FA-405

PROGRAMMABLE POWER SUPPLY

PROMAX

SAFETY NOTES

Read the user's manual before using the equipment, mainly " SAFETY RULES " paragraph.

The symbol  ***on the equipment means "SEE USER'S MANUAL". In this manual may also appear as a Caution or Warning symbol.***

Warning and Caution statements may appear in this manual to avoid injury hazard or damage to this product or other property.

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PROGRAMMABLE POWER SUPPLY
FA-405

1. GENERAL

1.1 Description

The **FA-405** is a programmable switching power supply with backlight liquid crystal display built to the latest technological standards.

With its continuously adjustable voltage and current settings, this power supply can be used universally in school, work, hobby, and other applications. An electronic current limiter protects the power supply from overload and short-circuits at its output; a fan controlled by a temperature circuit protects the power supply (its electronics) from thermal overload.

During such an overload (short circuit or overload) the output is regulated down, i.e. the voltage is reduced. Only when the short-circuit has been remedied is the output released.

The set values can be read via the illuminated multiple-line LCD display. The voltage, current or power setting is adjusted by means of an encoder wheel in 10mV, 1V, 10mA, 0.1A and 1 W steps respectively. Therefore the exact adjustment of the output voltage and the current limit and maximum output power is possible.

Construction is in accordance with VDE 0411 = EN 61010. Moreover, the **FA-405** has been EMV-tested and fulfils the requirements of the applicable European and national directives.

To maintain this condition and to guarantee safe operation, the user must observe these operating instructions without fail.

1.2 Specifications

MAIN OUTPUT

Output voltage	0~40 VDC, 10 mV resolution
Program accuracy	± 0.05 % ± 3 digits
Output current	0~5 A, 2 mA resolution
Program accuracy	± 0.1 % ± 5 digits
Voltage load regulation	≤ 10 mV
Current load regulation	≤ 5 mA
Voltage line regulation	≤ 0.05%
Current line regulation	≤ 0.05%

English

Ripple voltage	≤ 20 mV rms
Ripple current	≤ 10 mA rms
Readback resolution (Meter)	10 mV 2 mA

READBACK ACCURACY (METER)

Voltage	± 0.05 % ± 3 digits
Current	± 0.1 % ± 5 digits
Digital display	Multi-line LCD with background lighting

OPERATING ENVIRONMENTAL CONDITIONS

Operating	Indoor use, altitude up to 2000m.
Ambient temperature range	0 °C to +40 °C
Relative humidity	Max 80 % , non condensing
Storage temperature	-10 °C to +70 °C

POWER SUPPLY

Mains voltage	115/230 VAC ± 15 % 50/60 Hz
Consumption	approx. 420 VA max.

MECHANICAL FEATURES

Dimensions	225 (W) x 100 (H) x 305 (D) mm
Weight	Approx. 4 kgs

INCLUDED ACCESSORIES

1 x	Power Cord
1 x	User's manual

2. SAFETY RULES

2.1 General

* Use this equipment connected **only to systems with their negative of measurement connected to ground potential**.

* This is a **Class I** equipment, for safety reasons plug it to a **supply line with the corresponding earth connection**.

* This equipment can be used in **Overvoltage Category II** installations and **Pollution Degree 1** environments.

* When using some of the following accessories **use only the specified ones** to ensure safety.

  Power cord **CA-005**

* Observe all **specified rating** both of supply and measurement.

* Remember that voltages higher than **60 V DC** or **30 V AC rms** are dangerous.

* Use this instrument under the **specified environmental conditions**.

* **The user is only authorised to** carry out the following maintenance operations:

  Replace the mains fuse that must be of the **type** and **value specified**.

  On the Maintenance paragraph the proper instructions are given.

  Any other change on the equipment should be carried out by qualified personnel.

* **Do not obstruct the ventilation system** of the instrument.

* Follow the **cleaning instructions** described in the Maintenance paragraph.

* Symbols related with safety:


DIRECT CURRENT


ALTERNATING CURRENT


DIRECT AND ALTERNATING


GROUND TERMINAL


PROTECTIVE CONDUCTOR


FRAME TERMINAL


EQUIPOTENTIALITY

ON (Supply)


OFF (Supply)


DOUBLE INSULATION
(Class II Protection)


CAUTION
(Risk of electric shock)


CAUTION REFER TO MANUAL


FUSE

2.2 Descriptive Examples of Over-Voltage Categories

Cat I Low voltage installations isolated from the mains

Cat II Portable domestic installations

Cat III Fixed domestic installations

Cat IV Industrial installations

3. INSTALLATION

3.1 Power Supply

This instrument has been designed to be supplied with a mains voltage of 115 or 230 V AC, 50-60 Hz. For your safety, the sources are protected by a **fuse** in the input line and use a standard mains plug with earth connection.

3.2 Mains Voltage Conversion

Conversion from one mains voltage to 115 or 230 VAC is done by change AC selects switch [9] as shown in Fig. 2.

To convert to different line voltage, perform the following procedure:

(1) Make sure the power cord is unplugged.

(2) Set the AC switch to the desired line voltage position.

(3) Verify that the mains fuse has the suitable value, you must see section Maintenance.

4. OPERATING INSTRUCTIONS

4.1 Front Panel Description

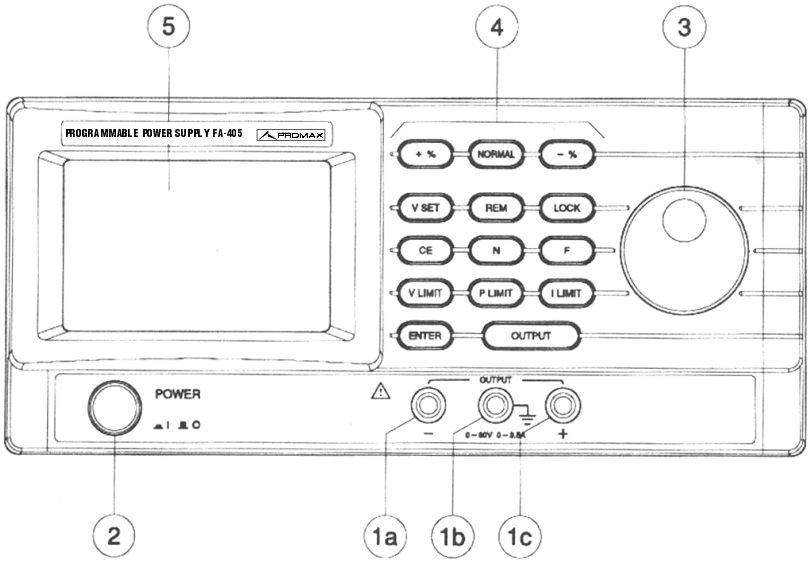


Figure 1.- Front panel

[1] Connector sockets:
1a: negative connection "-", **1b**: earth connection and **1c**: positive connection "+".

[2] "POWER" AC switch for switching the power supply on ("I") and off ("O").

[3] Encoder wheel for changing the V SET, V LIMIT, I LIMIT, P LIMIT, +%, and -% parameter settings.

[4] Keypad for actual operation of the Switching Power Supply **FA-405**. The exact description follows below.

[5] Backlight LCD Display with indication of the output voltage, current, power settings and indication of the V, I and P limits. Additionally, indication of OUTPUT On or Off and keypad locked or unlocked.

English

4.2 Rear Panel Description

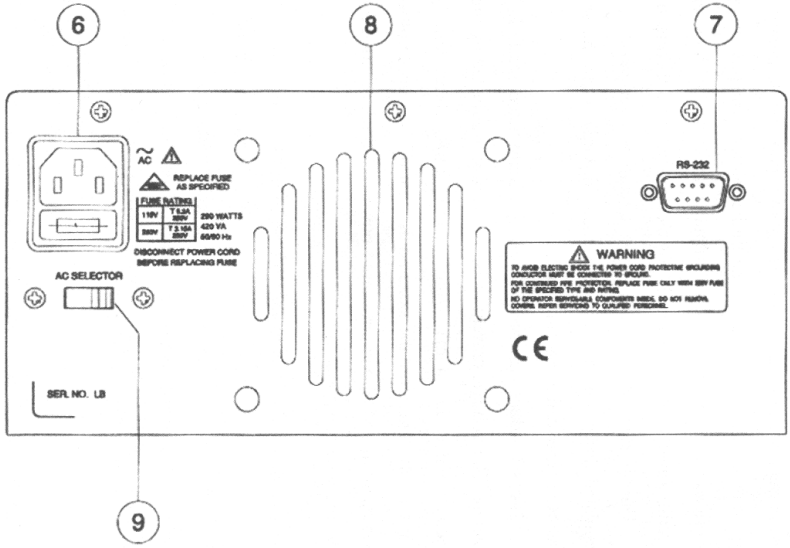


Figure 2.- Rear panel.

[6] AC rear power socket.

[7] RS-232 interface (with optocoupler) for connection to PC.

[8] Cooling fan.

[9] AC Selector

4.3 Starting Up

a) Connect the AC power cable to the AC power socket and ensure that it is firmly seated. Then plug the earthed power plug into an earthed AC power socket.

Attention: The continuity of the safety earth wire must be unbroken within the instrument, within the AC power cable and within the AC power socket otherwise life will be endangered.

b) Press the AC power On/Off switch

Attention: The earth connector in the front of the instrument and the RS-232 interface connector earth are connected directly with the earthing wire of the AC power input socket and of the connected AC power socket.

Before operating the instrument each time, first check and ensure that the supply output cables of the instrument is well fit of no damage.

4.4 Operating Instructions with keypad input

4.4.1 Setting the limits

The voltage, current and power output values are each limited to a maximum. This upper limit can be varied downwards. Setting the limits is carried out using the "V LIMIT" "I LIMIT" "P LIMIT" keys as follows:

V LIMIT **Voltage limit**

Press the "V LIMIT" key in the "LIMITS" field until the symbol "U-const" flashes. The voltage limit can now be adjusted to 1V steps by using the encoder wheel. If the "V LIMIT " key is now pressed for longer than 2s, the voltage upper limit will again be set at "maximum voltage value" (40V). To complete the input, press the "ENTER" key. An inadvertently wrong-set limit setting can be erased/reset with the " CE " key. As a result of this, the previous set value will be indicated and the setting menu exited. The "U-const" will no longer flash.

During operation, the voltage output can also be adjusted up to the set limit.

I LIMIT **Current limit**

Press the " I LIMIT" key in the "LIMITS" field until the symbol "I-const" flashes. The current limit can now be adjusted to 10mA ("FINE") or 100mA ("NORM", coarse) steps by using the encoder wheel. If the "I LIMIT" key is now pressed for longer than 2s, the current upper limit will again be set at "rmaximum current value" (5A). To complete the input, press the "ENTER" key. An inadvertently wrong-set limit setting can be erased/reset with the " CE " key. As a result of this, the previous set value will be indicated and the setting menu exited. The "I-const" will no longer flash.

English

P LIMIT **Power limit**
Press the "P LIMIT" key in the "LIMITS" field until the symbol "P-const" flashes. The power limit can now be adjusted to 1 W steps by using the encoder wheel. If the "P LIMIT" key is now pressed for longer than 2s, the power upper limit will again be set at "200 W". To complete the input, press the "ENTER" key. An inadvertently wrong-set limit setting can be erased/reset with the " CE " key. As a result of this, the previous set value will be indicated and the setting menu exited. The "P-const" will no longer flash.

Attention: The current "I LIMIT" is adjusted independently of its setting by the maximum output power setting. The voltage upper limit does not change.

4.4.2 Voltage output settings

V SET Using the "V SET" key, the output voltage can be adjusted up to the preset upper limit directly. For this the "V SET" key must be pressed and held and the voltage changed with the encoder wheel. If the "fine" F key is selected, the changes occur in 10 mV steps. If "norm" N key is selected, the changes occur in 1V steps.

ENTER Each input via the "LIMITS" keypad is completed with the "ENTER" key.

CE Any values incorrectly entered via the "LIMITS" keypad can be reset with the "CE" key.

F If the "N" key is pressed, the "fine" symbol disappears from the display. If the "F" key is pressed, the symbol "fine" appears on the display.

LOCK Pressing the "LOCK" key locks/blocks all keys and the encoder wheel against inadvertent adjustment. Only the "Power" switch remains active. Locking is indicated by the "locked" symbol in the bottom line of the display. If the "LOCK" key is pressed again (> approx. 2s), then the operating elements are released again (unlocked).

4.4.3 Controlling the output

OUTPUT The output of the power supply is switched on or off via a relay with the "OUTPUT" key. In the process, the status "On" or "Off" is indicated at the bottom right of the display. On switching the power supply on, the output is always in switched-off status.

4.4.4 +%, -% settings

+% Under output off status, press +% key once, the LCD display will indicate xxx (the multiple value in percentage on the established voltage of the original storage data), now set the +% value by using the knob and press ENTER key to save it. Afterward, when the output is in the "ON" status, press +% key, the output will be changed according to the saved multiple value in percentage.

-% Under output off status, press -% key once, the LCD display will indicate xxx (the multiple value in percentage of the original storage data), now set the -% value by using the knob and press ENTER key to save it. Afterward, when the output is in the "ON" status, press -% key, the output will be changed according to the saved multiple value in percentage.

For example: Set the output voltage as 10.00V, the save value of +% is 105, and the save value of -% is 95. The +% key is pressed, output voltage will be changed to 10.00V $\times$ 1.05 = 10.50V, while the -% key is pressed, output voltage will be changed to 10.00V $\times$ 0.95 = 9.50V. The output voltage will be back to normal by pressing the normal key.

4.4.5 "REM" key

A serial RS-232 interface is incorporated on the rear of the case. With the appropriate interface cable and optional software, communication with an IBM-compatible PC is therefore possible. The interface is naturally via an optocoupler.

REM Clear the Remote Control mode and use panel control setting instead. Thereupon, as with "LOCK", all operating elements (except POWER) are locked against direct input.

4.5 Comments on handling

4.5.1 Rectification of faults

With the **FA-405** power supply you have acquired a new generation measuring instrument constructed to the latest technological standards. However, faults can occur. Because of this, the following describes how some of these problems can be resolved by the user relatively easily:

English

Problem	Possible solution
No display	• Is the instrument switched on? • Is the AC power plug making good contact both in the instrument and in the AC power socket? • Is the AC fuse OK?
No input possible	• "LOCK" or "REM"; key pressed; see under section 4.4.2 or 4.4.5

Attention: Except when this is possible manually, the opening of covers or removal of parts can expose voltage-carrying components. Connection points may also be live. Before any adjustment, maintenance, repair or exchange of parts or assemblies requiring opening of the unit, the unit must be disconnected from all voltage sources and measurement circuits. If the adjustment maintenance or repair is subsequently required for the open unit, these must only be performed by a specialist familiar with the associated hazards and relevant regulations (VDE-0100, VDE-0701, VDE0683).

Capacitors within the instrument can remain charged even when the unit has been disconnected from all voltage sources and measurement circuits..

4.5.2 Fan Control

1. The fan of the power supply will not work upon power on until the temperature or load current reaches the condition as follows:

   - Temperature oriented:
     When the temperature of the power supply reaches to range of 45 °C ± 5°C for 5 to 6 seconds, the fan starts to work, while the temperature is less than 40 °C ± 5°C the fan stops rolling.

   - Load current oriented:
     After the load current reaches to the value 2.10A ± 50mA the fan will keep on rolling when current reaches to the value 1.80A ± 50mA the fan will stop.

2. To avoid damaging the power supply, if the fan failed to work when the temperature or current has reached to the specific condition, please power off the instrument and contact our local distributor for service.

5. MAINTENANCE ⚠

5.1 Replacing the mains fuse

If the fuse blown, the display will be off and the power supply will not operate. The fuse should not normally blow unless a problem has developed in the unit. Try to determine and correct cause of the blown fuse, then replace only with a fuse of the correct rating and type. The fuse is located on the rear panel (see Fig. 2).

CAUTION

For continued fire protection. Replace with 250V fuse of the specified type and rating, and disconnect the power cord before replacing fuse.

FUSE TYPE SHOULD BE:

For 230 V AC: Type IEC127 5 x 20 mm. 250 V Time-lag (T) 3.15 A

For 115 V AC: Type IEC127 5 x 20 mm. 250 V Time-lag (T) 6.3 A

AVOIDING THESE DIRECTIONS COULD DAMAGE THE EQUIPMENT

English

Make sure that only the fuses of the given types and nominal current ratings are used as replacements. The use of repaired fuses or the bridging of fuse holders is not permitted. A small flat-bladed screwdriver is required to change the AC fuse. Carefully lever up the cover in the AC power socket and withdraw it. Remove the defective fuse and replace it with an intact one of the same type and nominal current rating. Afterwards replace the fuse cover.

The measuring instrument is operated only when the case is securely closed and screwed up.

5.2 Cleaning Recommendations

CAUTION

Make sure that the device is disconnected when cleaning the casing.

CAUTION

Do not use aromatic hydrocarbons or chlorinated solvents for cleaning. These products can attack the materials used in the casing.

The casing may be cleaned with a light solution of detergent with water and applied with a soft damp cloth.

Dry completely before using the device again.

6. APPENDIX: CONNECTING VIA RS-232 INTERFACE

6.1 RS-232 Interface Capabilities

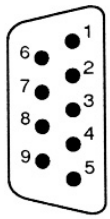
The RS232 interface provides a point-to-point connection between two items of equipment such as a computer and the power supply. There are some parameters you need to set on the both sides. Once you have set these parameters, you can control the power supply through the RS232 interface.

- Baud rate: 2400 baud.
- Parity bit: none.
- Data bit: 8 bits.
- Stop bit: 1 stop bit.
- Data flow control: none.

6.2 Notes for RS-232 Installation

The power supply is a DTE device with a 9-pin D-type shell RS-232 connector located on the rear panel. Fig. 3 shows the equipment of 9-pin connector (Male) with its pin number assignments. Fig. 4 shows the wiring configuration for DB9 to DB9. When the programmable power supply is set up with a RS-232 interface, please check the following points:

- *Do not connect the output line of one DTE device to the output line of the other.*
- *Many devices require a constant high signal on one or more input pins.*
- *Ensure that the signal ground of the equipment is connected to the signal ground of the external device.*
- *Ensure that the chassis ground of the equipment is connected to the chassis ground of the external device.*
- *Do not use more than 15m of cable to connect devices to a PC.*
- *Ensure the same baud rate is used on the device as the one used on PC terminal.*
- *Ensure the connector for the both side of cable and the internal connected line are met the demand of the instrument.*



1.	No connection	
2.	Receive Data (RxD)	(input)
3.	Transmit Data (TxD)	(output)
4.	+12V Input (*)	(input)
5.	Signal Ground (GND)	
6.	No connection	
7.	No connection	
8.	No connection	
9.	No connection	

***Note: This pin needs a constant high signal (+12V).**

Figure 3.- Pin assignments of the RS-232 connector on the rear panel for DB-9-D

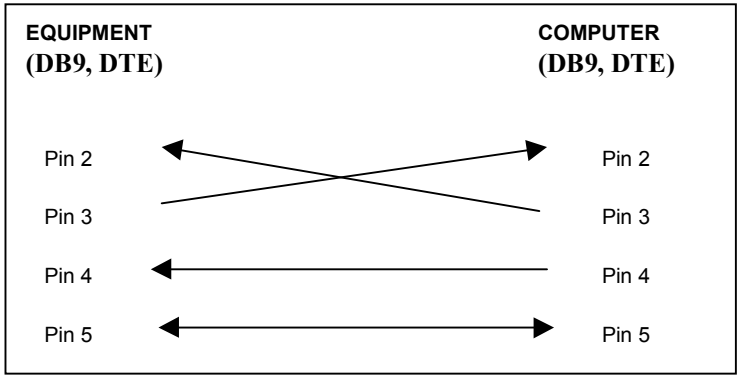


Figure 4.- Wiring configuration for DB9 to DB9.

6.3 Computer's connection

A personal computer with a COM port is the essential facilities in order to operate the programmable power supply via RS-232 interface.

The connections between power supply and computer are as follows:

I. Connect one end of a RS232 cable to the computer.

II. Connect the other end of the cable to the RS-232 port on the programmable power supply.

III. Turn on the programmable power supply.

IV. Turn on the computer.

6.4 List of commands

The power supply has 25 commands available. Every command is end up with <cr> (ASCII 0Dh or ACSCII 0D 0A acceptable). The return message <cr>of the power supply is CR/LF (ASCII 0D 0A).

L

Function: To obtain all the status values of the power supply.

Syntax: L<cr> HEX = 4C 0D

Explain: When the message L<cr>is sent to the power supply from computer, the power supply will return the message as follows immediately:

Vvv.vvAa.aaaWwww.wUuuIi.iiPpppFffffff<cr> 37 characters totally

The contents consist of the uppercase V,A,W,U,I,P,F, the numeral from 0 to 9 and decimal. Further details is described as follows:

vv.vv = The present output voltage, the unit: V.
a.aaa = The present output current, the unit: A.
www.w = The present output load, the unit: W.
uu = The maximum voltage limit at present, the unit: V.
i.ii = The maximum current limit at present, the unit: A.
ppp = The maximum load limit at present, the unit: W.
ffffff = The status of power supply at present.

1st f = the relay status 0: OFF 1:ON
2nd f = the temperature status 0: Normal 1: Overheat
3rd f = the wheel knob status 0: Normal 1: Fine
4th f = the wheel knob status 0: Lock 1: Unlock
5th f = the remote status 0: Normal 1: Remote(*)
6th f = the lock status 0: Unlock 1: Lock

NOTE: The setting is workable through computer only when the remote is at 1.

All the data above is in the range from 0 to 9.

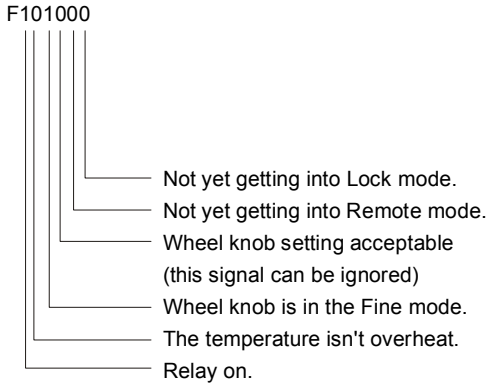
When the uppercase U becoming the lowercase u means that the status is in the setting of the voltage limit mode.

When the uppercase I becoming the lowercase i means that the status is in the setting of the current limit mode.

When the uppercase P becoming the lowercase p means that the status is in the setting of the load limit mode.

English

Example: The return message from power supply is:
V20.00A2.500W050.0U40I5.00P200F101000<cr>
V20.00 means that the present output voltage is at 20.00V.
A2.500 means that the present output current is at 2.500A.
W050.0 means that the present output load is at 050.0W.
U40 means that the present voltage limit is at 40V.
15.00 means that the present current limit is at 5.00A.
P200 means that the present load limit is at 200W.



V

Function: The present output voltage, the unit is V.

Syntax: V<cr> HEX = 56 0D

Explain: When the message of V<cr>is sent to the power supply from computer, the power supply will return the following message immediately:

Vvv.vv<cr> 6 characters totally + CR/LF

The contents consist of the uppercase V, the numeral from 0 to 9 and decimal. Further details is described as follows:

vv.vv = The present output voltage, the unit: V

A

Function: The present output current, the unit is A.

Syntax: A<cr> HEX = 41 0D

Explain: When the message of A<cr>is sent to the power supply from computer, the power supply will return the following message immediately:

Aa.aaa<cr> 6 characters totally + CR/LF

The contents consist of the uppercase A, the numeral from 0 to 9 and decimal. Further details is described as follows:

a.aaa = The present output current, the unit: A

W

Function: The present output load, the unit is W.

Syntax: W<cr> HEX = 57 0D

Explain: When the message of W<cr>is sent to the power supply from computer, the power supply will return the following message immediately:

Wwww.w<cr> 6 characters totally + CR/LF

The contents consist of the uppercase W, the numeral from 0 to 9 and decimal. Further details is described as follows:

www.w = The present output load, the unit: W

U

Function: The maximum voltage limit at present, the unit is V.

Syntax: U<cr> HEX = 55 0D

Explain: When the message of U<cr> is sent to the power supply from computer, the power supply will return the following message immediately:

Uuu<cr> 3 characters totally + CR/LF

The contents consist of the uppercase U and the numeral from 0 to 9. Further details is described as follows:

uu = The maximum voltage limit at present, the unit: V

When the uppercase U becoming the lowercase u means that the power supply is in the setting status of voltage limit mode.

I

Function: The maximum current limit at present, the unit is A.

Syntax: I<cr> HEX = 49 0D

Explain: When the message of I<cr>is sent to the power supply from computer, the power supply will return the following message immediately:

Ii.iii<cr> 5 characters totally + CR/LF

The contents consist of the uppercase I, the numeral from 0 to 9 and decimal. Further details is described as follows:

i.ii = The maximum current limit at present, the unit: A

When the uppercase I becoming the lowercase i means that the power supply is in the setting status of current limit mode.

P

Function: The maximum output load limit at present, the unit is W.

Syntax: L<cr> HEX = 50 0D

Explain: When the message of L<cr>is sent to the power supply from computer, the power supply will return the following message immediately:

Pppp<cr> 4 characters totally + CR/LF

The contents consist of the uppercase P and the numeral from 0 to 9. Further details is described as follows:

ppp = The maximum load limit at present, the unit: W

When the uppercase P becoming the lowercase p means that the power supply is in the setting status of output load limit mode.

F

Function: The present status of the power supply.

Syntax: F<cr> HEX = 46 0D

Explain: When the message of F<cr> is sent to the power supply from computer, the power supply will return the following message immediately:

Ffffff<cr> 7 characters totally + CR/LF
• • • • • •
1 2 3 4 4 6

The contents consist of the uppercase F and the numeral from 0 to 9. Further details is described as follows:

1st f = the relay status 0:OFF 1:ON
2nd f = the temperature status 0: Normal 1: Overheat
3rd f = the wheel knob status 0: Normal 1: Fine
4th f = the wheel knob status 0: Lock 1: Unlock
5th f = the remote status 0: Normal 1: Remote(*)
6th f = the lock status 0: Unlock 1: Lock

NOTE: The setting is workable through computer only when the remote is at 1.

SV+

Function: Add one unit to the present voltage setting.

Syntax: SV+<cr> HEX = 53 56 2B 0D

Explain: When the message of SV+<cr> is sent to the power supply from computer, the power supply will add one unit to the present voltage setting immediately.

Example: The present output voltage is at 20.00V, and the wheel knob status is at normal, the SV+<cr> message is sent to the power supply, the voltage of which will become 21.00V.

SV-

Function: Subtract one unit from the present voltage setting.

Syntax: SV-<cr> HEX = 53 56 2D 0D

Explain: When the message of SV-<cr> is sent to the power supply from computer, the power supply will subtract one unit from the present voltage setting immediately.

Example: The present output voltage is at 20.00V, and the wheel knob status is at normal, the SV-<cr> message is sent to the power supply, the voltage of which will become 19.00V.

SU+

Function: Add one unit to the present voltage limit setting.

Syntax: SU+<cr> HEX = 53 55 2B 0D

Explain: When the message of SU+<cr> is sent to the power supply from computer, the power supply will add one unit to the present voltage limit setting immediately.

Example: The present voltage limit is at 30V, and the wheel knob status is at normal, the SU+<cr> message is sent to the power supply, the voltage limit of which will become 31V.

SU-

Function: Subtract one unit from the present voltage limit setting.

Syntax: SU-<cr> HEX = 53 55 2D 0D

Explain: When the message of SU-<cr> is sent to the power supply from computer, the power supply will subtract one unit from the present voltage limit setting immediately.

Example: The present voltage limit is at 30V, and the wheel knob status is at normal, the SU-<cr> message is sent to the power supply, the voltage limit of which will become 29V.

SI+

Function: Add one unit to the present current limit setting.

Syntax: SI+<cr> HEX = 53 49 2B 0D

Explain: When the message of SI+<cr> is sent to the power supply from computer, the power supply will add one unit to the present current limit setting immediately.

Example: The present current limit is at 3.00A, and the wheel knob status is at normal, the SI+<cr> message is sent to the power supply, the current limit of which will become 3.10A.

SI-

Function: Subtract one unit from the present current limit setting.

Syntax: SI-<cr> HEX = 53 49 2D 0D

Explain: When the message of SI-<cr> is sent to the power supply from computer, the power supply will subtract one unit from the present current limit setting immediately.

Example: The present current limit is at 3.00A, and the wheel knob status is at normal, the SI-<cr> message is sent to the power supply, the current limit of which will become 2.90A.

SP+

Function: Add one unit to the present load limit setting.

Syntax: SP+<cr> HEX = 53 50 2B 0D

Explain: When the message of SP+<cr> is sent to the power supply from computer, the power supply will add one unit to the present load limit setting immediately.

Example: The present load limit is at 100W, and the wheel knob status is at normal, the SP+<cr> message is sent to the power supply, the load limit of which will become 101W.

SP-

Function: Subtract one unit from the present load limit setting.

Syntax: SP-<cr> HEX = 53 50 2D 0D

Explain: When the message of SP-<cr> is sent to the power supply from computer, the power supply will subtract one unit from the present load limit setting immediately.

Example: The present load limit is at 100W, and the wheel knob status is at normal, the SP-<cr> message is sent to the power supply, the load limit of which will become 099W.

SUM

Function: Set the maximum voltage limit value.

Syntax: SUM<cr> HEX = 53 55 4D 0D

Explain: When the message of SUM<cr> is sent to the power supply from computer, the power supply will set the voltage limit to the maximum immediately.

Example: The present voltage limit is at 20V, the SUM<cr> message is sent to the power supply, the voltage limit of which will become 40V.

SIM

Function: Set the maximum current limit value.

Syntax: SIM<cr> HEX = 53 49 4D 0D

Explain: When the message of SIM<cr> is sent to the power supply from computer, the power supply will set the current limit to the maximum immediately.

Example: The present current limit is at 2.50A, the SIM<cr> message is sent to the power supply, the current limit of which will become 5.00A.

SMP

Function: Set the maximum load limit value.

Syntax: SPM<cr> HEX = 53 50 4D 0D

Explain: When the message of SPM<cr> is sent to the power supply from computer, the power supply will set the load limit to the maximum immediately.

Example: The present load limit is at 100W, the SPM<cr> message is sent to the power supply, the load limit of which will become 200W.

KF

Function: Set the wheel knob to Fine status.

Syntax: KF<cr> HEX = 4B 46 0D

Explain: When the message of KF<cr> is sent to the power supply from computer, the power supply will set the wheel knob to Fine status immediately.

Example: The present wheel knob status is at Normal, the KF<cr> message is sent to the power supply, the wheel knob status will become Fine.

KN

Function: Set the wheel knob to Normal status.

Syntax: KN<cr> HEX = 4B 4E 0D

Explain: When the message of KN<cr> is sent to the power supply from computer, the power supply will set the wheel knob to Normal status immediately.

Example: The present wheel knob status is at Fine, the KN<cr> message is sent to the power supply, the wheel knob status will become Normal.

KO

Function: Set the Relay status to Invert.

Syntax: KO<cr> HEX = 4B 4F 0D

Explain: When the message of KO<cr> is sent to the power supply from computer, the power supply will invert the relay status immediately.

Example: The present relay status is at OFF, the KO<cr> message is sent to the power supply, the relay status will become ON, send the message again will become OFF.

KOE

Function: Set the Relay status to ON.

Syntax: KOE<cr> HEX = 4B 4F 45 0D

Explain: When the message of KOE<cr> is sent to the power supply from computer, whatever the relay status is, the relay of power supply will be set to ON immediately.

KOD

Function: Set the Relay status to OFF.

Syntax: KOD<cr> HEX = 4B 4F 44 0D

Explain: When the message of KOD<cr> is sent to the power supply from computer, whatever the relay status is, the relay of power supply will be set to OFF immediately.

EEP

Function: Save the present status to the EEPROM.

Syntax: EEP<cr> HEX = 45 45 50 0D

Explain: When the message of EEP<cr> is sent to the power supply from computer, the power supply will be save the present setting value to EEPROM immediately.

B

Function: To obtain +% value.

Syntax: B<cr> HEX = 42 0D

Explain: When the message of B<cr> is sent to the power supply from computer, the power supply will return the following message immediately

Bbbb<cr> 4 characters totally +CR/LF

The contents consist of the uppercase B, and the numeral from 0 to 9. Further details is described as follows:

bbb = The present +% value, the unit: %

When the uppercase B becoming the lowercase b means that the status is in the setting of the +% mode.

D

Function: To obtain -% value.

Syntax: D<cr> HEX = 44 0D

Explain: When the message of D<cr> is sent to the power supply from computer, the power supply will return the following message immediately

Dddd<cr> 4 characters totally +CR/LF

The contents consist of the uppercase D, and the numeral from 0 to 9. Further details is described as follows:

ddd = The present -% value, the unit: %

When the uppercase D becoming the lowercase d means that the status is in the setting of the -% mode.

Q

Function: Display the present value at +% or -% mode.

Syntax: Q<cr> HEX = 51 0D

Explain: When the message of Q<cr> is sent to the power supply from computer, the power supply will return the following message immediately

Qqqqqqq<cr> 7 characters totally +CR/LF

The contents consist of the uppercase B, and the numeral 0 or 1. Further details is described as follows:

Whether the first q is at -% mode? 0: No 1:Yes
Whether the second q is at +% mode? 0: No 1: Yes

SB+

Function: To add one unit to the present setting of +%.

Syntax: SB+<cr> HEX = 53 42 2B 0D

Explain: When the message of SB+<cr> is sent to the power supply from computer, the power supply will add one unit to the present setting of +% immediately

Example: The present +% value is at 105, after the command is sent from computer, the +% value is at 106.

SB-

Function: To decrease one unit from the present setting of +%.

Syntax: SB-<cr> HEX = 53 42 2D 0D

Explain: When the message of SD-<cr> is sent to the power supply from computer, the power supply will decrease one unit from the present setting of +% immediately

Example: The present +% value is at 105, after the command is sent from computer, the +% value is at 104.

SD+

Function: To add one unit to the present setting of -%.

Syntax: SD+<cr> HEX = 53 44 2B 0D

Explain: When the message of SD+<cr> is sent to the power supply from computer, the power supply will add one unit to the present setting of -% immediately

Example: The present -% value is at 90, after the command is sent from computer, the -% value is at 91.

SD-

Function: To decrease one unit from the present setting of -%.

Syntax: SD-<cr> HEX = 53 44 2D 0D

Explain: When the message of SD-<cr> is sent to the power supply from computer, the power supply will decrease one unit from the present setting of -% immediately

Example: The present -% value is at 90, after the command is sent from computer, the -% value is at 89.

SV

Function: Set the output voltage value.

Syntax: SV xx.xx
x is a number between 0 and 9.

Explain: The power supply will set the desired value of output voltage when the command is received.

Example: SV 12.34
Set output voltage to 12.34V

SU

Function: Set voltage limit.

Syntax: SU xx
x is a number between 0 and 9.

Explain: The power supply will set desired up-limit value of the voltage when the command is received.

Example: SU 20
Set voltage limit to 20V

SI

Function: Set current limit.

Syntax: SI x.xx
x is a number between 0 and 9.

Explain: The power supply will set desired up-limit value of the current when the command is received.

Example: SU 1.25
Set current limit to 1.25A

SP

Function: Set power limit.

Syntax: SP xxx
x is a number between 0 and 9.

Explain: The power supply will set desired up-limit value of the power when the command is received.

Example: SP 100
Set power limit to 100W

The power setting changes the current limit only, the voltage limit will remain unchanged.

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