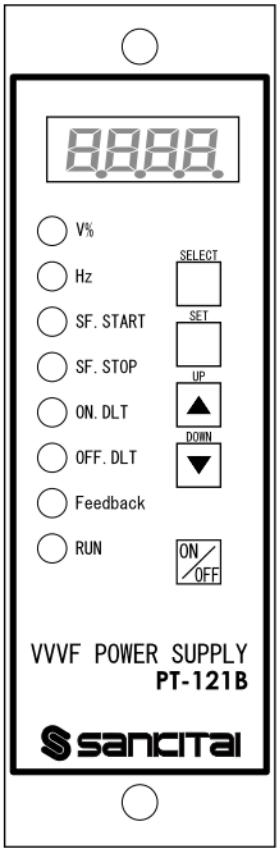
PT-121B Piezoelectric Vibration Machine Controller

(Edition issued: Version 5, Date: 2022/08/01)

1. Specification **(Applicable for software version v8.10 and hardware version 09-100H1):**

Model	PT-121B Variable-frequency controller for piezoelectric vibration feeding machine		
Function	Voltage, Frequency, On Delay, Off Delay, Slow Start, Slow Stop, Amplitude Auto Compensation, Intermittent output		
Input Voltage	AC110V/220V Single-phase power	Frequency	50/60Hz
Output Voltage	AC225V±10%(Max)	Frequency	50~600Hz
Temperature	0℃~40℃(cannot froze)	Humidity	10~99%Rh(cannot froze)

2. Panel operation descriptions



Button	Button Function Descriptions
SELECT	Select display parameter, corresponding LED moves down in sequence.
SET	Enter parameter setting mode. Press SELECT until the desired parameter setting has been reached. Press the "SET" key to enter setting mode. When in the setting mode, the LED corresponding to the parameter will flash.
UP	Increase parameter value. After entering setting mode, press "UP" key to increase parameter value.
DOWN	Decrease parameter value. After entering setting mode, press "DOWN" key to decrease parameter value.
ON/OFF	Force Start or Stop.

LED	Function description and parameter setting range
V%	Output voltage: 1.0%~99.8% percentage range, increase or decrease 0.2%/step
Hz	Output frequency: Range is 50.0Hz~600.0Hz, increase or decrease 0.1Hz/step
SF.START	Slow start: range is 0~3.0s, increase or decrease 0.1s/step
SF.STOP	Slow stop: range is 0~3.0s, increase or decrease 0.1s/step
ON.DLT	Start on delay: range is 10ms ~ 9.99s, increase or decrease 10ms/step
OFF.DLT	Start off delay: range is 10ms ~ 9.99s, increase or decrease 10ms/step
Feedback	1st time: Amplitude auto compensation: must be operated with J10 GSen, refer to 2-2 for parameter setting.
	2nd time: Initial manual setting voltage display – For example: =40.5 (Initial setting value 40.5)
	3rd time: Automatic frequency search function – Surface display "tUnE" Parameter setting refer to 8.

All light	1st time: Intermittent output: When turned on, the on and off time of intermittent output can be set - Range 0.1~3.0s refer to 2-3 for parameter setting.
	2nd time: Modbus ID - For example: " Id:2 "(ID setting value=2) Setting Range 1~247
	3rd time: Modbus communication baud rate - For example: " 1152 "(Baud rate setting value = 115200) Parameter setting refer to 2-4. Communication format - Modbus RTU、8 Bytes、No check code、1 stop bit (8 n 1) Communication interface - RS-485
RUN	Operation status: normal start-LED light; force start-LED flash; not operating -LED light off.

2-1. G-Sensor Amplitude reference value: It must be used with J10 GSen, and the LED light switch is under the setting of Feedback display (Feedback - LED on) - Press the "UP" key and the interface will display the current G-Sensor amplitude reference value in real time. (The operation method of start and off is the same)

Note: The G-Sensor amplitude reference value is fixedly displayed as" L xxx ", for example: "L104 ".

2-2. Amplitude auto compensation: operate with J10 GSen. The speed of amplitude compensation must be set when the Feedback-LED is on.

Display	Description
SoFF	Compensation function off. Feedback-LED off. No compensation function.
Son1	Compensation function on: Feedback-LED on. Compensation speed -maximum.
Son2	Compensation function on: Feedback-LED on. Compensation speed - fast
Son3	Compensation function on: Feedback-LED on. Compensation speed –medium
Son4	Compensation function on: Feedback-LED on, Compensation speed - slow

Note: A. Parameter should be set before starting. Parameters change after starting will be updated at the next start.

B. When the auto compensation is on, the output range is: 1%~set value%*2 (Max output is 99.8%).

C. 10 seconds after start, the device will automatically check the output amplitude and perform the compensation function. If the voltage, frequency, or operation mode changes, it will automatically check the output amplitude again after 10 seconds.

(During the ten seconds of confirmation, the decimal point of the single-digit on display will flash. After the output amplitude is confirmed, the decimal point stop flashing.)

D. If the "intermittent output" function is in the" Hd:on" state, this function cannot be enabled. If you want to enable this function, you need to set the "intermittent function" to" Hd:oF" and then you can set it.

2-3. Intermittent output: The interface will display when switching to this function”Hd：on/oF.

(For example:”Hd:on”、“Hd:oF”)

Note: A. When set to "on", the on/oF time setting after the "Hd" option will only appear to provide the setting.

(For example:”on:0.1”、”oF:0.5”)

B. If the "Amplitude Auto Compensation Function" option is not” SoFF ”state, this function cannot be turned on. If you want to enable this function, you need to set the "Auto amplitude compensation function" option to ” SoFF ” state and then you can set it.

2-4. Modbus communication baud rate:

There are five baud rate settings: 9600, 19200, 38400, 57600, and 115200. Switching to this screen will not automatically jump back to the V% screen. Users can use the last two decimal points of the screen to flash to observe whether the communication status is in progress.

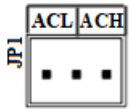
3. JP1 Function setting description (The default setting is active LOW. After changing the setting, it needs to be powered on again to take effect.)

※ JP1: Set Start signal active polarity.

ACH set active HI.

ACL set active LOW.

《Start signal polarity switching configuration》



4. Start synchronization output signal terminal

Contact 1: Short circuit during operation. (Dry contact)

Note: (J2-word mark: Inter lock)

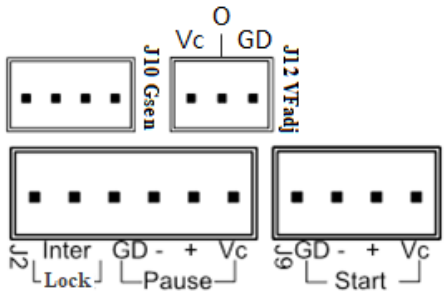
Contact 2: "O" is grounded during operation. (NPN signal)

Note: (J12-word mark: VFadj)

Refer to 12. Signal Operation Priority.

Remarks: J2、9、12 之 DC24v(Vc) is the power supply provided to the client, and external power supply shall not be connected. Drive current 80mA(max).

《Output and input signal connector configuration》



Refer to 13.、14. external signal connection.

5. Pause input signal (NPN)

Stop operation when OPEN. Refer to 11. Signal Operation Priority.

Note: (J2-word mark: Pause)

6. Start input signal (NPN)

Operates when OPEN. Refer to 11. Signal Operation Priority.

Note: (J9- word mark: Start)

7. Four groups of parameter memory (When switching parameter groups, it needs to be switched in the non-operating state.)

Switching method: first press and hold the "UP" key for 5 seconds, wait until the interface displays" SEL " and then press the "SELECT" key, switch to the parameter to be set, and then release it. The switching recognition will be based on the display frequency, and the default frequency is 188.0Hz, 200.0Hz, 220.0Hz, 240.0Hz.

8. Automatic frequency search function (This function needs to be activated when there is no operation)

Start method: LED light switch is displayed under the set frequency display (HZ - LED on), first long press the "DOWN" key for **5** seconds, wait for the interface to display" UP " and then press the "UP" key to start the automatic search and release the key, the frequency will increase from 50Hz to 600Hz (the red RUN-LED flashes during the process, and the software will stop when the optimal resonance point is determined by itself). If you want to stop the search during the search process, you can directly press "ON/OFF" " key to stop. Note: If the best resonance point is not found, the frequency will display the frequency value of the maximum current during the search process.

9. Easy mode or full function mode switch

Switching method: first press and hold the "DOWN" key for **5** seconds, wait until the interface displays" SEL " and then press the "SELECT" key to switch the operation mode.

When switching to full function mode, the display will show " FSET " around 1 second, at this time all parameters can be set.

When switching to the simple mode, the display will show" ESET " around 1 second, at this time **only the output voltage percentage parameter can be set.**

10. Error code description

E-03: (For example: " E-03 ") When the temperature sensor is abnormal, it may be not connected, disconnected, or the temperature sensor is damaged.

E-04: (For example: " E-04 ") The temperature of the controller is too high, it may be overloaded when it occurs, and the test can be restarted after cooling down。

FAIL: (For example:" FAIL ") When Feedback mode is turned on, the G-Sensor value is abnormal (the G-Sensor may not be connected or the voltage of the controller is too low).

Note: When E-03 and E-04 occur, it is necessary to turn off the power and then turn it on again after eliminating the problem. If the error occurs repeatedly, please contact the manufacturer (please specify the serial No.).

11. Alarm description

When setting V%:

- Display Hxx .x: (For example: " H83.0 ") The set voltage has reached the maximum value of the hardware limit and cannot be increased further, but can be adjusted downward.

  When the output power exceeds the set maximum value (about AC230V), the software will automatically reduce the power to the maximum output voltage and display "Hxx.x" to achieve protection.

- Display Uxx.x: (For example: "U50.0") The set voltage has reached the maximum software limit of 50.0. It cannot be increased further, but it can be adjusted downward.
  When the machine is delivered from the factory, the upper limit value will be set according to the driving voltage limit of each vibrator to achieve the function of protection.

When setting HZ:

- Display Fxxx: (For example: "F600") The set frequency has reached the maximum value of 600, which cannot be increased further, but can be adjusted downward.

12. Signal operation priority description

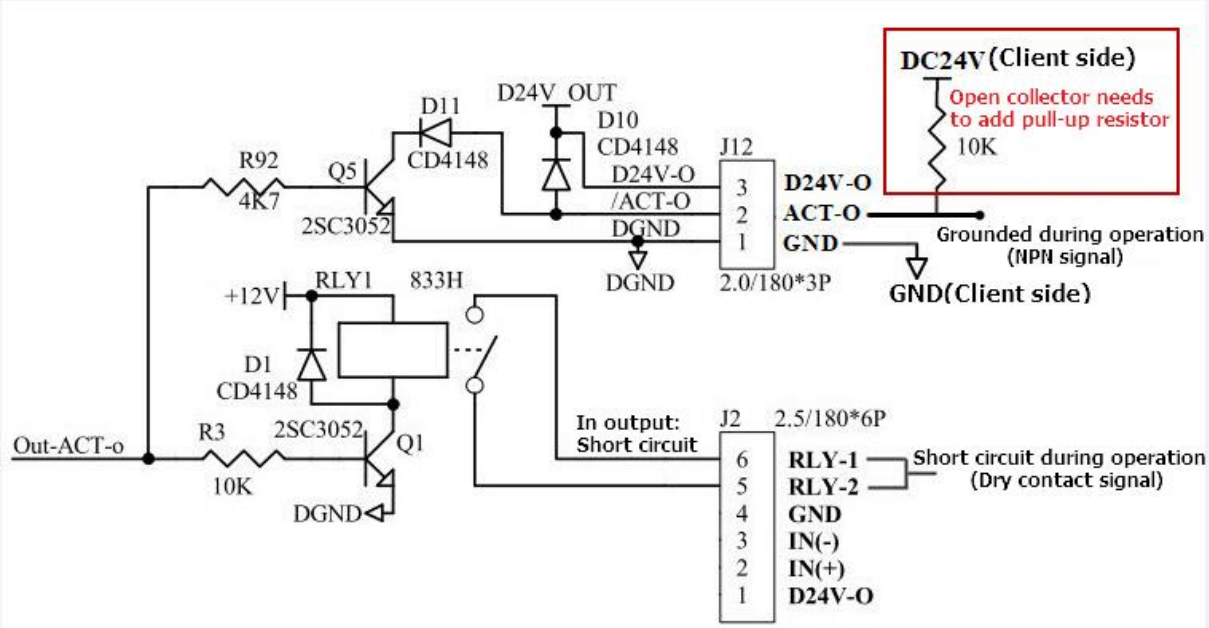
	START signal	PAUSE signal	Operate state(N)	Display state	ON/OFF Key	Running state (N+1)	Description	Release forced state
1	ON	ON	STOP	Current Parameter	PRESS	FORCE RUN	If the ON/OFF Key is pressed cyclically, RUN/STOP will be cycled, and the START and PAUSE signals will be ignored.	When PAUSE is "ON", the forced operation is released when the START signal is changed from OFF->ON.
2	OFF	ON	RUN	Current Parameter	PRESS	FORCE STOP	If the ON/OFF Key is pressed cyclically, RUN/STOP will be cycled, and the PAUSE signals will be ignored.	When PAUSE is "ON", the forced operation is released when the START signal is changed from ON->OFF.
3	ON	OFF	STOP	SrOP	PRESS	FORCE RUN	If the ON/OFF Key is pressed cyclically, RUN/STOP will be cycled, and the START signals will be ignored.	When START is "ON", the forced operation is released when the PAUSE signal is changed from OFF->ON.
4	OFF	OFF	STOP	SrOP	PRESS	FORCE RUN	If the ON/OFF Key is pressed cyclically, RUN/STOP will be cycled, and the START and PAUSE signals will be ignored.	When START is "OFF", the forced operation is released when the PAUSE signal is changed from ON->OFF.

In the above 1 and 2, the display is the current parameter. If you press the "ON/OFF" key, it can be forced to run/stop. If you want to adjust the parameter, press the "Set" key to enter the setting.

In the above 3 and 4, the display is" SrOP ", If you press the "ON/OFF" key, it can be forced to run/stop. If you want to adjust the parameters, press the "Set" key to enter the setting.

13. External signal connection description - OUTPUT

《 OUTPUT interface reference 》

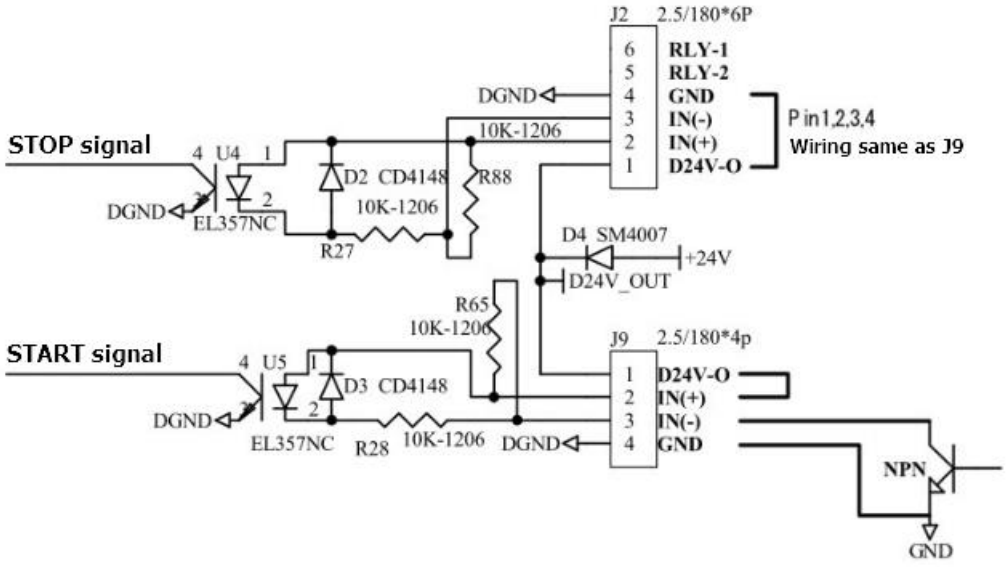


Remarks: DC24v (D24V-O) of J2 and J12 is the power supply provided to the client, and external power supply should not be connected.

Drive current 80mA(max).

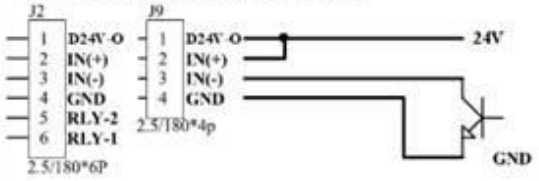
14. External signal connection description - INPUT

《 INPUT interface reference 》

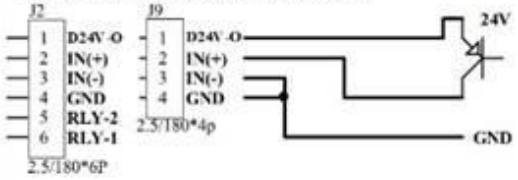


《 Wiring reference 》

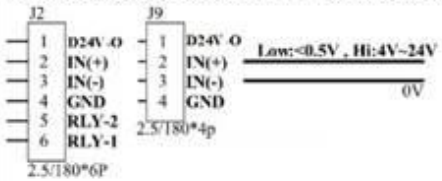
(1) NPN output wiring reference



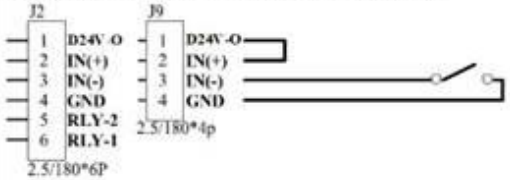
(2) PNP output wiring reference



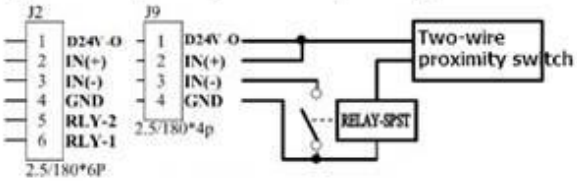
(3) Voltage type output wiring reference



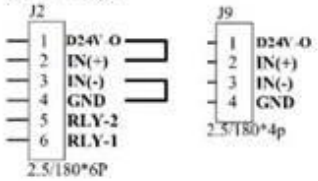
(4) Dry contact output wiring reference



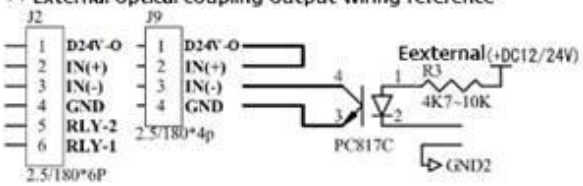
(5) Two-wire proximity switch output wiring reference



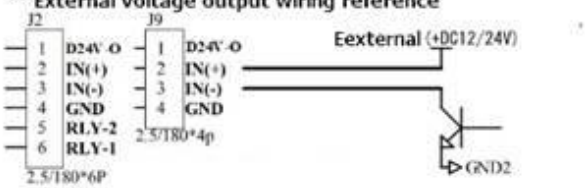
(6) Turn on



(7) Ground isolation - External optical coupling output wiring reference



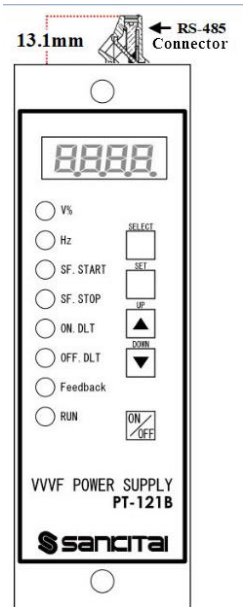
(8) Ground isolation - External voltage output wiring reference



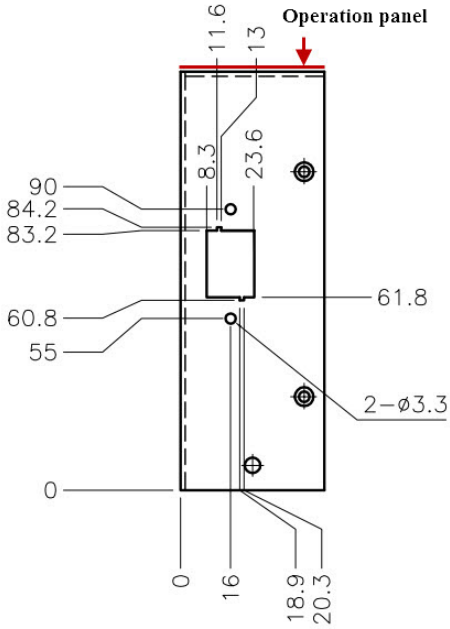
Remarks: DC24v (D24V-O) of J2 and J9 is the power supply provided to the client, and external power supply should not be connected.

Drive current 80mA(max).

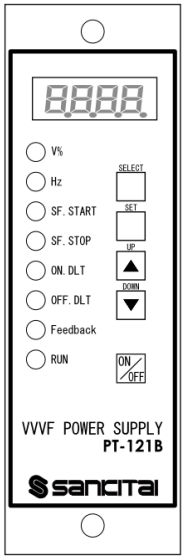
15. Controller type and connection description



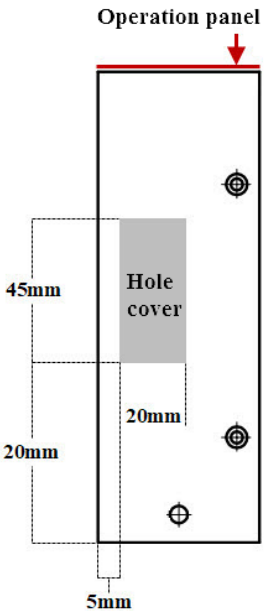
Communication type - Operation panel



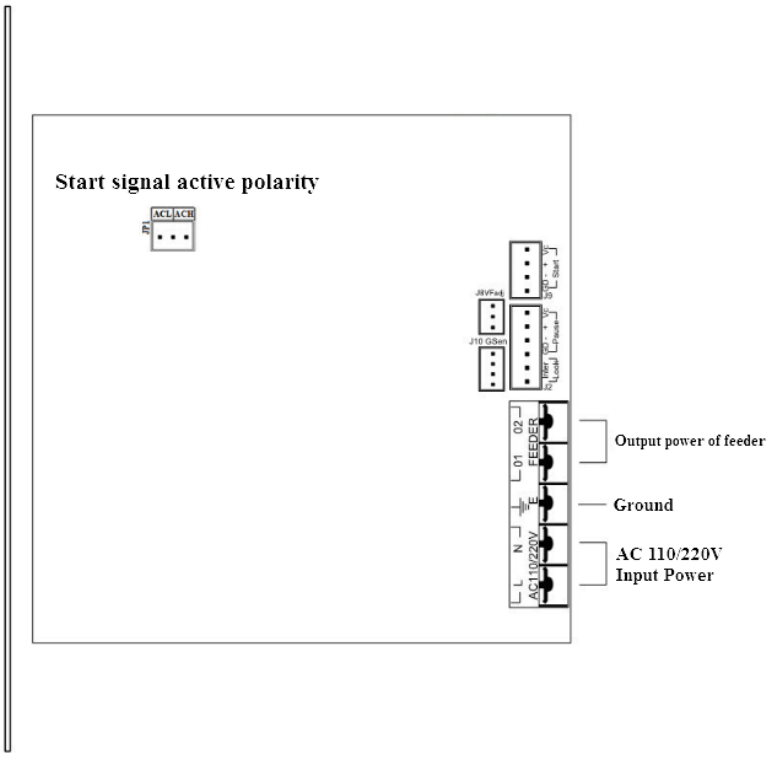
The position of the hole on the side of the terminal.



NON- Communication type - Operation panel

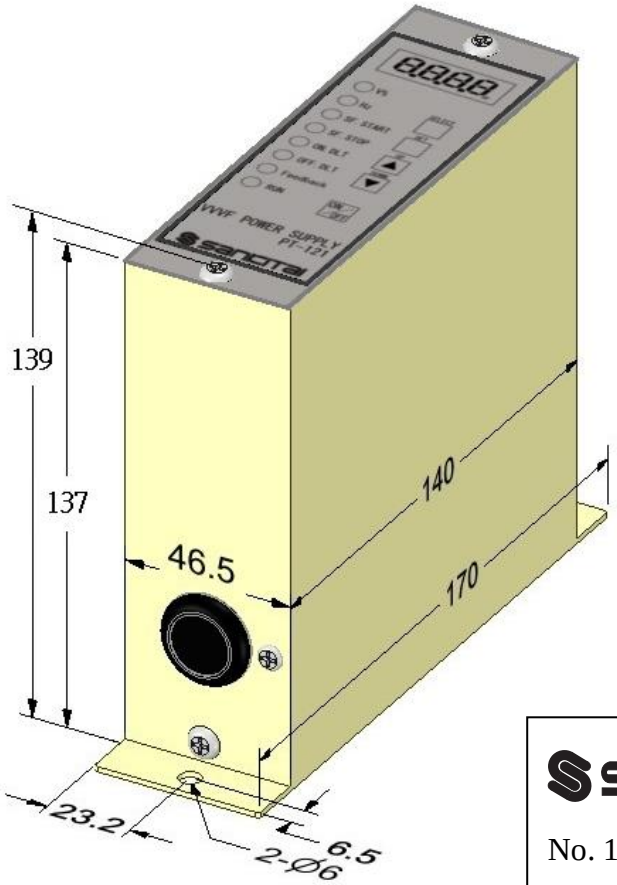


The position of the hole on the side of the terminal.



Description of input and output mating terminals

16. Appearance dimension(Unit: mm)



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