MFC-ST6N Controller

(Edition issued: Version 1, Date: 2019/10/24)

一、Environmental conditions

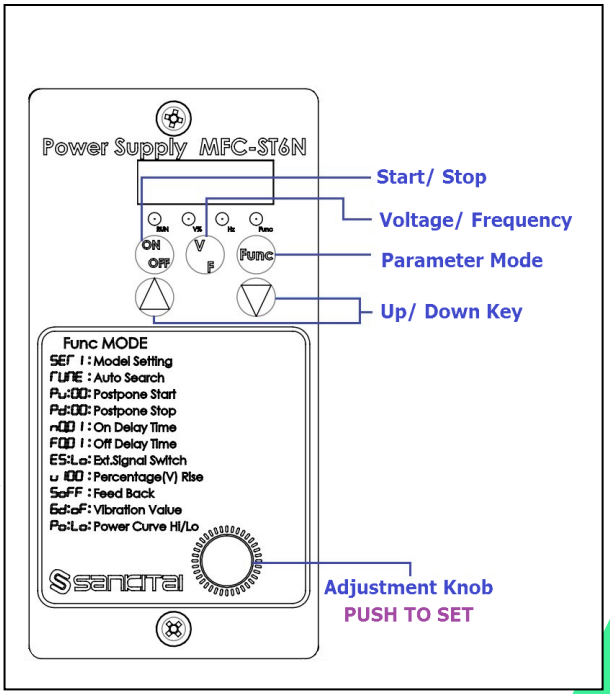
Setting place：Interior 、Ambient temperature：0℃ ~ 40℃、Humidity：10 ~ 90%RH

二、Specification (Applicable for software version v1.4 and hardware version 17-140A2):

	Item	Description
Output	Maximum Output Current	6A(Ampere) / Fuse 6.3A
	Output Voltage Setting Range	1.0% ~100.0%
	Output Cycle Number Range	42.0Hz ~ 250.0Hz
	Sensor Power	DC 24V, 80mA
	Control	PWM Control
Input	Input Voltage	AC110V/220V±10% Single-phase
	Frequency	50~60Hz
Display	Version	Display version when turn on
	Setting Parameter	Set value is displayed on the seven-segment display
	Parameter on Setting	Parameter Selection LED flash
	Error Display	Refer to 三-6. Protection function (Error message)
	Run	“RUN”LED light

三、MFC-ST6N Panel operation descriptions

1. KEY



V/F: Voltage/Frequency switching. When pressing the corresponding LED and start to flash, accept the setting. Setting time is around 8 sec.

V: 1.0%~100% , minimum increase or decrease 0.1%.

F: 42.0~250.0Hz, minimum increase or decrease 0.1Hz.

Func: Other parameter adjustment. Press Func KEY will display the current parameter settings in turn and can be set.

ON/OFF: Forced start/ Forced stop.

▼ : Increase parameter value. Long press KEY to increase quickly.

▼ : Decrease parameter value. Long press KEY to decrease quickly.

Adjustment knob- Right rotation: In the settable state, the value is increased by one unit by one turn. If you turn right quickly, will be quickly increased.

Adjustment knob- Left rotation: In the settable state, the value is

increased by one unit by one turn. If you turn left quickly, will be quickly increased.

Adjustment knob-Press: Can start or end the setting.

After the parameter is set, it will automatically return to the display voltage value.

2. Func- Parameter setting

A. Change the working group by panel change or external hardware, and display the frequency value after the change.

(External selection connection terminal –P6, refer to 4. Group switching)

Indicated Value	SEr 1	SEr 2	SEr 3
Description	Memory parameter -1	Memory parameter -2	Memory parameter -3

B. "rUnE" (Automatic frequency search)：Need to use G-Sensor to perform resonance point search. (G-Sensor is optional) When the "Func-LED" is flashing, press the adjustment knob and start it in the no-operation state, the search frequency will be counted from 250 to 42Hz. If you want to stop searching during the search, you can directly press the "ON/OFF" key to stop. Note: If no optimal resonance point is found, the frequency will display the frequency value of the maximum amplitude during the search process. (When there is no G-Sensor, you can observe the bowl running and manually find the resonance frequency, which is analyzed by 1Hz.)

C. "Pu:0.1" (Slow start)：0 ~ 6.0s, increase or decrease resolution is 0.1 sec.

D. "Pd:0.1" (Slow stop)：0 ~ 6.0s, increase or decrease resolution is 0.1 sec.

E. "n0.01"(on dly) **(will go slow stop)**：0.01~9.99s. Shortly press increase or decrease 0.01sec, long press increase or decrease 0.1sec.

F. "F0.01"(off dly) **(will go slow start)**：0.01~9.99s. Shortly press increase or decrease 0.01sec, long press increase or decrease 0.1sec.

G. "ES:Hi" or "ES:Lo" (Select START signal to activate polarity.)

H. "u 100"： (Over Voltage)：From 50 to 100, the unit for each increase or decrease is 5, limit the voltage output maximum.

I. Son1~4: Start the feedback function, reaction time Son1 > Son2 > Son3 > Son4. (Operate with J5 GSen)

Indicated Value	SoFF	Son1	Son2	Son3	Son4
Description	No compensation function	Compensation speed - maximum.	Compensation speed - fast	Compensation speed - medium	Compensation speed - slow

J. "Gd:on" or "Gd:oF"： G-Sensor amplitude reference value.(Operate with J5 GSen)

Note: 1. When the Feedback function is set to "SoFF", the G-Sensor amplitude reference value is fixedly displayed as " L xxx ", for example: "L 104".

Note: 2. When the Feedback function is set to **not-**"SoFF", the G-Sensor amplitude reference value will be displayed as "H xxx " or " L xxx " according to the current program compensation level, for example: "H 171 " or "L 104 ".

(The display H represents large-scale compensation, and the display L represents small-scale compensation.)

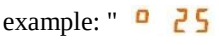
K. "Po:Hi" or "Po:Lo" ：Voltage output high / low selection.

3. External voltage control (J6):

A. If the external voltage control connector (J6) detects a voltage over than 0.7V, activate external voltage control. At this point, the output voltage can only be controlled by an external voltage and changes with voltage.

B. The voltage value will not be written into the memory during external control.

C. If the external voltage control is activated, the feedback cannot be controlled.

D. " ° XXX " is displayed during external voltage control, for example: "  it represents the current voltage output is 25%.

E. Calculation formula：**Vout=306Vi-230, 0.8v< Vi <5.0v or Vout=1%(Minimum), 0.7v< Vi <=0.8v**

For example: When the external voltage control connector (J6) is input 2.0V, the voltage control is around 38.2%.

For example: When the external voltage control connector (J6) inputs 4.0V, the voltage control is around 99.4%, but whether it is output to 99.4% is regarded as the current over voltage setting value.

F. External variable resistance regulation：5K~15K ohms. (10K ohm is recommended)

Variable resistor three-terminal insert to J6 (1+, S, 3-).

G. If controlled by DC voltage, input power to J6-S (pin2), G (pin3) both ends (+0.7 ~ +5.0V).

H. When the external resistor is removed or the external input voltage is less than 0.7V, it will return to the panel button control mode.

4. Group switching

A. Panel setting

When pressing Func key to SETn (n:1~3), you can select the group (1~3). You can switch the working group and load new parameters by pressing the adjustment knob or waiting for the setting time to end.

B. Hardware setting(P6)

There is no connection at the terminal - setting the first group (SET1) - preset value (at this time you can also switch other groups through the panel)

Pin1 (+5) and pin2 (2) short circuit (> 150ms) is set. Second group (SET2).

Pin1 (+5) and pin3 (3) short circuit (> 150ms) is set. Third group (SET3).

C. When powering on, it will give priority to determine whether there is external group setting. If there is, it will have higher priority with external control (that is, when the external hardware has group setting, the software cannot change the working group).

D. The current working group can press Func key to SETn (n:1~3) to display.

5. Feedback function (J5 terminal)

A. Start the feedback control after starting and performing the slow start 10 sec.

B. The compensation parameters are Son1 (fast compensation speed) ~ Son4 (slow compensation speed).

C. The maximum compensation value is 87% of the current working voltage setting and does not exceed the over voltage value. The minimum will drop to 1%.

D. The voltage, frequency, and feedback parameters will be changed, and the status will be re-determined. After 10 sec, the feedback control will be executed.

E. After the Feedback function starts successfully, if it stops running and restarts, it will enter the compensation control.

F. In Power ON, if the feedback function is executed before the shutdown, the previous compensation speed will be executed after the power is turned on.

G. Feedback control cannot be performed during external voltage control.

H. Feedback function display (the decimal point display status on the far right of the seven-segment display)
< Light off >：No feedback function 、 <Flash>：Record status (10 sec) 、 <Light>：Feedback operating

6. Protection function (Error message)

A. Replaceable 6.3A - FUSE on the PCB.

B. Input voltage selection setting (J2 - Jumper), set 110V or 220V input voltage.
When set to 110V system, if the input voltage is 220V, turn on will display the error message "AC:HI", at this time, the panel 4 LEDs flash and all functions cannot be operated.

C. When the temperature detection line is disconnected, the error code "nTC.B" is displayed, at this time, the panel 4 LEDs flash and all functions cannot be operated.

D. When the temperature is over temperature (85 °C), the error code "nTC.H" is displayed, at this time, the panel 4 LEDs flash and all functions cannot be operated.

E. Overcurrent protection - When overcurrent, error code "Ld:HI " is displayed, at this time, the panel 4 LEDs flash and all functions cannot be operated.

※When the protection function is activated, you need to turn off the power to troubleshoot and then restart the power.

7. Simple mode or full function mode

Press" ▲ " up key for 6 sec when display " FUnc" and simultaneously press " Func " key to switch operation mode. When switching to full function mode, the display shows "FSET" for around 1 sec and all parameters can be set. When switching to simple mode, the display shows "ESET" for around 1 sec and only the output voltage parameter can be set.

8. External output/ input signal

A. Output voltage (Vc)：DC+24V, maximum current **80mA**.

B. External control：Operating < Inter lock > Short circuit、Stop < Inter lock > Open circuit, panel display " STOP ".

C. When the protection function is activated, the "ERROR-OUT" pin will output logic Low (normal is open-collector).

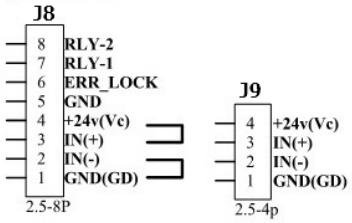
D. For external voltage control, please refer to wiring diagram, control mode (1) variable resistance regulation. (2) DC+0.7 ~ +5V voltage regulation.

E. For the external working group switching, please refer to the wiring diagram.

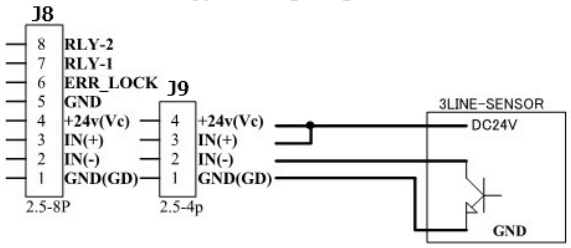
9. External wiring

《 MFC-ST6N Input interface wiring 》

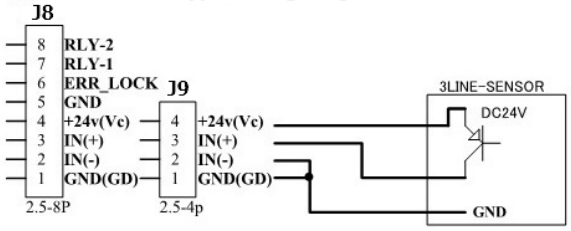
(1) Turn on



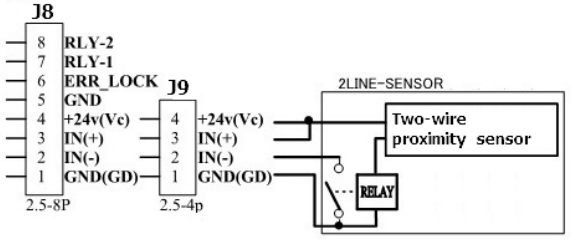
(2) Sensor-NPN type wiring diagram



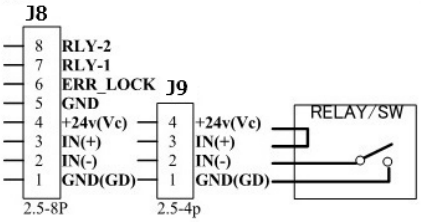
(3) Sensor-PNP type wiring diagram



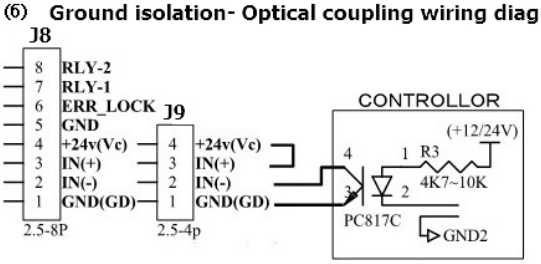
(4) Two-wire proximity sensor wiring diagram



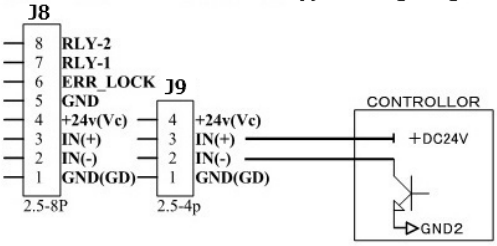
(5) Ground isolation-Dry contact wiring diagram



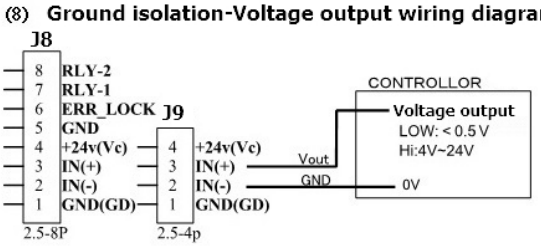
(6) Ground isolation- Optical coupling wiring diagram



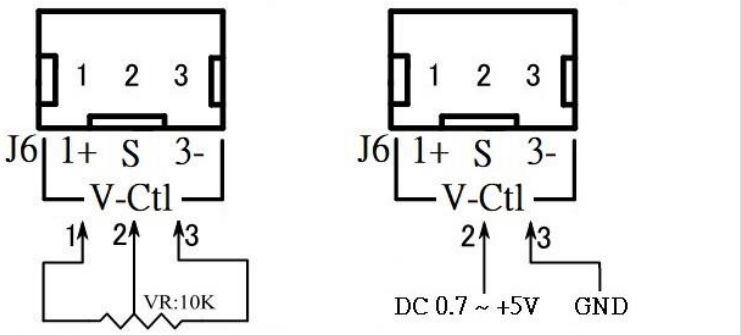
(7) Ground isolation-NPN type wiring diagram



(8) Ground isolation-Voltage output wiring diagram

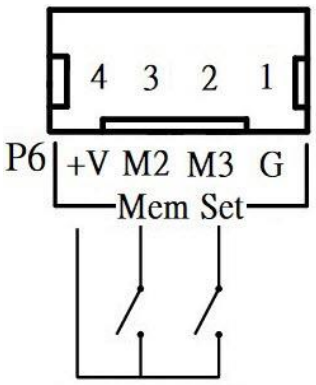


《External voltage control wiring 》



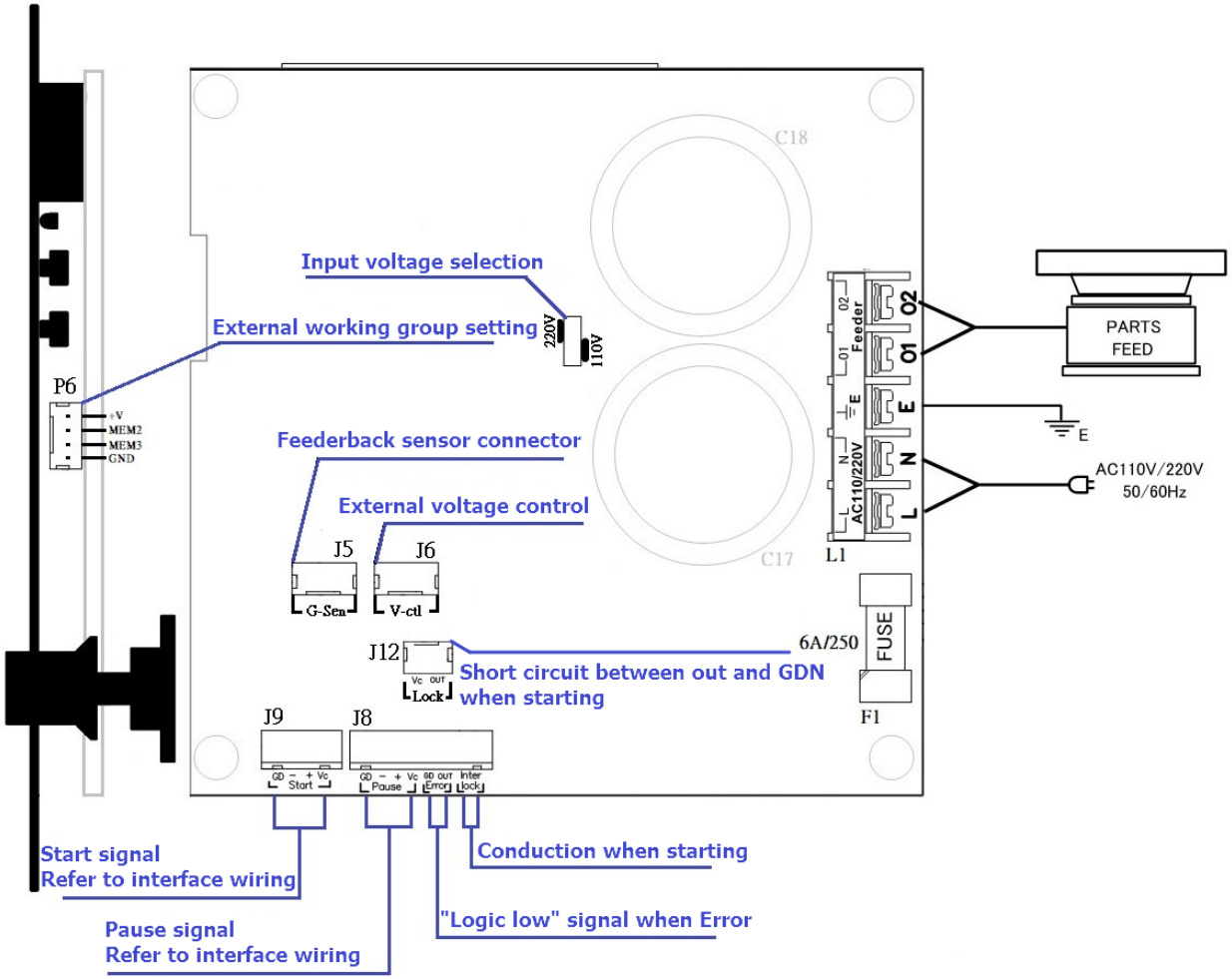
Variable resistance regulation DC+0.7~+5V voltage regulation

《External working group setting 》

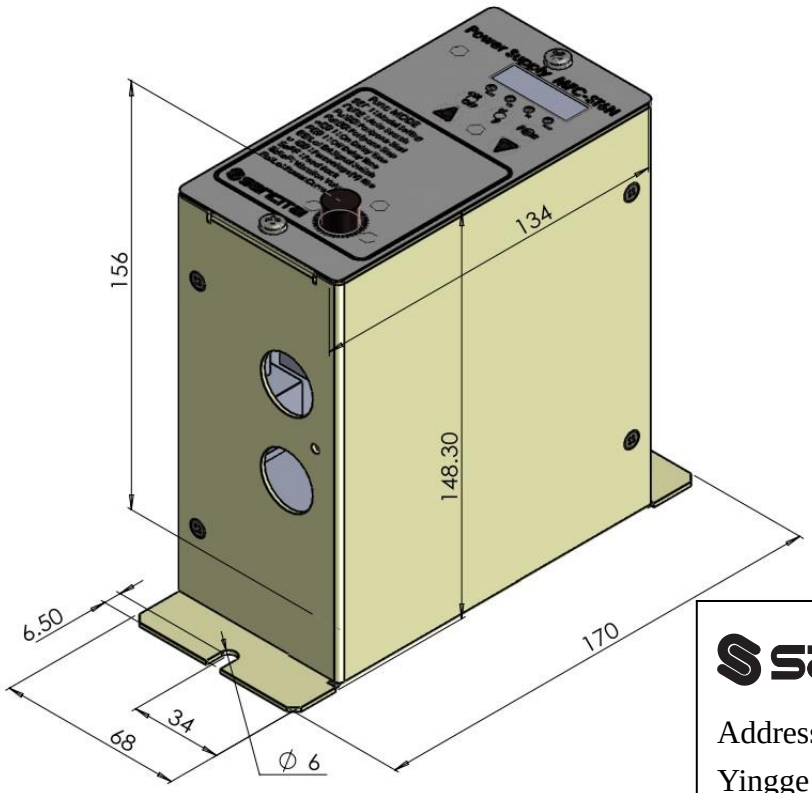


(Cannot be in conduction simultaneously)

10. MFC-ST6N wiring diagram and each connector location map



11. Dimension (unit: mm)



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