HORIBASTEC

Digital Readout and Control Unit

MT-52 Series Instructions (Ver.2.2)

HORIBA PRECISION INSTRUMENTS (BEIJING) CO., LTD.

CSMS5202

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1. INTRODUCTION

MT-52 series flow display instruments can supply power, realize control operation, flow setting and flow display function for mass flow controller (MFC) or mass flow meter (MFM).



2. SPECIFICATIONS

Table 2-1. MT-52 Series Specifications

ITEMS / MODELS		MT-52	MT-52-2J	MT-52-3J	MT-52-4J
AC Power Supply		185~240VAC 50/60Hz			
Input Power Max.		19.8W	39.6W	59.4W	79.2W
Channel Numbers		1	2	3	4
DC Power Output	+15V ± 5% -15V ± 5%	I_{max}=150mA I_{max}=350mA	I_{max}=300mA I_{max}=700mA	I_{max}=450mA I_{max}=1050mA	I_{max}=600mA I_{max}=1400mA
SET Output Type		0～5V(Default), or 1～5V, or 4～20mA			
SET Output Accuracy		±0.2% (@ F.S.=1000, 5～40℃)			
Signal Input Type		0～5V(Default), or 1～5V, or 4～20mA			
Display Digits		$3/\frac{1}{2}$ digits			
Display Accuracy		F.S. ± 2 digits (@ F.S.=1000, 5～40℃)			
MFC Interface		D-sub 15/Female			
External Control Interface		D-sub 9/Female			

Continue to Table 2-1. MT-52 Series Specifications

ITEMS \ MODELS		MT-52	MT-52-2J	MT-52-3J	MT-52-4J
Operating Temperature		0～50℃			
Dimensions (mm)	Panel (L×H)	96×96	483×110		
	Body (L×W×H)	90×156×90	440×201×109		
Warm-up Time (min)		5			
Weight (Kg)		0.9	3.4	3.7	4.0

3. DIMENSIONS & INSTALLATION

3.1 MT-52 Dimensions & Installation

3.1.1 Dimensions



Figure 3.1-1. MT-52 Exterior

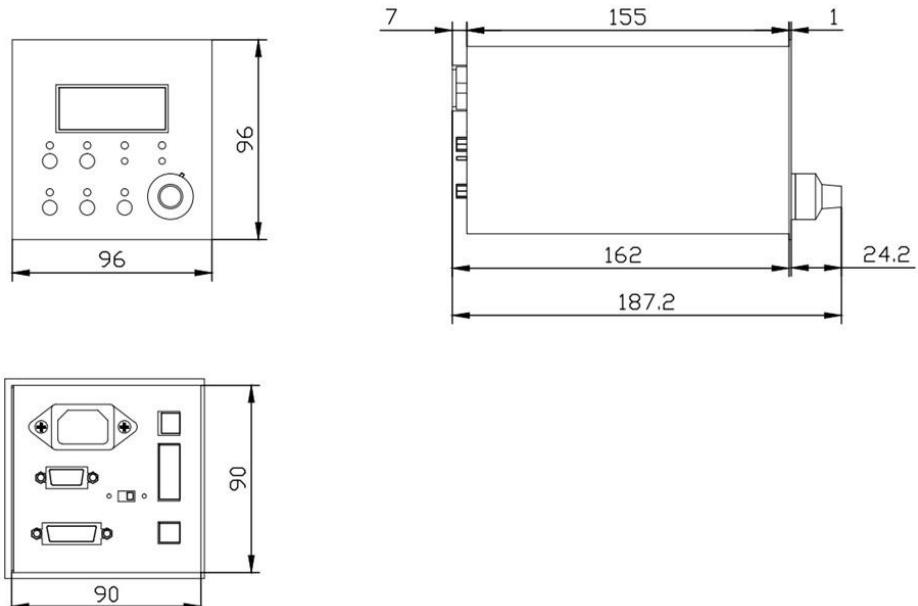


Figure 3.1-2. MT-52 Dimensions (unit: mm)

3.1.2 Installation

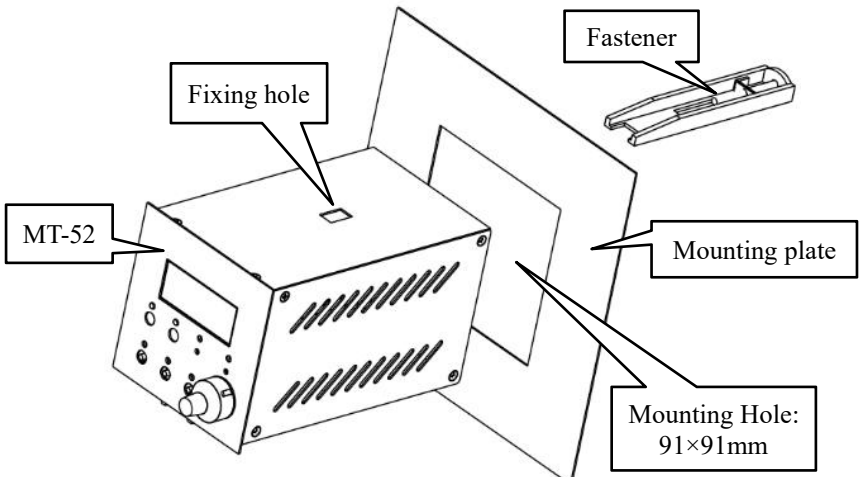


Figure 3.1-3. MT-52 Installation

Before Installation, fasteners are assembled as shown above. Then the MT-52 is inserted into the mounting hole of the mounting plate, and finally the fasteners are loaded into the fixing hole, and the screw should be tightened. The fasteners are a set of two, and the other one on the bottom is installed as mentioned above.

3.2 MT-52-2J/3J/4J Dimensions



Figure 3.2-1. MT-52-4J Exterior

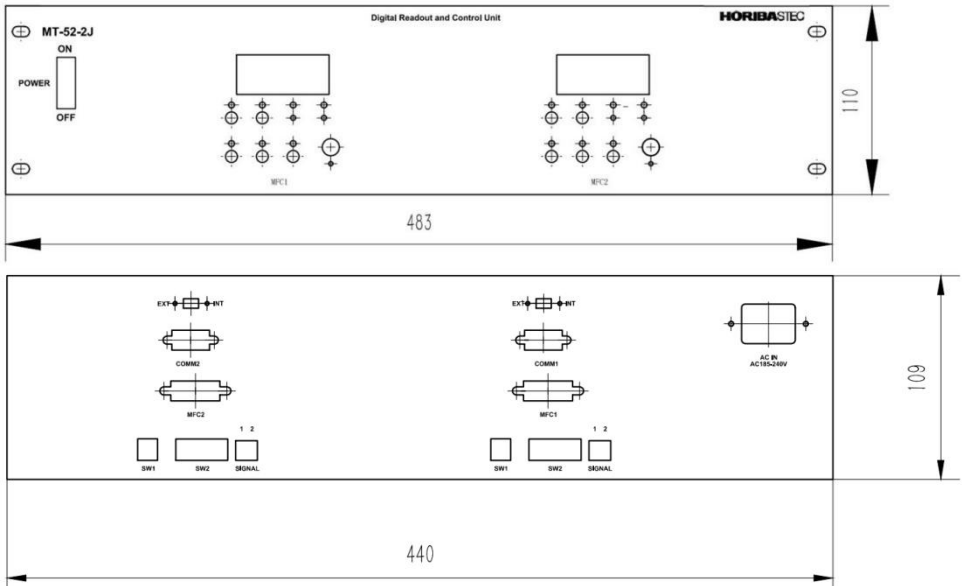


Figure 3.2-2. MT-52-2J Dimensions (unit: mm)

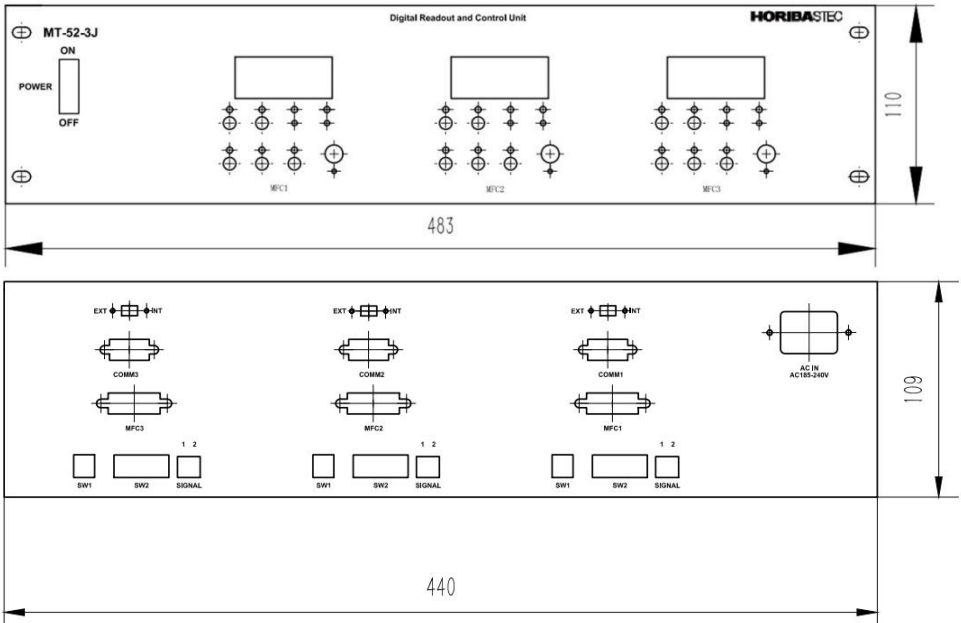


Figure 3.2-3. MT-52-3J Dimensions (unit: mm)

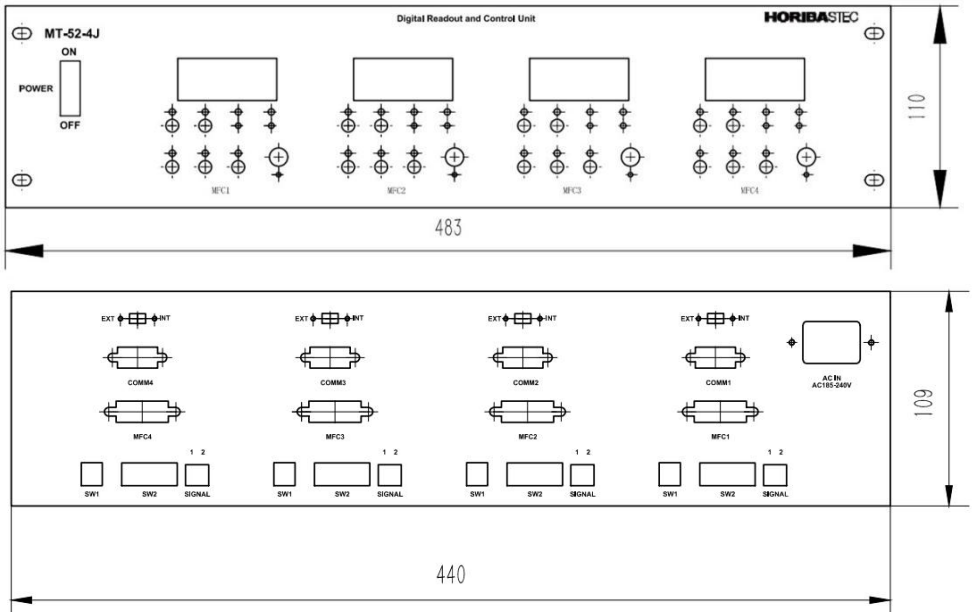


Figure 3.2-4. MT-52-4J Dimensions (unit: mm)

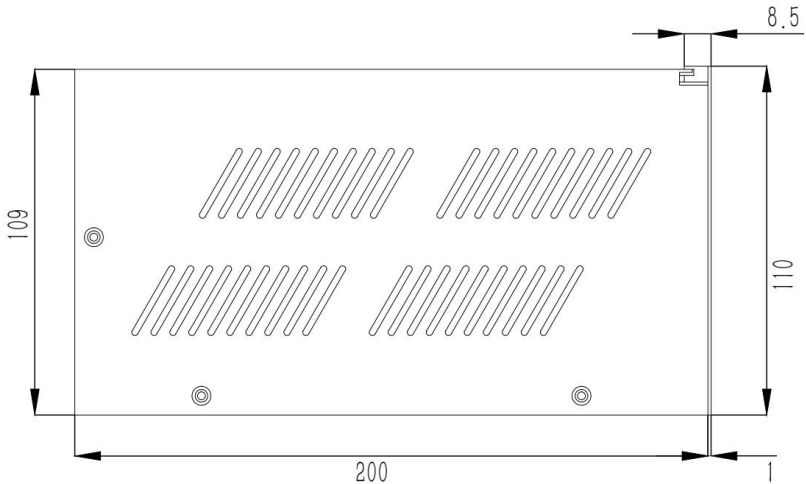


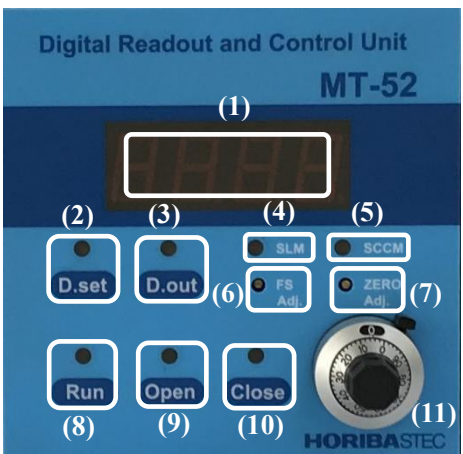
Figure 3.2-5. MT-52-2J/3J/4J Dimensions (left elevation) (unit: mm)

Note: The right elevation and the left elevation are mirror image.

4. PANEL INTRODUCTION

The panels and interfaces of MT-52 series flow display instruments are the same, take MT-52 as an example for explanation.

4.1 Front Panel View



1) Display window
2) "D.set" key & light (white)
3) "D.out" key & light (white)
4) "SLM" light (white)
5) "SCCM" light (white)
6) "Display F.S." **trimmer** potentiometer
7) **External** "Zero Adj." potentiometer①
8) "Run" key & light (green)
9) "Open" key & light (yellow)
10) "Close" key & light (yellow)
11) "SET" knob

Note: 1. The "Zero Adj. potentiometer" is used for external zero adjustment of MFC or MFM. It only works for MFC or MFM with this function. Please refer to MFC or MFM instructions for details.

4.2 Rear Panel View



Table 4.2-1. Rear Panel Introduction

No.	Items	Details
①	AC_IN	AC220V input interface (**for the sake of safety, "earth" must be connected to the earth**)
②	COMM	External control input/output interface
③	INT / EXT[①]	Internal/external control change switch
④	MFC	MFC or MFM connection interface
⑤	SIGNAL	Flow signal measurement interface (**only for voltage type**)
⑥	SW1	Display F.S. change switch
⑦	SW2	Configuration switch

Note: 1. "INT" means “internal control” and "EXT" means “external control”.

5. ELECTRICAL INTERFACE

5.1 MFC Interface (D-sub 15/Female)

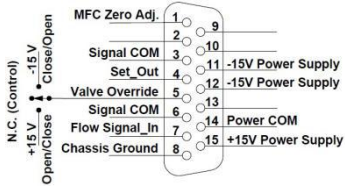


Table 5.1-1. Pin Assignment of MFC Interface

Pin	Details	Pin	Details
1	External Zero Adj.①	8	Chassis Ground
2	Not Connected	9 & 10	Not Connected
3	Signal Common	11	-15VDC Power Supply
4	SET Output	12	-15VDC Power Supply
5	Valve Override	13	Not Connected
6	Signal Common	14	Power Common
7	Flow Signal Input	15	+15VDC Power Supply

Note: 1. The pin is used for external zero adjustment **of the MFC or MFM**. For details, please refer to chapter "**6.4 External Zero Adjustment**".

2. Pin 3 and pin 6 are short connected internally, and connected with pin 14. Pin 11 and pin 12 are short connected internally.

5.2 COMM Interface (D-sub 9/Female)

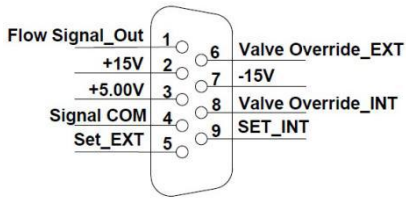


Table 5.2-1. Pin Assignment of COMM Interface

Pin	Details
1	Flow Signal Output (same as pin 7 of MFC interface)
2	+15VDC (**only for external valve override, not for power supply**)
3	+5.00V Reference Voltage
4	Signal Common
5	External SET Input
6	External Valve Override Input
7	-15VDC (**only for external valve override, not for power supply**)
8	Internal Valve Override Output
9	Internal SET Output

The “COMM interface” is an external controlling signals input/output interface. There are 3 external control methods that can be selected according to the actual situation as follows.

First, you must turn the "INT / EXT" switch on the rear panel to "EXT" , which means "External Control".

1. Simultaneous use of external “SET” and external “valve override”

(1) Connect the external “SET” signal (its type must match the nominal type of the instrument) to pin 5 ;

(2) Connect the external “valve override” signal to pin 6 ;

(3) Connect the ground signal of the external signals to pin 4.

Note: In this mode, the MFC connected to the instrument is controlled by the external “SET” and external “valve override” signals. The “SET knob” and “Run”, “Open”, “Close” keys on the front panel of the instrument are not available.

2. Use only external “SET” without external “valve override”

(1) Connect the external “SET” signal (its type must match the nominal type of the instrument) to pin 5 ;

(2) Connect pin 6 (external “valve override” signal) to pin 8 (internal “valve override” signal) ;

(3) Connect the ground signal of the external signals to pin 4.

Note: In this mode, the MFC which connected the instrument is controlled by the external "SET" signal. The "SET knob" on the front panel is not available. But the "Run", "Open", "Close" keys are still available.

3. Use only external "valve override", without external "SET"

(1) Connect the external "valve override" signal to pin 6 ;

(2) Connect pin 5 (external "SET" signal) to pin 9 (internal "SET" signal) ;

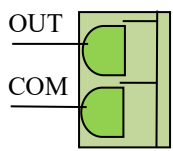
(3) Connect the ground signal of the external signals to pin 4.

Note: In this mode, the MFC connected to the instrument is controlled by the external "valve override" signal. The "Run", "Open", "Close" keys on the front panel are not available. But the "SET knob" is still available.

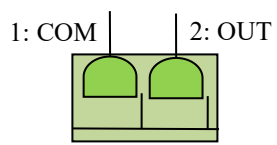
5.3 SIGNAL Interface

The “OUT” pin of the SIGNAL interface is connected to pin 7 of the MFC interface and pin 1 of the COMM interface, which are both "Flow Signal". The interface is used for measuring the **voltage** of the "Flow Signal" to “Signal Common”.

Note: 1. The interface is not available when the flow signal is current type.



MT-52 Pin Assignment



MT-52-2J/3J/4J Pin Assignment

Table 5.3-1. Pin Assignment of Signal Interface

Pin	Details
OUT	Flow Signal Output
COM	Signal Common

6. OPERATING INSTRUCTIONS

6.1 Power On and Power Off

- **MT-52**

  Power on: Connect AC220V power supply to the AC_IN interface

  Power off: Cut off the AC220V power supply of the AC_IN interface.

- **MT-52-2/3/4J**

  Power on: Connect AC220V power supply to the AC_IN interface, then turn on the red power switch on the front panel.

  Power off: Cut off the AC220V power supply of the AC_IN interface, or turn off the red power switch on the front panel.

6.2 Basic Operations

The initial power-on status of the instrument is “D.out” (the window displays flow signal) and “Close” (valve closing state). That is, “D.out” and “Close” lights should light up. If there is a flow signal input, the window displays the instantaneous flow rate.

6.2.1 Flow rate display / SET display Change

The display window on the front panel can display “internal SET” signal as well as flow signal. The specific operations are as follows:

- Click “D.set” key, the “D.set” light will be on, and the window will display the current setting value of the “SET knob”.
- Click “D.out” key, the “D.out” light will be on, and the window will display the currently instantaneous flow signal value.

Note: If there is no connection to the “Flow Signal Input” pin of the MFC interface, the flow value displayed in the window in D.out mode is meaningless.

6.2.2 Flow setting

- **Internal flow setting**

Rotating the “SET knob” on the front panel will change the value of the “SET Signal Output” (pin 4) of the MFC interface, which can set flow of the MFC.

- **External flow setting**

The flow setting of the MFC can be realized by adjusting the value of the external signal connected to the pin 5 of the COMM interface.

Note: 1. The flow setting only works for MFC and does not work for MFM.

2. Flow setting only works at the state of “valve controlling”.

6.2.3 Valve override operations

Before performing the valve override operation, please confirm the valve override level according to the chapter "**6.3.2 Valve Control Level Setting**".

- **Internal valve override operation**

1. "Valve Controlling"

Click the "Run" key, then the "Run" green light will be on, and the "valve override" (pin 5) of the MFC interface is "vacant".

2. "Valve Closing"

Click the "Close" key, then the "Close" yellow light will be on, and the "valve override" (pin 5) of the MFC interface is "Valve Closing" level.

3. "Valve Cleaning"

Click the "Open" key, then the "Open" yellow light will be on, and the "valve override" (pin 5) of the MFC interface is "Valve Cleaning" level.

Note: Clicking the "Close" or "Open" key will only affect the "valve override" (pin 5) of the MFC interface, and will not change the value of "SET output" (pin 4).

- **External valve override operation**

1. **"Valve Controlling"**

   Leave the "External Valve Override" (pin 5) of the COMM interface vacant.

2. **"Valve Closing"**

   Connect "Valve Closing" signal to the "External Valve Override" (pin 5) of the COMM interface.

3. **"Valve Cleaning"**

   Connect "Valve Cleaning" signal to the "External Valve Override" (pin 5) of the COMM interface.

6.3 Instrument Configuration

MT-52 series flow instruments are equipped with two setting switches. The blue one named SW1 is the display F.S. change switch, and the red one named SW2 is the display configuration switch. See Table 6.3-1 and Table 6.3-2 for more details.

Table 6.3-1 Gear & Display F.S. Cross-references of SW1

Gear	0	1	2	3	4	5	6	7	8	9
Display F.S.①	100	200	300	400	500	600	700	800	900	1000

Note: 1. The decimal point is neglected.

Table 6.3-2 Gear & Function Cross-references of SW2

Items		Details	Gear Settings
Display Unit	SLM	SLM light on the front panel is on	10 ON; 9 OFF
	SCCM	SCCM light on the front panel is on	9 ON; 10 OFF
	%	SLM and SCCM lights are not lit	9 & 10 OFF
Display Decimal Point	DP3	The window displays d.ddd	6 ON; 7 & 8 OFF
	DP2	The window displays dd.dd	7 ON; 6 & 8 OFF
	DP1	The window displays ddd.d	8 ON; 6 & 7 OFF
	DP0	The window displays dddd	6 & 7 & 8 OFF
Valve Override Level	Mode A	Cleaning valve level: -15V	1 & 3 ON; 2 & 4 OFF
		Closing valve level: +15V	
	Mode B	Cleaning valve level: +15V	2 & 4 ON; 1 & 3 OFF
		Closing valve level: -15V	

Note: 1. When switching the gear, make sure that the toggle is in place to avoid unreliable connection.

6.3.1 Display Settings

Both the “internal SET” signal and the MFC flow signal are displayed through the display window on the front panel.

6.3.1.1 Display F.S. Setting

When changing the display F.S., it is necessary to switch to the “D.set” state and rotate the “SET knob” to maximum. According to Table 6.3-1, SW1 on the back panel should be toggled to the required gear. If the required display F.S. is not a value in the table, toggle SW1 to the nearest gear and adjust it as follows.

If the display value deviates from the required value after switching, you can use a slotted screwdriver with a specification of 2.0mm (±20%) to adjust the “F.S. Adj.” potentiometer on the front panel and thus adjust the display F.S. value to the desired value.

Note: 1. This setting only changes the display value. It does not change the value of “SET output signal", nor does it change the flow signal of the MFC or MFM.

2. The more digits of display F.S., the better accuracy.

6.3.1.2 Decimal Point Setting

The 6, 7 & 8 gears of SW2 on the back panel are used to set the decimal point of the display value. For more details, see Table 6.3-2.

6.3.1.3 Unit Setting

The 9 & 10 gears of SW2 on the back panel are used to set the display unit.

For more details, see Table 6.3-2.

6.3.2 Valve Override Level Setting

The 1, 2, 3, & 4 gears of SW2 on the back panel are used to set the internal “valve override” level of the instrument. It is to set the level of the "valve override" (pin 5)of the MFC interface, when you click the “Open” and “Close” keys.

There are two setting modes: mode A and B (For details, refer to Table 6.3-2.), and the MFC connected determines which mode to choose.

Mode A setting applies to our S500 AR111 and S49 series MFC.

Mode B setting applies to our S48 series MFC.

6.4 External Zero Adjustment

This function is only used for MFC or MFM with external zero adjustment①.

Adjusting the "ZERO Adj." potentiometer on the front panel can adjust the zero point of the connected MFC or MFM. If the connected MFC or MFM is replaced, the potentiometer needs to be adjusted again.

Adjustment method: Turn off the gas flow②, then connect the MFC or MFM③ to the instrument and turn on the power. After warm-up is finished, set the MFC to the valve closing state (or SET 0 at valve controlling state). If there is a large deviation, adjust "ZERO Adj." to make the display value close to 0 in D.out mode.

Note: 1. Please refer to the MFC or MFM manual for confirmation. Our S49 series MFC or MFM has an external zero adjustment function.

2. It is forbidden to adjust the "ZERO Adj." potentiometer if there is gas flowing.

3. It is forbidden to adjust the "ZERO Adj." potentiometer without MFC or MFM connected (i.e., the "Flow Signal Input" pin is vacant).

7. FACTORY DEFAULT SETTINGS

Taking our S500 AR111 as an example, If not specified, the initial settings of the MT-52 series display instruments are as follows:

Factory default setting	Switch	Gear	Meaning
“Valve override” level (Mode A)	SW2	1 & 3 ON; 2 & 4 OFF	“Valve cleaning” level: -15V “Valve closing” level: +15V
Display F.S. (100.0)	SW1	9 ON	Display F.S. (1000)
	SW2	8 ON; 6 & 7 OFF	One decimal (000.0)
Unit (%)	SW2	9 & 10 OFF	Display unit (%)

8. ATTENTIONS

1. The potentiometers inside the instrument have been adjusted before leaving the factory, and users should **not** adjust them at will.
2. If you connect the instrument with other MFCs, pay attention to whether the power supply capacity matches, and wiring and converting are correct. Pay attention to the level of MFC “valve override” signal and correctly configure the SW2 switch.
3. The case of the instrument and the case of the MFC should be earthing in principle, i.e. equal both at ground potential. If the two are placed far from each other, and the chassis ground is connected to the separate cabinet ground, you should consider disconnecting the “Chassis Ground” wire from the cable connecting the instrument with the MFC. Otherwise, ground wire interference, and even ground wire burnout may occur.

9. ORDERING GUIDE

MT-52 — XX — XXX

Custom Code:
Empty: Close, power-on status is “valve closing” (default)
001: Run, power-on status is “valve controlling”
002: Open, power-on status is “valve cleaning”

Number of Channels：
Empty: single display,1 channel
2J: multi-display, 2 channels
3J: multi-display, 3 channels
4J: multi-display, 4 channels

Note: You can specify the power-on valve control status of the MT-52 series display when ordering. In the unspecified state, the power-on status is “valve closing”, that is, the custom code is empty.

Example: 1. MT-52: 1 channel，power-on status is “valve closing”
2. MT-52-001: power-on status is “valve controlling”
3. MT-52-3J: 3 channels, power-on status is “valve closing”
4. MT-52-3J-001: power-on status is “valve controlling”

APPENDIX I: RoHS

标记的意义
Meaning of Marking
マークの意味

	本标记适用在中华人民共和国销售电器电子产品，标记中央的数字表示环境保护使用期限的年数。(不是表示产品质量保证期间。）只要遵守这个产品有关的安全和使用注意事项，从制造日开始算起在这个年限内，不会给环境污染、人体和财产带来严重的影响。请不要随意废弃本电器电子产品。
	This marking is applied to electric and electronic products sold in the People's Republic of China. The figure at the center of the marking indicates the environmental protection use period in years. (It does not indicate a product guarantee period.) It guarantees that the product will not cause environment pollution nor serious influence on human body and property within the period of the indicated years which is counted from the date of manufacture as far as the safety and usage precautions for the product are observed. Do not throw away this product without any good reason.
	本マークは、中華人民共和国で販売される電気電子製品に適用され、マークの中央の数字は環境保護使用期限の年数を意味します（製品の品質保証期間を示すものではありません）。この製品に関する安全や使用上の注意をお守り頂く限り、製造日から起算するこの年限内では、環境汚染や人体や財産に深刻な影響を及ぼすことはありません。本製品をみだりに廃棄しないでください。

产品中有害物质的名称及含量
Name and amount of hazardous substance used in a product

部件名称 Unit name	有害物质 Hazardous substance					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent chromium (Cr (VI))	多溴联苯 Polybromo-biphenyl (PBB)	多溴二苯醚 Polybromo-diphenyl ether (PBDE)
外壳　Case	×	×	×	×	×	×
机械零部件　Machine parts	×	×	×	×	×	×
电路板　Printed board	×	×	×	×	×	×

本表格依据 SJ/T 11364 的规定编制。

This form is prepared in accordance with SJ / T 11364.

○:　表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

Denotes that the amount of the hazardous substance contained in all of the homogeneous materials used in the component is below the limit on the acceptable amount stipulated in the GB/T 26572.

×:　表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

Denotes that the amount of the hazardous substance contained in any of the homogeneous materials used in the component is above the limit on the acceptable amount stipulated in the GB/T 26572.

2020.04.13

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