 1 raw [address> 0x06] 2 raw [speed> 19200bps]
	▌In other to change speed(Baud-Rate), press the right & left cursor key. ▌Baud rate consist of 1200bps, 2400bps, 9600bps, 19200bps and it must be matched between PC nterface Baud rate. For examples, in other to select 19200bps, press right cursor key. LCD Display 1 raw [address> 0x06] 2 raw [speed> 19200bps]
	▌In other to finish the I/O setting, press the "I/O" key. LCD Display 1 raw [address> 0x06] 2 raw [done] Address is set no.06, Baud rate is set 19200bps.
	▌When you wanna send RS485 protocol to power supply, refer to following "ODA" + Address(1byte hex) + SCPI Command로

RS232C & RS485 Communication Specification

▌RS232C & RS485 are fixed as following.

Data Bit : 8

Stop Bit : 1

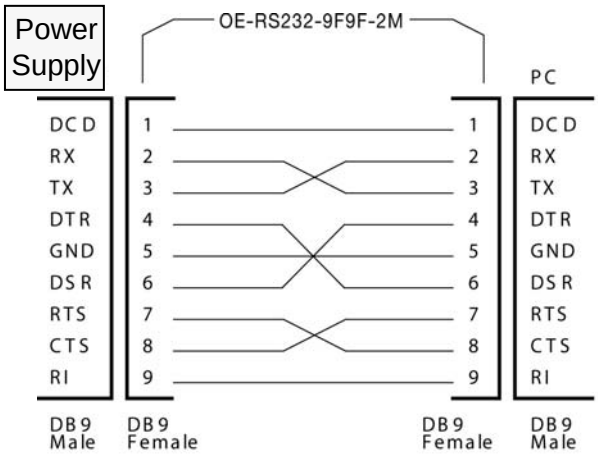
Parity Bit : None

▌Data frame specification.

RS232C Connection Drawing

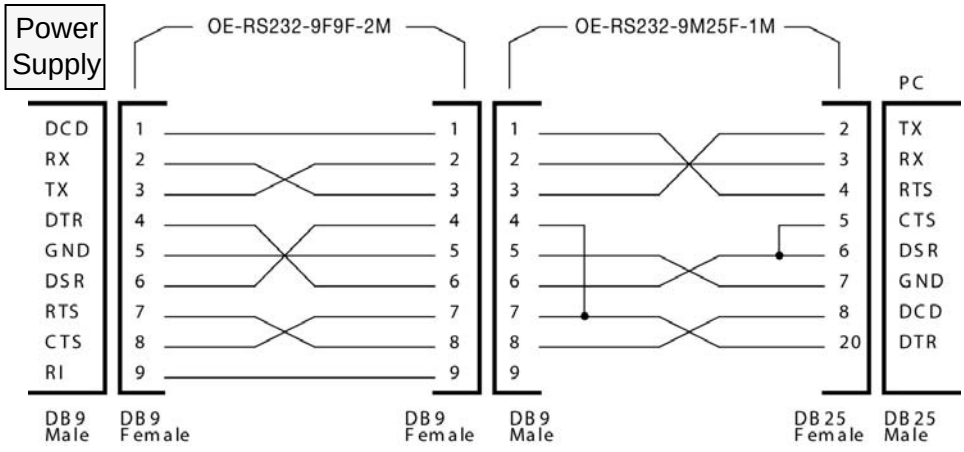
In other to connect the power supply of RS485 type, it is necessary standard cross cable of female type. Below is connection drawing of female type cross cable. proceed as follows.

"Refer to chapter 1-2. Accessories & Option"



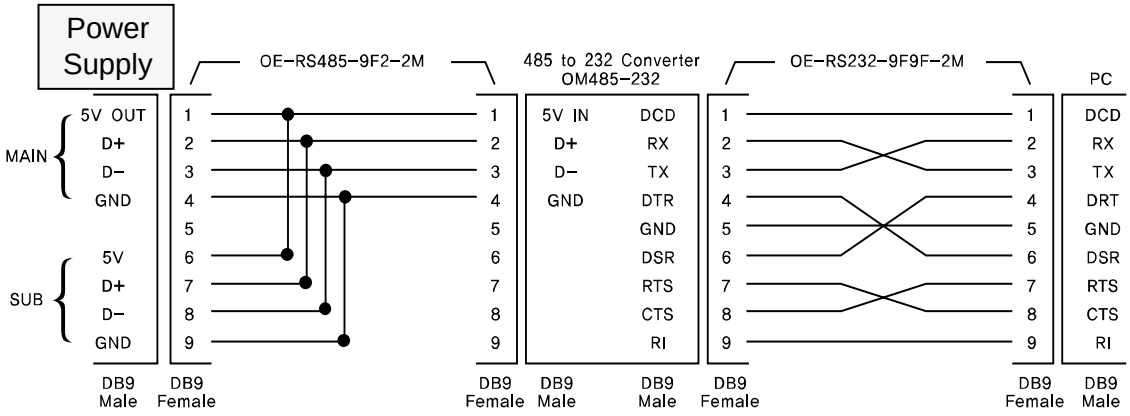
▌If you want to connect the power supply with PC by using another cable(for examples, DB25PIN), please use another adapter

"Refer to chapter 1-2. Accessories & Option"



RS485 Connection Drawing

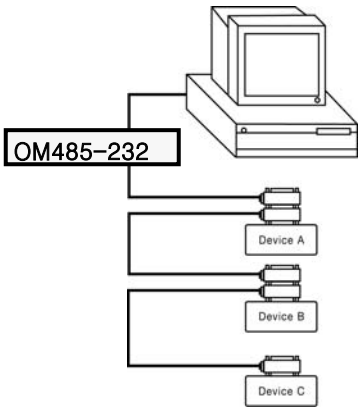
In other to connect the power supply of RS485 type, it is necessary standard cross cable of female type. Below is connection drawing of female type cross cable. proceed as follows.



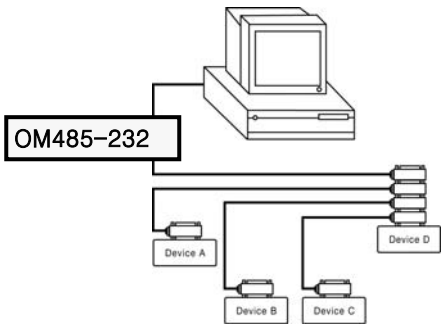
▌RS485 PC Interface installation map.

RS485 module outputs DC 5V/0.3A from RS485 cable pin in case of OPE-Series4, so you don't need another power supply to supply the 485-232C communication operating.
The length of between power supply and OM485-232(RS485 to RS232 Converter) must be short in other to avoil voltage loss.
Purchase another OE-RS485-9F2-XX interface cable additionally. You can connect the device to pc easily and save the time.

<A>



<B>

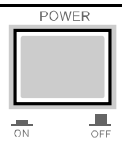


or

3-4. STORE

You can store the operating states that are total five voltage, current in non-volatile memory. In case of this function, the mode must be in "**OUTPUT MODE**". If the mode of power supply is output on mode, store key is used the left move key of cursor. Proceed as follows.

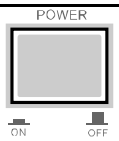
Tracking mode states can not store in non-volatile memory.

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌In other to store the operating states in non volatile memory, press the store key. LCD Display 1raw [STORE [1]]
	▌Choose the non volatile memory number from 1 to 5 by using encoder switch. For example, turn clockwise one click, the number is increase. LCD Display 1raw [STORE [2]]
	▌In other to store, press the store key one more time. LCD Display 1raw [STORE [2]] 2raw [done]
	▌After displayed "DONE" message, return to former state.

3-5. RECALL

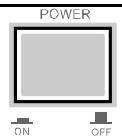
You can recall the saved operating states that are total five voltage, current in non-volatile memory. In case of this function, the mode must be in "**OUTPUT MODE**". If the mode of power supply is output on mode, recall key is used the right move key of cursor. Proceed as follows.

Under tracking mode, if you use recall function, cancelled the tracking mode.

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌In other to recall the saved operating states in non volatile memory, press the recall key. LCD Display 1raw [RECALL [1]]
	▌Choose the non volatile memory number from 1 to 5 by using encoder switch. For example, turn clockwise one click, the number is increase. LCD Display 1raw [RECALL [2]]
	▌In other to recall, press the store key one more time. LCD Display 1raw [RECALL [2]] 2raw [done]
	▌After displayed "DONE" message, return to former state.

3-6. OUTPUT ON/OFF

Enables or disables the power supply output. This key toggles between on and off.
At the output off mode, voltage and current output is 0V and 50mA, therefore
you can acquire the effect of output off without remove the connected DUT.
Proceed as follows.

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌Basic state is output off mode. In other to enable output on, press the "OUTPUT ON/OFF" key.
	▌In other to disable output off, press the "OUTPUT ON/OFF" key once more.

≫ Related remote interface command

OUTP {OFF|ON}

OUTP?

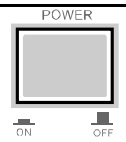
Application : Check the Output on/off state, and in case of output off mode, changing to on mode.

OUTP? Return value "0" Output state check.

OUTP ON Output on.

3-7. P1/P2 Select and TRACKING

Channel select key between P1 & P2. When pressing once , it changes to P1 from P2 or vice versa. You can confirm the changing cursor key on the LCD.When Pressing this key during 1second more, it changes to tracking mode and also TRK lamp turns on. At that time, you can set the same voltage and current at once whatever you turn between P1 and P2 Although canceling tracking mode, it does not recover to former state. When Pressing this key during 1second more, it cancels tracking mode and also TRK lamp turns off.
Proceed as follows.

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌Basic state is output off mode. In other to enable output on, press the "OUTPUT ON/OFF" key.
	▌At this time, the cursor is at P1 voltage, you can increase or decrease the P1 voltage by using encoder switch.
	▌In other to change the output channel to P2, press the P1/P2 key. You can see the cursor moved to P2 voltage.

≫ Related remote interface command

INST?

INST {OUTP1|OUTP2}

Application : Check the present output selected channel and and change the other channel.

INST? Return value "OUTP1" Output channel check.

INST OUTP2 select the P2 channel

Note

Under TRACKING Mode, you can change the channel between P1 and P2.

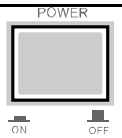
TRACKING 기능

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌Basic state is output off mode. In other to enable output on, press the "OUTPUT ON/OFF" key.
	▌Press the tracking key during 1 sec. ▌TRK lamp turns on and P1 & P2 voltage and current becomes same. If you turn encoder switch, it changes P1 & P2 at once.
	▌In other to canceling TRK mode, press the tracking key during 1 sec. ▌TRK lamp turns off and P1 & P2 channel operate independently

3-7. V/I & LMT DISPLAY

Shows voltage and current limit values on the display and allows knob adjustment for setting limit values. Also you can choose between voltage limit set or current limit set.

V/I & LMT DISPLAY

	▌Turn on the power supply After turned on, check the power supply displays "**OUTPUT OFF**".
	▌In other to set the voltage & current lit, press the "OUTPUT ON/OFF" key.
	▌At first power is readback display state, at that time if press V/I & LMT key, change to limit display state. During about 3 seconds, you can see the setting value, before 3 seconds, if press V/I key once more, cursor move to current value set mode.
	▌Also before 3 seconds, if press V/I key once more, cursor move to voltage value set mode.
	▌After about 3 seconds, the display will go to output monitoring mode automatically to display the voltage and current at the output.

4. SCPI Command

This section summarizes the SCPI (Standard Commands for Programmable Instruments) commands available to program the power supply over the remote interface. Refer to the later sections in this chapter for more complete details on each command.

4-1. Commands Syntax

- Be able to use the command of capital/small letter.
- It is no limit about quantity of blank (20H) or tap(09H) and set minimun 1 more
- Command sending is one by one time.
- Braces ({ }) enclose parameters within a command string.
- A vertical bar (|) separates one of two or more alternative parameters.
- Triangle brackets (< >) indicate that you must substitute a value or a code for the enclosed parameter.
- Command finish suffix is LF(0AH).
- Maximum character of one time are 50 Byte.
- When you want to send RS485 protocol to power supply, "ODA" + 1byte address(01H ~ FFH) + SCPI Protocol.
- Return response of RS485 Query is same of RS232C comunication response.(Excluded address)

4-2. Commands

Output Setting Commands

VOLT <voltage>
VOLT?
CURR <current>
CURR?

Measurement Commands

MEAS:CURR?
MEAS:VOLT?

Calibration Commands

Calibration features of the power supply. For more detailed discussion of the calibration procedures request to us.

Warning

The person or institute who not only does not have the acknowledge but also is not certificate calibration center should not calibrate the power supply. If they calibrate the power supply, it maybe occur severe damage.

Do calibration periodically > precision use : one time after 180 days.
> nomal use : 1 time/one year.

System Commands

OUTP {OFF|ON}
OUTP?
*IDN?
*RST
*SN?

4-3. Channel Select Command

This section describes channel select between P1 and P2.

INST {OUTP1|OUTP2}

Channel select command.

> OUTP1 Present channel is P1

> OUTP2 Present channel is P2

ex) INST OUTP1 Change the channel to P1

INST?

Confirm command of present channel

Return Value "OUTP1" – Channel P1 select state
"OUTP2" – Channel P2 select state

4-4. Output Voltage/Current Setting & Operating Command

This section describes output voltage and current limit control protocol based on remote interface

VOLT <voltage>

Output voltage setting command.

> voltage input voltage value

ex) volt 10 *set the 10V*

VOLT?

Confirm present setting voltage.

Return value "voltage"

ex) volt? *return value "30.0"*

CURR <current>

Output current setting command.

> current input curent value

ex) curr 1.5 *set the 1.5V*

CURR?

Confirm present setting voltage.

Return value "current"

ex) curr? *return value "3.15"*

4-5. Measure Command

This command is for measurement of readback voltage/current. It is not necessary DVM(Digital Volt Meter) and ammeter.

MEAS:VOLT?

Command for measure the output voltage of power supply.

Return value "voltage"

ex) meas:volt? *return value "30.0"*

MEAS:CURR?

Command for measure the output current of power supply.

Return value "current"

ex) meas:curr? *return value "2.99"*

4-6. System Command

Command for control the power supply.

OUTP {OFF|ON}

Output on or off command for power supply.

> ON Enable output

> OFF Disable output

ex1) outp on *Enable output*

ex2) outp off *Disable output*

OUTP?

Command for confirming the power supply output state.

Return value " 0 " *the state of enable output*

" 1 " *the state of disable output*

ex) outp? *return value "1"*

***IDN?**

This command is for confirm the power supply qualification.
It is consist of version information by using 'comma"
Return value "ODA Technologies,OPE-303S,1.0-1.0-1.0"
first manufacturer name
second instrument model
third firmware version.
first System controller Version
second Front panel Version
third SCPI protocol Version

ex) *idn? *return value "ODA Technologies,OPE-303S,1.0-1.0-1.0"*

***RST**

The command the power supply to return to default value. After commanded, setting value is following.

VOLT - 0V
CURR - max setting value.
OUTP : OFF - OFF

ex) *rst *initialized.*

***SN?**

confirm the power supply's serial number
Return value "oda-00-0000-00000"

ex) *SN? *return value "oda-01-0923-00185"*

5. Caution

Non compliance with the warnings and/or the instructions for use may damage the instrument and/or its components or injure the operator. Keep following articles.

- Avoid the installation in severe cold or hot area.

- Do not use immediately after moved from cold area
  As liquefaction phenomenon, it gives damage to the power supply
  After 20~30min later, use the power supply.

- Do not place the liquor thing on the power supply
  The use of this instrument in a wet state could result in electrical shock or fire.

- Avoid vibration or severe impact.

- Make sufficient space at the sides and rear of the power supply for adequate air circulation.

- Do not place the heavy things on the power supply.

- Avoid the electric-magnetic field as motor and etc.

- Do not allow any foreign matter such as metal or inflammable substance to get into the instrument via the air holes . The penetration of any foreign matter from the ventilation holes could result in fire . electrical shock ,or power failure.

- Avoid hot instrument such as iron nearby the power supply.

- Do not place the front panel to downside.
  It will occur to broken knob & output terminals.

- Do not connect other kinds power sources to this power supply output terminals.

- Do not connect the DUT to outputs when power on.

- Do not disassemble the power supply. The power supply can be out of order and we do not give you the guarantee.

- Do not remove either the cover or panel

- Avoid use of damaged cables.