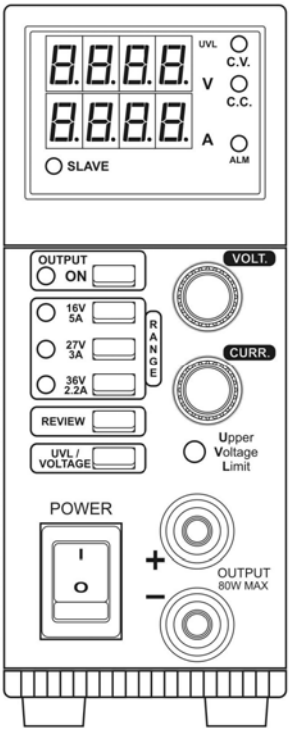
Model 72-8355

80W Constant Power Switch Mode Power Supply with Master/Slave Remote Sensing



INSTRUCTION MANUAL

Copyright 2008, all rights reserved
Tenma Test Equipment®
www.tenma.com

CONTENTS

Warnings, cautions and operating conditions	3
Introduction	4
Front panel controls and indicators	4 ~ 5
Back panel terminals and controls	4 ~ 5
Stand alone operation	6
Selection of voltage and current range	6
The **PREVIEW** button	6
Selection of voltage and current range	6
Setting the current limiting value	6
UVL / VOLTAGE button and **UVL** LED	7
Setting the **UVL** (upper voltage limit) value	7
Master and slave operation	7~8
Remote sensing operation	9
Troubleshooting	10
Specifications	11

Keep this manual in a safe place for quick reference at all times.

This manual contains important safety and operation instructions
for correct use of the power supply. Read through the manual and pay special
attention to the markings and labels of this unit and equipment to be connected.

Pay special attention to these two types of notices used in this manual.

WARNING

Failure to observe this warning may cause injury to persons and damage to power supply or connected equipment

CAUTION

Failure to observe this warning may result in damage to equipment and improper functioning of the power supply.

WARNING:

1. Do not use this power supply near water.
2. Do not operate or touch this power supply with wet hands.
3. Do not open the casing of the power supply when it is connected to AC power source.
4. Refer all servicing to qualified service personnel only.
5. Before replacing the AC fuse first determine and correct the cause or the blown fuse. Replace the AC fuse with the same type and rating as the original fuse.

CAUTION:

1. Use only a properly grounded AC power source.
2. This unit is for indoor use only.
3. Do not operate or place this unit in a humid or dusty environment, in direct sunlight or near any heat source.
4. Before plugging into AC power source, check with the rating label at the back of the unit.
5. Do not block ventilation openings on the unit.
6. This unit must be used within the specified rating. Continuous excessive loading may cause damage to the power supply.
7. The AC power cord must be at least 18AWG, and not exceed 3m in length.
8. Replacement fuse: T3AL250V (3A Time-Lag)

Environmental condition requirements:

1. 10-80% R.H.
2. Altitude up to 2000m
3. Installation category: CAT 2
4. Pollution degree: 2
5. Maximum supply voltage fluctuation: ±10% of specified operating voltage.

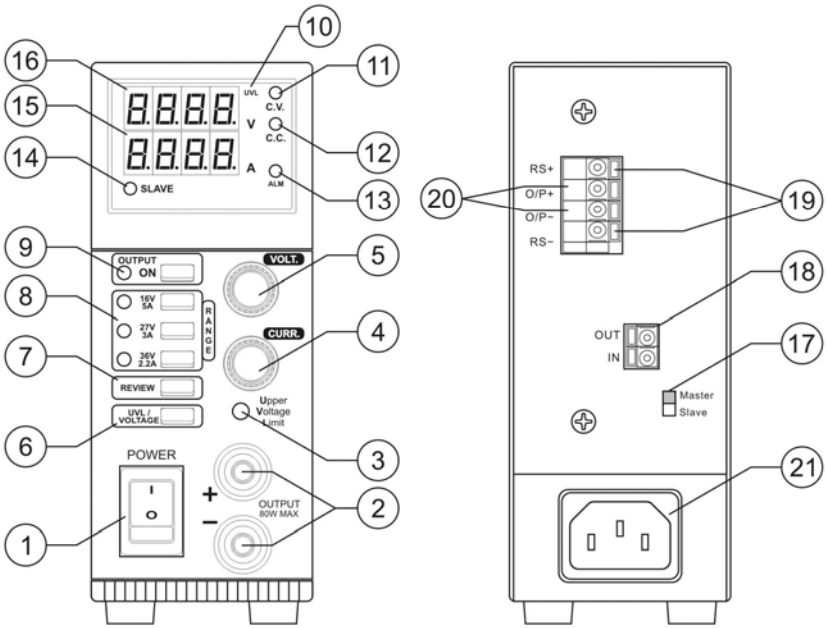
Introduction

The Tenma Model 72-8355 compact adjustable laboratory supply is ideal for test, measurement and service applications where tight voltage and current regulation are critical. Its unique feature is that it delivers up to 80W of constant output power in three selectable ranges. Output ON/OFF control allows user to set voltage and current with the supply's output turned off. Additionally, a front panel "review" button displays voltage and current settings, without a connected load. Multiple units may be cascaded in master/slave configuration to suit higher current requirements.

Features

- Efficient switch mode design
- Extremely compact footprint
- Remote sensing
- Four digit LED display
- Simultaneous display of voltage and current
- Auto selecting constant voltage (CV) and constant current (CC) modes
- Ultra quiet convection cooling
- Short circuit, overload, over voltage and thermal protection
- 75% efficiency at maximum output
- RoHs compliant

Front Panel Controls / Indicators, Rear Panel Connections



Front Panel Controls

1. **POWER** – Master on/off selector
2. **OUTPUT**– Power output terminals
3. **UVL** – Recessed screw adjustment for UVL (upper voltage limit)
4. **CURR** – Current limit adjustment
5. **VOLT** – Output voltage adjustment
6. **UVL/VOLTAGE** – Press to view upper voltage limit
7. **REVIEW** – Press to display voltage and current limit settings
8. **RANGE** – Select desired output voltage and current range
9. **OUTPUT ON** – Activates supply output

LED Indicators

10. **UVL –** Upper Voltage Limit Indicator, illuminates when UVL is displayed
11. **C.V.** – Constant Voltage Indicator, illuminates when supply is in CV mode
12. **C.C.** – Constant Current Indicator, illuminates when supply is in CC mode
13. **ALM** – Indicates output voltage is either over the set Upper Voltage Limit or power supply is in over temperature protection
14. **SLAVE** – Illuminates when supply in Slave Mode. No light assumes supply is in **MASTER** or stand alone mode.
15. **Four Digit** Ammeter display
16. **Four Digit** Voltmeter display

Rear Panel Connections

17. **MASTER/SLAVE** selector – Use select mode in Master/Slave configuration. For normal operation, this switch should be set to **MASTER** (default)
18. **OUT/IN** terminals – Connections for use in the Master/Slave control parallel operation mode
19. **RS+** and **RS–** Remote sensing terminals
20. **OUT+** and **OUT–** Alternative output terminals, in some permanent applications the location of these terminals may be more convenient.
21. **INPUT POWER** jack – For connection of supplied AC power cord.

Operation

1. Stand Alone Operation

- Make certain that the power supply is set for MASTER operation. To do this, maker sure the MASTER/SLAVE selector on the rear panel (17) set to MASTER position. All controls will function as with any a normal power supply.

- With no load connected to the power supply, turn the power supply ON via the POWER switch on the front panel (1). The LED display should light up, however there will not be any reading on the voltmeter or ammeter.

- Press the OUTPUT ON button (9), its green LED will light up and the voltmeter will display the set output voltage.

- Take note of the preset RANGE (8) by which LED is illuminated. Adjust the VOLT control (5) and note the effect on displayed voltage on the LED display.

2. Selection of Voltage and Current Range at (8)

- The three buttons in the RANGE panel (8) will determine the voltage and current range available from the supply. Depress the corresponding button to place the power supply in the desired range. The appropriate LED will illuminate to show which range the supply is in.

- Note: To protect the connected load, the OUTPUT (9) will return to OFF status any time the output RANGE (8) is changed. The Volt and Amp display will return to zero.

3. Viewing Settings

- The REVIEW button (7) allows you to check voltage and current limiting settings of the power supply while the OUTPUT (9) is turned off, or when no load is connected. This is especially helpful since conventional power supplies require the connection of some type of load to view the current limit setting.

- To operate, press and hold the REVIEW button (7) to display voltage and current limiting values. Note this is a momentary pushbutton and will only display the settings while depressed.

4. Setting the Current Limiting Value

- Press and hold the PREVIEW button (7)

- Turn the **CURR** current adjustment (5) to our desired current limit value

5. Viewing the Upper Voltage Limit (UVL)

- Press **UVL/VOLTAGE** button (6) to display the default value of Upper Voltage Limit.
- The **UVL** LED (10) will light up during this operation.

6. Setting the Upper Voltage Limit (UVL) value

- This limited access setting utilizes a recessed screwdriver adjustment on the front panel (3). Note this is a delicate control and care should be exercised when adjustment is made.
- While pressing the **UVL** button (6), insert the small screw driver into (3), slowly turn to clockwise to increase and counter–clockwise to decrease the **UVL** value.
- Note that only one **UVL** value can be set for all three ranges. When the output voltage exceeds the set **UVL**, the output terminal will automatically turn off and the **ALM** LED (13) will illuminate.

7. Master / Slave Operation

Introduction

Two or more Tenma 72-8355 Power Supplies can be connected in parallel to increase output current to the sum of each supply. In this mode, the designated **MASTER** supply will control voltage and current settings of the **SLAVE** supplies.

Preparation and connecting the Control Terminals (18)

- Ensure that all power supplies are set to the same **UVL** (6) and voltage **RANGE** (8).
- Set the voltage and current limit of all **SLAVE** units to maximum values.
- Switch off all power supplies before connection.
- Make certain the **MASTER** supply has switch (17) set in the **MASTER** position.
- Set the switch (17) to **SLAVE** position of all the **SLAVE** supplies.
- Refer to Fig 8.1 and 8.2 for rear connections of the **OUT/IN** terminals (18) of the **MASTER** and **SLAVE** units.
- Take note that the connection begins at the **OUT** of the **MASTER** and feeds the **IN** of the first **SLAVE** unit. If additional **SLAVE** units are used, connect the **OUT** of the first **SLAVE**, to the **IN** of the second **SLAVE**. Then connect the **OUT** of the second **SLAVE** to the **IN** of the third **SLAVE** and so on.

Output terminal connection and operation

- You can either use the front **OUTPUT** terminals (2) or rear **O/P+** and **O/P–** terminals (20) to connect to the load as shown in Fig 8.3 depending on your application and requirements.
- For proper performance, all power cables should be of the same thickness and length.
- Switch on the **MASTER** unit first and set to desired voltage, then switch on the SLAVE units.
- The **SLAVE** indicator LED (14) should light up in the **SLAVE** units as a confirmation of proper connection.
- All output voltage and current of the **SLAVE** units are now controlled by the **MASTER**.

Important Note:
If the load connected to the **MASTER/SLAVE** paralleled supplies falls to zero amperes, the output voltage will no longer be controlled by the **MASTER** unit. Make sure to keep a minimum amount of current draw on the supplies that is at least several percent of the rated current. This can be accomplished by supplying a small removable load such as a resistor.

Fig. 8.1

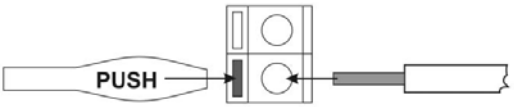


Fig. 8.2

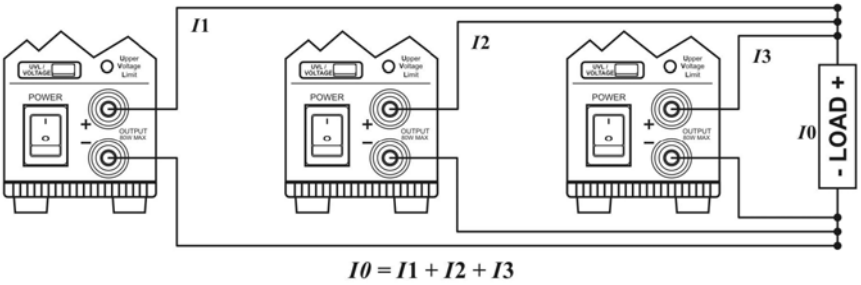


Fig. 8.3

8. Remote Sensing Operation

In situations where the load current is very high, or when there is a long distance of cable between the output of the supply and the load, a voltage drop can occur. This can create problems in applications where precise voltage levels are critical. For this situation, **RS+** / **RS–** terminals (19) are provided on the rear panel for remote sense connection.

Connection and operation

- Ensure that the front panel **OUTPUT** selector (9) is **OFF.**
- Connect the load to either the front **OUTPUT** (2) or rear **O/P** alternative output (19) connections
- Using separate leads, connect the **RS** terminals (19) to the load as well, be careful not to reverse polarity.
- If desired, utilize the **REVIEW** (7) function to verify proper voltage and current settings.
- Switch the **OUTPUT** selector (9) **ON**.

Important Note:

- Be extremely careful not to reverse the polarity between the main output and remote sensing terminals.
- Do not leave the load connected to the remote sensing terminals when not connected to the supply output. If the load must be disconnected while the supply is on, remove the remote sensing connections first.

9. Troubleshooting

PROBLEM	INDICATIONS	POSSIBLE CAUSES	SUGGESTED SOLUTIONS
Power supply not working	panel display, LED Indicators not on	1. AC power input not connected 2. AC input fuse blown	Check AC power connection.
No DC output power	Voltage meter displays zero. ALM (13) Alarm led on ALM (13) Alarm led on CC (12) led on	A. output on off button not on. B. UVL (10) protection triggered C. OTP protection triggered D. output short circuit	A. check output LED (9) is on or not, push (9) to on. B. check UVL set voltage by pushing (6), re-set UVL to applicable limit, see section 5 and 6 . C. check vent holes at top and bottom is clear, ambient temperature too high . D. check and undo short circuit of output connection.
Voltage meter read outs grossly inaccurate	Actual output voltage is grossly different from the meter read outs	A. Volt meter shows not the output voltage. B. possible misalignment in voltmeter calibration	A. check the LED indicator of UVL on the top right hand side of the Volt meter, if it lights up then the volt meter only shows the set UVL value. Push (6) to go back to output voltage. B. contact local agent or send back to local agent for recalibration
Ampere meter reading grossly inaccurate	In CV mode , the actual current measured is grossly different from the Amp meter reading	Possible misalignment in calibration .	contact local agent or send back to local gent for recalibration
The activated (auto-cross over) current limiting value is different from the preset cc value	All indicators and display are normal , only CC mode has the problem	For stand alone unit, Master & Slave Switch (17) in wrong position (Slave). Wrong setting or connection in Master & Slave or set up procedure.	Check the Master & Slave switch (17) correct position. Use stand alone mode to check power supply separately without any connection to slave units. Follow the procedure in section 8 carefully and make sure there is only one Master unit.

10. Specifications

Input AC Voltage Range	90 ~ 264Vac
No load Input Current at 230VAC	≤0.1A
Full Load Input Current at 230VAC	≤0.5A
AC Input Frequency	47Hz ~ 63Hz
Efficiency	≥75%
Power Factor	≥0.9

Constant Voltage and Current Range Selection:

- 0-16V / 5A selection I 0~16.4V / 0~5.1A
- 0-27V / 3A selection II 0~27.6V / 0~3.1A
- 0-36V / 2.2A selection III 0~36.8V / 0~2.3A

Constant Voltage Characteristics :

- Load Regulation (0~100%) ≤20mV
- Line Regulation (±10%) ≤4mV
- Ripple & Noise (p-p) ≤30mV

Constant Current Characteristics :

- Load Regulation (0~100%) ≤10mA
- Line Regulation (±10%) ≤10mA

Meter Accuracy :

- Voltmeter Accuracy ±1% +2 counts
- Ammeter Accuracy ±1% +2 counts

Protection

- Adjustable Upper Voltage Limit,
- Current Limiting Protection,
- Short Circuit, Overload,
- Over Temperature Protection

CE Approvals	LVD : EN 61010 , EMC : EN 55011
Cooling	Natural Convection
Dimensions	5” (H) x 2” (W) x 13” (D)
Weight:	1.9Kgs / 4.2Lbs