

MODEL 7385

REGULATED DC POWER SUPPLY

OPERATION MANUAL

KIKUSUI ELECTRONICS CORP.

0
7
M
D
C
E
R

Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark)

Input voltage

The input voltage of this product is _____ VAC,
and the voltage range is _____ to _____ VAC. Use the product within this range only.

Input fuse

The rating of this product's input fuse is _____ A, _____ VAC, and _____.

WARNING

- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.



Table of Contents

	<u>Page</u>
1. INTRODUCTION	1
2. SPECIFICATIONS	2
3. OPERATION	4
3.1 Front Panel Explanation	4
3.2 Rear Panel Explanation	5
3.3 Precautions	7
3.4 Constant Voltage Operation	8
3.5 Constant Current Operation	8
3.6 Output Voltage Overshoot	9
4. MAINTENANCE	10
5. BLOCK DIAGRAM	11

1. INTRODUCTION

The 7385 is a hybrid-type regulated DC power supply which provides constant voltage and constant current. The voltage is continuously valuable for a range of 0 ~ 400 V with a 5-turn vernier resistor and the current for a range of 0.05 ~ 1 A. Crossover between constant voltage and constant current can do automatically and continuously. The output is stable against non-linear load and against short-circuiting.

The 7385 employs vacuum tubes and transistorized circuit. A forced air cooling system is used to prevent temperature rise of the vacuum tubes. Such a protective circuit is incorporated that the output voltage is automatically cut out if the internal temperature of the equipment rises beyond a certain limit for any reason. Screw holes have been drilled in the housing so that an overvoltage protector and an overcurrent protector can be installed if required.

2. SPECIFICATIONS

AC input: 100 V AC $\pm 10\%$, 50/60 Hz
Full load approx. 1 kVA

Dimensions: 430 mm W x 170 mm H x 450 mm D
(Maximum) 440 mm W x 190 mm H x 510 mm D

Weight: Approx. 30 kg

Ambient temperature: 0 ~ 40°C

Accessories: Short bar 1
Operation manual 1
Test data 1

Output

Terminals: "-", GND, and "+"; color coded,
horizontally aligned, spaced 38 mm

Polarity: Positive or negative

Floating voltage: ± 500 V max.

Constant voltage characteristics

Voltage: 0 ~ 400 V, continuous variable with
5-turn variable resistor

Current: 1 A max.

Ripple and noise: (5 Hz ~ 1 MHz) 5 mV rms

Regulation

Line regulation: 0.02% +10 mV for $\pm 10\%$ variation of line voltage

Load regulation: 0.02% +30 mV for 0 ~ 100% variation of load

Constant current characteristics

Voltage: 0 ~ 400 V, continuously variable

Current: 0.05 ~ 1 A, continuously variable

Ripple and noise: (5 Hz ~ 1 MHz) 0.2 mA rms

Regulation

Line regulation: 0.2% +0.1 mA for $\pm 10\%$ variation of line voltage

Load regulation: 0.3% +0.5 mA for 0 ~ 100% variation of load

Overload protection circuit: The 7385 is a constant voltage - constant current supply and, therefore, the output current is limited by the set current even when the output circuit is shorted. However, if the current limiting circuit is mal-functioning, a large current will flow. To protect the power supply against this, a 1-ampere fuse is used.

Voltmeter: 400 V; accuracy, 2.5% of full scale

Ammeter: 1.2 A; accuracy, 2.5% of full scale

3. OPERATION

3.1 Front Panel Explanation (See Fig. 3-1.)

- (1) **POWER:** For on-off switch. When throw it ON position, the AC line power is supplied to the equipment and the pilot lamp lights. The switch actually is a circuit breaker which cuts out the line power to protect the equipment against further damage when short-circuiting or other abnormal state is caused within the equipment.
- (2) **VOLTAGE:** This control is for continuously-variable adjustment of output voltage for a range of 0 ~ 400 V. The voltage increases as this control is turned clockwise. The control actually is a 5-turn vernier type resistor for fine adjustment of 80 V per one revolution.
- (3) **CURRENT:** This control is for output current setting. The output current increases as this control is turned clockwise.
- (4) **V (left side):** Voltmeter to indicate the output voltage, 400 V DC.
- (5) **A (right side):** Ammeter to indicate the output current, 1.2 A DC.
- (6) **Output Terminals:** Terminals to feed the output of the equipment. They are, right to left, "-" (white), GND (black), and "+" (red). Normally, either the "-" or "+" terminal is connected to the GND terminal with the short bar.

3.2 Rear Panel Explanation (See Fig. 3-2.)

- (7) Output Fuse: This fuse (1 A) is used to protect the objective equipment connected to this power supply against damagingly large current which might occur when the power supply has become abnormal.

- (8) Rear Terminal Block: These terminals are used for modifications.

- (9) Cord Retainers: When the equipment is not in used, the power cord is wound on these retainers.

- (10) Holes to Mount an Overvoltage Protector and Overcurrent Protector:

These holes are used to mount an over-voltage protector and an over-current protector.

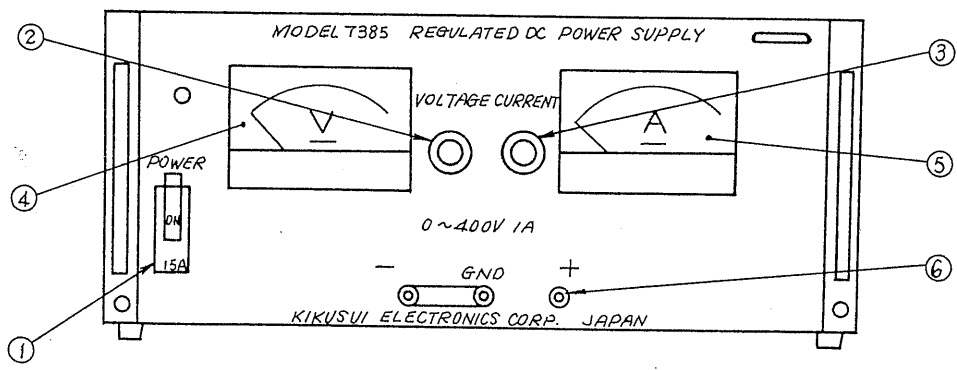


Fig. 3-1 Front panel

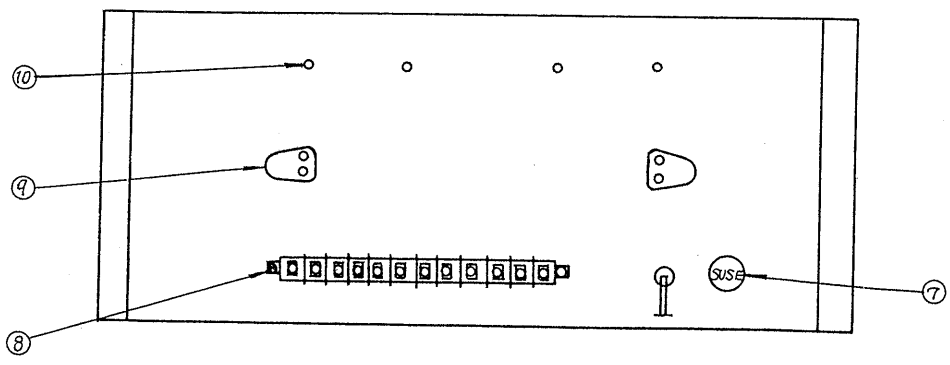


Fig. 3-2 Rear panel

3.3 Precautions

In using the 7385 power supply, attention must be paid on the following items:

(1) Line Voltage

The equipment must be operated on an AC line power of 100 V AC $\pm 10\%$, 48 - 62 Hz.

(2) Installation

The 7385 employs a forced air cooling with a fan motor. It must not be placed in a location where air flow through the right and left ventilation holes is hampered.

Notes: When ventilation is insufficient for any reason or when the fan motor has failed, the equipment could rise to an abnormally high temperature. In order to prevent this, the equipment incorporates an automatic output cut out circuit.

The equipment must not be operated in the following location:

- (a) The equipment is subjected to radiation heating from other heat-generating equipment.
- (b) Ambient temperature exceeds the range of 0 ~ 40°C.
- (c) Highly humid place or dusty place.
- (d) A place where the bottom is not flat.

Note that heat dissipation is hampered and troubles might be caused to the equipment if it is laid on its side or if an object is placed on its top.

- (3) The vernier type resistor used for output voltage control is of an endless type. When it is turned for more than 5 revolutions, the rotation will become heavy, indicating that the end of the electrical variable range has been reached.

3.4 Constant Voltage Operation

- (1) Connect the power cord to the AC line receptacle and throw the POWER switch to the ON position (upper position). The pilot lamp will light to indicate that the AC power is being supplied. Allow approximately 10 seconds of warm-up period for the vacuum tube heaters.
- (2) Turn the CURRENT knob to the fully clockwise position. Turn the VOLTAGE knob to obtain the required output voltage.

Notes: If the load current is required to be limited at a certain value, short the output terminals and set the CURRENT knob to obtain the required value.

3.5 Constant Current Operation

- (1) The initial operating procedure is identical with that of 3.4 (1) above for constant voltage operation.
- (2) Turn clockwise the VOLTAGE knob to a position where rotation becomes heavy (maximum voltage position). Turn the CURRENT knob to obtain the required output current.

Notes: This equipment is of an automatic voltage/current crossover type. When the load current has increased and the voltage has exceeded a certain limit, the equipment operation is automatically crossovered from the constant current mode to the constant voltage mode. Therefore, if the voltage applied to the load is

required to be limited at a certain value, the output voltage must be pre-set at the required value in the procedure of item (2) above. Since this equipment has been designed for a very wide output current range, the output voltage may fall to zero volt if the CURRENT knob is turned to the fully counter-clockwise position.

3.6 Output Voltage Overshoot

This equipment incorporates a unique circuit to eliminate voltage overshoot which could, if otherwise, be produced in power on-off operation of the equipment.

4. MAINTENANCE

1. Adjustment of Output Voltage Range

Turn the VOLTAGE knob of the front panel to the fully clockwise position. Adjust the VOL ADJ (R5) on the printed board located in the front right side, so that the output voltage is made 420 V as measured with a voltmeter.

2. Adjustment of Output Current Range

Turn the CURRENT knob of the front panel to the fully clockwise position. Set the output voltage at several tens volts, and short the output terminals. Adjust the CUR ADJ (R14) on the printed board located in the front right side, so that the output current is made 1.1 A as measured with an ammeter.

3. Adjustment of Transfer Points of Relays

K1: Adjust the LOW (R29) on the printed board located in the front left side, so that the transfer is effected when the output voltage is increased to 175 V.

K2: Adjust the HIGH (R40) on the printed board located in the front left side, so that the transfer is effected when the output voltage is further increased to 305 V.