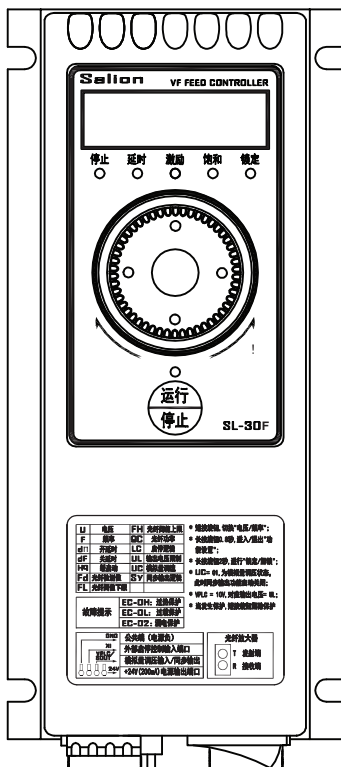


# SL-30F Digital Variable Frequency Vibration Feeding Controller

(Built in fiber amplifier and external analog voltage regulating port)



## Product Function Description:

1. Built in high-performance fiber amplifier, patented design, high stability, can accurately detect micro feeding workpieces, and can detect no less than 16 feeding workpieces per second. 999 level photoelectric threshold can be set, real-time monitoring of fiber optic detection values can be achieved, and fiber optic detection threshold signals can be synchronously output.
2. High power factor, significantly reducing electricity costs.
3. It can be controlled by PLC or external potentiometer for analog speed control.
4. Single key shuttle operation, patented design, fast and accurate, reliable and durable.
5. Optimized external control interface, flexible and convenient installation and debugging.
6. Intelligent slow start and slow stop ensure smooth feeding at the moment of start and stop.
7. It can output 12V60mA DC stabilized power supply to power external sensors or speed control potentiometers.
8. Adopting high-performance power devices, lower heat loss, optimized heat dissipation design, lower temperature rise, and more stable and reliable operation.
9. High precision voltage stabilization, which can maintain stable output voltage and effectively suppress beat frequency effects caused by power frequency fluctuations in the power grid voltage.
10. High integration system, optimized external dimensions, light weight, small space occupation, and easy installation.
11. Fully enclosed casing, suitable for harsh working environments.
12. Equipped with overvoltage, undervoltage, overheating, overload, and output short circuit protection.

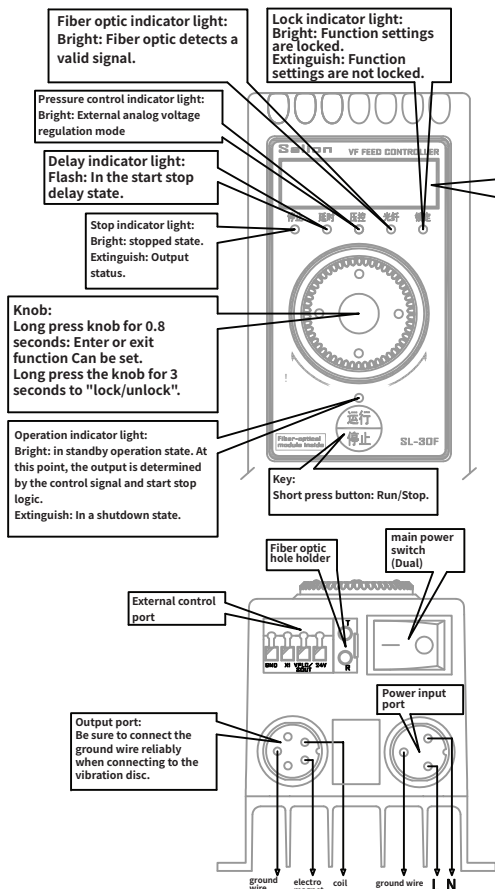
## Precautions for use:

1. Applicable range of power supply voltage: 85V~265VAC50/60Hz. The input power supply voltage should not exceed 285V, otherwise it will cause irreparable damage
  - 2.To prevent accidental electric shock accidents, the grounding port of the power plug must be reliably connected, and the power supply must have overcurrent and leakage protection measures
  - 3.To ensure long-term stable operation, the controller should be avoided from being installed in locations with excessive vibration amplitude
  - 4.When the controller is working, it will generate heat. To ensure long-term stable operation, this controller is installed vertically in a ventilated area
  - 5.To ensure long-term stable operation, avoid any dust or liquid contact with this controller
  - 6.The output port has a ground wire, and the vibration disc must be reliably connected to this ground wire
  7. It is strictly prohibited to use any method of cutting off input power or cutting off power output to control the start/stop of the vibration disc, as this will seriously shorten the service life of the controller. Start/stop control signals should be used for start/stop control.
  - 8.The load current of the 24V DC power output port of the controller cannot exceed 200mA, otherwise it will cause the 24V power supply to disconnect or the parameters cannot be saved.
  - 9.To prevent electric shock accidents, it is strictly prohibited to unplug the power output port when the controller is powered on.
- After all wiring is completed, connect the power input cable and turn on the power switch of the controller.



The vibrating disc body must be reliably grounded, otherwise significant personal injury or property damage may occur  
Please confirm that the wiring of each port is reliable before inserting the power cord into the power socket

## Introduction to operation panel and ports:



### Parameter setting instructions:

<b>U 125</b>	output voltage
<b>F 1300</b>	output frequency
<b>0000</b>	Open delay time Can set a delay time of 0-99.9 seconds for opening
<b>0F000</b>	Delay time Can set a delay time of 0-99.9 seconds for shutdown
<b>H9 06</b>	Slow start speed Can set a slow start speed of 0.1-9.9 seconds
<b>Fd000</b>	Fiber optic detection value
<b>FL200</b>	Lower limit of fiber optic threshold
<b>FH999</b>	Fiber optic threshold upper limit
<b>FC</b>	Fiber optic function settings
<b>9C 02</b>	Fiber power setting
<b>9A000</b>	Fiber open delay (seconds)
<b>9F000</b>	Fiber delay time (seconds)
<b>LC000</b>	Start stop logic
<b>LFXI</b>	
<small>X1=0: External start stop port X1 is low level shutdown. X2=1: The external start stop port X1 is running at a low level. P=0: Fiber optic signal does not participate in shutdown control. P=1: Fiber optic signal participates in shutdown control. L=0: External shutdown signal and fiber optic signal logic OR. L=1: Logic of external shutdown signal and fiber optic signal.</small>	
<b>UL250</b>	Output voltage limit
<b>UC 00</b>	Analog voltage regulation 00: Panel knob for voltage/amplitude adjustment. 01: External analog voltage regulation (synchronous output function will be blocked).
<b>54 00</b>	Synchronous output logic At runtime, the port has driver output. 01: When stopped, the port has a driver output. 02: The port is driven and output by fiber optic signal control.

### Fault prompt explanation:

<b>EC-OH</b>	overheat protection
<b>EC-OL</b>	overload protection
<b>EC-OV</b>	Overvoltage protection
<b>EC-LV</b>	Undervoltage protection
<b>EC-OE</b>	earth leakage protection

Short press the knob to release overload and overheating protection.

### Precautions for use:

- Please confirm that the power input is AC 85-265V.
- The ground wire must be reliably connected.
- After completing the wiring, turn on the main power switch.
- Please avoid installing in machine positions with excessive vibration amplitude.

### Troubleshooting:

- No display: Confirm if the power is connected.
- E-0H: Overheating protection. Install the controller vertically in a ventilated area, and if possible, on a metal machine to facilitate heat dissipation.
- E-OL: Overload protection. Check: whether the gap between the electromagnetic coil and the armature is too large, whether the power of the vibration disc matches the controller, and whether the output cable is short circuited.
- E-OE: Leakage protection. Inspection: Electromagnetic coil (this leakage protection is only detected when powered on and not during operation).

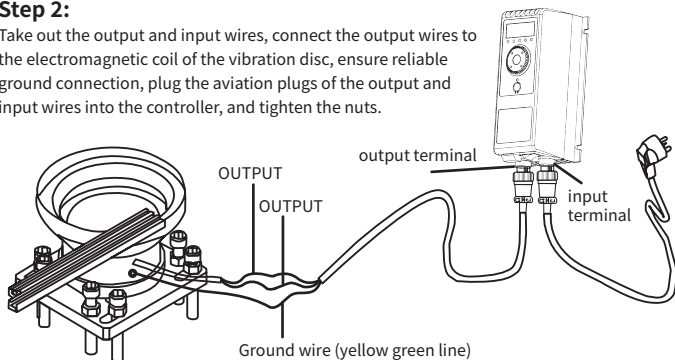
## Quick installation and usage guide:

### Step 1:

Open the outer packaging of the controller, check the appearance and side label model of the controller, and determine whether it is the required model

### Step 2:

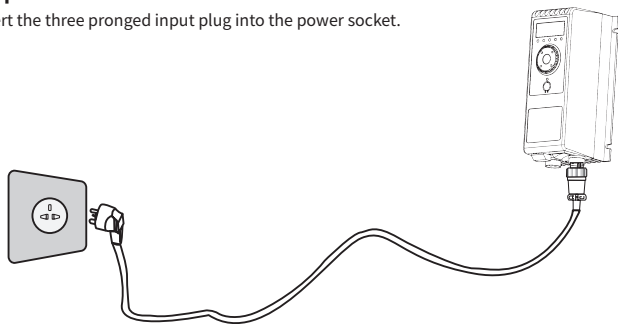
Take out the output and input wires, connect the output wires to the electromagnetic coil of the vibration disc, ensure reliable ground connection, plug the aviation plugs of the output and input wires into the controller, and tighten the nuts.



- Be sure to confirm that the electromagnetic coil is connected to both output pins and that the controller heat sink needs to be reliably grounded. Otherwise, it will cause the controller to be subjected to electrostatic shock, which may lead to controller failure. The yellow and green ground wires should be reliably connected, and not connecting them may cause serious safety accidents!!

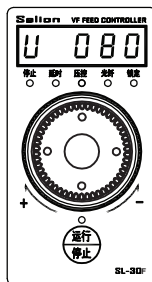
### Step 3:

Insert the three pronged input plug into the power socket.



**Step 4:**

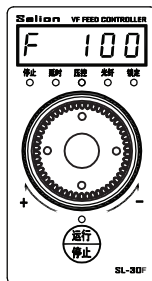
Turn on the power switch of the controller and rotate the knob to adjust the output voltage "U" to between 80 and 100.

**Step 5:**

Short press the knob to enter the frequency "F" adjustment state; Rotate the knob key to find the natural frequency of the vibrating body, which is commonly referred to as the resonance point.



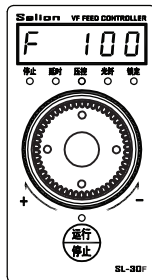
- ◆ The maximum frequency of vibration is the natural frequency of the vibrating body. Each vibrating body has an inherent vibration frequency. In order to achieve the best working state, please adjust this parameter to make the vibrating body work at the appropriate working frequency.

**Step 6:**

After finding the natural frequency of the vibrating body, briefly press the knob to return to the voltage adjustment function and adjust to the optimal feeding speed.



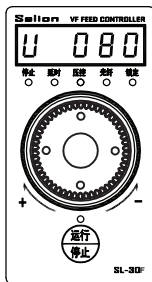
- ◆ To achieve optimal working conditions, please adjust this parameter and increase the 'output voltage' to the desired feeding speed.



## Parameter settings:

### U (output voltage):

By default, the panel displays "U", indicating that it is in the output voltage setting state. At this time, press the "+" or "-" to set the range: 0~250V, with 1V as the step.



### Tips:

1. When the output voltage is set high, if the "excitation" indicator light on the panel lights up, it indicates that the current output is in an excitation state, the output voltage waveform is no longer a complete sine wave, and the anti beat frequency capability will be affected.

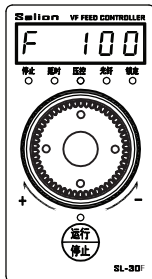
When the output voltage is set high, if the "saturation" indicator light on the panel lights up, it indicates that the current output voltage has reached its limit and the voltage stabilization ability will be affected.

This output voltage is limited by the "UL (output voltage limit)" parameter.

When "UC" (output voltage control mode)=1, it is an external analog control mode, and the output voltage cannot be set through the "knob" on the panel, and the "lock" LED will flash.

### F(Output frequency):

Short press the "knob" and the panel will display "F", indicating that it is in the output frequency setting state. At this time, rotating the "knob" can be used for setting, with a range of 40.0~400.0 Hz and a step size of 0.1 Hz.

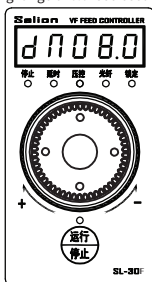


### Tips:

1. Short press the "knob" again to switch to the "U (output voltage setting)" state.

**dn(Open delay time):**

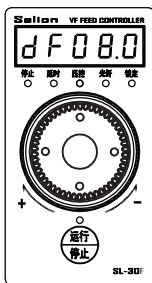
Long press the "knob" for 0.8 seconds to enter the function settings, rotate the "knob" to select the function parameters until the panel displays "dF", then short press the "knob", and "dF" will flash. At this time, rotating the "knob" can be used for settings, with a setting range of 0.0~999 seconds, with 0.1 seconds as the step.

**Tips:**

In the running state (with the running indicator light on), when the signal from the external start stop or photoelectric sensing port meets the starting conditions, it needs to go through an "on delay time" before starting the output. At the same time, the "delay indicator light" on the panel will flash. Regarding the operating conditions, please refer to the description of "LC (Start Stop Logic)".

**dF(Delay time):**

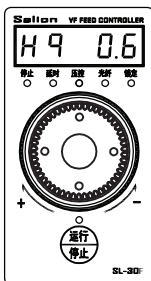
Long press the "knob" for 0.8 seconds to enter the function settings, rotate the "knob" to select the function parameters until the panel displays "dF", then short press the "knob", and "dF" will flash. At this time, rotating the "knob" can be used for settings, with a setting range of 0.0~999 seconds, with 0.1 seconds as the step.

**Tips:**

1. In the running state (with the running indicator light on), when the signal from the external start stop or photoelectric sensing port meets the stop conditions, the output needs to go through a "shutdown delay time" before stopping. At the same time, the "delay indicator light" on the panel will flash.
2. Regarding the stopping conditions, please refer to the description of "LC (Start Stop Logic)".

**Hq(Slow start time):**

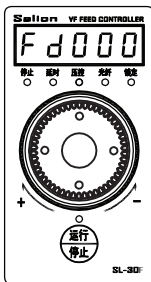
Long press the "knob" for 0.8 seconds to enter the function settings. Rotate the "knob" to select the function parameters until the panel displays "Hq". Then press the "knob" briefly, and "Hq" will flash. At this time, rotating the "knob" can be used for settings. The setting range is 0.1~9.9 seconds, with 0.1 second as the step.

**Tips:**

1. When the controller starts the output, the output voltage will gradually (at the speed of this slow start time) increase linearly from 0V to the set output voltage to eliminate the impact on the vibration plate and prevent the workpiece from falling off.

**Fd (fiber optic detection value):**

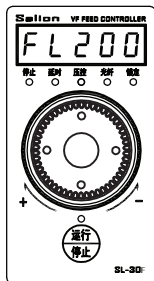
Long press the "knob" for 0.8 seconds to enter the function settings, rotate the "knob" to select the function parameters until the panel displays "Fd", which is the value of fiber optic detection.

**Tips:**

The value of "Fd" is the value detected by the optical fiber, and the signal output will be generated when the value between the lower limit of "FL" and the upper limit of "FH" is detected.

**FL(Lower limit of fiber optic threshold):**

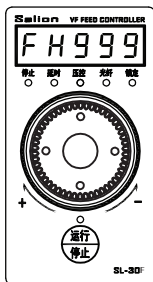
Long press the "knob" for 0.8 seconds to enter the function settings. Rotate the "knob" to select the function parameters until the panel displays "Fd". Short press the "knob" to enter "FL". At this time, rotate the "knob" to make settings, with a range of 0-999.

**Tips:**

Set the lower limit value of the "Fd" fiber detection value.

**FH (upper limit of fiber optic threshold):**

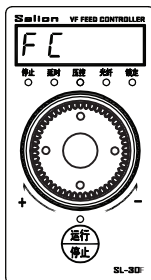
Long press the "knob" for 0.8 seconds to enter the function settings, rotate the "knob" to select the function parameters until the panel displays "Fd", short press the "knob" to enter "FL", and then short press the "knob" to enter "FH". At this time, rotating the "knob" can be used for settings, with a range of 0-999.

**Tips:**

Setting the upper limit of the "Fd" fiber detection value.

### FC(Fiber optic function settings):

Long press the "knob" for 0.8 seconds to enter the function settings, rotate the "knob" to select the function parameters until the panel displays "FC", which is the fiber optic function setting.

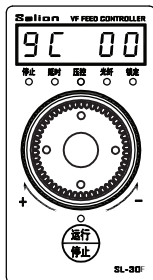


#### Tips:

FC "is the entry point for setting fiber power, on delay, and off delay.

### gC(Fiber power setting):

Long press the "knob" for 0.8 seconds to enter the function settings. Rotate the "knob" to select the function parameters until the panel displays "FC". Short press the "knob" to enter "gC". At this time, rotate the "knob" to make settings, with a range of 00-03.

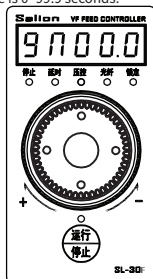


#### Tips:

There are 4 levels in total, with "00" having the weakest fiber power and "03" having the strongest fiber power

**gn(Fiber optic open delay):**

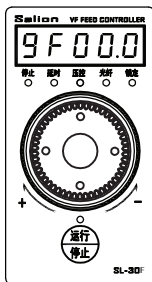
Long press and hold the "knob" for 0.8 seconds to enter the function settings. Rotate the "knob" to select the function parameters until the panel displays "FC". Short press the "knob" to enter "gn". At this time, rotate the "knob" to make the settings. The setting range is 0-99.9 seconds.

**Tips:**

The "gn" fiber opening delay setting can be set with an opening delay of 0-99.9 seconds.

**gF(Fiber optic delay time):**

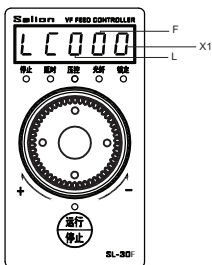
Long press the "knob" for 0.8 seconds to enter the function settings, rotate the "knob" to select the function parameters until the panel displays "FC", short press the "knob" to enter "gn", and then short press the "knob" to enter "gF". At this time, rotating the "knob" can be used for setting, with a setting range of 0-99.9 seconds.

**Tips:**

The "gF" fiber optic turn off time setting can be set with a turn off time of 0-99.9 seconds.

**LC(Start stop logic setting):**

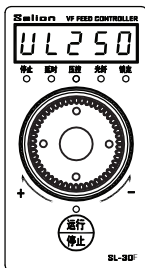
Long press the "knob" for 0.8 seconds to enter the function settings. Rotate the "knob" to select the function parameters until the panel displays "LC". Then press the "knob" briefly, and the "LC" will flash. At this time, rotate the "knob" to set the range: 000-111.

**Tips:**

- X1=0: External start stop port X1 is low level shutdown;
- X1=1: The external start stop port X1 is running at a low level;
- F=0: Fiber optic signal does not participate in shutdown control;
- F=1: Fiber optic signal participates in shutdown control;
- L=0: External shutdown signal and fiber optic signal logic OR;
- L=1: Logic of external shutdown signal and fiber optic signal.

**UL(Output voltage limit):**

Long press the "knob" for 0.8 seconds to enter the function settings. Rotate the "knob" to select the function parameters until the panel displays "UL". Then press the "knob" briefly, and the "UL" will flash. At this time, rotate the "knob" to set the range: 0V~250V.

**Tips:**

Setting an upper limit value for this parameter can prevent users from accidentally operating and causing the output voltage to be too high, resulting in damage to the vibration disc.

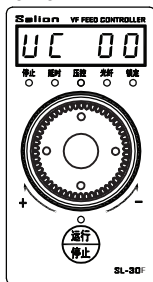
When the setting of this parameter is less than "U (output voltage)", "U (output voltage)" will automatically decrease.

This parameter is also applicable to the external analog voltage regulation mode.

When "UC" (output voltage control mode)=1 and it is an external analog control mode, the UL parameter will automatically adjust the external analog control range: VPLC=0~10V, corresponding to output voltage: 0~"UL".

### UC(Output voltage control mode):

Long press and hold the "knob" for 0.8 seconds to enter the function settings. Rotate the "knob" to select the function parameters until the panel displays "UC". Then press and hold the "knob" briefly, and the "UC" will flash. At this time, rotate the "knob" to make settings, with a setting range of 0-1.



#### Tips:

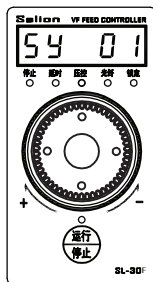
UC "00": Adjust the output voltage through the "knob" on the panel;

UC=01: Adjust the output voltage through an external analog voltage regulator port;

When "UC"=1, rotate the "knob" of the panel, and the "lock" indicator light on the panel will flash, indicating that the operation is invalid.

### SY(Synchronous output control):

Long press the "knob" for 0.8 seconds to enter the function settings, rotate the "knob" to select the function parameters until the panel displays "Sy", then short press the "knob", and "Sy" will flash. At this time, rotating the "knob" can be used for settings, with a range of 0-1.



#### Tips:

Sy "0": When the controller is in the output state, the synchronous output port "OUT" is conductive to "GND".

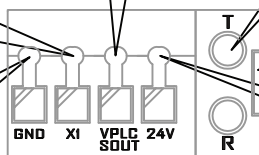
Sy "1": When the controller is in output state, the synchronous output port "OUT" is open to "GND".

**External control and fiber port description:**

When UC=00, this port is a synchronous output port that can directly drive loads such as solenoid valves and relays. Attention: This port can drive a maximum load of 2A and does not have overcurrent protection. When "UC=01", this port is an analog control voltage input port, and the 10V control voltage corresponds to the voltage set by the "UL" parameter. At the same time, the OUT (synchronous output port) is invalid.

External start stop control signal input port (X1)

Public end (negative power supply)

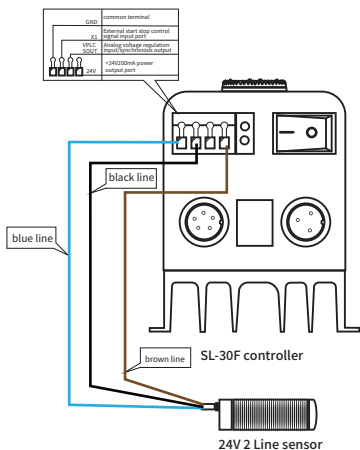


Fiber optic hole holder. The upper hole is a light emitting hole, and the lower hole is a light receiving hole.

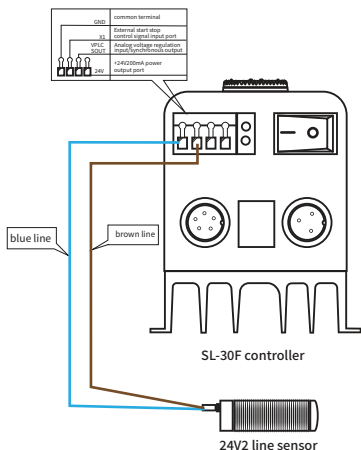
Fiber optic locking plug After inserting the fiber optic cable into the socket, insert this plug to secure the fiber optic cable.

+24V power output port with 200mA overcurrent protection.

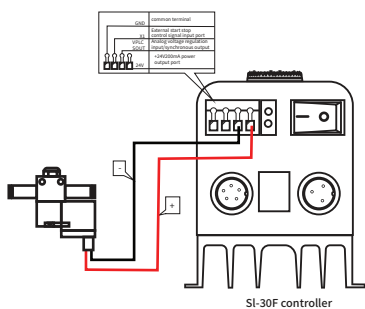
**External start stop control port:**



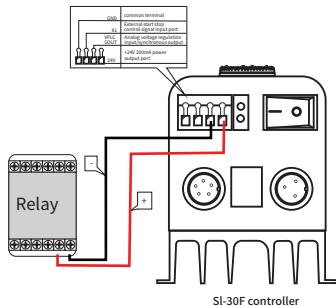
**Universal sensor start stop control (NPN three wire)**



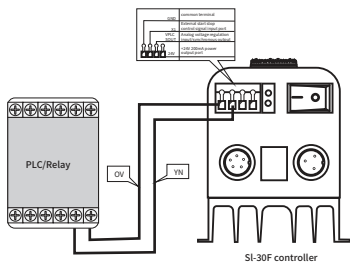
**Universal sensor start stop control (NPN two-wire)**



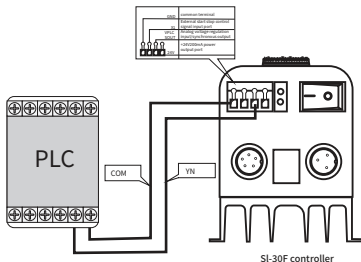
SI-30F controller  
**Synchronous output port drives solenoid valve**



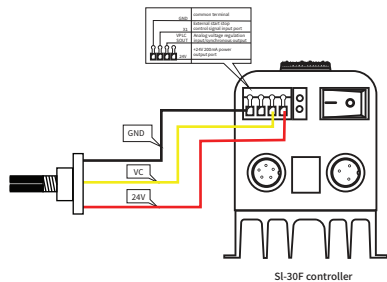
SI-30F controller  
**Synchronous output port drives relay**



SI-30F controller  
**Relay contacts or PLC output signals are used for start stop control**

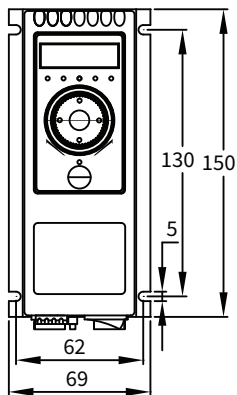


SI-30F controller  
**PLC analog output for output voltage control**

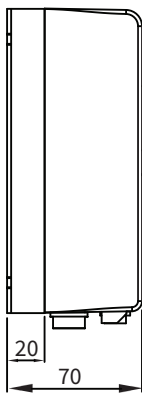


SI-30F controller  
**Potentiometer voltage regulation module for voltage regulation control**

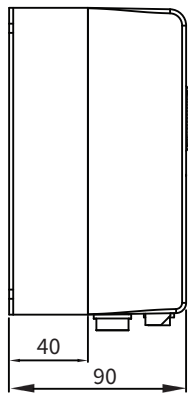
**SL-30F Controller dimensions:**



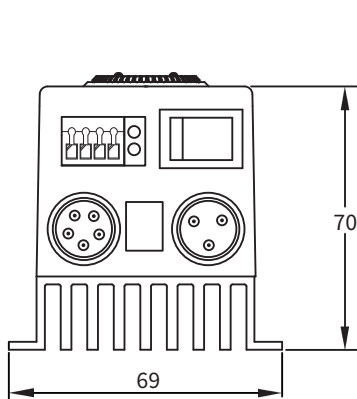
SL-30F (top view)



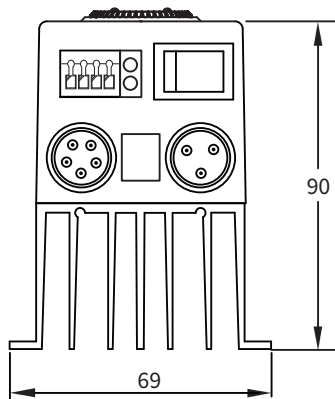
SL-30F 1.5A 3A (left view)



SL-30F 4.5A (left view)



SL-30F 1.5A 3A (front view)



SL-30F 4.5A (front view)

**Tips:**

SL-30F Small and Medium Power: 150 (length) \* 69 (width) \* 70 (height) High Power: 150 (length) \* 69 (width) \* 90 (height) Unit: mm

## Vision and exclusion:

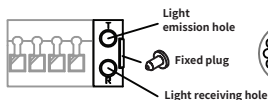
No display	Confirm if the power is connected and check if the fuse is intact. (Fuse specification: 250V6.3A fast melting type 5 * 20mm)
EC-0H	Overheating protection. Install the controller in a ventilated area. If possible, install it on a metal machine to facilitate heat dissipation.
EC-0L	Overload protection. Check: whether the gap between the electromagnetic coil and the armature is too large, whether the power of the vibration disc matches the controller, and whether the output cable is short circuited.
EC-02L	Leakage protection. Inspection: Electromagnetic coil (this leakage protection is only detected when powered on and not during operation)

## Function and parameter description of fiber amplifier:

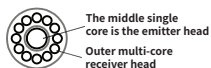
The controller is equipped with a set of fiber amplifiers, which can detect 10000 times per second and output 1000 effective detection results per second. It has extremely low temperature drift and wide temperature adaptability (better than 1.5% for 0-40 degrees Celsius and better than 3% for -20-60 degrees Celsius); 2. 999 level fiber detection value upper and lower limits (window detection) can be set, and 4 levels (better than 100 times) of optical power adjustment can be performed for workpieces with different reflectivity.

Parameter Code	parameter description
<b>Fd</b>	Display the current detection value of the fiber optic cable.
<b>FL FH</b>	FL: Set the lower threshold; FH: Set the upper limit of the value. When the fiber optic detection value is in the FL and FH range, the fiber optic detection result is valid.
<b>9C</b>	Optical power setting, consisting of four levels of optical power, is set based on the reflectivity of the workpiece and the distance between the workpiece and the fiber head. It should be noted that the higher the detection value, the better. Instead, it is best to keep the workpiece detection value in the middle range of 0-999 (500) as much as possible
<b>9n</b>	The opening delay of the solenoid valve can be set within a range of 0-99.9 seconds, with a 0.1 second step. When the detection result is valid, the solenoid valve will only open after this delay time. This parameter is generally used for the full blowing action of the material.
<b>9F</b>	The opening delay of the solenoid valve can be set within a range of 0-99.9 seconds, with a 0.1 second step. When the fiber optic detection result is invalid, the solenoid valve will only close after this delay time. This parameter is generally used for the full blowing action of the material.

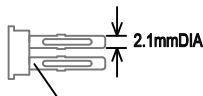
## Fiber optic hole holder and applicable fiber optic cable diagram:



Fiber optic hole holder



Applicable coaxial fiber optic cables



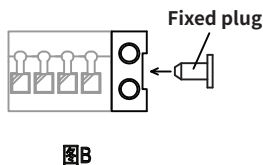
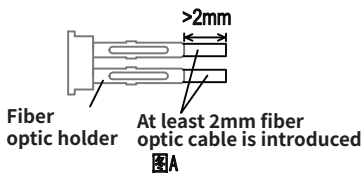
Suitable fiber optic cable holder

## Precautions for fiber optic cable installation (must be read carefully):

1. The applicable fiber optic cable is coaxial fiber optic cable, and it is necessary to distinguish between the transmitting and receiving ends, otherwise it will seriously affect the detection effect;
2. Before inserting the fiber optic cable into the fiber optic socket, in order to achieve optimal detection performance, it is necessary to use the accompanying "fiber optic cable dedicated cutter" to cut the light Cut the fiber head flat, and then insert the fiber optic cable into the fiber optic hole holder;
3. Install the fiber optic cable after the fiber optic hole holder. To ensure stable and reliable operation, try to avoid repeatedly installing the fiber optic cable;
4. After the installation of the fiber optic cable, immediately clamp and fix the fiber optic cable to the controller housing with the attached "fiber optic fixing clip" to prevent the fiber optic cable from being pulled and loosened by large external forces, which may cause detection function failure;
5. Do not excessively bend the fiber optic cable (the recommended bending diameter is greater than 25mm), and avoid damaging the outer surface of the fiber optic cable, otherwise it will seriously reduce the sensitivity and reliability of fiber optic detection;
6. When wiring and fixing fiber optic cables, it is necessary to avoid high temperature heat sources, otherwise it will affect the stability of detection;
7. When designing and installing fiber optic inspection heads, it is important to understand the following:
  1. The detection head should be completely prevented from being hit by the workpiece;
  2. Try to keep the detection head away from the airflow of the nozzle, as the airflow can bring dust, water vapor, and even oil stains.
  3. To prevent dust adhesion from causing detection failures, the principle of lateral or downward installation angle should be followed, and the possibility of accidental interference from unknown strong light sources from the outside can also be eliminated;
  4. The optical fiber must be securely fixed.

## Fiber optic cable installation steps:

1. Check if the end of the fiber optic cable (fiber holder end) is flat. If it is not flat, use the "fiber optic cable dedicated cutter" attached to the fiber optic cable to cut it flat;
2. After pushing the fiber optic cable out of the holder by at least 2mm (as shown in Figure A below), fully insert the fiber optic holder into the fiber optic socket of the controller (ensuring that the transmitter and receiver are distinguished correctly);
3. Fully insert the fiber optic plug into the plug hole on the side of the fiber optic socket (as shown in Figure B below) to securely fix the fiber optic cable;
4. After installing the fiber optic cable in the fiber optic hole seat, in order to ensure stable and reliable operation, try to avoid repeatedly installing the fiber optic cable;
5. Use the attached "fiber optic fixing clip" to clamp and fix the fiber optic cable to the controller housing to prevent the cable from being pulled or loosened by large external forces, which may cause detection function failure. Installation is complete.
6. If you need to disassemble the fiber optic cable, first pull out the fixing plug (pry it up with a small flathead screwdriver).

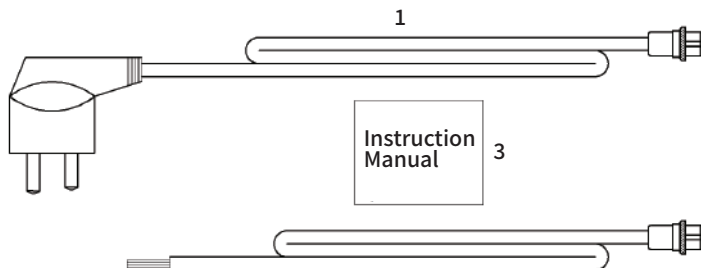


## Daily maintenance:

Due to differences in working environments, the fiber optic cable detection head inevitably adheres to dust or stains, affecting the reliability of the detection. Therefore, users need to regularly clean the detection head (especially when equipped with lenses) according to the actual environment. They can use a degreased cotton swab dipped in water to clean it, and must not use chemical solvents for cleaning.

**Standard accessories:**

1. Power plug cable 2.output cable 3. instruction manual

**Optional accessories:**

1. Proximity switch (M12) 2. potentiometer  
3. solenoid valve 4. fiber optic

