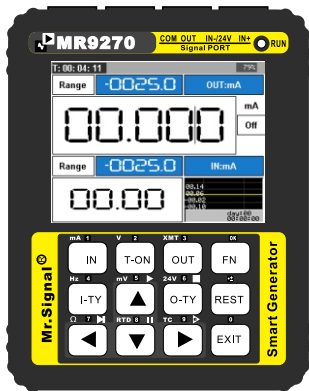


# SMART Signal generator



User Manual  
v2. 6

## User Guide

Dear User, thank you for choosing calibrator, Mr.Signal Smart, which is designed by Shanghai Lanyi Electronic Technology Co., Ltd.

Quick master the operation of Smart you need to learn the next four point.

**1.**Read “Instrument Brief Introduction” and “Technical Parameters” to know the main functions and signal types of the Smart.

**2.**Basic operation: how to choose signal type and signal mode. For example, If choose to output millivolt which is one of the signal types, and TC is one kind of millivolt, then millivolt and all kinds of TC is the signal mode.

**3.**Basic operation: Enter menu.

**4.**Basic operation: Set parameters of image controls of the menu.

---

# Smart -Signal generator

Model	MR9270S+HART	MR9270S+	MR9270CP	MR9270P
Current output	●	●	●	●
Voltage output	●	●	●	●
Simulator transmitter	●	●	●	●
Frequency/PWMSpeed output	●	●	●	
Thermocouple/millivolt output	●	●	●	
Resistance/Pt100/Cu50 output	●	●	●	
24V(transmitter power) Loop current measurement	●	●	●	●
Current input	●	●	●	●
Voltage input	●	●	●	●
Frequency/PWMSpeed input	●	●	●	
Thermocouple/millivolt input	●	●	●	
Resistance/Pt100/Cu50 input	●	●	●	
<b>Program extensions</b>				
Programming the output	●	●	●	●
Preset output	●	●	●	●
Signal conversion	●	●	●	●
RS485 interface of modbus	●	●		
USB modbus RTU	●	●	●	●
Firmware upgradeable	●	●	●	●
Real time curve	●	●	●	●
<b>The exclusive function of the Smart</b>				
Quantitative output pulse signal	●	●		
Pulse counting	●	●		
Modbus master station	●	●		
USB TO RS485 serial port	●	●		
20000 records some simple paperless recorder	●	●		
PID control panel	●	●		
HART Operator (built-in HART modem)	●			
PC suite, historical data operation	●	●		

## **Directory:**

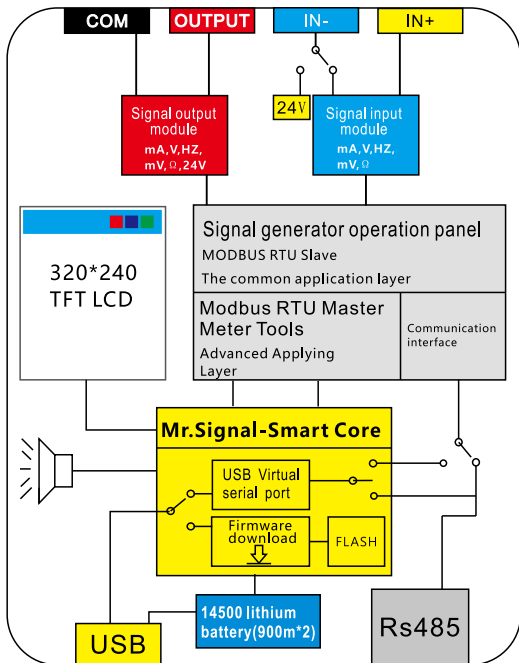
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2.Technical Parameters-----	3
3.Basic Operation-----	4
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---

# Smart -Signal generator

## 1.Instrument Brief Introduction

1.1 Smart has powerful performance for it has a high-speed ARM CPU and is easy to get start for it has friendly UI. The following is the structure chart of Smart.



## 1.2 Introduction of Software functions

### **Programmed Output:**

You can make Mr. Signal Smart to do auto increased/decreased output. There has two modes.

#### **Mode One:**

Set a period and start/end value of output. The output will be automatically linear increased from start value to end value and linear decreased from end value to start value in a period. The auto increased/decrease output will be repeated as many times as you want.

#### **Mode Two:**

Advanced setting, the changing of output is determined by more parameters.

#### **Type One:**

After setting the starting point, ending and cycles the equipment can start working.

#### **Preset Values:**

You may need only several fixed value of output in your daily work. The product allow you to customize 9 presetting value for you to quick output.

**Converting Signal:** Input can be converted into another kind of output. For example, Input Hz signal, then convert them into current output.

#### **Real-time Curve:**

The input/output changing can be displayed as curves. You can set the capture period and zoom in the curves according to the max and min.

#### **Display as Range/Actual Value:**

Input and output value can be displayed as actual value or range according to your wish. Actual value corresponds to range linearly. For example, 4-20mA corresponds to 0-100, then 4mA corresponds to 0, 12mA corresponds to 50, 20mA corresponds to 100. You can vary correspondence between actual value and range.

## **Modbus RTU Remote Control:**

Mr. Signal Smart will be able to communicate with PLC or configuration software via RS485 to online change output and monitor input.

## **Modbus RTU Master Station:**

To do communication test on, change parameters of, copy parameters of and monitor Slave devices with RS485 Modbus interface.

## **Extend Function:**

We may provide more function, such as PID controller, recorder etc. For further information, visit our company website.

## **USB Firmware Update:**

The device can get bug fixed and new function through firmware update via usb. You can download DFU package from our website.

## **USB to Rs485:**

The device can be use as a USB virtual RS485 serial port. A driver will be needed in os before Win10.

## 2. Technical Parameters

Output signal					
Type	Range	Precision	Resolution	Coefficient	Internal Impedance
Current(mA)	0~24mA	0.05%	0.001mA	<b>+25PPM</b>	<b>100Ω</b>
voltage (V)	0~12V	0.05%	0.001V	<b>+25PPM</b>	<b>500k</b>
Passive current (XMT)	0~24mA	0.1%	0.001mA	<b>+25PPM</b>	<b>100Ω</b>
24V Loop	0~24mA	0.1%	0.01mA	<b>+25PPM</b>	<b>100Ω</b>
frequency(Hz)	0~9999Hz	0.03%	5bit	<b>+10PPM</b>	<b>1Mk</b>
millivolt (mV)	-10~110mV	0.05%	0.01mV	<b>+25PPM</b>	<b>2K</b>
TC-S	0-1760°C	0.2%	1°C	<b>+25PPM</b>	<b>2K</b>
TC-B	0-1810°C	0.5%	1°C	<b>+25PPM</b>	<b>2K</b>
TC-E	0-990°C	0.2%	1°C	<b>+25PPM</b>	<b>2K</b>
TC-K	0-1320°C	0.2%	1°C	<b>+25PPM</b>	<b>2K</b>
TC-R	0-1760°C	0.3%	1°C	<b>+25PPM</b>	<b>2K</b>
TC-J	0-1190°C	0.3%	1°C	<b>+25PPM</b>	<b>2K</b>
TC-T	0-390°C	0.2%	1°C	<b>+25PPM</b>	<b>2K</b>
TC-N	0-1290°C	0.2%	1°C	<b>+25PPM</b>	<b>2K</b>
Pt100	-200~650°C	0.5%	1°C	<b>+50PPM</b>	<b>---</b>
Cu50	-20~150°C	0.5%	1°C	<b>+50PPM</b>	<b>---</b>

Input signal					
Type	Range	Precision	Resolution	Coefficient	Internal Impedance
Current(mA)	0~24mA	0.1%	0.001mA	<b>+25PPM</b>	<b>100Ω</b>
voltage (V)	0~12V	0.1%	0.001V	<b>+25PPM</b>	<b>500k</b>
frequency(Hz)	0~9999Hz	0.1%	5bit	<b>+10PPM</b>	<b>1Mk</b>
millivolt (mV)	-10~110mV	0.1%	0.01mV	<b>+25PPM</b>	<b>2Mk</b>
TC-S	0-1760°C	0.2%	1°C	<b>+25PPM</b>	<b>2Mk</b>
TC-B	0-1810°C	0.5%	1°C	<b>+25PPM</b>	<b>2Mk</b>
TC-E	0-990°C	0.2%	1°C	<b>+25PPM</b>	<b>2Mk</b>
TC-K	0-1320°C	0.2%	1°C	<b>+25PPM</b>	<b>2Mk</b>
TC-R	0-1760°C	0.2%	1°C	<b>+50PPM</b>	<b>2Mk</b>
TC-J	0-1190°C	0.2%	1°C	<b>+25PPM</b>	<b>2Mk</b>

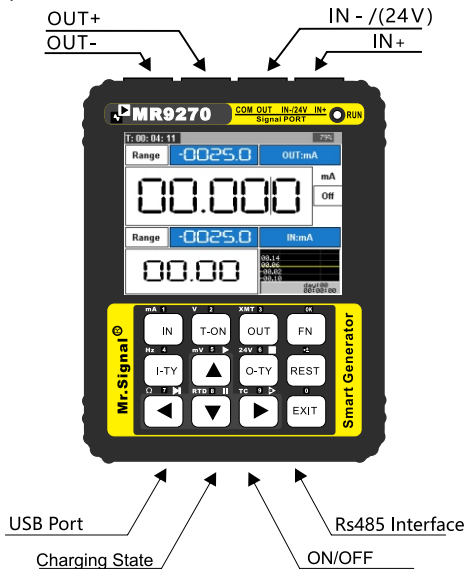


# Smart -Signal generator

TC-T	0-390°C	0.2%	1°C	+25PPM	2Mk
TC-N	0-1290°C	0.2%	1°C	+50PPM	2Mk
Pt100	-200~650°C	0.1%	0.1°C	+50PPM	2.5k
Cu50	-20~150°C	0.1%	0.1°C	+50PPM	2.5k
Resistor	0 - 400Ω	0.1%	0.01Ω	+50PPM	2.5k

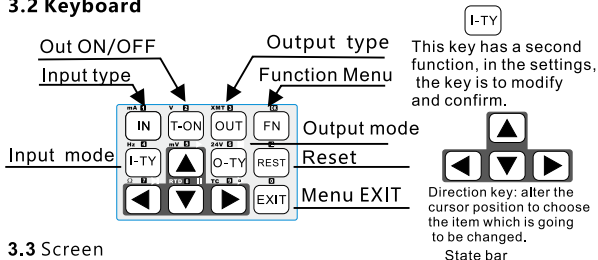
## 3. Basic Operation

### 3.1 Appearance

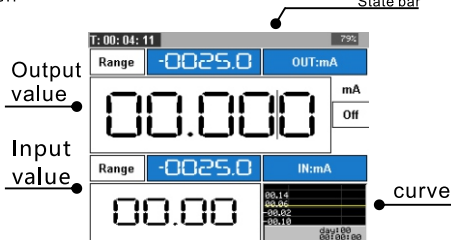


# Smart -Signal generator

## 3.2 Keyboard



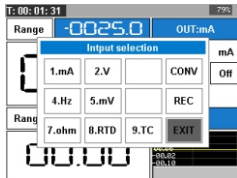
## 3.3 Screen



## 3.4. Choose Signal Type:



Press **OUT** to pop up output signal type choose menu, press the corresponding number key to choose a signal type.



Press **IN** to pop up input signal type choose menu, press the corresponding number key to choose a signal type.

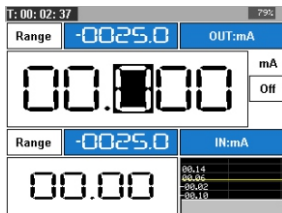
# Smart -Signal generator

## 3.5.Start Output:



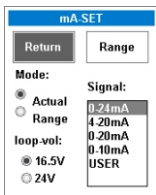
Press left and right arrow keys to choose a digit, press up and down arrow key to vary the digit.

**T-ON** You must press this key to turn on output signal.

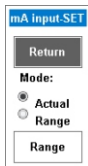


## 3.6.Enter Settings:

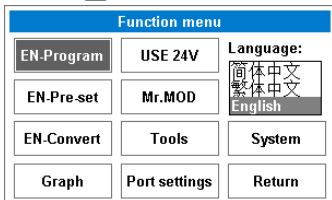
3.6.1 Press and hold **OUT** for 2 seconds to pop up output settings widgets. The following graphic is the settings when output type is current.



3.6.2 Press and hold **IN** for 2 seconds to pop up input settings widgets. The following graphic is the settings when input type is current.



3.6.3 Press **FN** to pop up system settings widgets.



## 3.7 Settings Widgets Operation:

Press to choose an item, Press to modify an confirm, press to quit or return.

### 3.7.1 Vary numerical value:

Choose an item, press , then the item can be modified. Then press direction key to vary the number. Finally press to save.

Range-H:

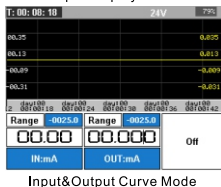
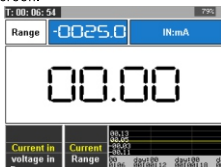
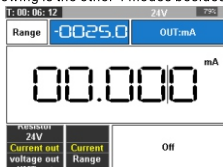
### 3.7.2 Adjust Slider:

Choose a slider, press , then the slider move left side. Press , the slider move right side. The changing will be save automatically every time.



## 3.8 Change Display Mode

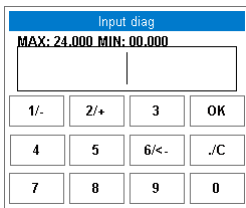
Press and hold for two seconds, The Display will be changed into 5 modes. The following is the other 4 modes besides the main screen.



# Smart -Signal generator

## 3.9 The use of digital keyboard window

Press **EXIT** to pop up numeric keyboard widget, the 12 keys in the widget correspond to the 12 hardware key on the device. The widget is for varying output value quickly. There may have a second function If Press and hold a key. For example , press and hold Digit '1' input minus sign.



number pad

## 4.Signal operation

### 4.1 Current output

4.1.1 Switch display mode: Press **O-TY** to change mode



Actual Value Display

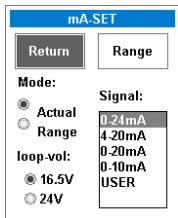


Range Display

4.1.2 Current circuit open testing: Press **T-ON** to start output. If a "OC/ON" flag flash on the screen, The circuit is open or no testing subject connected.

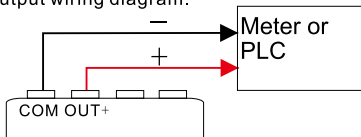
4.1.3 Current Output Settings: Press and hold **OUT** for 2 second to open settings widgets.

# Smart -Signal generator



**Mode:** choose display mode.  
**Loop-vol:** Change the voltage on the circuit. Default option is 16.5v for longer battery life. Some device need a 24V drive capability.  
**Range:** Learn more from section 1.2 Display as Range/Actual Value.  
**Signal:** Select an option to restrict output to a range. When you choose "User" option, you need to set a customized range according what you determine in "Range" widget.

## 4.1.4 Current output wiring diagram.

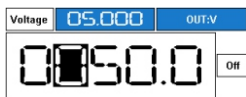


## 4.2 Voltage Output

4.2.1 Switch display mode Press **O-TV** to change mode.



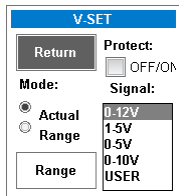
Actual Value Display



Range Display

4.2.2 **Voltage Output Settings:** Press and hold **OUT** for 2 second to open settings widgets.

# Smart -Signal generator



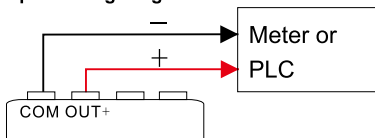
**Mode:** choose display mode.

**Range:** Learn more from section 1.2 Display as Range/Actual Value.

**Protect:** If there is a short in output circuit for 2 seconds, output will be turned off automatically.

**Signal:** Select an option to restrict output to a range. When you choose “User” option, you need to set a customized range according what you determine in “Range” widget.

## 4.2.3 Voltage output wiring diagram.



## 4.3 XMT Output Simulate a transmitter

### 4.3.1 Switch display mode Press **O-TY** to change mode



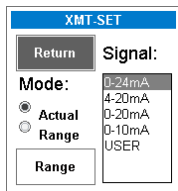
Actual Value Display



Range Display

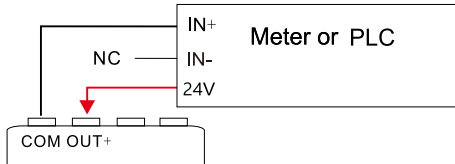
### 4.3.2 Current Output Settings: Press and hold **OUT** for 2 second to open settings widgets.

# Smart -Signal generator



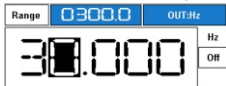
**Mode:** choose display mode.  
**Range:** Learn more from section 1.2 Display as Range/Actual Value  
**Signal:** Select an option to restrict output to a range. When you choose "User" option, you need to set a customized range according what you determine in "Range" widget

## 4.3.3 XMT output wiring diagram.



## 4.4 Pulse output

4.4.1 There are four type of Pulse mode Press and hold  for 2 seconds to change mode



Frequency output



PWM Duty ratio output



Speed frequency output

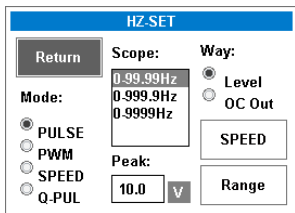


Quantitative output pulse



# Smart -Signal generator

**4.4.2 Pulse Output Settings:** Press and hold **OUT** for 2 second to open settings widgets.



**Mode:** choose pulse mode  
**Out range:** the frequency range of output.  
**Peak:** peak of wave form, max is 24V.  
**Way:** electrical level output (PNP) or OC switch output (NPN).  
**Speed:** Enter speed settings.  
**Range:** Learn more from section 1.2 Display as Range /Actual Value. Only work in pulse mode.

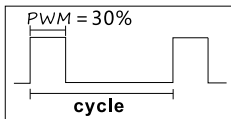
## 4.4.3 Pulse output-Frequency mode

Pulse is the most widely used mode. It has four kinds of range, which can be changed in output settings or by pressing **O-TY**.



## 4.4.4 Pulse output-PWM mode.

PWM is short for Pulse-Width Modulation. Pulse is modulated according to the percentage of keep electrical level high in a cycle. Two parameters need to be set, which are percentage and frequency. Press **O-TY** to alter from frequency setting and percentage setting.

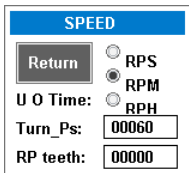


The main usage of PWM:

pulse heat system, adjustment of Motor speed, Light Brightness, brake strength, etc. PWM is widely used, especially in linear drive.

# Smart -Signal generator

## 4.4.5 Pulse output-Speed mode.



The best method to Calculate rotating speed of motor or gear is by pulse. For example, a motor generate a pulse for every rotation, if speed is 3000 rotations per minute, then 50 pulse will be generated for every second.

Frequency=RPS(rotations per second)\* the number of pulse generated every rotation.

$$RPM=RPS*60$$

$$RPM(\text{per minute})=RPS*60$$

$$RPH=RPS*3600$$

$$RPH(\text{per hour})=RPS*3600$$

RP teeth In a practical application, the gear of moter may have some

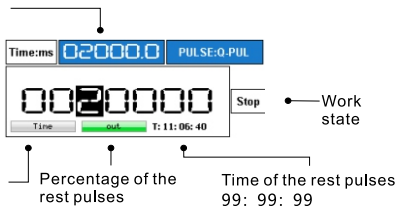
missing teeth. For example, a gear of a motor must have 60 teeth but deliberately have one loss. The rotating speed is calculated by the missing tooth.

## 4.4.6 Frequency output- Qualitative pulse mode

This function is to simulate flow sensor. For example, a liter of water flood over a turbine, sensor generated 100 pulses. The device generate pulses as a flow sensor will be.

The period of pulse.  
The unit is millisecond,  
min is 0.1ms.

The number or qualitative pulse



The rest period for the next pulse

Percentage of the rest pulses

Time of the rest pulses  
99: 99: 99

# Smart -Signal generator

Quantitative instructions:

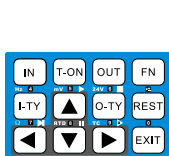


**Quantitative models and working condition**

**Stop:** the generation is stopped. The number of qualitative pulse can be modified.

**Pause:** the generation is suspended.

**Run:** the pulses are generating.



T-ON

The work state is from stop to pause.



Press when work state is pause, pulse start generation.



Press when work state is run, the generation is suspended.



Press when work state is run, one pulse will be generated.

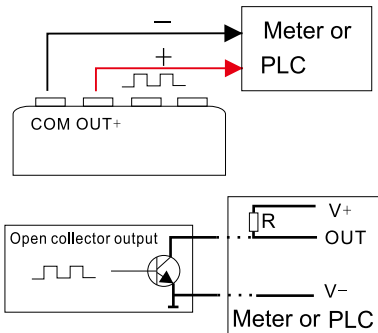
REST

Press when work state is run, the generation stop and reset.

O-TY

Press on any work state to modify the period.

## 4.4.7 Frequency output wiring diagram.



## 4.5 Millivolt/thermocouple Output

### 4.5.1 Switch mode Press **O-TY** to change mode

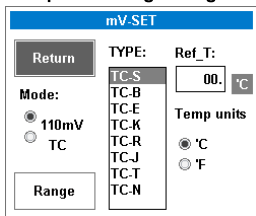


Millivolt output



Thermocouple output

### 4.5.2 Current Output Settings: Press and hold **OUT** for 2 second to open settings widgets.



**Mode:** choose display mode.

**Range:** Learn more from section 1.2  
Display as Range/Actual Value.

**Type:** Choose the type of thermocouple.

**Cold-T:** The temperature of cold junction.

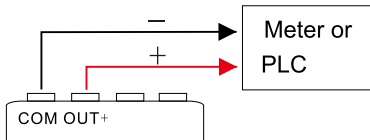
**Temp Unit:** set unit to be Celsius degree or Fahrenheit

Why need a cold junction compensation?  
Thermocouple work in testing spot and instrumentation work in monitor room.

The temperature is quite different

between these two places. The signal of TC base on 0 degree. And to avoid the signal is too faint to transfer to instrumentation, a circuit used for cold junction compensation is a must. If find out the temperature measured by instrumentation is higher than it should be, when device simulate TC, you should set the temperature of cold junction.

### 4.5.3 Millivolt output wiring diagram.



## 4.6 Resistance Output

### 4.6.1 Switch mode Press **O-TY** to change mode

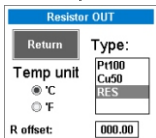


Resistance Value Output



Thermocouple Output

### 4.6.2 Resistance Output Settings: Press and hold **OUT** for 2 second to open settings widgets.

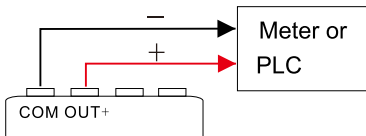


**Temp Unit:** set unit to be Celsius degree or Fahrenheit

**Type:** type of RTD

**Resistance offset:** correct the resistance output.

### 4.6.3 Resistance output wiring diagram.



## Use attention:

RTD is a special signal, which is not a electronic signal. So the device has some requirement to generate resistance output. Instrumentation supply a voltage for RTD to vary current and voltage as the temperature changed. The Voltage of instrument should be lower than 10V or the device will be fail to simulate a RTD. You can make device generate RTD signal and measure by itself to check if the RTD output is work. Usually the voltage of instrumentation is lower than 5V, current is lower than 1mA, or the lifetime of RTD will be reduced.

# Smart -Signal generator

## 4.7 24V loop detection (transmitter power supply and detection of current and output ports)

### 4.7.1 Switch mode Press **O-TY** to change mode

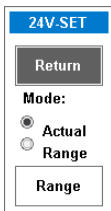


Actual Value Display



Range Display

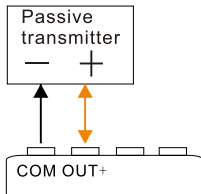
### 4.7.2 Current Output Settings: Press and hold **OUT** for 2 second to open settings widgets.



**Mode:** choose display mode.

**Range:** Learn more from section 1.2  
Display as Range/Actual Value.

### 4.7.3 24V loop output wiring diagram.

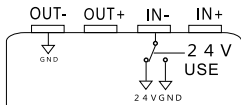


There are many kinds of transmitter, for example: pressure transmitter, temperature transmitter, pneumatic valve feedback transmitter, etc.. Test equipment supply current can not be more than 24mA.

## 4.8 Independent 24V

### 4.8.1 Recognition of independent 24V

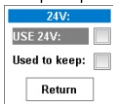
- □ Input (-) can be switched to an independent 24V function, which is a single output 24V. 24V terminals and input (+) with the use of the transmitter can be tested. Its main purpose is to test the pneumatic control valve or two wire transmitter.



**Tip:** 24V loop detection and independent 24V difference is, 24V loop detection using output signal port power supply and measurement feedback current, independent 24V port and the output (-) port composition 24V power supply, also can be input and (+) composed of transmitter power supply and measuring transducer feedback current.

### 4.8.2 USE 24V

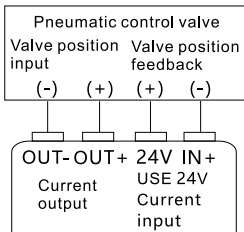
Enter the function menu select "24V USE", the status bar will appear 24V prompt and flashing



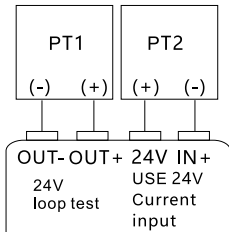
**USE 24V:** Enable independent 24V start output.

**Used to keep:** Enable the 24V status after each boot to keep the state in the last boot. Conversely, each boot 24V need to manually open.

### 4.8.3 wiring diagram:



Pneumatic control valve test

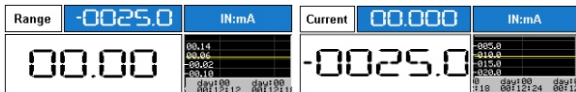


Simultaneous testing of two two wire transmitter.

# Smart -Signal generator

## 4.9 Current input

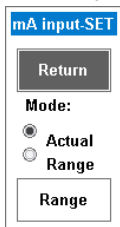
4.9.1 Switch display mode Press **I-TY** to change mode.



Actual Value Display

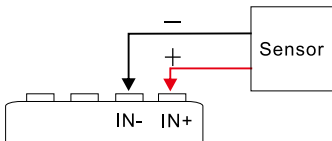
Range Display

4.9.2 Current input Settings: Press and hold **IN** for 2 second to open settings widgets.



**Mode:** choose display mode.  
**Range:** Learn more from section 1.2  
Display as Range/Actual Value.

4.9.3 wiring diagram:



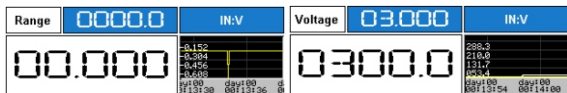
Signal  $\leq 24\text{mA}/<30\text{V}$



# Smart -Signal generator

## 4.10 Voltage input

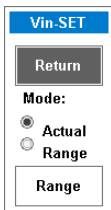
4.10.1 Switch display mode Press **I-TY** to change mode.



Actual Value Display

Range Display

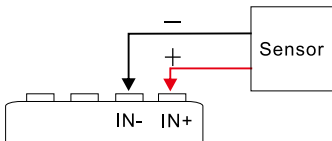
4.10.2 Voltage input Settings: Press and hold **IN** for 2 second to open settings widgets.



**Mode:** choose display mode.

**Range:** Learn more from section 1.2 Display as Range/Actual Value.

4.10.3 wiring diagram:



Signal = - 4V~30V

## 4.11 Pluse input

### 4.11.1 Switch display mode Press **I-TY** to change mode



Frequency input mode



PWM input



Frequency speed mode



Pluse counting

### 4.11.2 Pluse input Settings: Press and hold **IN** for 2 second to open settings widgets.

HZinput-SET

Return

**Mode:**

Pulse

PWM

Speed

Count

SPEED

Range

**Way:**

Level in

OC in

**Count way:**

Rising

Falling

R/F

**MODE:**Pluse on work mode.

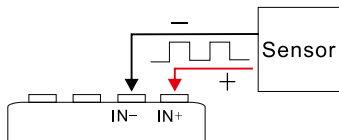
**Speed:** Working principle of pulse output is the same.

**Way:**input way.

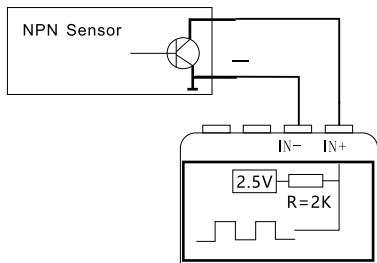
**Count way:**Rising edge representation level from 0V to rise to the peak of the pulse, the counter plus 1, down along the said input level down to 0V counter plus 1, jump is input level as long as the upper and lower jump, the counter is incremented by 1, reset the counter, please press the **REST**

# Smart -Signal generator

## 4.11.3 wiring diagram

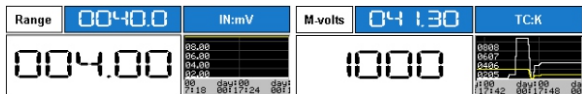


The frequency of the input range is 0-9999HZ



## 4.12 Millivolt/thermocouple Input

### 4.12.1 Switch display mode Press **I-TY** to change mode

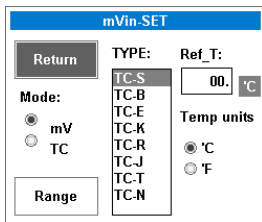


Actual Value Display

Temperature display

# Smart -Signal generator

4.12. 2 Millivolt input Settings: Press and hold **IN** for 2 second to open settings widgets.



**Mode:** choose display mode.

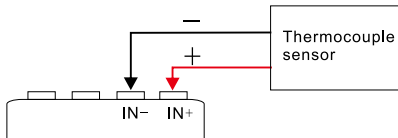
**Range:** Learn more from section 1.2 Display as Range/Actual Value.

**Type:** Choose the type of thermocouple.

**Colt-T:** The temperature of cold junction.

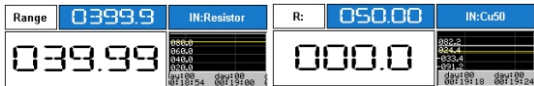
**Temp Unit:** set unit to be Celsius

## 4.1 2.3 wiring diagram



## 4.13 Resistance/Pt100/Cu50

4.13.1 Switch display mode Press **I-TY** to change mode

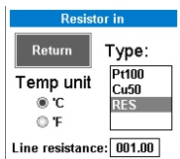


Actual Value Display

Temperature display

# Smart -Signal generator

4.12. 2 Resistance input Settings: Press and hold **IN** for 2 second to open settings widgets.

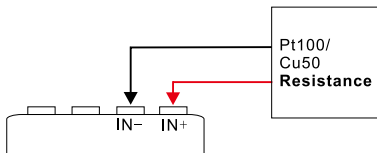


**Temp Unit:** set unit to be Celsius degree or Fahrenheit

**Type:** type of RTD

**R offset:** correct the resistance output.

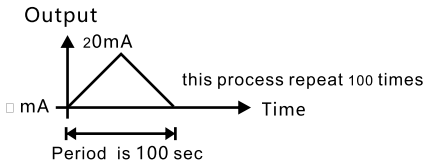
## 4.13.3 wiring diagram



## 5. Programmable Output

According to the parameters you set, the output will be automatically increased and decreased as many times as you want. It is use for the aging test of valve, PLC debugging, etc.

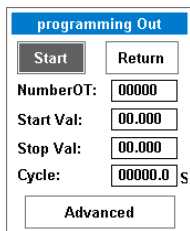
### 5.1. Set Four Parameters For Quick Programmable Output



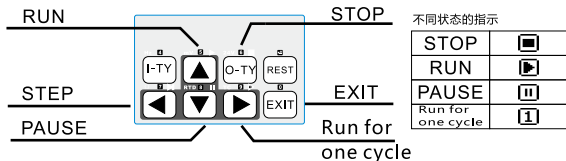
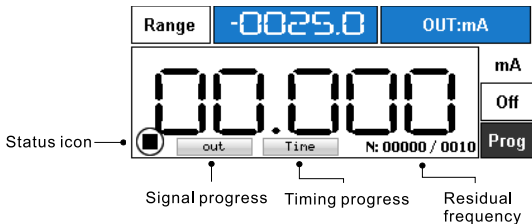
# Smart -Signal generator

## 5.2 Start programming output

Press **FN** , enter the function menu to select the “EN-Program”.



Programming output window selection starts, will automatically return to the main interface, waiting for the user to start running.

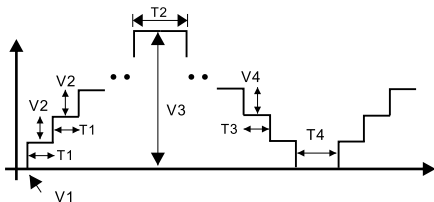


## 5.3 Advanced

Advanced		
<input type="button" value="Return"/>	UP Step:	<input type="text" value="00.000"/>
Mode:	Step Time:	<input type="text" value="000.0"/> S
<input checked="" type="radio"/> Cycle	Stop Time:	<input type="text" value="000.0"/> S
<input type="radio"/> Custom	Down Step:	<input type="text" value="00.000"/>
	Step Time:	<input type="text" value="000.0"/> S
	Stop Time:	<input type="text" value="000.0"/> S

**Cycle:** programmable output will work according to parameters in preview menu.

**USER:** programmable output will work according to parameters in current menu plus parameters in previous menu.



**V1:Start Val(Previous Menu)** : The floor of output

**V2:Up Step** : Increase amount of every step

**T1:Step Time**:Increase every step time

**T2:Stop Time**:Idle time on the ceiling

**V3:Stop Val(Previous Menu)**:The ceiling of output

**V4:Down Step**:Decrease amount of every step

**T3:Step Time(Second One)**:Decrease every step time

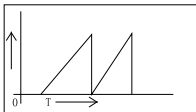
**T4:Stop Time(Second One)**:Idle time on the floor

**Tip:** the use of custom mode and set the 6 parameters, return to the programming output window, the increase or decrease of the cycle will be displayed with the custom to re calculate the cycle.

# Smart -Signal generator

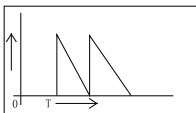
## 5.4.Set Parameters To Output Other Waveforms

rise sawtooth waveform



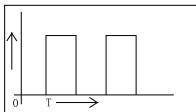
Set Down Step as Stop Val minus Start Val. When output has been increased to Stop Val, it will be decreased to Start val in one step.

fall sawtooth waveform



Set Up Step as Stop Val minus Start Val. When output has been decreased to Start Val, it will be increased to Stop val in one step.

Pulse waveform

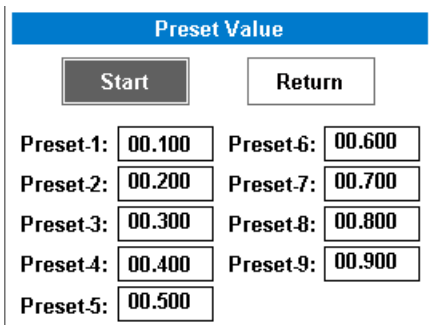


Extend Stop Time



## 6.Preset

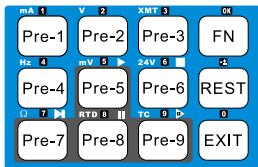
6.1 Press **FN** enter the function menu to select the “EN-Pre-set”.



## 6.2 Pre setting operation

Enable the pre setting, the keyboard of the left three keys into a pre occupied, the right to continue to use, press the **EXIT** button to exit the pre set function.

**EXIT**



## 7.Signal conversion

Users in the test process, if you need to use the signal conversion, such as the frequency of 0 - 100Hz converted to 4 - 20mA, then you can use the signal conversion function.

Press **FN** enter the function menu to select the "EN-Convert".

Signal Convert	
Start	Return
Input-H:	0010.000
Input-L:	0000.000
Output-H:	0010.000
Output-L:	0000.000
Ovrange:	<input checked="" type="checkbox"/> Yes/No
Auto RUN:	<input type="checkbox"/> Yes/No

**Input H/Input L:**Signal range of input signal.

**Output H/Output L:**Signal range of output signal.

**Ovrange:** For example, 1-5V converted into 4-20mA, if the user check this, when the input is 0V, the output will follow to 0mA, if the user does not check, then the output is 4mA, the output is locked in the range of settings.

**Auto RUN:** Check this option, the

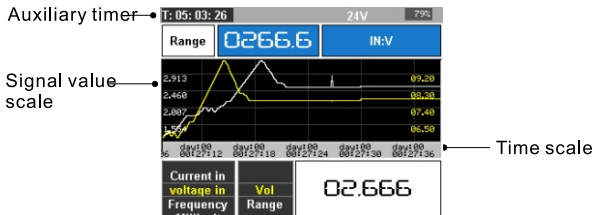
next boot will automatically start the signal conversion, when the switch to work in the press of the **EXIT**, the signal conversion will exit and disable RUN Auto check.

## 8.Real time curve

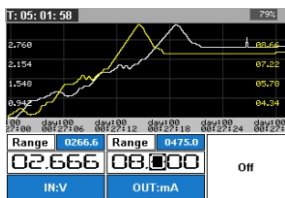
Used to analyze the changing trends of signals.

8.1 Hold down the **EXIT** key for 2 seconds, you can switch to the big curve screen.

# Smart -Signal generator



Input signal curve interface



Input signal output signal at the same time working curve interface.

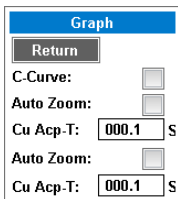
## 8.2 Real time curve operation

**Real time curve of pause refresh:** by leaning on **T-ON** for 2 seconds, the real-time curve box will appear pause and flashing, then the real curve of pause refresh, continue to press this button for 2 seconds, real-time curve began to refresh.

**Auxiliary timer is cleared:** the auxiliary timer shows the time of the machine running, hold down the **REST** 2 seconds timer cleared. Please use this function with clear and flexible.

# Smart -Signal generator

**8.3 Enter the real-time curve setting window:** press the **FN** to display the function menu to select the real time curve.



**Output Graph:** open the output signal to follow the curve (yellow line).

**Auto Zoom:** automatic adjustment of the output signal scale range, the maximum value of the minimum curve to automatically adjust the Y axis scale range.

**Cu-Acp-T:** the refresh interval time of the output curve.

**Auto Zoom:** the scale of the

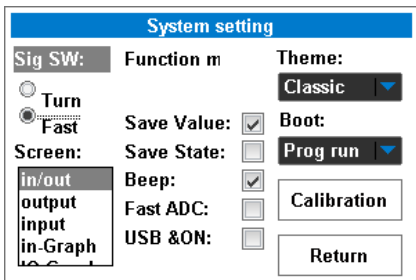
input signal is automatically changed.

**Cu-Acp-T:** the time of the refresh interval of the input signal.

## 9. System setting

### 9.1 Enter system setup window

Press **FN** enter the function menu to select the "System"



**Sig SW:** the way of signal selection

**Screen:** select the working interface.

**Backlight:** adjusting backlight brightness.

**Save Value:** save the output value before the shutdown.

**Save State:** the output signal of the switch state to maintain, (if the signal is open every time the signal can be set up, usually with the signal conversion work).

**Beep:** Beep switch.

**Fast ADC:** to improve the speed of signal input and refresh.

**USB & ON:** plug in the USB power supply, the instrument automatically enter the working state, no check, the instrument on the electric reserve at the charging interface. If the instrument is inserted in the USB PC port, and the driver is normal, the instrument will automatically boot.

**Theme:** change the color scheme of the instrument.

**Fn function:** hold down the **FN** key for 2 seconds, can quickly start the program function.

**Calibration:** the fine tuning window into the signal.

## 10.Modbus RTU Slave

Using the standard RTU Modbus protocol, can use the configuration software or PLC for remote control and monitoring.

**10.1** Press **FN** enter the function menu to select the "Port setting".

ComPort Setting	
Mode:	USB RS485
Baud:	19200
Parity:	NONE
StopBit:	1
Slave address:	001
Return	

# Smart -Signal generator

## 10.2 Instrument register address and description

Name	Address	Data type	ATT	instructions
ID	40001	ushort	R	
Battery voltage	40002	ushort	R	MR9270 Battery voltage
CPU-ID	40003	ulong	R	Unique product number
Reserve	40005~4008			other
OUT select	40009	ushort	R/W	X=0:Current, X=1:Voltage, X=2:Passive current, X=3:Frequency, X=4:millivolt, X=5:Resistance, X=6 24V Loop
OUT switch	40012	ushort	R/W	Switch of output signal, turn on the output signal when =1
temperature	40015	ushort	R	cold end temperature
OUT Value	40017	long	R/W	Set the output signal to read the current set value and synchronize with the register 40019
OUT Value	40019	float	R/W	Set the output signal to read the current set value and synchronize with register 40017

## Smart -Signal generator

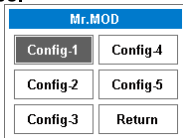
input select	40041	ushort	R/W	X=0:Current, X=1:Voltage, X=2:Frequency, X=3:millivolt, X=4:Resistance,
temperature	40047	short	R/W	The cold end temperature
input value	40049	long	R/W	Same function as floating point display, but integer representation
input value	40051	float	R/W	Same function as integer display, but floating point representation

## 11.Modbus Master -Mr.MOD

Modbus main function of the main functions of this product, will be updated regularly, this note only shows the basic operation, such as the update staff will be released in the website, please pay attention to! Modbus master station is mainly used to modify the instrument parameters, parameter replication monitoring, test communication is normal. Communication mode to use the RS485 interface, the interior has a three pole protection, can prevent more than 100V of static electricity, and short circuit protection, PTC self recovery insurance.

# Smart -Signal generator

11.1 Modbus master has 5 configurations for users to test different devices.



## 11.2 Modbus master interface

Communication count

Master tag

Register label

Device address

Register address

24V 79%

T: 00: 03: 27

Modbus Tx: 00014 Er: 00000 Rx: 00000 REG:01/02 BT: 9600 N 8 1

Register information	Value	Staut
PV 001: 400001   Short	00000	Offline
OUT 001: 000002   Bit	[ 0 ]	Offline

Online instruction

Value data type

Error count

Number of registers

Baud rate information

Run Pause Add Setup

Master Slave

IN T-ON OUT FN

Corresponding to the keyboard. The first row of keys

The diagram shows a Modbus master interface with various status indicators and a data table. Labels point to specific elements: 'Communication count' points to the top left; 'Master tag' points to the 'Modbus' label; 'Register label', 'Device address', and 'Register address' point to the first two columns of the table; 'Value' and 'Value data type' point to the third and fourth columns; 'Online instruction' points to the 'Staut' column; 'Error count' and 'Number of registers' point to the top right; 'Baud rate information' points to the BT: 9600 N 8 1; 'Run', 'Pause', 'Add', and 'Setup' buttons are at the bottom; and a keyboard key set (IN, T-ON, OUT, FN) is shown below with a note that it corresponds to the first row of keys.



## 11.3 Modbus master parameter settings

Press FN to enter the main station parameter setting.

Modbus Service setting	
Return	Modbus
Update T:	0300. ms
Baud rate:	9600
Timeout:	0500. ms
Check:	None
Stop bit:	1
Port:	RS485
Return	
Out range	<input checked="" type="radio"/> Auto <input type="radio"/> Manua <input type="radio"/> Slave

**There are two modes operation:**

**Auto:** the user triggers the running button, the program starts polling from the station equipment variable, the real-time refresh variable, and the on-line modification variable.

**Manual:** read operations and write operations are performed manually, according to a write button, the program on a polling station equipment. To modify the parameters to modify a unified, according to the write button, the program will automatically change the variable in order to write.

## 11.4 Add a register

Press the "Add"

Add register	
OK	Return
DRV Addr:	001.
Reg TYPE:	ushort
Point:	01:00X
Usual Label:	-----
Reg addr:	00001
Usual Lz:	Reg_
Add more:	01.
Reg Order:	1234

**DRV Addr:**range 0-255

**CMD:** Selection of instructions from the transmitting device, 03:40x. 03 said protection instructions operate on registers and 40x said MODBUS register address prefix, such as the address of a variable set 00001, then access the register address as 40001 and hexadecimal address 0000.

**Add more:** the number of variables to add, such as adding a number of 10, then the variable address will automatically increment.

# Smart -Signal generator

## Reg TYPE:

**ushort** : 16bit unsigned integer

**short:** 16bit integer

**Byte-1:** 8 bits in the first byte integer (Modbus the underlying protocol variables are 16 bits of data, if the user wants to take 8 integers, then the bytes are selected by the user)

**Byte-2:** Second 8bit byte integer

**ulong:** 32bit unsigned integer

**long:** 32bit integer

**Float:** 32 bit single precision floating point number

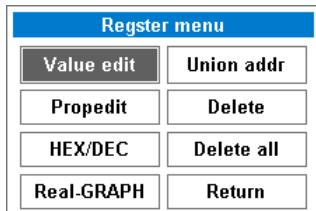
**Commonly used labels and Tags:** Comments on the role of.

**Data Order:** MODBUS master read variables, the rearrangement. Such as: a floating point number is composed of four words, since MODBUS differs from the station equipment by the CPU, there may caused a four byte floating point in different rows, a 32-bit integer is similarly, so that read back data anomalies, can modify this setting.

Setup is completed, you can press the  key to confirm the addition, you can also select the OK key.

## 11.5 Register operation:

In the Modbus master interface according to the  to display the register window.



# Smart -Signal generator

---

**Value edit:** Pop up digital keyboard to modify.

**Propedit:** Edit select register.

**HEX/DEC:** Decimal display and sixteen decimal display.

**Real-GRAPH:** Reserve.

**Union addr:** Set the device address of the other register to the same as the selected variable address.

**Delete:** Delete a register.

**Delete all:** Delete all register.

**Fast modify register value:** in the MODBUS main interface, press  to pop up the digital keyboard.

**Bit change:**  key on the main interface of the MODBUS

## 12. Attentions

### 12-1. Extend Battery Life

If you are going to leave the instrument unused for a long time. Do not keep it with an empty battery. Please fully charge the battery before keep it. Discharge and charge at least one time in every 3 month to keep the battery active.

### 12-2. The battery replacement

If the battery has bad need to change, be sure to use the battery manufacturer established parameters, or purchased from the manufacturer. Battery for: 14500 rechargeable lithium battery, voltage of 3.6 V, charging termination voltage of 4.2 V, normal manufacturer of battery capacity Is in commonly 800 ~ 900 ma, the weight of the battery in about 20 g, please normal manufacturer of battery, It is forbidden to use AAA batteries, battery types are different.

### 12-3. Self-Check

If you suspect that the instrument does not work. As the instrument allows input and output at the same time, you can do a self-Check this way. Output a signal, and connect the output to the input terminal. The instrument can meter the signal generated by itself.