

HM305P/HM310P DC Power Supply

Product Manual Update

v1.0

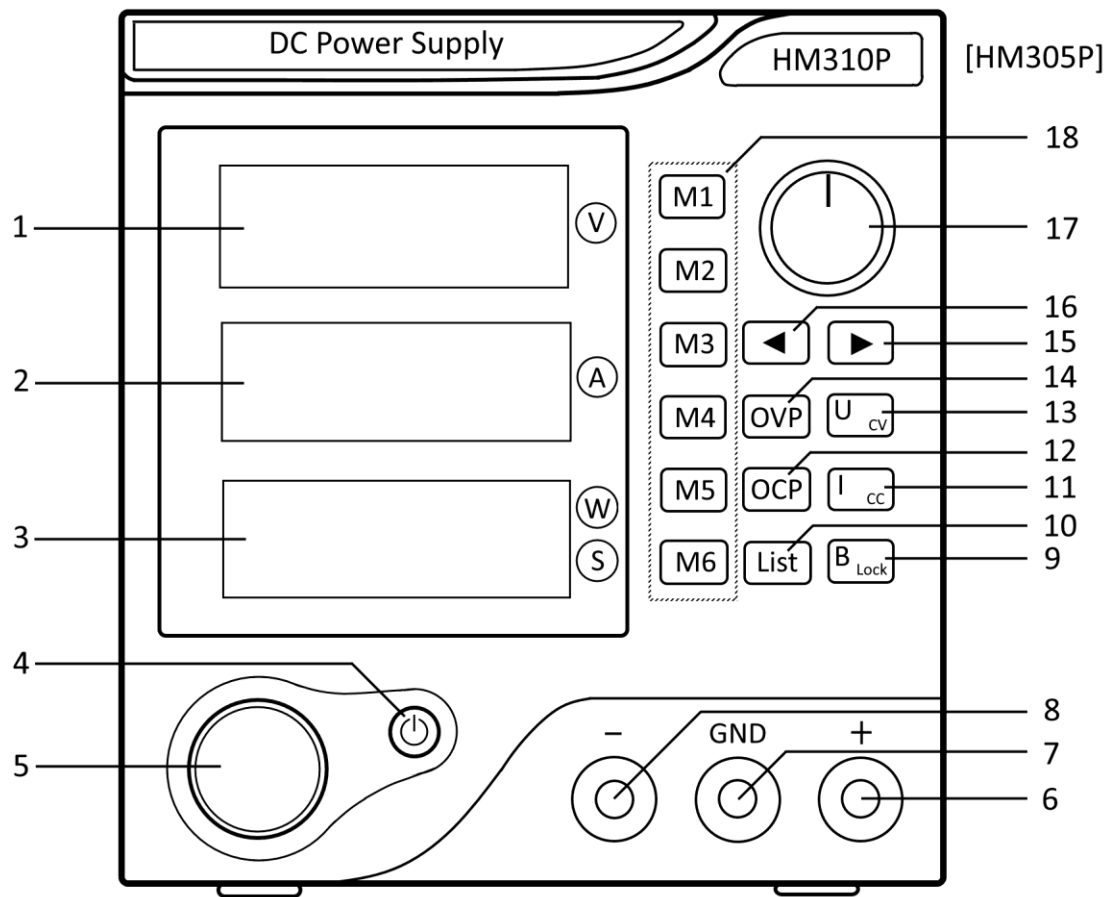
Chapter 1 Overview

This HM305P/HM310P DC Power Supply series is a single output switching DC regulated power supply with a LED digital display. It can display voltage, current and power simultaneously. The DC Power Supply is portable and small where the voltage and current may be adjusted continuously.

1.1 Functional features

- Three sets of 4-digit 7-segment LED displays to visually indicate the output *Voltage*, output *Current* and output *Power/Time/Status*
- Automatic adjustment of voltage and/or current to maintain output voltage and current settings.
- Dedicated ON /OFF output button
- Five powerful protection features: over voltage, over current, over power, over temperature, and short circuit.
- Six memory buttons to store voltage, current and time settings
- Saved voltage and current memory settings may be automatically sequenced using the *List* feature
- Three-function power supply: Normal power supply, CNC power supply, Programmable power supply.
- Temperature controlled low-noise fan speed to keep the instrument heat low and extend the units life.
- Voltage and current values may be set in advance while the output is disabled.
- A soft keypad lock disables all the panel buttons to prevent miss-operation.

1.2 Front and rear panel



Front Panel Diagram

1. Voltage display: The output *Voltage* value is displayed in volts (V) when the **ON/OFF power output button** (item 4) is turned on. The preset *Voltage* value is displayed when the **ON/OFF power output button** is off.

2. Current display: The output *Current* value is displayed in Amperes (A) when the **ON/OFF power output button** (item 4) is turned on. The preset *Current* value is displayed when the **ON/OFF power output button** is Off.

3. Power/Time/Status Display: The output *Power* value is displayed in units of Watts (W) when the **ON/OFF power output button** (item 4) is turned on. The *Time* value is displayed in seconds (up to 9,999 seconds) when using the automated sequence "List" mode feature (item 10). The output *Status* is displayed as "ON"(S) when the **ON/OFF power output button** (item 4) is turned on. Likewise the output *Status* is displayed as "OFF"(S) when the **ON/OFF power output button** is turned off. Other status values are displayed when the power supply enters a protected state; these status values are displayed as follows:

Status	Over voltage protection	Over current protection	Over power protection	Over temperature protection
Display	"OVP"	"OCP"	"OPP"	"OTP"

4. ON/OFF power output button: This button directly controls the *output* state of the power supply. While the unit is powered on, no power is outputted to the output terminal until this button is turned on. When the button color is green it indicates that the output state is ON and power is being supplied to the load. When the button color is red it indicates the output state is OFF and no power is supplied to the load.

5. Power switch: This is the main switch used to power the unit on and off. Note that no power is supplied to the output terminals until the **ON/OFF power output button** (item 4) is turned on. As a safety feature the default status of the **ON/OFF power output button** is OFF when the unit is first powered on.

6. Output positive electrode: Power output positive (+) electrode

7. Grounding terminal: The safety ground terminal is connected to the power supplies metal case.

8. Output negative electrode: power output negative (-) electrode

9. "B Lock" - Enter/Keyboard Lock: In data entry mode a short press of the **B Lock** button is used to enter the current values. There is an inactivity timeout period of 5 seconds after which the current settings are entered automatically and the unit jumps out of data-entry mode.

A long press of 2 seconds or more is used to lock the keyboard. When locked the operation of all the panel function buttons (excluding the **ON/OFF power output button** (item 4)) are disabled and the **B**

Lock button lights up. Pressing the **B Lock** button for 2 seconds or more when locked will remove the lock.

10. "List" mode key: A long press of 2 seconds or more is used to enter or exit the hardware **List** function mode. This mode sets up the unit to automatically rotate through preset voltage and current settings based on time schedules you set. When active the **List** button will illuminate with a blue light. After entering the **List** function mode, the output turns off and the pre-programmed memory buttons **M1...M6** may be selected, or de-selected, as part of the rotation group using a single press of the required memory button (see item 18 on how to program the **M1...M6** memory buttons beforehand). Each memory button lights up when it is selected, pressing a memory button when it is selected will de-select it from the group and the button light will go off.

The selected (lit) memory buttons indicate the group of voltage, current and timing settings values that will be executed when the List output is enabled.

The order in which the List executes is the selected memory buttons from **M1...M6**.

To execute the selected list, while still in **List** mode, simply press the **ON/OFF power output (item 4)** button. This will begin the sequence of rotating through each selected memory button using the associated voltage and current settings, where the time set for each will count down and then the unit will automatically switch to the next memory button settings. Once the unit reaches the end of the list it will automatically rotate back to the first item on the list. This process will continue until you exit **List** more.

11. "I CC" current setting key: use a short press to enter edit mode and set the value of the power supply current. In current editing mode the center **Current display** (item 2) will be enabled as indicated by the flashing least significant digit and the text "**S—C**" (Set Current) will appear in the **Power/Time/Status Display** (item 3). The "**I CC**" does not light up when editing and setting the current value.

To enter the current value press the "**B Lock**" key (see note below about the inactivity timeout).

When the unit **ON/OFF power output** is turned on the current setting is applied to the load. If the load consumes *more* than the current setting then the "**I CC**" button will light up in a red color and the current will be limited to the present setting.

Note: *there is a 5-second inactivity timeout in effect during editing mode. This means that if no front panel adjustments are made for a period of 5 seconds then the unit will time out and automatically enter whatever settings are currently displayed and exit edit mode. Press the "I-CC" button again to re-enter edit mode.*

12. "OCP" over-current setting key: Use a short press of the OCP button to enter edit mode of the over current protection feature. The **Voltage display** (item 1) will now show "OCP" and the center **Current display** (item 2) will be enabled for editing as indicated by the flashing least significant digit. The 3rd

Power/Time/Status Display (item 3) line of the display will show the current On/OFF status of the over current protection feature, pressing the OCP button again will toggle the feature On and OFF.

To enter the current OCP value press the **"B Lock"** key (see *note* below about the inactivity timeout).

With the **"OCP"** feature turned "On" as indicated above, when the main **ON/OFF power output button** (item 4) is turned on then power is applied to the load. If the load consumes more current then the OCP setting then the power to the load is turned off, and "O.C.P." appears on the **Power/Time/Status Display** (item 3).

***Note:** there is a 5-second inactivity timeout in effect during editing mode. This means that if no front panel adjustments are made for a period of 5 seconds then the unit will time out and automatically enter the settings currently displayed, and will then exit edit mode. Press the "OCP" button again to re-enter edit mode.*

13. "U CV" voltage setting key: Use a short press to enter edit mode and set the value of the power supply voltage. In voltage editing mode the top **Voltage display** (item 1) will be enabled as indicated by the flashing least significant digit and the text **"S—U"** (Set Voltage) will appear in the **Power/Time/Status Display** (item 3). The **"U CV"** does not light up when editing and setting the voltage value.

To enter the voltage value press the **"B Lock"** (item 9) key (see *note* below about the inactivity timeout).

When the unit **ON/OFF power output** is turned on the voltage setting is applied to the load and the **"U CV"** button will light up in a green color to indicate the correct voltage setting is being applied

***Note:** there is a 5-second inactivity timeout in effect during editing mode. This means that if no front panel adjustments are made for a period of 5 seconds then the unit will time out and automatically enter whatever settings are currently displayed and exit edit mode. Press the "U CV" button again to re-enter edit mode.*

14. "OVP" over-voltage setting key: Use a short press of the OVP button to enter edit mode of the over voltage protection feature. The top **Voltage display** (item 1) will now show "OUP" and the center **Current display** (item 2) labeled "A" will be enabled for entering the voltage as indicated by the flashing least significant digit. The 3rd **Power/Time/Status Display** (item 3) line of the display will show the On/OFF status of the over voltage protection feature, pressing the OVP button again will toggle this feature On and OFF.

To enter the OVP value press the **"B Lock"** (item 9) key (see *note* below about the inactivity timeout).

With the **"OVP"** feature turned "On" as indicated above, when the main **ON/OFF power output button** (item 4) is turned on then power is applied to the load. If the load encounters more voltage then the OVP setting then the OVP key briefly flashes, power to the load is turned off, and "O.U.P." appears on the **Power/Time/Status Display** (item 3).

Note: *there is a 5-second inactivity timeout in effect during editing mode. This means that if no front panel adjustments are made for a period of 5 seconds then the unit will time out and automatically enter the settings currently displayed and will then exit edit mode. Press the “OVP” button again to re-enter edit mode.*

15. " ->" Cursor right arrow key: In data entry mode, short press this key to move the currently selected flashing digit one position to the right. If the least significant digit is already selected then it remains selected (the selection does not wrap to the most significant digit).

16. "<- " Cursor left arrow key: In data entry mode, short press this key to move the currently selected flashing digit one position to the left. If the most significant digit is already selected then it remains selected (the selection does not wrap to the least significant digit)

17. Rotating shuttle button: Normally (while not specifically entering voltage, current, or other values) simply rotating the shuttle knob in any direction, or pressing the knob, will automatically select the *voltage* entry option as described in item: **13 "U CV" voltage setting key**. The 5-second inactivity timeout is in effect after which the unit will automatically save the current settings and exit data entry mode. Before the 5-second inactivity timeout engages you may enter the current settings using the “**B Lock**” (item 4) key.

In data editing mode of any setting value such as voltage or current, turning the shuttle knob in a clockwise direction will increase the value of the currently selected flashing digit. Once the value of “9” is reached then further rotation will increment the count and cause the next most significant digit to increase thereby going from a value of “9” to a value of “10” for example. Rotating the knob further will continue to increase the setting in a “counting” manner. Once the maximum count is reached, such as 9999, then further rotation of the shuttle knob will not change the value

Turning the shuttle knob in a counter-clockwise direction will decrease the value of the currently selected flashing digit. Once the value of “0” is reached then further rotation will cause the count to decrement. For example, a value of 1.00 will decrement to 0.99 when the least significant digit is being edited. Rotating the knob further will continue to decrease the setting in a “counting” manner. Once the minimum count is reached, typically “0000”, then further rotation of the shuttle knob will not change the value.

While the shuttle knob can be rotated to set any value, higher values may be more efficiently entered using the left and right **Cursor keys** (items 15 and 16) to directly select the digit required for entry.

When editing the shortcut memory keys **M1-M6** (item 18) then *pressing* the shuttle knob will cycle through editing the *voltage*, *current* and *time* values – see “**List**” mode (item 10).

When editing the **OVP** (item 14) and **OCP** (item 12) values, pressing the shuttle knob will select the next most significant digit, this selection will wrap back to the least significant digit once the most significant digit is reached.

When editing the **U-CV** (item 13) and **I-CC** (item 11) values, pressing the shuttle knob will alternately select between the least significant digit (digit 1) and the 2nd most significant digit (digit 3). This can be useful in switching between making fine and course adjustments.

18. "M1" - M6" six sets of shortcut storage keys: The M1 to M6 memory storage keys may be used to save often-used *voltage*, *current* and *time* settings. These keys can then be used to quickly retrieve previously saved settings or can be used in conjunction with the "**List**" feature (item 10) to provide automatic voltage and current output rotation.

To enter a new set of values press the desired memory key. This will provide a preview of any previous key voltage, current and time settings, and the unit will enter *voltage* edit mode. Enter the required voltage as normal using the top **Voltage display** (item 1) described in the **U-CV** section (item 13). Remember that the 5-second inactivity timed is engaged.

To enter a *current* setting, tap the shuttle knob one time while in voltage edit mode to select *current* edit mode. Enter the required current as normal using the middle **Current display** (item 2) as described in the **I-CC** section (item 11) Remember that the 5-second inactivity timed is still engaged.

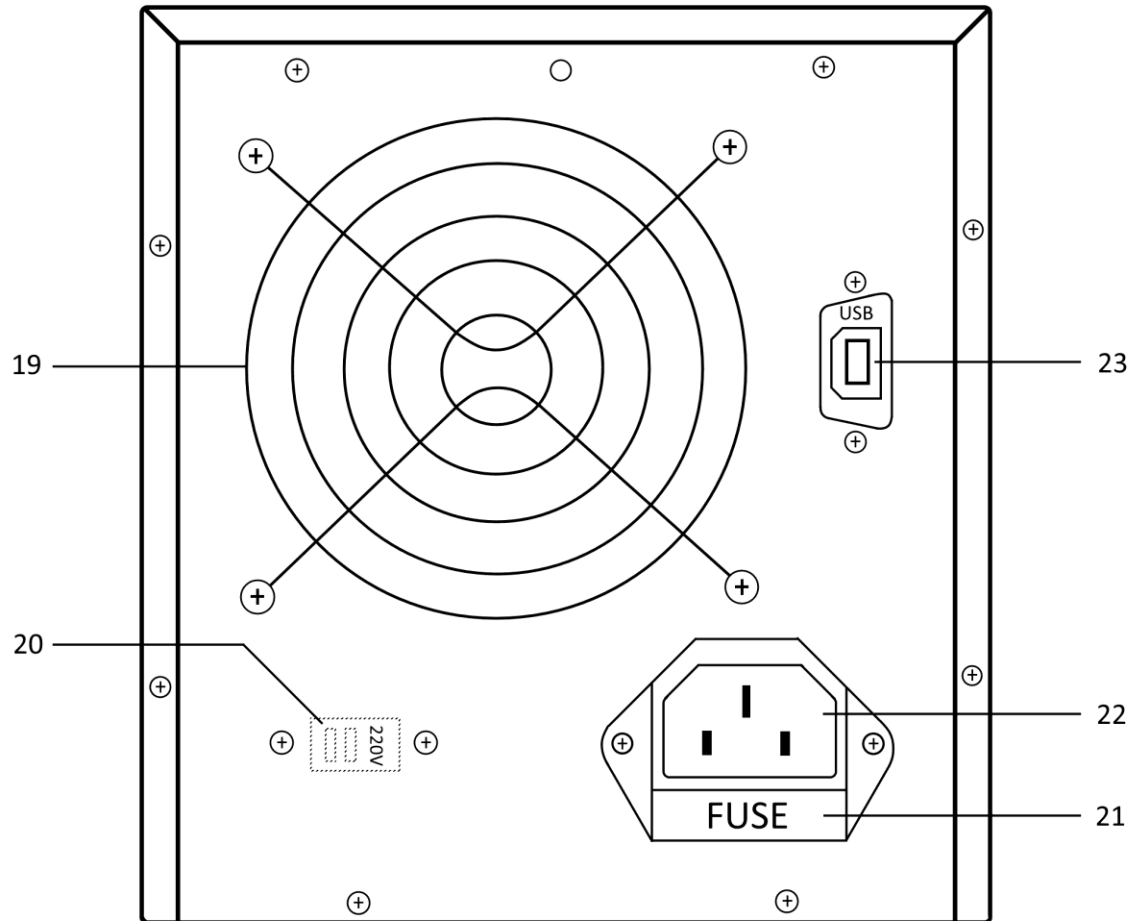
To enter a *time* value, tap the shuttle knob one time while in current editing mode to select *time* edit mode. This time is used to specify the duration of applied voltage and current during "List" mode (item 10) for this memory key.

To *retrieve* the voltage and current settings previously saved to a memory key tap the key once to enter edit mode. The keys saved value are displayed but not yet applied to the output terminals at this stage so preview the keys saved settings before the 5-second inactivity timer expires, and tap the key a second time to set the retrieved values before the inactivity timer runs out. The unit will now be set to the saved voltage and current values of the memory key.

For safety, note that if the output was on when the memory key is first tapped, then the memory keys saved voltage and current settings will be automatically output when the key is pressed a second time. This new setting could potentially damage your circuitry so it is important to preview the saved voltage and current settings before pressing the memory key a second time.

If the output was off when the memory key is first tapped, then the output remains off when the memory key is pressed a second time.

1.2.1 Rear Panel



Rear Panel Diagram

19. Cooling fan vents: An automatic fan is used for air cooling and heat dissipation of the power supply. The fan speed is intelligently adjusted according to the current output power consumption. This effectively reduces the fan noise and prolongs the service life of the unit.

20. Input power switch (optional): Present to AC 110V 60Hz (US version). Other locales may incorporate an input power switch for selection between 110V and 220V operation.

21. Fuse holder: The fuse holder immediately underneath the main power socket is equipped with a power fuse which may be pried up and replaced using a screwdriver.

22. Power input socket: AC main power input.

23. USB communication interface: This interface can communicate with a computer to control the power units programming. For details, please check the information on the accompanying CDROM

Performance Specifications

When using these specifications, please ensure that the unit has been operational for at least 10 seconds

4.1 Voltage output:

Output voltage	Power effect	Load effect	Ripple noise
0V -> Maximum rating	$\leq 0.1\% + 1\text{mV}$	$\leq 0.1\% + 5\text{mV}$	$\leq 30\text{mV RMS}$

4.2 Current output:

Output current	Power effect	Load effect	Ripple noise
0A -> Maximum rating	$\leq 0.1\% + 5\text{mA}$	$\leq 0.1\% + 5\text{mA}$	$\leq 10\text{mA RMS}$

4.3 Display resolution

Type	Four-LED display
Voltage resolution	$< 100\text{V}: 10\text{mV}; \geq 100\text{V}: 0.1\text{V}$
Current resolution	$< 10\text{A}: 1\text{mA}; \geq 10\text{A}: 10\text{mA}$
Power resolution	$< 10\text{W}: 1\text{mW}; \geq 10\text{W}: 10\text{mW}; \geq 100\text{W}: 0.1\text{W}$

4.4 Operating environment (Indoor use)

Altitude: $\leq 2000\text{m}$

Ambient temperature: $5^{\circ}\text{C} - 40^{\circ}\text{C}$

Relative humidity: $\leq 80\%$

4.5 Storage environment

Ambient temperature: $5^{\circ} - 30^{\circ}\text{C}$

Relative Humidity: $\leq 60\%$

4.6 Power input

AC 220V $\pm 10\%$, 50Hz (Or AC 110V input or AC 110V/220V manual switching)

4.7 Appendix:

Instructions: 1

Qualification certificate: 1

Power cord: 1

Power leads (alligator clips): 1 set

Serial Port Line: 1 (for models with communication interface)

CDROM (software): 1

4.8 product size:

280mm(D) x 130mm(W) x 165mm(H)

4.9 weight:

Net weight: About 2 Kg

Hidden Menu

The HM305P and HM310P power supplies feature a *Hidden* menu. This menu is used for diagnostic purposes and for setting up communication parameters between the unit and computer software. As such, this menu and these settings should not be modified under normal circumstances. However, the hidden menu does incorporate an option to turn the button *Beep* On and Off which can be useful. Here are the instructions for this feature.

Note: *This is not difficult, just follow these instructions exactly and do not make any other setting changes.*

To enter the hidden menu make sure the unit is first powered off, then power on the unit by first holding down the **ON/OFF power output button** (item 4) then then press the **Power switch** (item 5).

The unit will now power on and display an “Addr” option. The menu keys **M3**, **M4**, **M5** and **M6** will be lit. The next option is the “beeP’ option and we select it by pressing the **ON/OFF power output button** (item 4) one time. The display now shows the option “bEEP” on the display with the current “ON” or “OFF” status, and the **M4** button is lit. Press the **M4** button to toggle the “bEEP” ON and OFF as you desire. When you have the ON/OFF setting you require displayed simply power the unit off using **Power switch** (item 5).

If you make a mistake and get lost in the menus then power the unit off using the **Power switch** (item 5) and try again.

.end