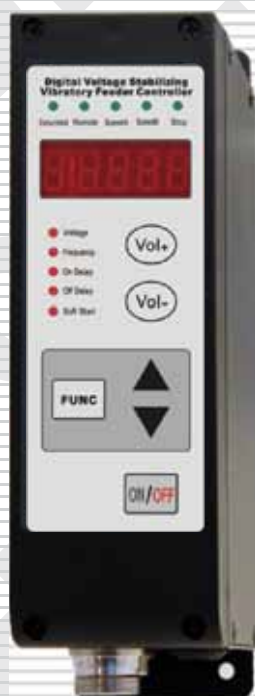# *Digital Voltage Stabilizing Vibratory Feeder Controller*

Instruction Book of SDVC21
Intelligent Digital Voltage Stabilizing Vibratory Feeder Controller

Preface

Thank you for choosing CUH Digital Vibratory Feeder Controllers. (The controller for short in the following text)

This instruction book includes notes for installing, debugging, parameter setting, maintaining and trouble shooting of the controller. Please read this instruction book carefully before operating the controller and keep it properly.

This instruction book applies to the following model:

→Intelligent Digital Voltage Stabilizing Vibratory Feeder Controller SDVC21

Notice :

→ Never hot swap nor touch the contacts in any case to avoid electric shock or other accidents.

→ Never connect the controller to 380V AC which may cause unrecoverable damage. (Choose products that are designed for 380V AC when needed)

→ Never switch the input of the controller by way of cutting off power supply through a relay or other devices, otherwise service life of the controller may reduced severely.

→ The controller is designed to work in a cool and dry environment. Never run outdoors to avoid soaking or sun exposure. Operating the controller within the temperature range that its electrical characteristics demand.

→ Never operate the controller under the condition that beyond its designed limits.

→ Operate the controller in accordance with this instruction book strictly. We will not assume any civil or criminal liability if the equipment damage or personal injury is caused by incorrect operation.

!

Never open the controller shell to avoid electric shock. Contact CUH if the controller breaks down.
Never try to revamp the controller since the solid state circuit boards inside the controller can not be repaired, and there's no adjustable part.

Operating Environment

Inspections Before Using

Every controller will go through rigorous quality inspection before delivery and is packed with crash-proof packaging.

Please Check the Following Items After Unpacking:

➔Whether the controller is damaged in appearance

➔Whether model of the controller are exactly what you ordered

Runtime Environment

Please follow the notes below to ensure better performance and longer lifetime of the controller

➔Well-ventilated environment

➔Keep away from water, steam, dust and especially oily dust

➔Keep away from corrosive or flammable gas and liquid

➔Keep away from flying dust and metal particles

➔Firmly fixed to avoid vibration

➔Keep away form electromagnetic interference

➔Operating within the temperature range of -10 °C to 40 °C

Contents

Chapter I   Features

The controller is specially designed for controlling vibratory feeder in the automation systems. Combined with the latest electronic technology and elaborate design, the controller provides the following convenient and practical features:

Automatic Voltage Stabilizing: The controller can eliminate feeding speed variation caused by mains voltage fluctuation.

Voltage Adjusting: Output voltage ranges from 0V to 260V.

Soft Startup: In order to avoid sudden shock to the work pieces, the controller can gently increase output voltage from 0 to the pre-set value when startup.

Soft Startup Time Setting: Soft Startup Time can be set exactly in digital numbers.

Halt when Work-pieces are full: A NPN switch sensor can help to halt the controller when work-pieces are full and to fulfill the functions of Soft Startup Time Setting, Startup Delay, Shutdown Delay, and Logical Relation Adjusting.

Controlling Output: The Controlling Output signal outgoing from the transistor can coordinate a solenoid or other external devices with the controller.

Overheat Protection: The controller will halt its output to protect itself when operation temperature is too high.

Current Overload Protection: The controller will halt its output to ensure operating safety of the equipment when operation current exceeds its rated value.

The Following Features Can be Customized:

Dual Control Signals Input: Dual control signals input of Work-pieces-Full and Work-piece-Empty could form the logical control relation of AND, OR, NOT, XOR, and all the others.

Output Voltage Preset Function: Up to four preset output voltage values can be chosen by external control signals.

Intelligent Photoelectric Sensing: Our adaptive Intelligent Photoelectric Sensor can help to stall the controller when work-pieces are full or work−pieces are empty and to fulfill the functions of Inching Startup Time Setting, Startup Delay, Shutdown Delay, and Logical Relation Adjusting.

Remote Speed Control: Output voltage of the controller can be controlled by an external potentiometer, a PLC, or a voltage control signal ranging form 1V to 5V.

CUH attaches great importance to the product quality management and safety performance. Apart form the high-quality components we use and rigorous quality control system, **CUH** has taken account of possible accidents users may encounter and provides the following protective functions to maximum the controller's practicability.

Short-Circuit Protection: If output of the controller is short-circuited, the controller will halt its output until restarted.

Current Overload Protection: The controller will halt its output to ensure equipments' operating safety when operation current exceeds its rated value.

Overheat Protection: The controller will halt its output to protect itself when operation temperature is too high.
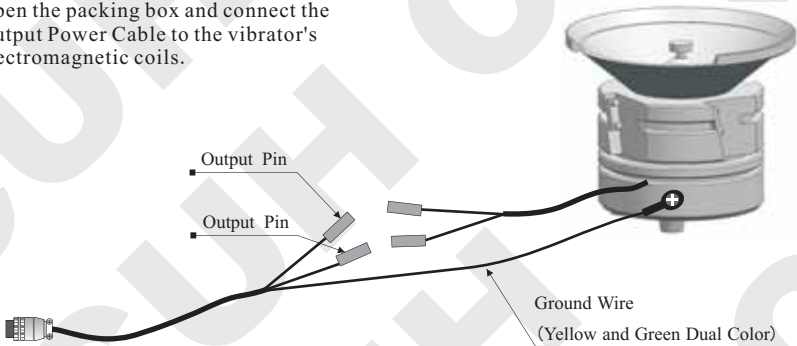
CUH controllers are strictly compliant with CE certification.

Chapter II Installation Guide

Step One:
Open the packing box and connect the
Output Power Cable to the vibrator's
electromagnetic coils.

Output Pin

Output Pin

Ground Wire

(Yellow and Green Dual Color)

! Note:

Make sure the vibrator's electromagnetic coils is connected to the two output pins of
the Output Power Cable and the electromagnetic coils is reliably grounded otherwise
series security incident may occur.

Step Two:
Connect the Output Power Cable plug to
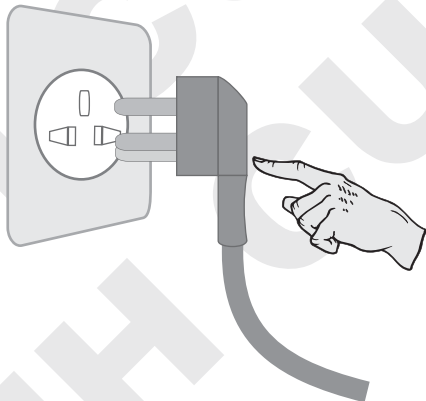the Output Socket of the controller.

Output Socket

Step Three:
Connect the Input Power Cable to the
controller and lock the power nut.

Step Four:
Connect the plug of the Input Power Cable
to the mains jack.

Chapter III   Components Description

There are 6 buttons on the control panel including the FUNC button to shift among different functions, the ▲ button to increase the parameter value, the ▼ button to decrease the parameter value, the (Vol+) and (Vol-) buttons to adjust the Output Voltage value and the ON/OFF button.

Keyboard Description

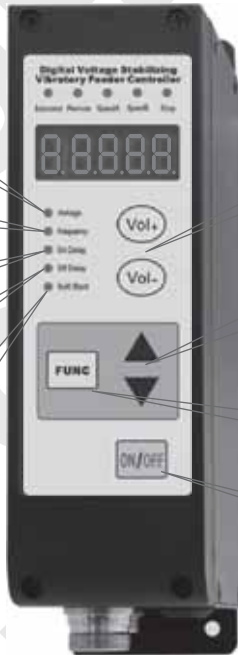Output Voltage Indicator:
The indicator lights up as the controller enters Output Voltage Adjusting status.

Output Frequency Indicator:
The indicator lights up as the controller enters Output Frequency Adjusting status.

Startup Delay Indicator:
The indicator lights up as the controller enters Startup Delay Time Adjusting status.

Shutdown Delay Indicator:
The indicator lights up as the controller enters Shutdown Delay Time Adjusting status.

Soft Startup Indicator:
The indicator lights up as the controller enters Soft Startup Time Adjusting status.

Output Voltage Increasing Button & Output Voltage Decreasing Button:
Output Voltage can be changed by these two buttons. When the Keypad Locking function is on, these two buttons lose efficacy.

Advanced Parameter Increasing Button & Advanced Parameter Decreasing Button:
Advanced parameters can be adjusted by these two buttons.

FUNC Button:
Shift advanced parameters by pressing this button.

Soft Power Switch Button:
Startup or shutdown output of the controller by pressing this button

-5-

Descriptions of the Status Indicators

Speed A Indicator:
The indicator lights up as the corresponding external control signal is available.

Remote Speed Control Indicator:
The indicator lights up when Remote Speed Control signal is available as the Vol+ and Vol- buttons loses efficacy.

Speed B Indicator:
The indicator lights up as the corresponding external control signal is available.

Saturation Indicator:
The indicator lights up when the preset Output Voltage value exceeds Input Voltage value.

Stop Indicator:
The indicator lights up as Output of the controller is shutdown by the ON/OFF batton.

LED displayer:
The LED displayer indicates the adjustable parameter at present.

I/O Interface Descriptions

Output Power Socket

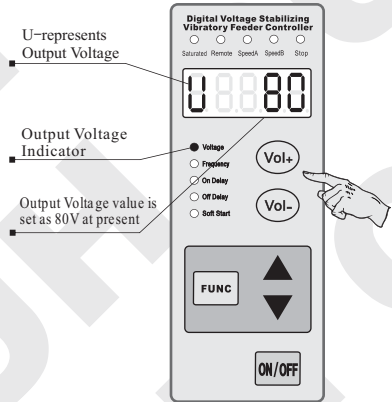Input Power Socket

Signal Wire Inlet
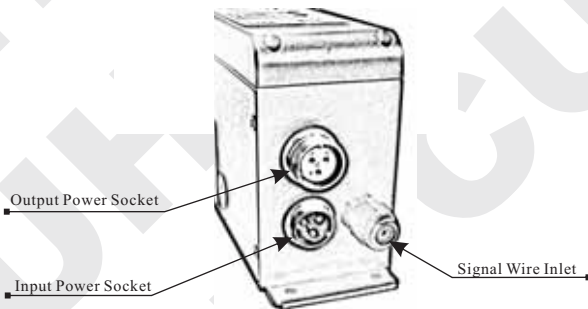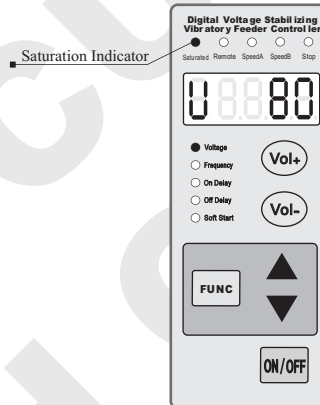
Chapter IV Function Descriptions

4.1 Output Voltage Setting

The output voltage can be set directly and digitally through the control panel. Benefit from the unique voltage stabilizing function, output voltage of the controller won't fluctuate as the input voltage does. So that a vibrator can work stably in unstable input voltage environment.

- ▸ Turn on the power switch

- ▸ The Output Voltage Indicator lights up as the controller enters Output Voltage Adjusting status when the LED displays the voltage symbol U and the previously set voltage value.

- ▸ Adjust the Output Voltage value by pressing the (Vol+) or (Vol-) button.

U-represents Output Voltage

Output Voltage Indicator

Output Voltage value is set as 80V at present

Digital Voltage Stabilizing Vibratory Feeder Controller

○ Saturated ○ Remote ○ SpeedA ○ SpeedB ○ Stop

U 80

● Voltage
○ Frequency
○ On Delay
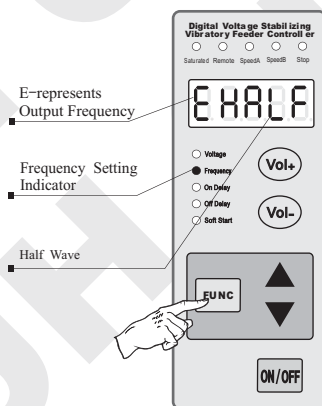○ Off Delay
○ Soft Start

(Vol+)
(Vol-)

FUNC ▲▼

ON/OFF

- ▸ Output Voltage value of the controller can not exceed Input Voltage value. If Output Voltage value is set too close to Input Voltage value, the controller fails to stabilize its voltage output and the Saturation Indicator lights up.

- ▸ If Output Voltage value is set too close to zero, the controller fails to stabilize its voltage output and the Saturation Indicator lights up.

Saturation Indicator

Digital Voltage Stabilizing Vibratory Feeder Controller

● Saturated ○ Remote ○ SpeedA ○ SpeedB ○ Stop

U 80

● Voltage
○ Frequency
○ On Delay
○ Off Delay
○ Soft Start

(Vol+)
(Vol-)

FUNC ▲▼

ON/OFF

4.2 Output Frequency Setting
The controller can choose to output frequency at the value of the mains' or the mains' double.

▸ Press the FUNC button and hold for 2 seconds to enter the Basic Parameters Adjusting status.

▸ Press the FUNC button repeatedly until Shifting to the Output Frequency Adjusting status （E）as the Output Frequency Indicator lights up.

▸ Press the ▲ or ▼ button to adjust the parameter value.

E−represents Output Frequency

Frequency Setting Indicator

Half Wave

Digital Voltage Stabilizing Vibratory Feeder Controller
Saturated Remote SpeedA SpeedB Stop

E HALF

○ Voltage
● Frequency
○ On Delay
○ Off Delay
○ Soft Start

(Vol+)
(Vol-)

FUNC ▲ ▼

ON/OFF

If the mains frequency is at 50 Hz, when the E parameter is adjusted to HALF, Output Frequency of the controller is at 50 HZ, when the E parameter is adjusted to FULL, Output Frequency of the controller is at 100 Hz.

If the mains frequency is at 60 Hz, when the E parameter is adjusted to HALF, Output Frequency of the controller is at 60 HZ, when the E parameter is adjusted to FULL, Output Frequency of the controller is at 120 Hz.

4.3 Soft Startup Time Setting

In order to avoid sudden shock to the work pieces, the controller can gently increase Output Voltage from 0 to the pre-set value when startup.

Soft Startup Time (t): The period of time it takes for the controller to gently increase Output Voltage from 0 to the pre-set value when startup.

▸ Press the FUNC button and hold for 2 seconds to enter the Basic Parameters Adjusting status.

▸ Press the FUNC button repeatedly until Shifting to the Soft Startup Time djusting status (t) as the Soft Startup Indicator lights up.

▸ Press the ▲ or ▼button to adjust the parameter value. The parameter unit is second, and the numerical precision is 0.1.

Adjustable Soft Startup Time ranges from 0.0 second to 9.9 seconds.
*Default value of the Soft Startup Time parameter is 1 second.*

t-represents Soft Startup Time

Soft Startup Time is set as 1.0 second at present

Soft Startup Indicator
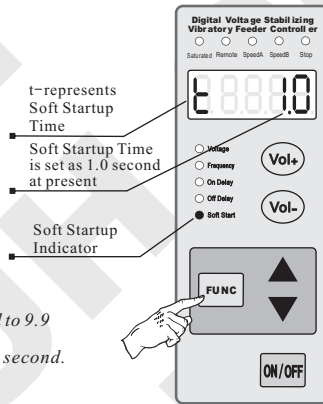
4.4 Output Switch

The soft-touch Output Switch Button on the panel can turn on/off the controller's output quickly and easily.

▸ Press the ON/OFF button to turn on/off the controller's output. The Stop Indicator lights up as output of the controller is turned off.

The Stop Indicator lights up as the controller is shutdown by the ON/OFF button.

Due to the soft-touch switch and digital signal control technology, no spark will generate to spoil the contact. As a result, life-span of the controller and the vibrator will be extended greatly.
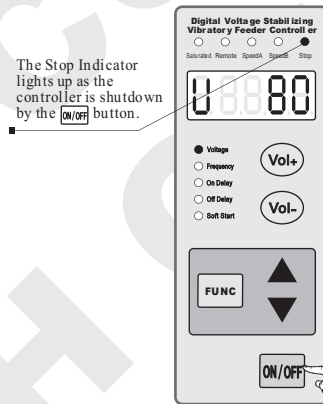
4.5 Maximum Output Voltage Restriction

Maximum Output Voltage of the controller can be set to prevent damage to the vibrator. Remote Speed Control function is affected by this parameter.

▸ Press the FUNC and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the FUNC button repeatedly until shifting to the Maximum Output Voltage Restriction status (h).

▸ Press the ▲ or ▼ button to adjust the parameter value.

h–represents Maximum Output Voltage

Maximum Output Voltage Value is set as250V at present
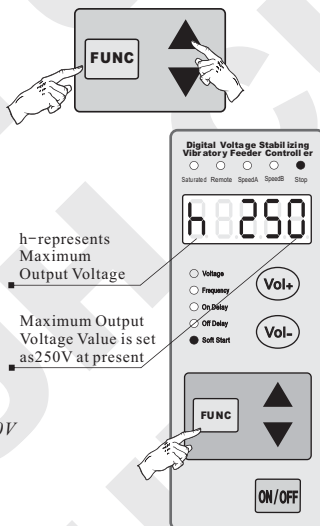
Default value of the Maximum Output Voltage is 260V

4.6 Keypad Locking

▸ Press the ON/OFF button and hold for 2 seconds to lock all buttons on the panel as the LED displays ∃

▸ Press the ON/OFF button and hold for 2 seconds in the locking mode to unlock the keypad.

The ON/OFF button will not be affected by the Keypad Locking function.

Locked symbol

Output Voltage of the controller is set as 250V

-10-
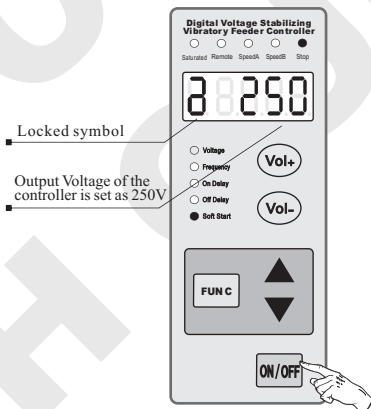
4.7 Default Settings Restoration

This function allows the operator to restore all default parameter settings.

Due to the abundant functions of the controller, many parameters can be adjusted. In order to avoid the circumstance that after too many times modification by a beginner, the controller can not work properly, this function allows the operator to restore default settings to the controller in an easy way.

▸ Press the FUNC and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the FUNC button repeatedly until ooooo is flashing on the LED displayer, and then press the ▲ button and hold until ----- is displayed which means default settings have been restored.

▸ After releasing the ▲ button, the controller enters Output Voltage Adjusting status (U). By this time, all parameters have been restored to default values.

Ready to restore

Restore successfully
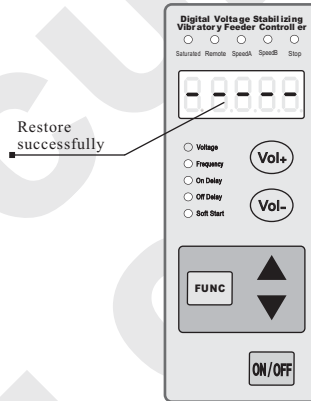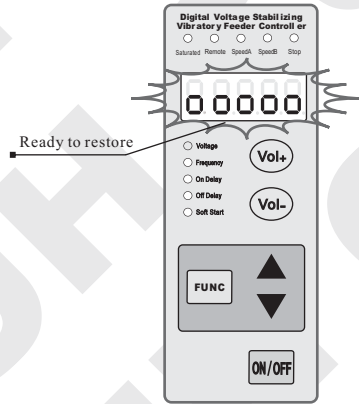
Chapter V   Sensors and Signal Control

The controller can be controlled by many kinds of external signals and sensors. This chapter mainly elaborates using method of the Intelligent Photoelectric Sensor, the NPN Switch Sensors and the PLC.

5.1 Intelligent Photoelectric Sensing

Combined with the SDVC-S1 Photoelectric Sensor the function of Intelligent Photoelectric Sensing can be achieved. The SDVC-S1 sensor can filter the interference of background light impacting on the sensitivity of the controller. As a result, the controller can work reliably without manual sensitivity adjustment.

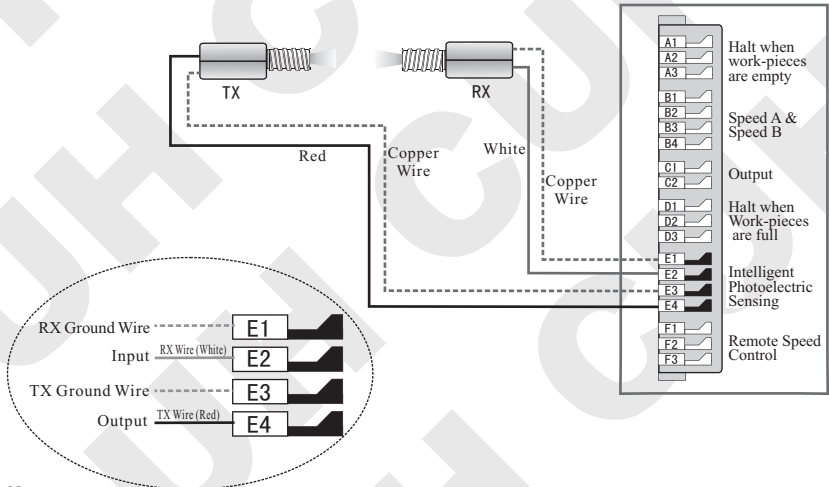### 5.1.1 Connection Method of the SDVC-S1 Intelligent Photoelectric Sensor

Step One:
Open the upper cover plate of the controller.
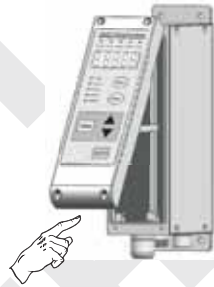
Step Two:
Connect the SDVC-S1 sensor to the terminals of the controller according to the diagram

TX

RX

Red

Copper Wire

White

Copper Wire

Terminal	Function
A1 A2 A3	Halt when work-pieces are empty
B1 B2 B3 B4	Speed A & Speed B
C1 C2	Output
D1 D2 D3	Halt when Work-pieces are full
E1 E2 E3 E4	Intelligent Photoelectric Sensing
F1 F2 F3	Remote Speed Control

RX Ground Wire · · · · · · · E1
Input   RX Wire (White)   E2
TX Ground Wire · · · · · · · E3
Output   TX Wire (Red)   E4

Notice:
*Default logical relation of the sensor is set as work-pieces are empty*

5.1.2 Startup Delay Time and Shutdown Delay Time Adjusting of the Intelligent Photoelectric Sensor

In most actual applications, the output of the controller should be delayed for a period of time when Startup or Shutdown of the controller is controlled by external signals. Startup Delay Time and Shutdown Delay Time Adjusting function made this kind of application possible. Furthermore, shocks to the work pieces as the controller starts up can be eliminated by adjusting Soft Startup Time.

Startup Delay ($\rfloor$): The period of time the controller goes through from receiving a startup control signal to outputting.

▸ Press the FUNC button and hold 2 seconds to enter the Basic Parameters Adjusting status.

▸ Press the FUNC button repeatedly until shifting to the Startup Delay Time Adjusting status ($\rfloor$) as the Startup Delay Time Indicator on the panel lights up.

▸ Adjust the parameter by pressing the ▲ or ▼ button. The parameter unit is second, and the numerical precision is 0.1.

Adjustable range of the parameter is from 0.0 to 9.9 seconds
Default value of the parameter is 0.2 seconds

represents Startup Delay Time

Startup Delay Indicator
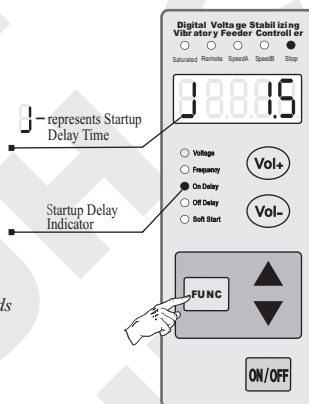
Shutdown Delay (L): The period of time the controller goes through from receiving a shutdown control signal to cutting off output.
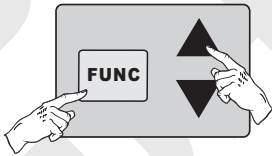
▸ Press the FUNC button and hold for 2 seconds to enter the Basic Parameters Adjusting status.

▸ Press the FUNC button repeatedly until shifting to the Shutdown Delay Time Adjusting status (L) as the Shutdown Delay Time Indicator on the panel lights up.

▸ Adjust the parameter by pressing the ▲ or ▼ button. The parameter unit is second, and the numerical precision is 0.1.

Adjustable range of the parameter is from 0.0 to 9.9 seconds
Default value of the parameter is 0.2 seconds

represents Shutdown Delay Time

Shutdown Delay Indicator
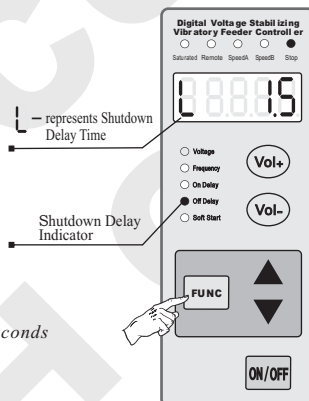
5.1.3 Logical Relation Adjusting of the Intelligent Photoelectric Sensor

Under normal circumstances, the receiving end of the Intelligent Photoelectric Sensor receives no optical signal, and the controller runs by default. But in some special applications the controller needs to be stopped when the receiving end receives no optical signal. Adjusting this parameter can fulfill these kind of applications.


▸ Press the FUNC and ▲ button simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the FUNC button repeatedly until Shifting to the Logical Relation Adjusting status of the Intelligent Photoelectric Sensor.

▸ Adjust the parameter by pressing the ▲

→ When Logical Relation is set as Normal Open, namely no optical signal received, the controller runs.

→ When Logical Relation is set as Normal Close, namely no optical signal received, the controller stops.

The parameter is set as Normal Open by default

-14-
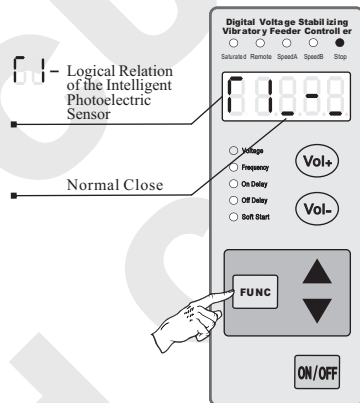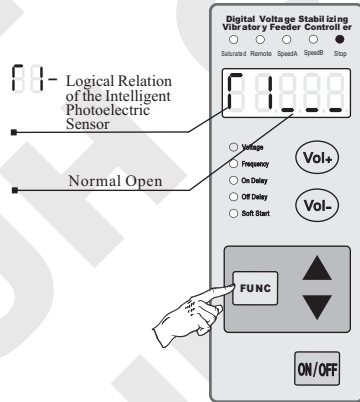
5.2 Using Method of the NPN Switch Sensor
The controller can operate with many kinds of sensors such as switch sensors, optical switch sensors and fiber optic sensors.

5.2.1 Connection method of the NPN Switch Sensor

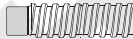### Step One:
Open the upper cover plate of the controller.

Step Two:
Connect the NPN Proximity Switch Sensor to the terminals of the controller according to the diagram.

Ground Wire ------ D1
Signal Wire ——— D2
+24V Output ——— D3

Ground Wire ------
Signal Wire
+24V Output

A1	
A2	Halt when
A3	work-pieces are empty
B1	
B2	Speed A &
B3	Speed B
B4	
C1	Output
C2	
D1	Halt when
D2	Work-pieces
D3	are full
E1	Intelligent
E2	Photoelectric
E3	Sensing
E4	
F1	Remote Speed
F2	Control
F3	

Convention

The blue wire represents ground wire
The black wire represents signal wire
The brown wire represents power wire.
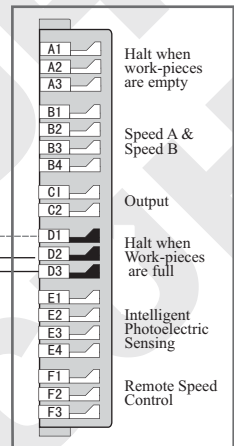
5.2.2 Startup Delay Time and Shutdown Delay Time Settings of the NPN Switch Sensor

By default, Intelligent Photoelectric Sensor and Switch Sensor share the same Startup Delay Time and Shutdown Delay Time. Operators can also set Startup Delay Time and Shutdown Delay Time of the NPN Switch Sensor independently.
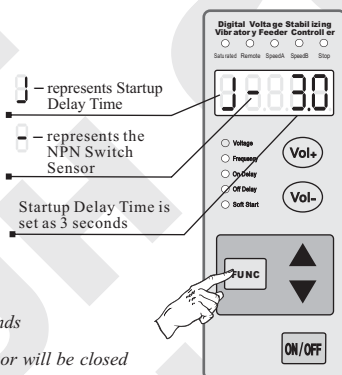
Startup Delay (⌐−): The period of time the controller goes through from receiving a startup control signal to outputting.

▸ Press the $\boxed{FUNC}$ and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the $\boxed{FUNC}$ button repeatedly until shifting to the Startup Delay Time Adjusting status (⌐----).

▸ Adjust the parameter by pressing the ▲ or ▼ button. The parameter unit is second, and the numerical precision is 0.1.

Adjustable range of the parameter is from 0.0 to 9.9 seconds
Default value of the parameter is
The independent Startup Delay of the NPN Switch Sensor will be closed when the parameter value is adjusted to 0
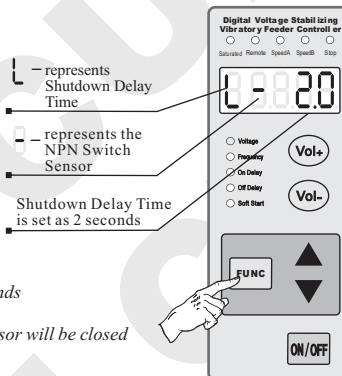
⌐ – represents Startup Delay Time

◻ – represents the NPN Switch Sensor

Startup Delay Time is set as 3 seconds

Shutdown Delay (L-): The period of time the controller goes through from receiving a shutdown control signal to cutting off output.

▸ Press the $\boxed{FUNC}$ and ▲ buttons and hold for 2 seconds to enter the Advanced Parameters Adjusting status

▸ Press the $\boxed{FUNC}$ button repeatedly until shifting to the Shutdown Delay Time Adjusting status (L----).

▸ Adjust the parameter by pressing the ▲ or ▼ button. The parameter unit is second, and the numerical precision is 0.1.

Adjustable range of the parameter is from 0.0 to 9.9 seconds
*Default value of the parameter is* L----
The independent Shutdown Delay of the NPN Switch Sensor will be closed when the parameter value is adjusted to 0

L – represents Shutdown Delay Time

◻ – represents the NPN Switch Sensor

Shutdown Delay Time is set as 2 seconds

➔ When ⌐- and L- values are adjusted to 0, Startup Delay Time and Shutdown Delay Time of the Switch Sensor will be the same with Startup Delay Time and Shutdown Delay Time of the Intelligent Photoelectric Sensor.

➔ Startup Delay Time and Shutdown Delay Time of the Intelligent Photoelectric Sensor will not affected by the parameter of ⌐- or L-.

5.2.3 Logical relation setting of the NPN Switch Sensor (Halt when work-pieces are full)
Under normal circumstances，the controller receives no signal from the NPN Switch Sensor and runs by default. But in some special applications the controller needs to be stopped when receives no signal from the NPN Switch Sensor. Adjusting this parameter can fulfill these kind of applications.
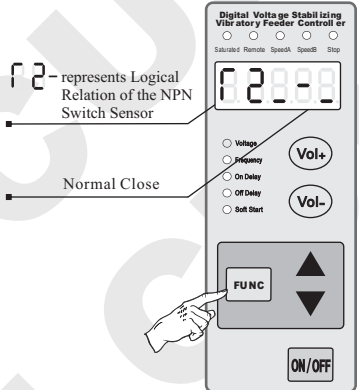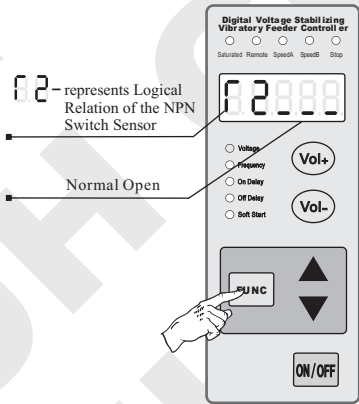

Γ2 - represents Logical Relation of the NPN Switch Sensor

Normal Open
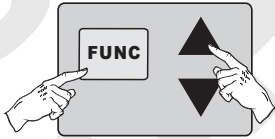
▸ Press the FUNC and ▲ buttons and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the FUNC button repeatedly until Shifting to the Logical Relation Adjusting status of the NPN Switch Sensor (Γ2).

▸ Adjust the parameter by pressing the ▲ or ▼ button.

Γ2 - represents Logical Relation of the NPN Switch Sensor

Normal Close

→ When Logical Relation is set as Normal Open, namely no signal received, the controller runs

→ When Logical Relation is set as Normal Close, namely no signal received, the controller stops.

The parameter is set as Normal Open by default

5.3 Using Method of the 2nd NPN Switch Sensor

The controller allows three sensors connecting to it, one Intelligent Photoelectric Sensor and two NPN Switch Sensors. The functions of Halt when work-pieces are full and Halt when work-pieces are empty can work with the help of these sensors .
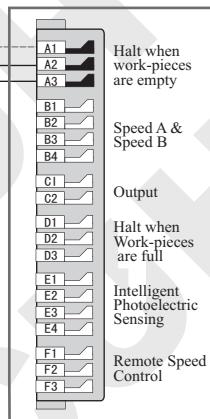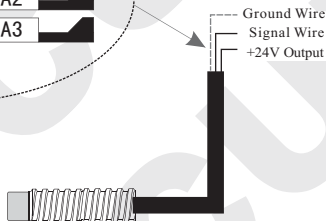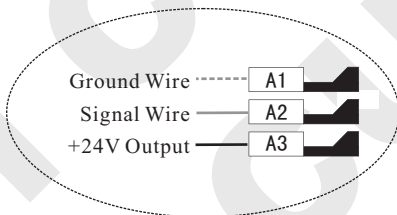
5.3.1 Connection method of the 2nd NPN Switch Sensor

Step One:
Open the upper cover plate of the controller.

Step Two:
Connect the 2nd NPN Proximity Switch Sensor to the terminals of the controller according to the diagram.

Ground Wire	A1
Signal Wire	A2
+24V Output	A3

Ground Wire
Signal Wire
+24V Output

Terminal	Function
A1 A2 A3	Halt when work-pieces are empty
B1 B2 B3 B4	Speed A & Speed B
C1 C2	Output
D1 D2 D3	Halt when Work-pieces are full
E1 E2 E3 E4	Intelligent Photoelectric Sensing
F1 F2 F3	Remote Speed Control

☺ **Commonly**

The blue wire represents ground wire
The black wire represents signal wire
The brown wire represents power wire

5.3.2 Startup Delay Time and Shutdown Delay Time Settings of the 2nd NPN Switch Sensor

By default, Intelligent Photoelectric Sensor and the two NPN Switch Sensor share the same Startup Delay Time and Shutdown Delay Time. Operators can also set Startup Delay Time and Shutdown Delay Time independently for the 2nd NPN Switch Sensor.
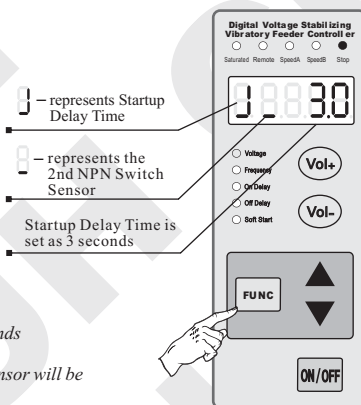
Startup Delay ($\rfloor\_$): The period of time the controller goes through from receiving a startup control signal to outputting.

➤ Press the FUNC and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

➤ Press the FUNC button repeatedly until shifting to the Startup Delay Time Adjusting status ($\rfloor\_ - - -$)

➤ Adjust the parameter by pressing the ▲ or ▼ button. The parameter unit is second, and the numerical precision is 0.1.

— represents Startup Delay Time

— represents the 2nd NPN Switch Sensor

Startup Delay Time is set as 3 seconds

Adjustable range of the parameter is from 0.0 to 9.9 seconds
Default value of the parameter is $\rfloor$---
The independent Startup Delay of the 2nd NPN Switch Sensor will be closed when the parameter value is adjusted to 0
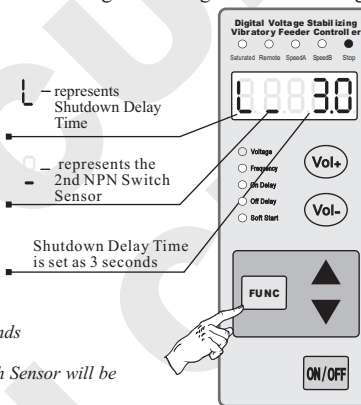
Shutdown Delay (L $\_$): The period of time the controller goes through from receiving a shutdown control signal to cutting off output.

➤ Press the FUNC and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

➤ Press the FUNC button repeatedly until shifting to the Shutdown Delay Time Adjusting status (L $\_- - -$).

➤ Adjust the parameter by pressing the ▲ or ▼ button. The parameter unit is second, and the numerical precision is 0.1.

L — represents Shutdown Delay Time

— represents the 2nd NPN Switch Sensor

Shutdown Delay Time is set as 3 seconds

Adjustable range of the parameter is from 0.0 to 9.9 seconds
Default value of the parameter is L---
The independent Shutdown Delay of the 2nd NPN Switch Sensor will be closed when the parameter value is adjusted to 0

➔ When $\rfloor\_$ and L- values are adjusted to 0, Startup Delay Time and Shutdown Delay Time of the 2nd Switch Sensor will be the same with Startup Delay Time and Shutdown Delay Time of the Intelligent Photoelectric Sensor.

➔ Startup Delay Time and Shutdown Delay Time of the Intelligent Photoelectric Sensor will not affected by the parameter of $\rfloor\_$or L-.

5.3.3 Logical Relation Setting of the 2ⁿᵈ NPN Switch Sensor (Halt when work-pieces are full)

Under normal circumstances，the controller receives no signal from the 2ⁿᵈ NPN Switch Sensor and runs by default. But in some special applications the controller needs to be stopped when receives no signal from the 2ⁿᵈ NPN Switch Sensor. Adjusting this parameter can fulfill these kind of application.

$\Gamma 4$ – represents Logical Relation of the 2ⁿᵈ NPN Switch Sensor

Normal Open
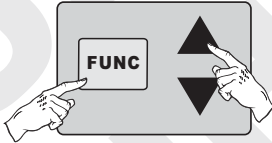
▸ Press the FUNC and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the FUNC button repeatedly until shifting to the Logical Relation Adjusting status of the 2ⁿᵈ NPN Switch Sensor ($\Gamma 4$)

▸ Adjust the parameter by pressing the ▲ or ▼ button.

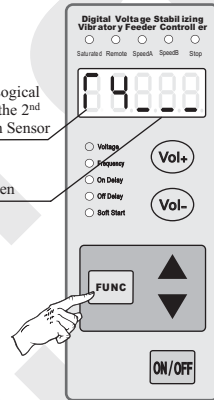$\Gamma 4$ – represents Logical Relation of the 2ⁿᵈ NPN Switch Sensor

Normal Close

→ When Logical Relation is set as Normal Open, namely no signal received, the controller runs.

→ When Logical Relation is set as Normal Close, namely no signal received, the controller stops.
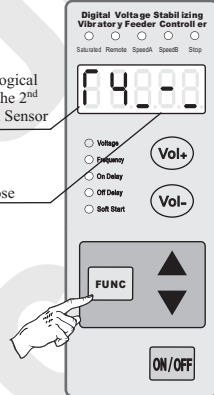
The parameter is set as Normal Open by default

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5.4 Logical Relation Setting of the Control Signal

The controller can set the logical relation of the Intelligent Photoelectric Sensor and the Switch Sensor when they work simultaneously.

▸ Press the FUNC and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the FUNC button repeatedly until shifting to the Logical Relation Adjusting status of the Control Signal (∏).

∏ – represents Logical Relation of the Control Signal

OR

▸ Adjust the parameter by pressing the ▲ or ▼ button.

→ Logical relation AND: The controller runs only when both the Intelligent Photoelectric Sensor and the NPN switch Sensor ask the controller to.

∏ – represents Logical Relation of the Control Signal

AND

→ Logical relation OR: The controller runs when the Intelligent Photoelectric Sensor or the NPN Switch Sensor asks the controller to.

→ Logical relation XOR: The controller runs only when the Intelligent Photoelectric Sensor and NPN Switch Sensor output the opposite control signal

∏ – represents Logical Relation of the Control Signal

XOR

Logical relation of the parameter is set as AND by default.
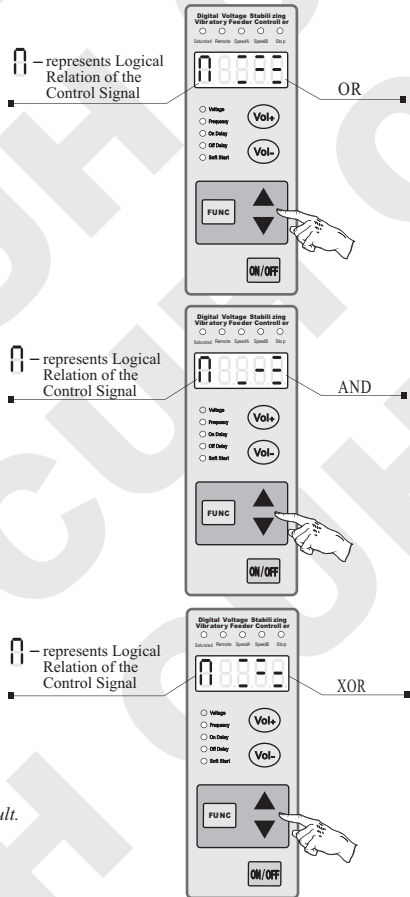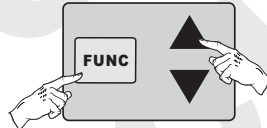
5.5 Controlling Output

The controller can output low-voltage controlling signal to cooperate with other devices such as a solenoid valve, a PLC or an electrical relay.
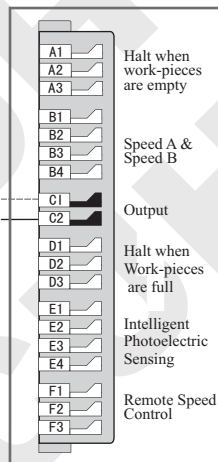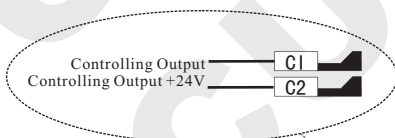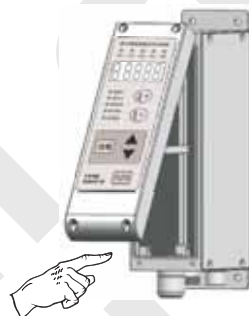
5.5.1 Connection Method of the Controlling Output

Connection method of the controlled PLC

Step One:
Open the upper cover plate of the controller.

Step Two:
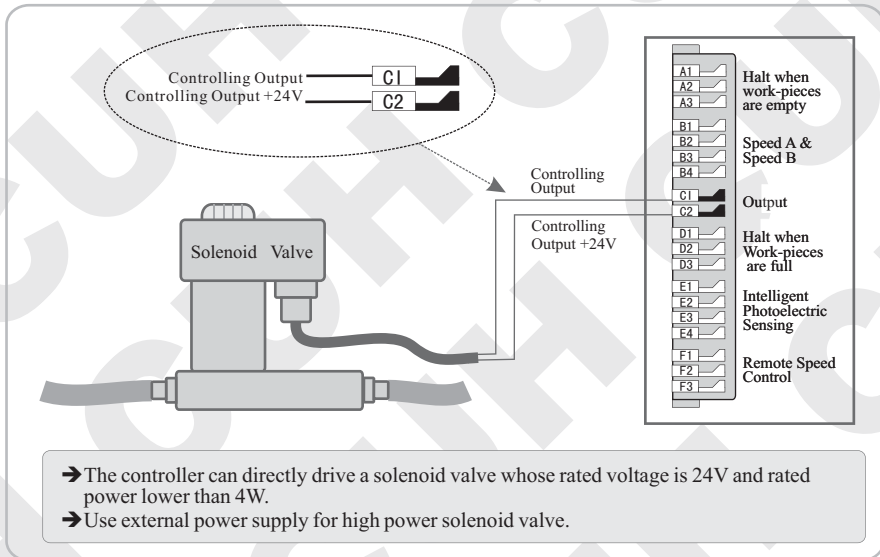Connect signal wire and ground wire of the controller to the terminals of the controller according to the diagram.

Controlling Output ——— C1
Controlling Output +24V ——— C2

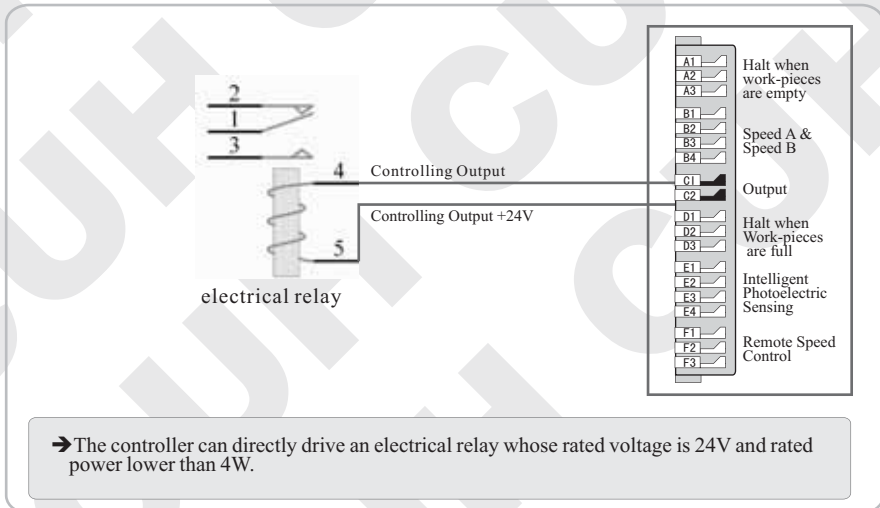| Terminal	Function
A1, A2, A3	Halt when work-pieces are empty
B1, B2, B3, B4	Speed A & Speed B
C1, C2	Output
D1, D2, D3	Halt when Work-pieces are full
E1, E2, E3, E4	Intelligent Photoelectric Sensing
F1, F2, F3	Remote Speed Control

Controlling Output
Controlling Output +24V

PLC

Relay output or NPN output of the PLC is compatible with the controller.

Parameter setting methods are the same with that of the switch sensor

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5.5.2 Connection Method of the Controlled Solenoid Valve

→ The controller can directly drive a solenoid valve whose rated voltage is 24V and rated power lower than 4W.
→ Use external power supply for high power solenoid valve.

5．5．3 Connection Method of the Electrical Relay

→ The controller can directly drive an electrical relay whose rated voltage is 24V and rated power lower than 4W.

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5.5.4 Logical Relation Setting of the Controlling Output

▸ Press the FUNC and ▲ buttons simultaneously and hold for 2 seconds to enter the Advanced Parameters Adjusting status.

▸ Press the FUNC button repeatedly until shifting to the Logical Relation Adjusting status of the Controlling Output (Г3).

▸ Adjust the parameter by pressing the ▲ or ▼ button.
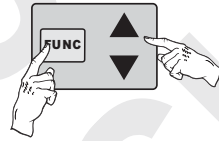
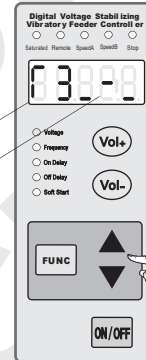represents Logical Relation of the Controlling Output

Normal Open
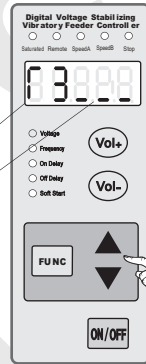
→ When Logical Relation is set as Normal Open, the Controlling Output works as the controller runs.

→ When Logical Relation is set as Normal Close, the Controlling Output doesn't work as the controller runs.

represents Logical Relation of the Controlling Output
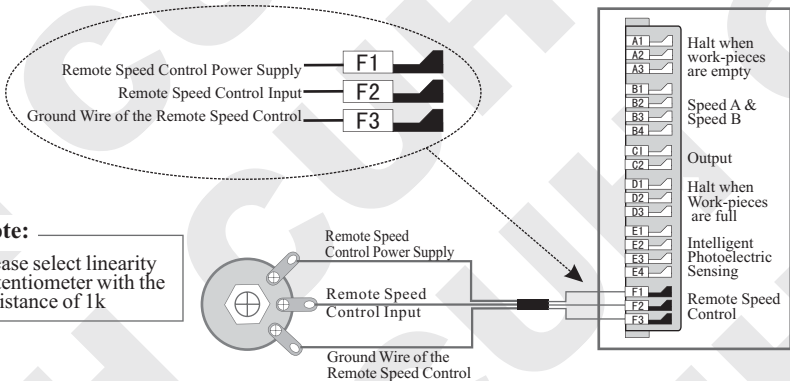
Normal Close

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5.6 Remote Speed Control

The function of Remote Speed Control allows the operator to control the Output Voltage by an external potentiometer or a control signal ranging from 1V to 5V. Thus, external remote speed control can be easily achieved by a PLC, a DCS or some other devices.
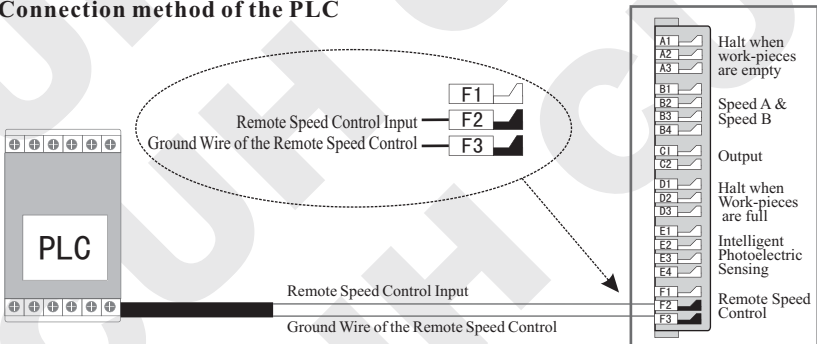
Remote Speed Control function becomes effective to the controller when the controlling signal exceeds 0.5V. Meanwhile, Remote Speed Control Indicator on the panel lights up and the (Vol+) and (Vol-) buttons lose effectiveness. The LED displayer shows current Output Voltage if the controller is running in the Output Voltage Adjusting status.

There are linear relationship between 1~5 V controlling voltage and 0~260V Output Voltage

### Connection method of the external potentiometer

Remote Speed Control Power Supply — F1
Remote Speed Control Input — F2
Ground Wire of the Remote Speed Control — F3

A1 / A2 / A3 Halt when work-pieces are empty
B1 / B2 / B3 / B4 Speed A & Speed B
C1 / C2 Output
D1 / D2 / D3 Halt when Work-pieces are full
E1 / E2 / E3 / E4 Intelligent Photoelectric Sensing
F1 / F2 / F3 Remote Speed Control

Note:

Please select linearity potentiometer with the resistance of 1k

Remote Speed Control Power Supply

Remote Speed Control Input

Ground Wire of the Remote Speed Control

Connection method of the PLC

F1
Remote Speed Control Input — F2
Ground Wire of the Remote Speed Control — F3

PLC

A1 / A2 / A3 Halt when work-pieces are empty
B1 / B2 / B3 / B4 Speed A & Speed B
C1 / C2 Output
D1 / D2 / D3 Halt when Work-pieces are full
E1 / E2 / E3 / E4 Intelligent Photoelectric Sensing
F1 / F2 / F3 Remote Speed Control

Remote Speed Control Input

Ground Wire of the Remote Speed Control

5.7 Preset Speed Switch

The function of Preset Speed Switch can choose the preset speed by means of external control signals, such as a PLC, a PC, sensors or other signal sources to build up a multi-speed feeding control system.

The controller supports two remote speed control switch . The Speed A switch and the Speed B switch are both Low Level effective.
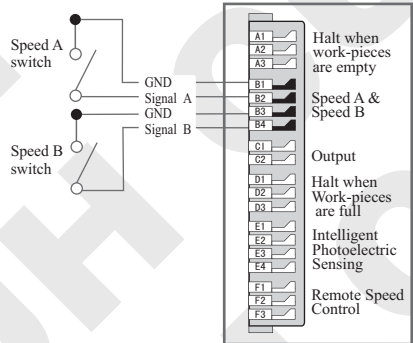
Each speed control switch has a corresponding indicator on the panel. When the controller receives an effective signal, the corresponding indicator will light up.

The two indicators indicate 4 statuses. (A lights up and B goes out, A goes out and B lights up, both light up, both go out). The diagram to the right shows the status that both speed control switches are given effective signals.
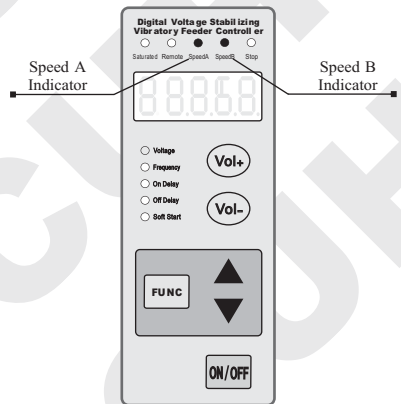
By means of speed control switches, the controller shifts to the corresponding speed. The output voltage corresponding to the speed can be adjusted by pressing (Vol+) or (Vol-) button. And the adjusted voltage will be stored automatically. As soon as the speed control signal is received, the controller outputs the corresponding voltage immediately.

Chapter VI   Security Functions

6.1 Automatic Digital Voltage Stabilizing

The internal digital voltage stabilizing function of the controller can stabilize feeding speed regardless of mains voltage fluctuation.

6.2 Short-Circuit Protection

If output is short-circuited, the controller will halt its output and display Err01 until restarting the controller.

6.3 Current Overload Protection

The controller will halt its output if output current exceeds rated current caused by faulty operation and display Err02 to protect the controller and customer equipments.
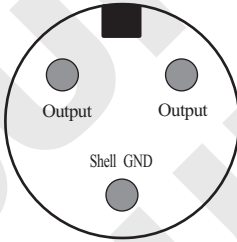
6.4 Overheat Protection

The controller will halt its output if operation temperature exceeds 65^0C and display Err03 to protect the controller until operation temperature drops to 60^0C.

Appendix A: Dimensions （mm）
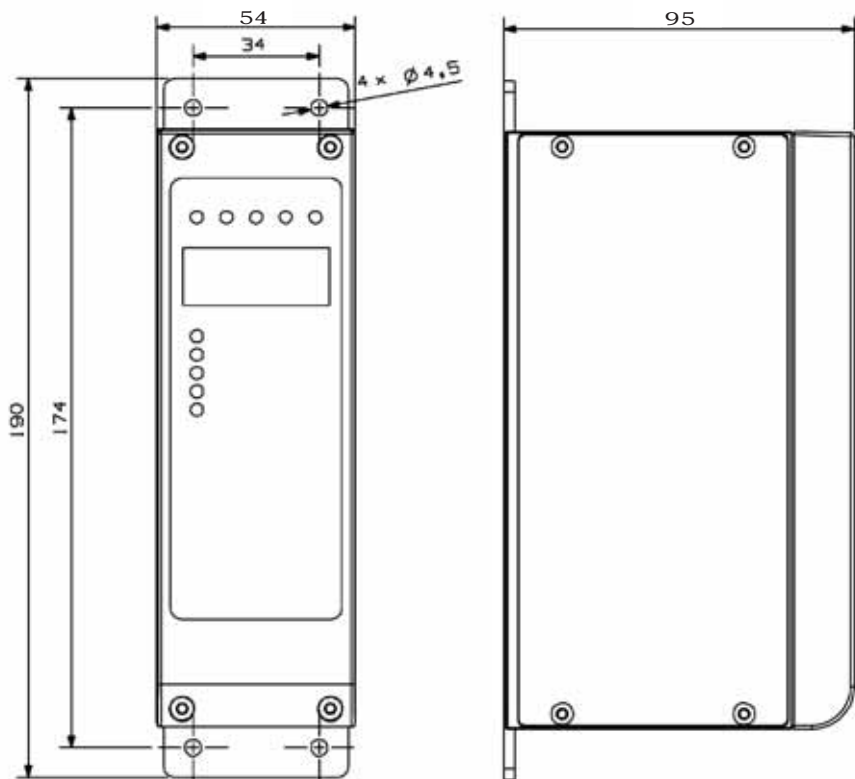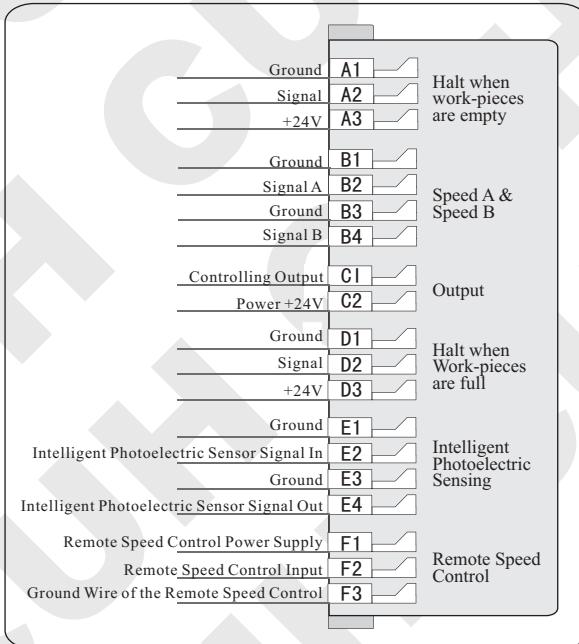
Appendix B: Output Interface Definition

! **Notice:**

A: Make sure the electromagnetic coils of the vibrator is connected to the two output pins of the Output Power Cable socket and the shell of the vibrator is reliably grounded, otherwise series security incident may occur.

B: After welding, make sure the blank area is enswathed by insulating tape or heat-shrinkable tube before insert it into the Output Power Cable socket to avoid electrical leakage or short-circuit.

Appendix C: Signal Interface Definition

Ground	A1	Halt when work-pieces are empty
Signal	A2	
+24V	A3	
Ground	B1	Speed A & Speed B
Signal A	B2	
Ground	B3	
Signal B	B4	
Controlling Output	C1	Output
Power +24V	C2	
Ground	D1	Halt when Work-pieces are full
Signal	D2	
+24V	D3	
Ground	E1	Intelligent Photoelectric Sensing
Intelligent Photoelectric Sensor Signal In	E2	
Ground	E3	
Intelligent Photoelectric Sensor Signal Out	E4	
Remote Speed Control Power Supply	F1	Remote Speed Control
Remote Speed Control Input	F2	
Ground Wire of the Remote Speed Control	F3	

Appendix D: LED Displayed Characters Definition

Displayed Character	Definition
U	Output Voltage
E	Output Frequency
t	Soft Startup
J	Startup Delay Time of the Intelligent Photoelectric Sensor
J - - - -	Startup Delay Time of the NPN Switch Sensor
J _ - - -	Startup Delay Time of the 2nd NPN Switch Sensor
L	Shutdown Delay Time of the Intelligent Photoelectric Sensor
L - - - -	Shutdown Delay Time of the NPN Switch Sensor
L _ - - -	Shutdown Delay Time of the 2nd NPN Switch Sensor
r1	Logical Relation of the Intelligent Photoelectric Sensor
r2	Logical Relation of the NPN Switch Sensor
r3	Logical Relation of the Controlling Output
r4	Logical Relation of the 2nd NPN Switch Sensor
h	Maximum Output Voltage
n	Logical relation of the Control Signal
ooooo	Default Settings Restore
- - - - -	Default Settings Restore Successful
Error	Error Information

Appendix E: Electrical Specification

Item	Value MIN	Value MAX	Unit	Description
Input voltage	85	260	V	AC RMS Value
Output voltage	0	260	V	Less than Input Voltage
Output Current	-	5	A	SDVC21
Output Frequency	50/100		Hz	the mains frequency is at 50 Hz
	60/120		Hz	the mains frequency is at 60 Hz
Output Power	-	1100	VA	SDVC21
Output Waveform	Tangent Sine			
Voltage Adjusting Accuracy	1		V	
Time Delay Range	0	20	s	
Time Delay Accuracy	0.1	-	s	
Soft Startup Time	0	10.0	VA	
Auxiliary Power Supply Voltage	22	26	V	
Auxiliary Power Supply Current	-	200	mA	
Stand-by Power Consumption	1.5	3	W	
Display Method	-	5	Bit	LED Digital Tube
Voltage Control Method	20		V	Remote Controlled Voltage
	Standard TTL Electric Level			Switching Signal
	6 Buttons plus LED			Touch Button Keyboard
Working Environment Temperature	-10	45	^{0}C	
Operating Environment Humidity	10	85	%	

Appendix F: Trouble Shooting Tips and Error Explanations

The following tips can help to solve the problems you may encounter

1	No display after power on	➜Make sure the power outlet is live ➜Make sure the Input Power Cable is reliably connected to the power outlet
2	Displays normally, but no output	➜Make sure the Input Power Cable and Output Power Cable are firmly connected ➜Make sure the Output Voltage parameter value is not too small ➜Make sure the controller is not stopped by the control signal ➜Make sure the controller is not stopped by the parameters that are set as normal off
3	Control signal loses effectiveness	➜Make sure the control signal is correctly inputted ➜Make sure the ground wire of the control signal is correctly connected to the controller ➜Make sure the Logical Relation of the control signal is set correctly as you expectation
4	Beat phenomena	➜Avoid vibration coupling among the vibrators ➜Heighten the resonant frequency of the vibrators
5	Displays normally, no output, but sound can be heard	➜Adjust all parameters as this book instructed
6	Err01	➜Output in short-circuit, Make sure the Output Power Cable and the coil are not shorted out
7	Err02	➜Output Over Current, Reduce the Output Voltage value and make sure the armature gap is not too big
8	Err03	➜Overheat, Place the controller in well ventilated environment
9	Err04	➜Reserved, please contact CUH
10	Err05	➜Reserved, please contact CUH