润泽流体 RUNZE FLUID

Key Components for Analytical Instrument
Ecological Closed-loop Supplier

Version 1.0

LV50 Series Intelligent Switching Valve Manual

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Content

Chapter 1 Product Introduction

1.1 Brief Introduction

The LV50 series intelligent switching valve can achieve basic programming, which can realize the port switching in accordance with the predetermined logical sequence, and the CAN bus communication is adopted internally; The RS232/RS485 communication bus of the switching valve is bridged to the external DB15 terminal of the device for backup.

1.2 Features

LV50 can be regarded as a programmable control switching valve. The logical sequence, stay time (hour/minute/second), and cycle index can be preset through the keypad. You can perform operations such as adding and deleting items. The interface function is clear and intuitive.

Chapter 2 Description of Product Technical Parameters

2.1 Product Technical Parameters

2.1.1 Valve head: Compatible with universal switching valves figured with 6 or more ports in RUNZE protocol

2.1.2 Cycle index: Support 1~9999 times loop, or 0000 means infinite loop

2.1.3 Number of members: Support 1~999 members, at least 1 member

2.1.4 Rotary encoder control interface: Has a nicer man-machine conversation interface

2.1.5 Power supply: DC24V±10%

2.1.6 Power: 20W

2.1.7 Working environment: Temperature range: 0 ~ 40C°; Relative humidity <80%

2.1.8 Dimension

Dimension	Length (mm)	Width (mm)	Height (mm)
LV50 6	200	100	93
LV50 8	200	100	93
LV50 10	200	100	93
LV50 12	205	100	93
LV50 16	210	100	93

2.1.9 Weight: 1.58kg~1.68kg

2.1.10 IP rate: IP31

2.2 Overall Structure Diagram

Figure 2-1 The structure diagram of the LV50 intelligent switching valve

2.3 DB15 Interface Definition

No.	Item	Description
1	NC	null
2	RS232-TXD	Built-in switching valve RS232 data sending
3	S232-RXD	Built-in switching valve RS232 data receiving
4	B	LV50 plug-in mode RS485 port B
5	A	LV50 plug-in mode RS485 port A
6	OUT1	Status output 1 (default status is high 3.3V, the status is low when the cycle starts)
7	OUT2	State output 2 (default status is high 3.3V, the status is low when the valve moves)
8	D0	Signal input interface (spare, no such function temporarily)
9	GND	Grounding
10	EX_ST	External start-stop signal input interface (triggered when shorted to ground once)
11	RS485-A	Built-in switching valve RS485 port A
12	RS485-B	Built-in switching valve RS485 port B
13	SWD-DIO	SWD data
14	SWD-CLK	SWD clock
15	+5V	DC5V power supply (spare)

Table 2-1 The definition of DB15 external terminal attribute

2.4 Memory Attributes

In order to facilitate the understanding of the memory media types involved in the subsequent descriptions, relevant explanations will be provided in advance.

Memory media	Volatility	Read-write	Read-write limit	Abbreviation
RAM memory block	Volatile	Radom	Almost unlimited times	RAM
CODE memory block	Non-Volatile	Read only	10000 times	CODE
FLASH memory block	Non-Volatile	Block erase/rewrite	10000 times	FLASH
Ferroelectric memory block	Non-Volatile	Read and write	1014 times	Ferroelectric

2.5 Power-on Specific Function Switch

2.5.1 Query version function.

Press and hold the "ENTER" key to turn on, you can check the software version and software release time.

2.5.2 Chinese /English interface switching.

Press and hold the "HOME" key to turn on, switch between Chinese and English interface.

2.5.3 CAN communication control mode.

Press the "left key" to switch to the CAN communication control mode (default).

2.5.4 RS485 communication control mode.

Press the "right key" to turn on, switch to RS485 communication control mode.

Note: Use in special circumstances, see "3.6 Bridge Operation Mode" for details

2.5.5 Store the latest factory settings.

Press and hold the "NEW key" to turn on, the ferroelectric parameters will be transferred to FLASH. (Note: Similar to FC function, while parameter editing is completed, use once, avoid frequently use)

2.5.6 Restore the latest factory settings.

Press and hold the "Delete" (DEL) key to turn on, and the FLASH parameters will be transferred to ferroelectric. (Note: similar to FF function, use it with caution)

2.5.7 Completely restore factory settings.

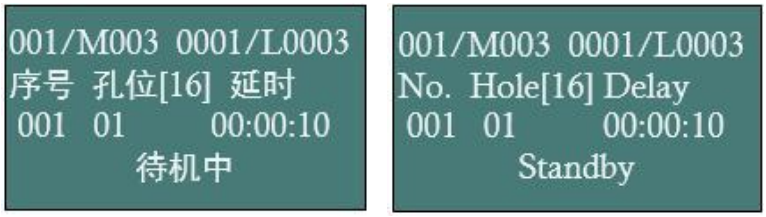
Press and hold the "Edit" (EDIT) button to turn on, and use the CODE area parameters to completely restore the factory settings. CODE -> Ferroelectric -> FLASH (Note: similar to erase function, use it with caution)

Chapter 3 Interface Introduction

3.1 Power-on self-test interface

3.2 Home Screen

Note: three switchable holes by default in the main interface, you can either add or delete holes if required.



The interface information is described as follows:

The 1st line indicates in turn: the current member is 001/total members is M003; the current cycle is 0001/total number of cycles is L0003.

The 2nd line means: "Serial No.--Port number [maximum effective port] --Delay" information prompt.

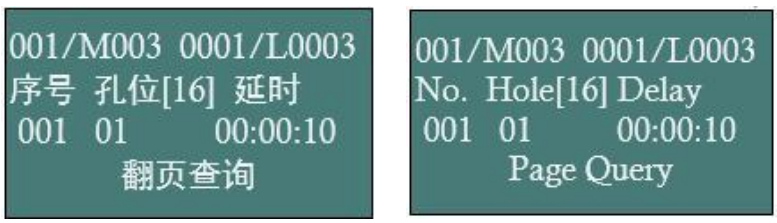
The 3rd line means: current serial No.-port number - holding time (hour: minute: second)

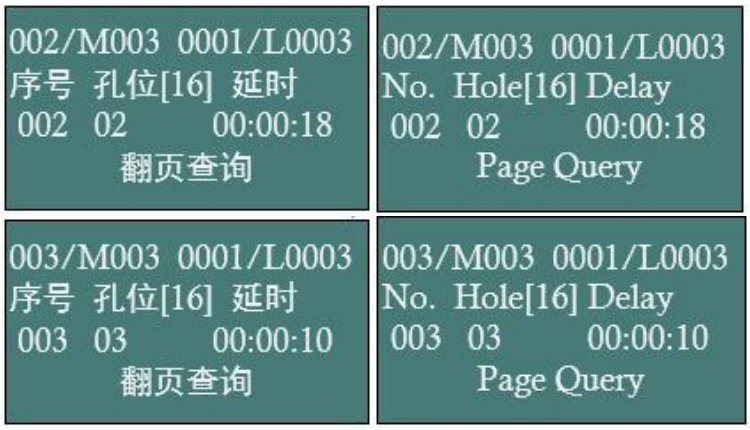
The 4th line is the information prompt area.

The same content in the follow-up will not be repeated here.

3.3 Query Operation

In the home screen, press the "PAGE/up/down key" to query the content of a member.





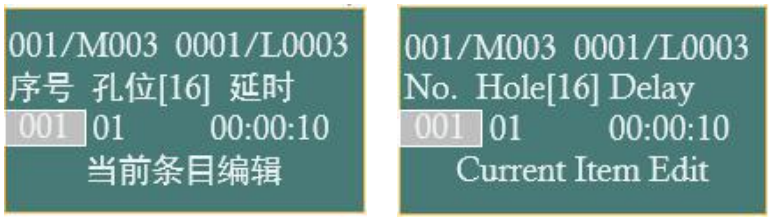
3.4 Edit Operation

3.4.1 Selection interface of item edit

In the main interface or any query interface, press the "EDIT" key to enter the item edit selection interface. When you enter item editing for the first time, the content of the "Serial Number" position is in reverse display. At this time, you can press the "PAGE" key/up key/down key to change the member object to be edited currently.

Note: the number of total members smaller than or equals to 10, page jump is 1

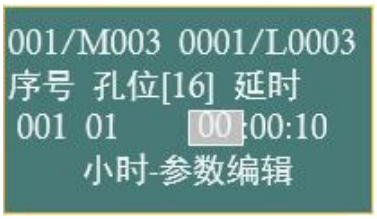
the number of total members bigger than 10, page jump is 10

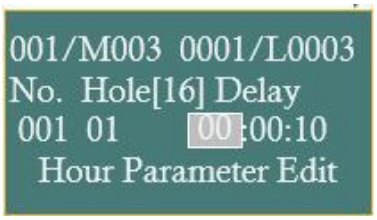


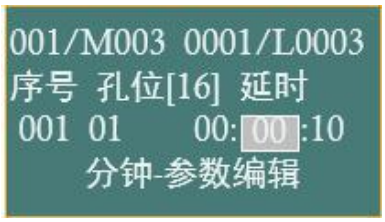
3.4.2 Editing interface of basic parameters

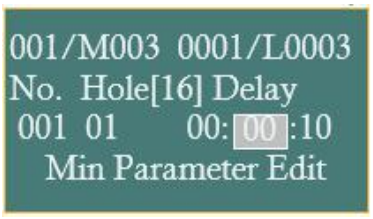
The basic parameters include "port No./hour/minute/second"

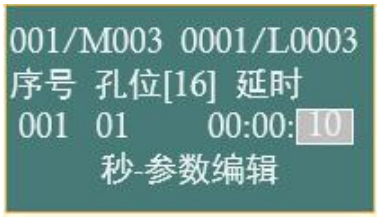
In the 3.4.1 interface, press the left/right key to switch to the basic parameter editing state of the current item. After entering this state, you can use the up key/down key/rotary encoder to modify the corresponding parameters.

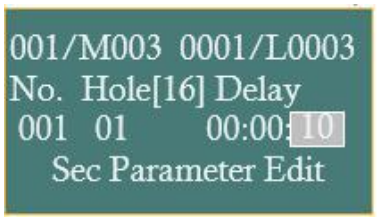












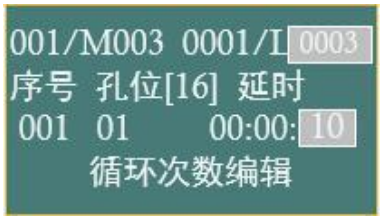
After editing the parameter "port No. /hour/minute/second", press the "ENTER" key to return to the item editing interface. At this time, the changed information of the item is temporarily stored in the RAM memory area. Meanwhile, you can continue to edit other items through "Page key /Up key/Down key/Rotary encoder".

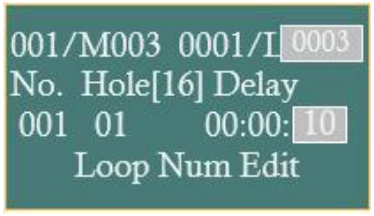
When all the items are edited and then press the "ENTER" key in the item editing interface to return to the main interface, the editing parameters of all items are saved in the ferroelectric memory.

Note: If you press the "HOME" key to return to the main interface after editing all items, the editing parameters of all items are only saved in the RAM memory area, not in the ferroelectric or FLASH memory. Under the condition of uninterrupted power restart, it can run according to the latest edited parameters. After power off then restart, it will run according to the last parameters saved in the ferroelectric memory.

3.4.3 Editing interface of the total cycle index

In the editing interface of 3.4.1 / 3.4.2, if you press the "EDIT" key again, you will enter the editing interface of the total number of cycles.

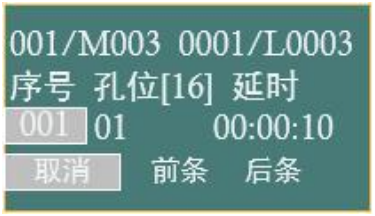


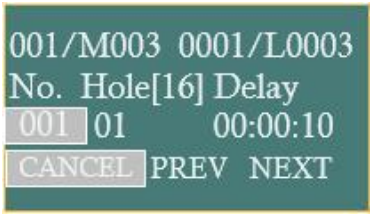


After entering this state, you can use the up key/down key/rotary encoder to modify the corresponding parameters. Long press and hold the up/down key to quickly change the total number of cycles. After editing, press the "ENTER" key to return to the item editing interface. At this time, the changed information of the total number of cycles has been saved in the ferroelectric memory.

3.4.4 Operation of adding items

In the 3.4.1 editing interface, press the "NEW" key to enter the operation of adding items.





At this time, the left/right keys can be used to select "Cancel"/"Previous"/"Next".

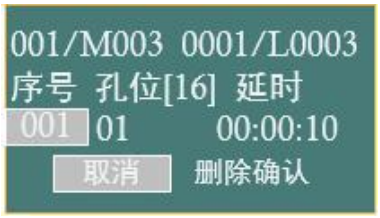
Select "CANCEL" (CANCEL) and press the "ENTER" key to exit the operation of adding items.

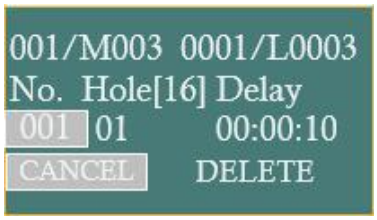
Select " PREV " (PREV) and press the "ENTER" key to add an item in the previous position of the current item. The original current item and all subsequent items are moved back by one item.

Select "NEXT" and press the "ENTER" key to add an item to the next position of the current item. All items after the original current item are moved back by one item position.

3.4.5 Operation of deleting items

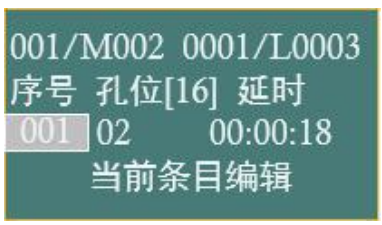
In the 3.4.1 editing interface, press the "DEL" key to enter the operation of deleting items.

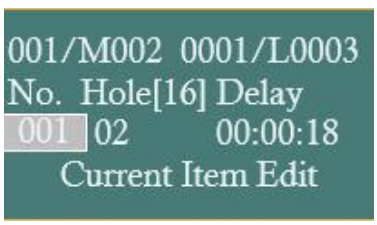




At this time, the left/right keys can be used to select "Cancel"/" Delete".

Select "CANCEL" (CANCEL) and press the "ENTER" key to exit the operation of deleting items.





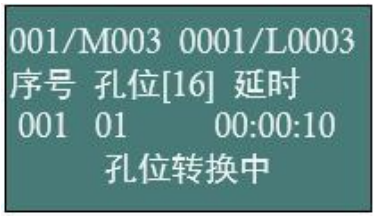
Select "DELETE" and press "ENTER" to delete the current item, and all items after the original

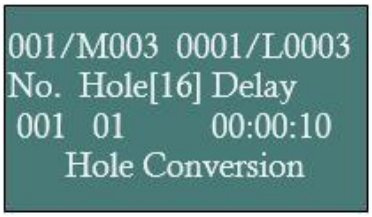
current item are moved forward by one item. The total number of members is reduced by 1. When the current total number of members is 1, that is, when M001 is displayed, the deletion cannot be continued.

3.5 Running Operation

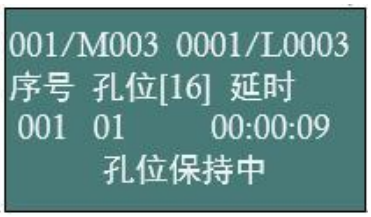
3.5.1 Start the control flow

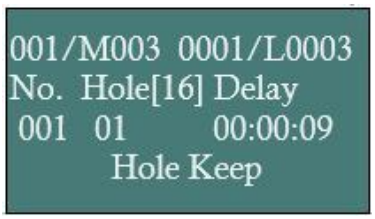
In the 3.2 main interface, press the "ON/OFF" key to start the switching valve control flow.



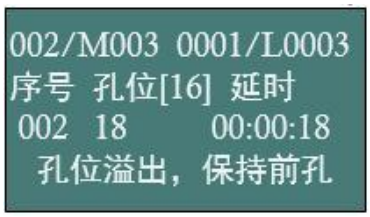


After the port switching is over, "Hole position is being held" is displayed.





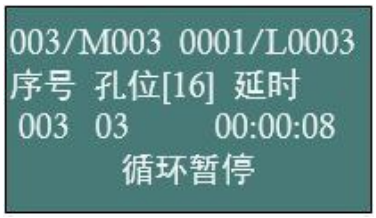
Countdown starts from the pre-set holding time, once the countdown reaches 0, it will automatically switch to the port of the next item. If the preset port No. exceeds the maximum port No., an error will be reported and the countdown will be valid.

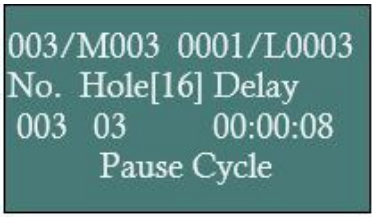


When the current cycle is over, it will automatically switch to the next cycle. When all cycles are over, the control flow ends.

3.5.2 Pause the control flow

During the start of the control flow, when the port position is hold (Hole Keep), if the "ON/OFF" key is pressed, the control flow is suspended. During the switching of port Hole Conversion), the pause operation is invalid.

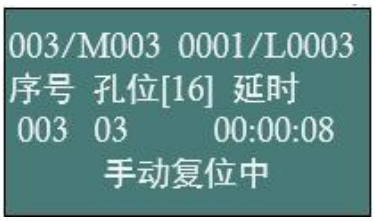


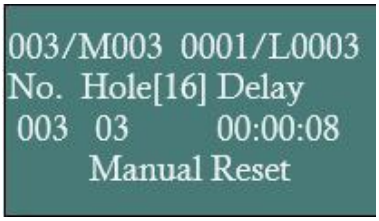


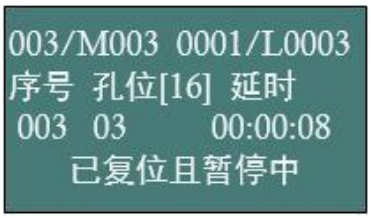
After the control flow is suspended, it will only be restarted after manual intervention.

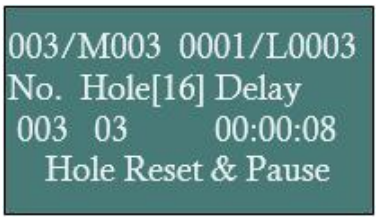
3.5.3 Manual reset operation

In the pause state, you can press the "Reset" (RESET) button to perform manual reset operations.







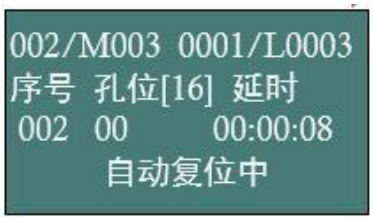


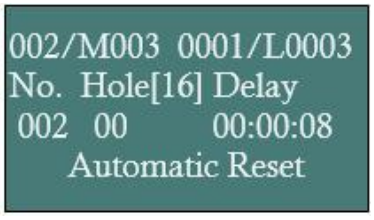
Note: Prompt "Manual Reset", the reset operation is in processing; Prompt "Hole Reset & Pause", the reset operation has been completed at this time; it is not the port position indicated by the current item.

Press （ON/OFF）again can automatically switch to the hole position of current item

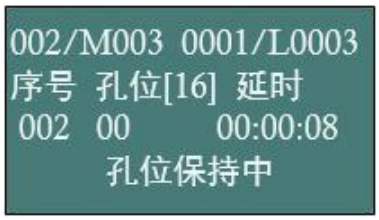
3.5.4 Automatic reset operation

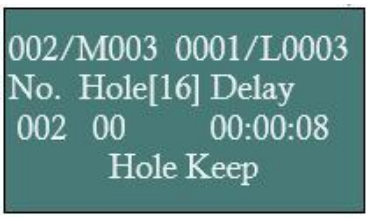
During the process, if the programmed port position is set to 0, when the item is executed, the "automatic reset" operation will be executed.





When the automatic reset operation is completed, the port/hole position is maintained according to the setting time.

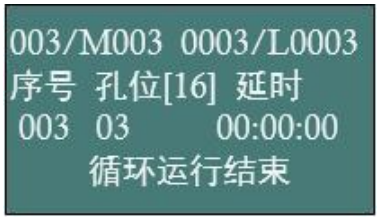


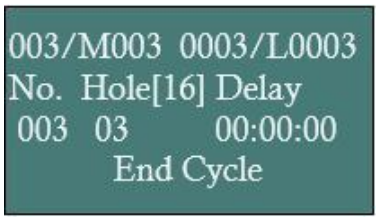


When the countdown set according to the control flow finished, proceed to the next item.

3.5.5 End of Cycle

When the total number of cycles is executed, the cycle operation ends automatically.





If the total number of cycles is 0000, it is regarded as an infinite cycle.

3.6 Bridge Operation Mode

In special circumstances, when RS485 communication is required to control internal or external switching valves, bridge operation mode is needed.

3.6.1 Set to RS485 communication control mode

Press "right key" to turn on, switch to RS485 communication control mode.

3.6.2 RS485 bridges internal switching valve

To use the plug-in mode to control the built-in switching valve, you need to bridge the pins 4-pin 12 and pin 5-pin11 of the DB15 respectively.

3.6.3 RS485 bridges external switching valve

To use the plug-in mode to control the external switching valve (Note: the switching valve needs to be RUNZE protocol), you need to connect the external RS485 interface (DB15-4 pin is B, DB15-5 pin is A) with the external RS485 device respectively.

Chapter 4 Equipment Maintenance

4.1 Common Equipment Maintenance Process

4.1.1 Regular maintenance of the valve core

When not in use for a long time, please empty the liquid in the valve core of the switching valve in time. Prevent the liquid from staying in the valve core for a long time and corrode the rotor plane.

4.1.2 Rotate the rotor regularly

When not in use for a long time, usually regularly (about 7 days), rotate the switching valve to prevent sticking due to residual liquid.

4.2 Common troubles and solutions

Trouble	Trouble Description	Troubleshooting
Backlight not working	The value of "Backlight time" in the "Settings" menu is set to 0	In the "Settings" menu, choose the "Backlight time" setting, change the value to a larger value.
	Backlight hardware or backlight power control partial failure	Backlighting does not affect application, it is only required in darker environments. If it is a hardware failure, it can be returned to the factory for repair.
Blurred screen	Large interference nearby	Stay as far away from the interference while the machine is working
	Unknown reasons result in LCD screen refreshes data in the wrong position	Erroneous display of the screen does not affect the motor control operation. If the motor is running, press the "START STOP" to stop the motor first. In the standby interface, press "HOME" five times in quick succession to refresh the display.
The fan does not turn.	Too much dust on the fan causes stoppage	Remove the dust with soft brush after power down
	The fan is broken or the fan power supply is not in good contact.	Return it to factory for repair.
The motor does not rotate.	The screen displays the speed but it does not actually rotate	Check whether the "Current code" in "Setting" is too small and set the current code consistent with the product.
		Motor connection wire is loose and return it to factory for repair.
		Motor power supply wire is loose and return it to factory for repair.
		Motor power supply wire is loose and return it to factory for repair.

Motor is stalled.	The original valve head/tube can run at a certain speed, but the new valve head/tube cannot run.	The new valve head/tube needs to run for one or two minutes at a lower speed.
	Exceed the maximum speed of the valve head/tube.	Refer to the aforementioned running curve and select the suitable speed corresponding to the valve head/tube.

Chapter 5 Technical Service

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