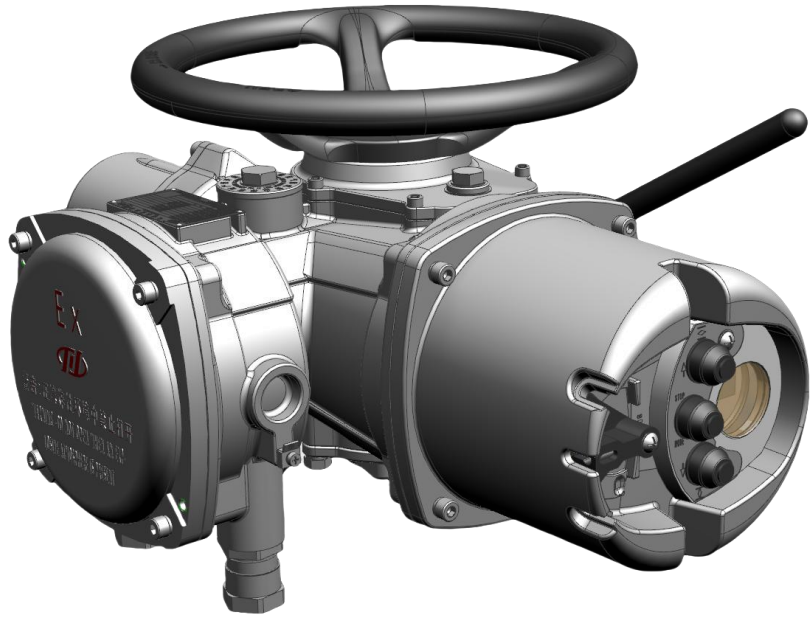
川仪股份
CYAC

Operation Manual

M Series Intelligent electric actuator

M8□□□(d)ⅢA



Chongqing Chuanyi Automation Co., LTD. Actuator Filiale

V002510

Preface

Thank you for using M8□□□(d)ⅢA Series Electric Actuator, please read this Manual carefully before installation and commissioning.

(1) About this Operation Manual

(1) This Operation Manual will be delivered to and used by end user. Please keep it carefully;
(2) Please read this Operation Manual carefully to understand fully the method of product operation before operation;
(3) Extracting or copying part of or the whole Operation Manual is forbidden without permission;
(4) The content of this Operation Manual may be changed without prior notice;
(5) We have endeavored to ensure its correctness during the preparation of this Operation Manual. Any mistake or omission, please contact with Marketing Department.

(2) Safety Cautions

(1) In order to protect and ensure safety of this product and the system controlled thereby, follow the safety instruction and cautions in this Operation Manual when using the product. We are not responsible for any bad consequence due to noncompliance with the Manual.
(2) If any independent protective unit or safety circuit is going to be installed on the product or the system controlled thereby, make sure such equipments are installed on the outside of the product. Please do not attempt to change this product or install such circuit in this product.
(3) When replacing spare parts or consumables of the product, please use the parts recommended by our factory.

■ Disclaimer for the Product

（1）We don't provide any guarantee except for those mentioned in the Warranty otherwise provided;
（2）We are not responsible for compensation of any losses to the concerned party caused by unpredictable product flaw during direct or indirect using process.

■ Environmental Protection Item

In order for better protect the environment and human health, when users install, repair and maintain the product or the lifetime of product is over, please observe national/regional laws and regulations, properly handle the material generated by recycling the actuators. Deliver them to the local manufacturers with the state-recognized recycling qualification. The type of waste materials include:
(1) Substituted damaged and scrap materials, such as coated metal parts, screws, nuts and batteries, cables and other rubber and plastic parts.
(2) Waste lubricants and lubricants spilled during use.
(3) Waste circuit boards and electronic components.
(4) Other waste materials.
If you have any question, please contact with us after-sale staff.

■ Special Cautions

------ To insure the operation pressure inside to release and no lubricant leaking occurs:
（1）After installation is completed, the oil plug screw at the highest point of the M84(d)ⅢA series (adjustable type) actuator must be replaced with the vent screw provided in the spare parts! The M84(d)ⅢA series (switching type) is not required.
------ To insure product reaching the stated protection and protect inside structure from the damage because of sealing:
（2）Put the cable through the lead collar accompanied in spare parts and tighten it!
（3）Tighten the hood screw after installation and adjustment!
（4）Forbidden to open explosion-proof cavity in electricity, open the explosion-proof cavity after power off for 5 minutes.
（5）Do not damage cover and explosion-proof combination surface during installation and maintenance. Tighten concerned screws after maintenance.
（6）It's forbidden to change spare parts randomly. If it's necessary to change, please use our appointed spare parts.
（7）When installing Angle Electric Actuator, please match the valve's off position strictly with the electric actuator's off position.
Any losses due to noncompliance of installation requirement are not within warranty scope.

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Instruction to Out-of-box Inspection, Transportation and Storage

1 Out-of-box Inspection

Each actuator was inspected strictly to ensure product quality before leaving factory. Please make the following inspections when opening the actuator package:

- Check whether the actuator is damaged in transportation.
- Check whether the actuator model conforms to that printed on the outside package and whether the actual items in the package conform to the packing list.

2 Transportation and Storage

- Transportation temperature: -30°C~+75°C; storage temperature: -10°C~55°C.
- Place the actuator in indoor and dry environment to avoid condensation in case of no special package.
- Appropriate package and desiccant must be provided for transportation or storage under environment of humidity or corrosive gases**;** check the desiccant regularly for effectiveness.

Note: Damage to the electric actuator resulting from improper storage will void the warranty and is excluded from free replacement or repair by our company.

3 Safety Instructions

According to the design purpose, the actuator is a dedicated device for driving the terminal control unit (valves, baffles, etc.). Improper operation can pose a danger to the operator. When in use, attention should be paid to:

The installation, disassembly, commissioning, operation and maintenance of the actuator must be carried out by qualified professional technicians. At the same time, necessary protective equipment such as safety helmets, safety ropes, goggles, work clothes, insulating gloves and labor protection shoes should be worn. In case of special circumstances, it must be carried out under the guidance of our company's professionals.

It is strictly prohibited to hang any items on the handwheel or shift lever following actuator installation..

Manual operation must strictly follow the handwheel operation instructions in this guide. It is prohibited to operate the handwheel or shift lever while the power is on.

When operating the actuator in a high-temperature environment, the operator must wear special protective gloves to prevent work-related injuries caused by the heating of metal parts.

In hazardous areas, it is strictly prohibited to use conductive or heat-conducting materials to come into contact with the actuator. The power supply should be cut off, the actuator removed and moved to a safe area for maintenance or repair.

The lubricating oil that spills during the oil change process should be cleaned up in time to avoid accidents.

When opening the cover, the operator must strictly follow the safety operation procedures: cut off the power supply first, and wait for 5 minutes before conducting operations such as electronic component inspection and replacement

1 Overview

M8□□□(d)ⅢA series product is the multi-turn electric actuator with embedded intelligent controller. Worm gear and worm are used for electric actuator, to which the gearbox can be added to satisfy users' different torque requirements.

1.1 Product Features

- Intelligent control and flexible starting;
- Providing with rich diagnostic information;
- Driven by three-phase motor with large driving force;
- Worm gear and worm for main drive;
- LCD display with abundant information;
- Simple operation and easy to learn;
- Safe and reliable with mechanical waterproof switch;
- Available for 4 mA ~20mA analog control and passive and active control of 24Vd.c. binary signal.

1.2 Application

The intelligent actuator is designed to drive the terminal control unit (valve and baffle etc) and has wide applications in industries such as electric power, metallurgy, and petroleum, chemical industry, building materials, urban water supply and wastewater treatment.

1.3 Types and Specifications

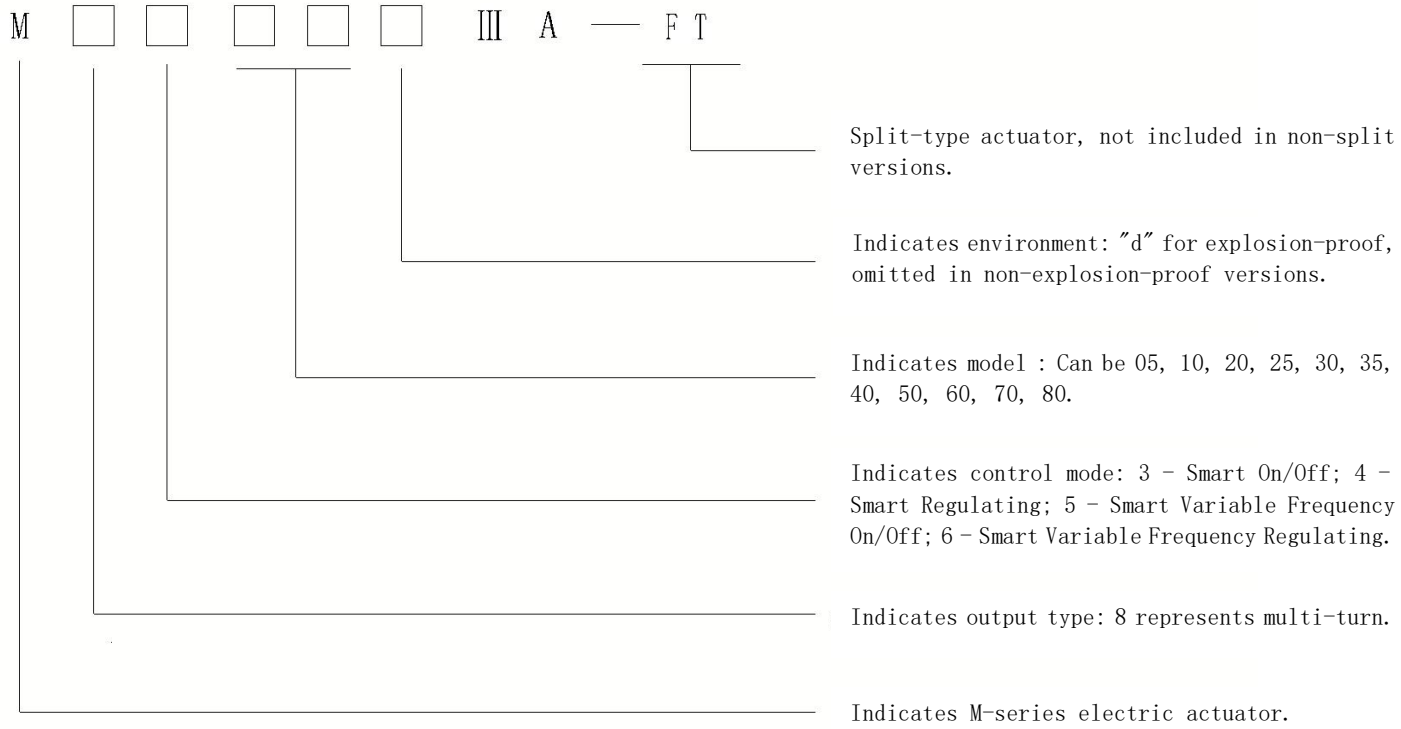


Fig. 1.1 Basic Model Format of M8□□□(d)ⅢA series actuator

1.4 Application Ambient Conditions

The following ambient temperature is applicable according to oil types.

- Standard: -40°C~+70°C. Other using conditions should be agreed between the purchaser and the manufacturer.
- Relative humidity: Not more than 95% (25°C);
- Atmospheric pressure: 86kPa~106kPa;
- Mechanical Vibration: 10-150 Hz, amplitude ≤ 0.075 mm
- External Magnetic Field: ≤ 400 A/m
- No corrosive media in ambient environment;

1.5 Operation Conditions

- Voltage: 380(-15%~+10%)Va.c.(Optional：400Va.c.、415Va.c.、440Va.c.、460Va.c.,-15%/+10%;)

- Frequency: 50×(±1%)Hz （Optional：60×(±1%)Hz）
- Harmonic content: less than 5%.

1.6 Impact on Environment

The actuator is a clean product without hazardous gas and liquid, and no pollution to the environment.

2 Structure Features and Operation Principle

2.1 Overall Structure, Operation Principle and Features

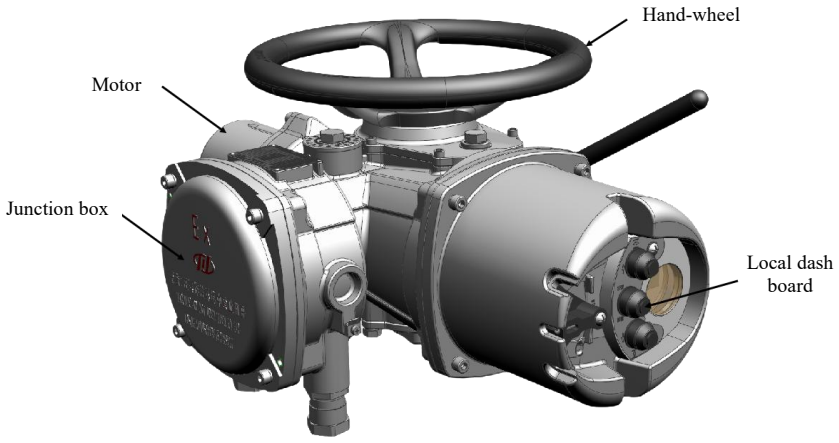


Fig. 2.1 Main Parts

The actuator mainly consists of motor, position sensor, worm gear, worm, drive shaft, control unit, local operation panel, and hand-wheel.

The control units adopt 4~20mA control signal or binary signal to drive the motor, driving the worm which drives the worm gear and the output shaft. The position sensor will check the motor displacement, and send the threshold signal to the control panel. If the control panel monitors that the position signal corresponds with the position specified by control signal, the power supply for the motor will be cut off and the actuator will be stopped by the worm gear and worm through the self-locking features.

The actuator is an electromechanical product to convert weak signal into torque output in the S4 operation mode.

2.2 Structure, Function and Operation Principle of Main Parts and Functional Units

2.2.1 Electric control unit

The electric control unit consists of CPU board, dash board, and electric parts. CPU board is used to handle the given signal and feedback signal. The dash board is used to drive the motor.

2.2.2 Worm gear and worm

This part can slowdown the drive speed of the output shaft of the motor and cause a mechanical self-locking.

2.2.3 Additional gearbox

The additional gearbox is provided for outputting of different torques of the actuator. Relevant information such as input torque and output torque/force are recorded in the data marks on the additional gearbox.

2.3 Functional Structure, Operation Principle, and Operation Features of the Structural Units

The external control signal is applied to the electric control unit through the cable of junction box. Electric control unit uses photoelectric isolation and transformer isolation to drive the motor, and then drive the worm gear and worm, and the output shaft, which is the feature of weak current controlling strong current.

2.4 Functional Structure, Operation Principle and Features of Auxiliary Device

Handwheel Assembly: This component is used for manual operation during installation, commissioning, and fault handling. This handwheel mechanism also serves as the manual-electric switching. When the shift lever is pressed down, manual operation can be performed.Before manual operation: The mode selector switch must be set to "O/S" and the external power must be disconnected. Then, press down the shift lever and rotate the handwheel.To restore electric operation: First, restore the power supply, then set the mode selector switch to "LOC" or "REM".

3 Technical Features

3.1 Main Features and Parameters

- Voltage output: DC 24V; maximum: 30mA, with input/output short-circuit protection.
- Working mode:Modulating type S4 - 25%, 1200 times/h, On-off type S2—15min;
- Protection ratings:IP66/IP67/IP68.
- Humidity: <95% average value (please use heater to avoid pulverization).
- Installation position: any position.
- Electro Magnetic Capability (EMC): according to GB/T17626.2～GB/T17626.5.
- Electric connection: refer to Part 4.1 for details.
- Minimum selected pulse of binary signal control: 200ms complete pulse.
- Dead-zone of controller: 0.4%; (0.4 ~ 5% adjustable).
- Analog input (optional): 4 ~ 20mA; electrical isolation, 250Ω input resistance, and increasing characteristic.
- Digital Inputs (E1-E4): 4 channels with optical isolation.Digit 0: -3~+5V or open circuit. Digit 1: +15V~+30V.
- Analog output (optional): 4~20mA position signal; load capacity: 500Ω (maximum); electrical isolation.
- Digital output: 4 standard output (A1-A4) and 3 options (A5-A7); electrical isolation, free configuration: Contact Capacity: 250 V a.c. or 30 V d.c., 5 A.
- Basic error limit: ±1%.

4 Installation and Commissioning

4.1 Electric connection

The external wiring terminal of the actuator is shown in Figure 4.1, table 4.1 is the functional description of the terminals, the electrical wiring schematic diagram is shown in Figure 4.2, and the recommended wiring diagram is shown in Figure 4.3 ~ 4.6. There are ground points in the wiring cavity and the enclosure, the ground connection is a very important way to protect the operator and anti-electromagnetic interference. Before using, please make sure that there is a reliable ground connection.

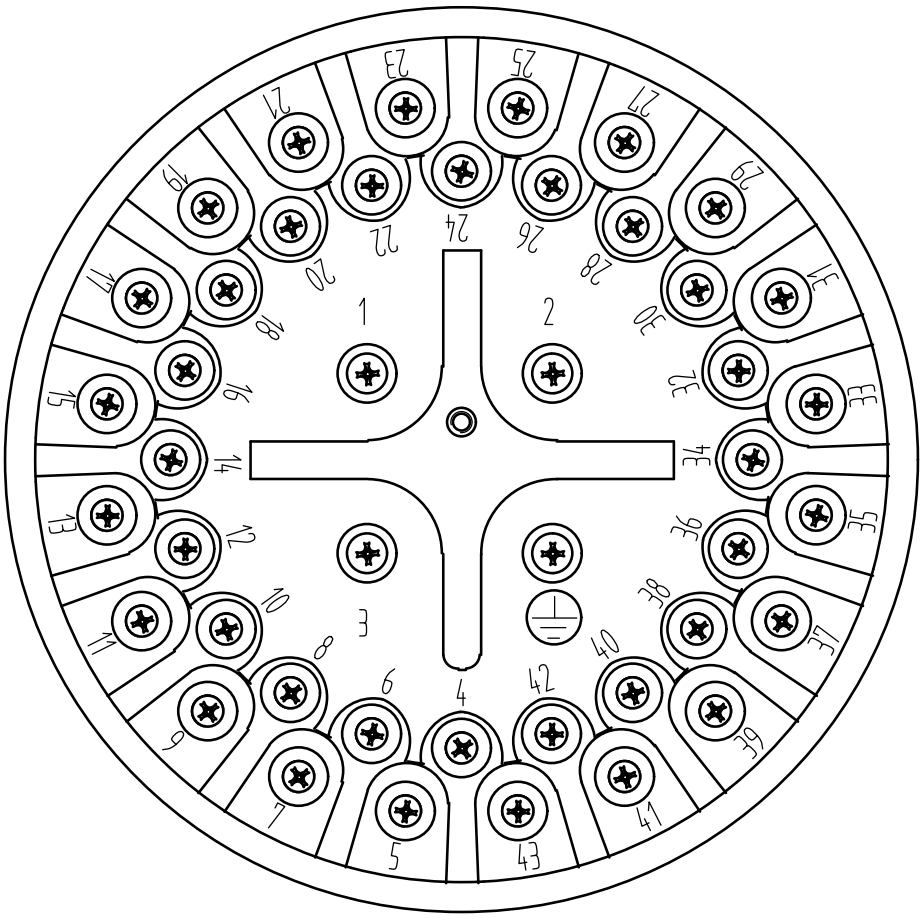


Fig.4.1 The external wiring terminal of the actuator

Table4.1 Terminal function

Function Name	Terminal number	Function description	Remarks
Power Supply	1、2、3	Three-phase power supply (no phase sequence).	standard
Grounding	⏚	Ground protection.	standard
Digital input 1（E1）	14（+）	actuator opening instruction.	standard
Digital input 2（E2）	15（+）	actuator closing instruction.	standard
Digital input 3（E3）	16（+）、20（-）	Remote analog control (24V)/remote switch control (0V) switching; When the ESD function is available, it is the ESD control input	standard
Digital input 4（E4）	17（+）	The actuator is stopped	standard
Common point（COM）	18（-）	The common negative terminal of the open instruction, close instruction, and stop instruction	standard
Digital output 1（A1）	4、5、6	For fault signal, terminal 4 is the common terminal. In normal time, terminals 4 and 5 are on, while in case of failure (or power loss), terminals 4 and 6 are on.	standard
Digital output 2（A2）	7、8、9	Local/Remote state feedback signal; terminal 7 is the common end; when the actuator is in Local, terminals 7 and 8 are on; when the actuator is in Remote, terminals 7 and 9 are on.	standard
Digital output 3（A3）	10、11	Open in place signal, when the actuator is in full open position, terminals 10 and 11 are on.	standard
Digital output 4（A4）	12、13	Close in place signal, When the actuator is in the fully closed position, terminals 12 and 13 are on.	standard
Digital output 5（A5）	25、26、27	Open over-torque alarm signal, terminal 25 is the common end, and terminals 25 and 26 are connected when alarming.	**optional**
Digital output 6（A6）	28、29、30	Turn off the over-torque alarm signal, terminal 28 is the common end, and terminals 28 and 29 are connected when alarming.	**optional**
Digital output 7（A7）	31、32	Operation signal of actuator, terminals 31 and 32 are switched on during normal operation.	**optional**
Adjust the analog input	33（-）、34（+）	4 mA ~ 20 mad. c. input, M84/86□□dⅢA series configuration, M83/85□□dⅢAd series not.	**optional**
Feedback analog output	35（-）、36（+）	4 mA~ 20mad.c. The output, M84/86□□dⅢA, M83/85□□dⅢ AC series configuration	**optional**
24Vd.c. output	21/23（+）、22/24（-）	External output of actuator 24Vd.c. Power interface, output current ≤ 30mA.	standard

Note: Digital output A1-A4 output is standard configuration, A5-A7 is optional when ordering, all functions in the table are factory
The default configuration allows the user to configure A1-A7 as needed.

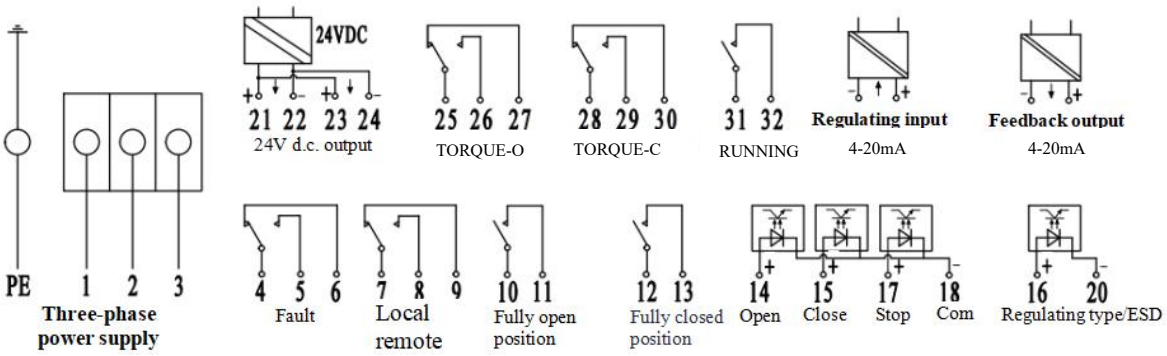


Figure 4.2. The electrical wiring schematic diagram

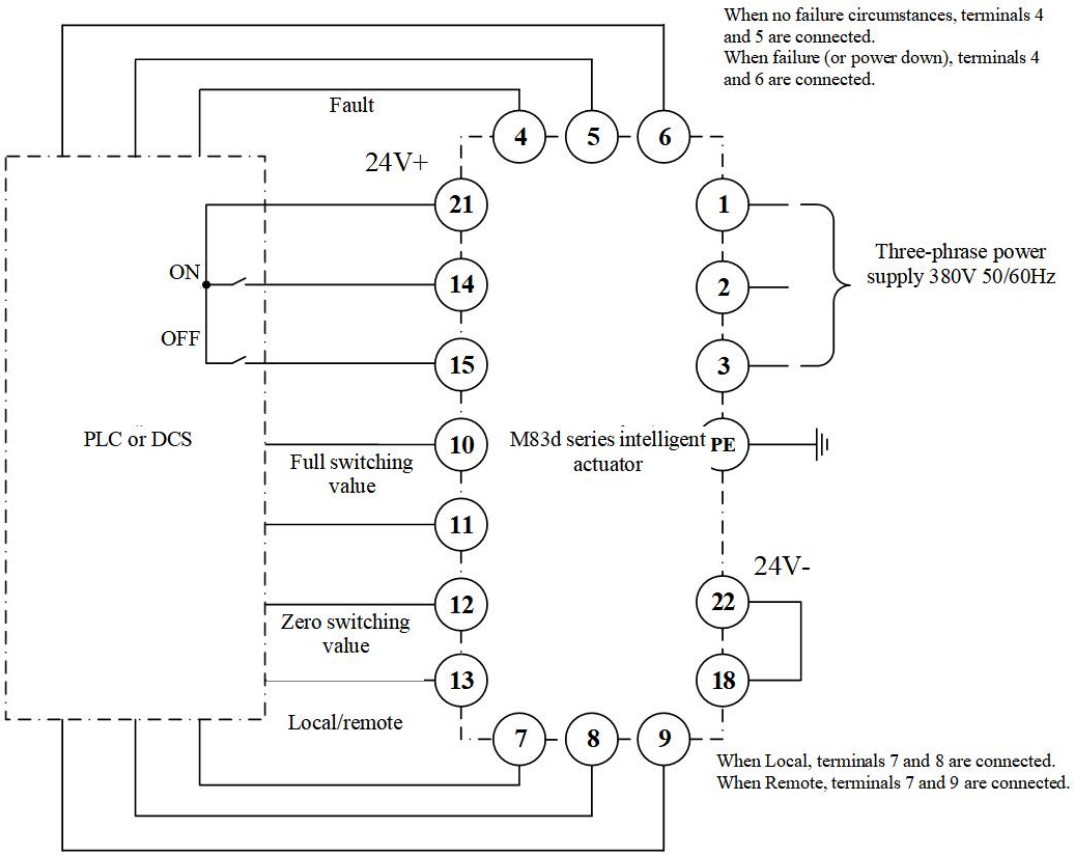


Figure 4.3. Switching Signal control wiring diagram (passive wiring mode)

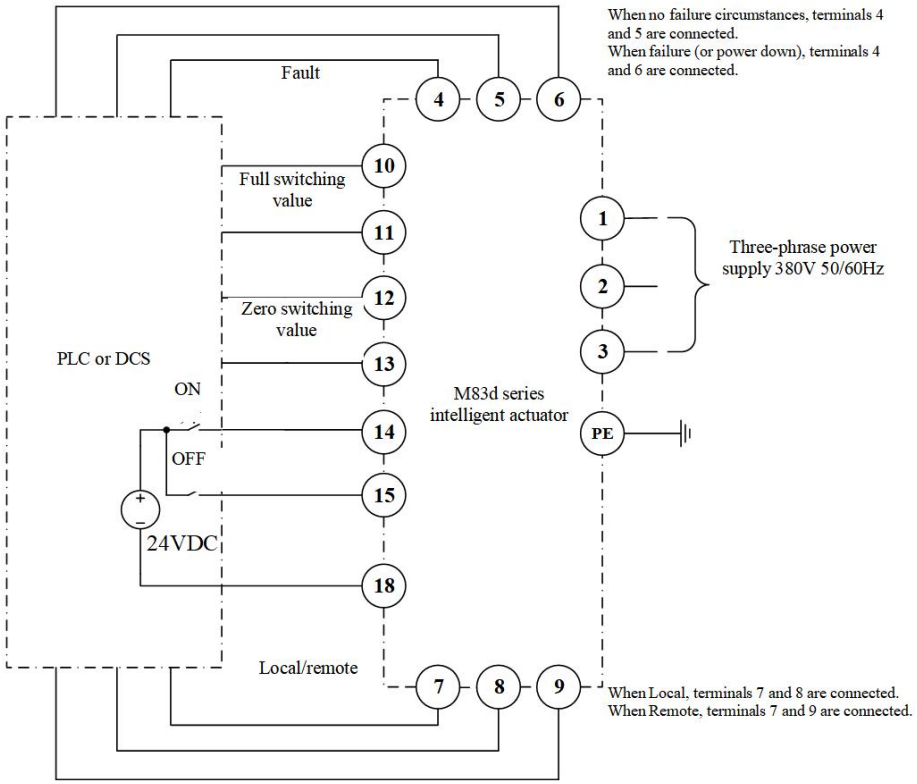


Figure 4.4. Switching Signal control wiring diagram (active wiring mode)

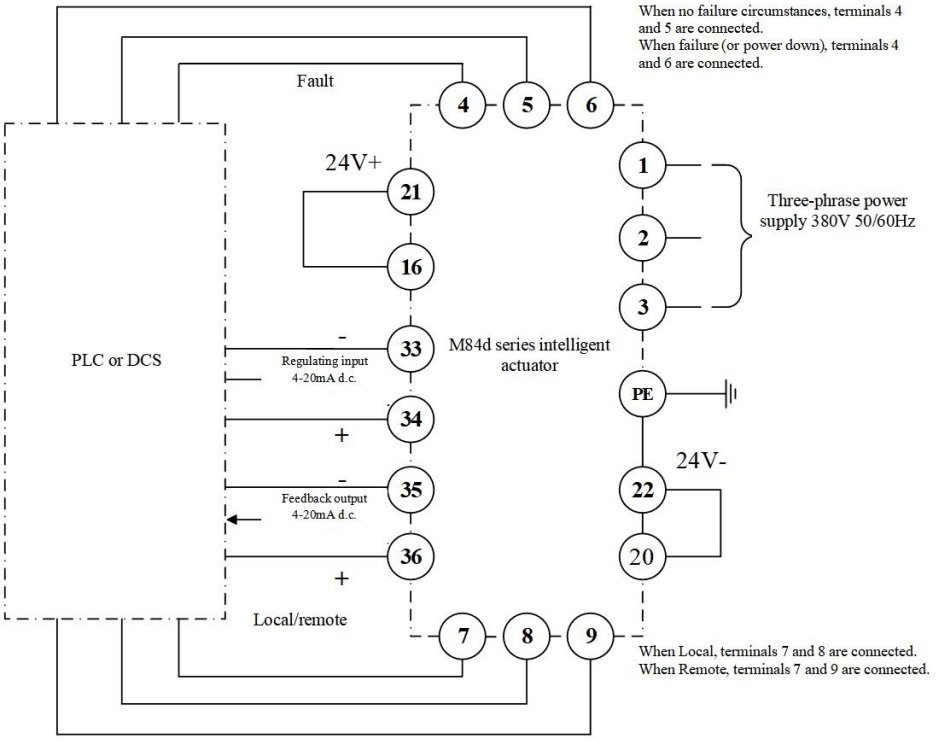


Figure 4.5. Analog signal control wiring diagram

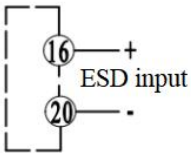


Figure 4.6. ESD Signal control wiring diagram

4.2 Wire diameter choice (contact connection)

Power cable: ≤6mm^2 hand wire or 4mm^2 soft wire

Signal cable: ≤2.5mm^2 hand wire or soft wire

4.3 The screw thread dimension of cable sealing entry.

Explosion-Proof Cable Gland Installation: The protection rating is ensured by the proper sealing of the cable entry point after field installation. You must use cables with an outer diameter that matches the requirements of the explosion-proof cable gland.

When users purchase their own explosion-proof cable glands to match the cable interface, the glands must feature a cable sealing structure and possess a valid explosion-proof certificate and production license issued by a nationally recognized authoritative testing organization. The cable outer diameter must be compatible with the cable gland. Our company shall not be held liable for any safety incidents resulting from the use of non-compliant cable glands. The actuator's cable outlet thread dimensions and required cable diameter are as follows:

Table 4.2 Actuator Cable Gland Entry Thread Size

Actuator Model	Cable Outlet Thread Size (Metric)	Recommended Cable Outer Diameter Range (mm)
M8□□□（d）ⅢA	2×M32×1.5	10-19
	1×M40×1.5	

4.4 Commissioning Procedure, Method and Precautions

The actuator adjusts the visualization through the Actuator Dash Board (such as location setting, parameter setting, configuration and diagnosis).The whole setting can be carried out in the “Local Operation” state of the Actuator Dash Board. Installed in the electric unit, the Actuator Dash Board contains the following parts:

Mode selection switch

REM: REMOTE mode, used for REMOTE 4-20mA control (LCD display "Remote-a")/remote switch quantity control (LCD display "remote-B")

O/S: Prohibited mode, electric operation prohibited.

LOC: Local mode, operated and set through the operation panel.

↑ Button: Increase the parameter setting value when opening the valve or setting the menu.

↓ Button: To close the valve or reduce the parameter setting value during menu Settings.

STOP/MODE button: Long press to enter the menu, short press to confirm or exit the menu.

LED: A green LED indicates "Main power available", while a red LED shows "Fault".

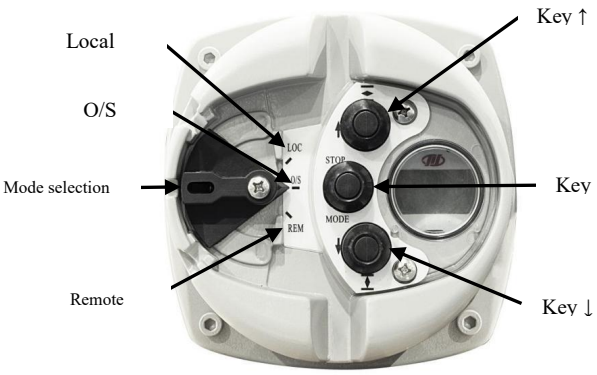


Fig. 4.7Actuator

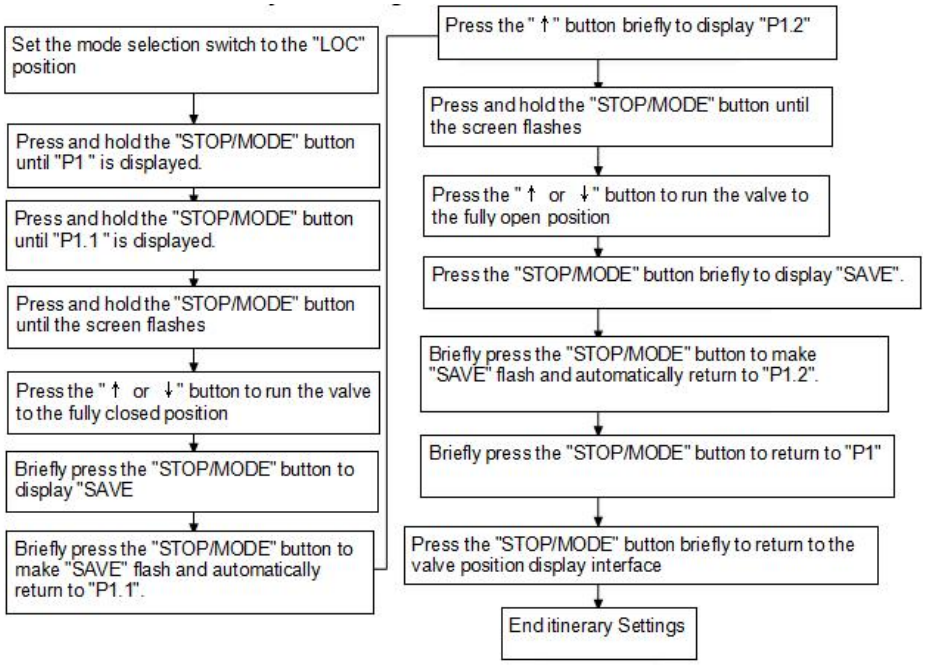


Figure 4.8 Setting the Actuator Travel

4.4.1 Operation and Adjustment on Actuator Dash Board

Put the mode selection switch to the “Local” position before the operation or adjustment on Actuator Dash Board .

Operation/Adjustment menu consists of 7 main menus:

- Setting (P1)
- Parameter (P2)
- Diagnosis (P3)
- Actuator version (P4)
- Adjustment (P5)
- Output (P6)
- Instancy (P7)

Each main menu can be expanded into one or multiple submenus. Use the " ↑ " or " ↓ " buttons to navigate between options at the same menu level. To enter or exit any menu level, press and hold or briefly press the "STOP/MODE" button.

Note: When setting the actuator's closed and open positions, the minimum travel requirement must be met. If the set travel is less than the minimum, the screen will display "----" and the settings cannot be saved. When "□□□□" is displayed, the settings can be saved.

4.4.1.1 Setting

Table 4.3 Menu functions

Main Menu			Notes
P1 SETUP	P1.1 ADJUST_C	————	Adjustment of close terminal position
	P1. 2 ADJUST_O	□□□□	Adjustment of open terminal position
	P1.3 TORQUE-C	40%-100%	Close protective torque (10% stepping)
	P1.4 TORQUE-O	40%-100%	Open protective torque (10% stepping)
	P1.5 ESD LEVEL	ACTIVE-H ACTIVE-L	ESD valid input setting; “ACTIVE-H” : ESD is valid when powers on; “ACTIVE-L”: ESD is valid when powers down.
	P1.6 Cur-Sig REV	NORMAL REVERSE	Normal and reverse function settings; “NORMAL” function 20mA corresponds to full open; “REVERSE” function 20mA corresponds to full close.

	P1.7 SHOW TORQUE	ON/OFF	Turn the torque display on or off
	P1.8 LANGUAGE	中 文 Русский язык English	Chinese, English and Russian language options

4.4.1.2 Parameters

Main menus			Note
P2 PARAMETR	P2.1 SWITCH	LOCAL:JOG/HOLD REMOTE:JOG/HOLD	In local or remote, the “JOG” refers to the continuous action of a given continuous signal signal, and the “HOLD” refers to the continuous action of a given pulse signal
	P2.2 LIMIT_O	55% - 100%	Open limit range of 55%-100%
	P2.3 LIMIT_C	0%-45%	Close limit range of 0-45%
	P2.4 ALM_DEAL	STAYPUT OPEN CLOSE	Set the action to be performed when the signal is disconnected, and select “STAYPUT” for position holding, “OPEN” for full on position and “CLOSE” for full off position.
	P2.5 PLACE_O	5%~100%	Preset open alarm position; when the position is equal to or greater than the preset open position, an alarm signal is generated.
	P2.6 PLACE_C	0%~50%	Preset close alarm position; when the position is less than the preset close position, an alarm signal is generated.
	P2.7 TORQUE_CUT	ON OFF	Torque off setting; when setting to “ON”, torque off mode is used; and when off torque is greater than protection torque set in Menu P1.3, the actuator shuts down.
	P2.8 ESD_PARM	ON/OFF MODULATE NORMAL	Control Source Setting: “NORMARL” :Remote control mode, which is determined by INPUT-E3 (analogue/hardwired switch). “ON/OFF” hardwired is the control source, under which INPUT-E3 is ESD control input end. “MODULATE” analogue(4-20mA) is the control mode , under which INPUT-E3 is ESD control input end.
	P2.9 ESD_CTRL	STAYPUT OPEN CLOSE	Set action to be performed when ESD emergency operation is valid, select “STAYPUT” for holding position, “OPEN” for full open position and “CLOSE” for full close position.

4.4.1.3 Diagnosis

Main menus			Note
P3 DIAGNOSE	P3.1 FAULT	As shown in Table P3.1 in Chapter 6	Fault description
	P3.2 ALARM	As shown in Table P3.2 in Chapter 6	Alarm information
	P3.3 CODE_DETECT	0~999	Hall sensor count value, for detecting condition of Hall sensor
	P3.4 IN_CUR	0%~100%	4~20mA analog input percentage

	P3.5 MOTOR_TEMP	-999~999	Motor temperature
	P3.6 BATTERY	0.0~9.9	Battery voltage
	P3.7 START TIMES	0~9999; shown in scientific notation after > 9999	Start times, unit: times. Shown in scientific notation; for instance, “2.5 4” indicates 2.5×10^4, i.e. 250000.
	P3.8 WORK HOURS	0~9999; shown in scientific notation after > 9999	Running time, unit: h. Shown in scientific notation; for instance, “2.5 4” indicates 2.5×10^4, i.e. 25000.
	P3.9 START FREQ	0~9999	Maximum start times per minute, unit: times.
	P3.10 MOT RUN HOUR	0As shown in P3.8	Motor running time, unit: h.
	P3.11 NEAR ERRO	As shown in 7.1	Last fault information
	P3.12 ERRO TIME	As shown in P3.8	Duration from last malfunction to now
	P3.13 MAX MOT TEMP	0~999	Recorded maximum temperature of motor, unit: °C
	P3.14 TEMP TIME	As shown in P3.8	Duration from recorded maximum temperature of motor to now
	P3.15 MAX CUR	A/D sampling value	Recorded maximum current of motor
	P3.16 MAX CUR TIME	As shown in P3.8	Duration from recorded maximum temperature of motor to now

4.4.1.4 Actuator version

Main menus			Note
P4 MACHINE	P4.1 SOFT_VER	1.00~x.xx	Software version number; x.xx is the upgraded version number.
	P4.2 HARD_VER		Backup for future.
	P4.3 MODEL	M8410～M8450	Actuator model
	P4.4 START LIMIT	Default 100000 times	Start times maintenance limit is panel display value ×1000.
	P4.5 MRT LIMIT	2,500h by default	Motor running time maintenance limit; unit: hour

4.4.1.5 Adjustment

Main menus			Note
P5 CALIBRAT	P5.1 PASSWORD	50	Enter password “51” to enter the menu below
	P5.2 INPUT-Z	Sampled Code Value	Set the calibrated input zero point value (4mA) by regulating signal Note: It will not be saved if deviation is more than 5%.
	P5.3 INPUT-F	Sampled Code Value	Set the calibrated input full point value (20mA) by regulating signal Note: It will not be saved if deviation is more than 5%.
	P5.4 OUTPUT-Z	0%~100%	Set the zero point feedback value of the calibrated output valve position (4mA)
	P5.5 OUTPUT-F	0%~100%	Set the full point feedback value of the calibrated output valve position (20mA)
	P5.6 SET POS	0%~100%	Force to set the current position as setting position

	P5.7 TEMP_ADJ	100℃ 0℃	For temperature calibration, press UP key to connect 1,670Ω (100°C), and press DWN key to connect 820Ω (0°C), exit from MODE setting and save.
	P5.8 DEADBAND	0.4~5%	Set the dead band of actuator
	P5.9 CLEAR ALARM		Clear the recorded fault records

4.4.1.6 Digital Output

The relay is triggered when the set conditions are ready.

Main menus			Note
P6 OUTPUT	P6.1 PASSWORD	60	Enter password “61” to enter the menu below.
	P6.2 OUTPUT_1 P6.3 OUTPUT_2 P6.4 OUTPUT_3 P6.5 OUTPUT_4 P6.6 OUTPUT_5 P6.7 OUTPUT_6 P6.8 OUTPUT_7	CUR_SIGN	It means no adjusting signal.
		REMOTE	It means that the actuator is at remote state.
		ADJUST_O	It means the full open position.
		PLACE_O	It means that the valve position is greater than or equal to the set open position.
		ADJUST_C	It means the full close position.
		PLACE_O	It means that the valve position is less than or equal to the set open position.
		TORQUE_E	It means either STO or STC.
		TEMPER	It means that the motor temperature exceeds 100°C .
		BAT_POWER_L	It means that the battery voltage is less than 3.0V.
		FAILURE	It means the actuator failure.
		ALARM	It means that the actuator gives an alarm.
		TORQUE_O	It means STO.
		TORQUE_C	It means STC .
		POS_LOSE	It means that the valve position is smaller than -20% or greater than 120%.
		RUN OPEN	It means that the actuator runs to open .
		RUN CLOSE	It means that the actuator runs to close.
		RUNNING	It means that the actuator is running .
		POWER INDCT	POWER INDCT

4.4.1.7 Emergency

Main menus			Note
P7 INSTANCY	P7.1 INSTANCY		Actuator can be driven over terminal position by force in the menu.

4.4.1.8 Communication

This menu is used when Modbus/DP bus communication is enabled.

Main menus			Note
P8 COMM	P8.1 IR_ADDR		Infrared communication address
	P8.2 BUS TYPE	0~4	0(--), 1(PROFIBUS) ,2(MODBUS), 3(FF), 4(HART)， Read-only, showing the current bus communication mode

	P8.3 COMMADDR_A	1～247	The bus address of channel 1
	P8.4 COMMADDR_B	1～247	The bus address of channel 2
	P8.5 REM_CTRL	0～4	Remote control mode(This menu works when P8.2 is not "--".)： 0-BUS ON/OFF:permanent contact signal BUS 1-BUS POS:positioner BUS 2-ON/OFF JOG:permanent contact signal conventional 3-ON/OFF HOLD:pulse contact signal conventional 4-POSITIONOR:positioner conventional (4-20ma analog input)
	P8.6 BUS ERRO ACT	0～3	Fail-Safe Action Mode 0: Hold Last Position(default) 1: Full Open 2: Full Close 3: Fail-Specified
	P8.7 ERRO RUN POS	0%～100%	Safe Position in the event of a bus failure，default 50%.
	P8.8 BAUDRATE	0.3Kbps 0.6Kbps 1.2Kbps 2.4Kbps 4.8Kbps 9.6Kbps 19.2Kbps 38.4Kbps	Default 9.6Kbps
	P8.9 CHECKMOD	8 N 2 8 O 1 8 E 1 8 N 1	8 data bits, no parity, 2 stop bits (default) 8 data bits, odd parity, 1 stop bit 8 data bits, even parity, 1 stop bit 8 data bits, no parity, 1 stop bit

4.4.2 Storage Setting

Set new parameters with "↑" or "↓" button on the monitor and then press the "mode/stop" button. The static "SAVE" will be displayed on the monitor if the parameters have been changed. Click "+" or "-" button to cancel and click "STOP/MODE" button to return.

Click "STOP/MODE" button to store new value. The flashing "SAVE" indicates the storage process.

4.4.3 Alarm and Error

Intelligent actuator is powerful; after the diagnosis function is started, short messages will be displayed through LCD; information of alarm and errors is described in detail in Table 9 and Table 10.

Definition of alarm: the alarm system will start automatically when the actuator reaches the critical condition; and the actuator is still working at this time. The actuator will be forced to stop working if it is always in this state.

Alarm information: according to the different selections of working modes, alarm information of LOCAL/ALARM, 0/S/ALARM, REMOTE-A/ALARM and REMOTE-B/ALARM will flash alternatively on the LCD monitor. See detailed information in P3.2 of the main menu. The LCD monitor will only display the errors but not make alarm display if several errors occur simultaneously.

Definition of error: The actuator will display error information automatically in case of errors in the hardware or software or improper operation by the operators. Cut off the power supply if the errors harm the operators or the safety of the actuator.

Error information: indication error information of LOCAL/FAILURE, 0/S/FAILURE or REMOTE-A/FAILURE will flash alternatively on the LCD. REMOTE-B/FAILURE indicates error information. See P3.1 Menu for the detailed information.

4.5 Acceptance Test Items, Methods, and Criteria after Commissioning

Commissioning Acceptance: Upon completion of commissioning, the valve shall be in the fully open or fully closed position, with the corresponding status signal output. After operating the actuator through one complete travel cycle both locally and remotely, the valve shall move to the pre-set open/close positions and provide the corresponding status signals.

4.6 Preparations before Trial Operation, Start of Trial Operation and Trial Operation

- Make sure mechanical and electric connections are properly connected.
- Make sure that the actuator is commissioned and all the operations are effective.
- Start the trial operation procedure.
- Trial operation.

5 Application and Operation

5.1 Preparations and Check before Application

- Make sure that the actuator has been installed and commissioned and should be accepted;
- Make sure that the valve is operable;

5.2 Safety before and in the Application, Safety Protection, Safety Sign and Instructions

- The manual has been carefully read and the performance of the electric actuator has been understood before the application;
- Danger caused by non-human factors should be taken into consideration and there should be quick response measures during the application;
- The actuator is only for the application of operators or bad consequences will be caused.

5.3 Operation Method

- To operate on-site, please set the selector switch to "LOC"
- Point operation mode: Press the "↑ or ↓" button, and the actuator will run. Release the "↑ or ↓" button to stop the actuator from running.
- Self-holding mode: Briefly press the "↑ or ↓" button, and the actuator will continue to run until it reaches the fully open or fully closed position before stopping. To STOP halfway, please briefly press the "STOP/MODE" button.

In local self-holding mode, please be careful not to accidentally touch the "↑ or ↓" button, which may cause the actuator to act.

- When the selector switch is set to "REM", remote control signals (switch quantity, analog quantity, digital communication) can be input to achieve remote control of the actuator.
- When the selector switch is set to "O/S", both local and remote control fail.

5.4 Monitor and Record during the Operation

- Monitor and record relevant data during the operation.
- Record equipment operation.
- Record error handling.
- Make handover records.

5.5 Halt Operation Procedure and Precautions

Operation procedure:

- Run the equipment to the position required and confirm such condition prior to halt.
- Cut off power supply.
- Make clear marks.

Precautions:

- Operate with hand wheel if electric operation fails.
- Make halt records.

6 Trouble Shooting

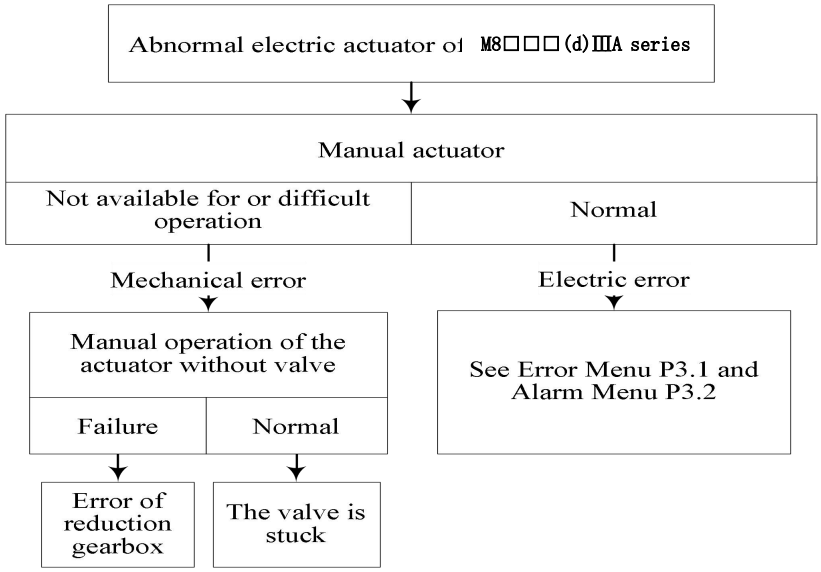


Table 6.1 Menu P3.1 fault display text

	Causes analysis	Troubleshooting methods
PHASE	Power supply has incorrect phase sequence detected.	Check the main power supply.
PHASE-A/B/C	Power supply is out of phase.	Check the main power supply.
TEMP-MOT	Go beyond motor temperature limit.	In case of out-of-limit, cut off power supply of the motor till that the temperature is below alarm value.
POS-LOSE	Valve position gets lost.	Set stroke again.
SET-POS	The entire stroke count is less than the allowable minimum code value	Adjust the set values of close and open positions.
TORQUE-E	Actuator torque is greater than protection torque.	Drive the actuator reversely.
CUR-OVER	Excess motor current	Check the motor for phase loss or turn-to-turn short circuit of the motor.
END-POS	The actuator runs beyond the terminal position i.e. position beyond the limitation (over 120% or less than -20%).	Re-store the force from terminal control unit, check accessories, and make the actuator run into the operation range through manual operation or adjust terminal position again.
RELAY	Incorrect operation direction of the actuator	Dash board error, replace it.

Table 6.2 Menu P3.2 alarm display text

	Analysis	Trouble Shooting
BATRENEW	Low battery	Replace the battery.
BAT-EMPT	Low battery	Replace the battery.
TORQUE-O	Open torque alarms and load torque is over the selected open alarm value.	Check the alarm value; check the actuator, valve body and gear box (if it is applied) for the increase of friction; whether the actuator is working in the allowed ambient temperature (oil viscosity increases).
TORQUE-C	Close torque alarms and load torque is over the selected close alarm value.	
TEMP-MOT	Critical motor temperature	Once it reaches the alarm motor temperature, the actuator will stop operation until the motor temperature is low enough.
IN-SIGN	No adjustment signal alarms and signal is over 110% or less than -10%	Check the signal board for errors or input current.

	(write signal is too large while read signal is too small).	
MAINTAIN	Need maintenance. A maintenance limit has been exceeded.	Increase the default maintenance value in P4 menu after the maintenance check of the actuator

7 Maintenance and Repair

Actuator should undergo the following check items every year to ensure the operation without errors and necessary safety measures should be taken before the check, maintenance of the actuator to ensure the smooth and safe maintenance process.

If you need to disassemble the actuator during the check and maintenance, power supply to the main circuit and sub circuits should be cut off and some charged parts around should be isolated.

7.1 Daily maintenance

Table 7.1 Actuator servicing

	Maintenance period	**Maintenance contents**	**Maintenance criterion**
1	Every week	Inspect the oil leakage of the actuator’s gearbox	No oil leaking
2		Inspect the valve position indication	Correct indication
3		Inspect thecleaning and lubrication of the stem and axle sleeve	Clean and lubricate
4		Inspect the housing of the actuator	No looseness, no damage
5		Inspect the stem thread of the uncovering flange joint	Using the requiring machine oil and protection sleeve to guarantee
6	Every month	Inspect the fastening bolt of the actuators	No looseness
7		Inspect the seal of the in and out wire	No looseness, no damage
8		Inspect the junction box	No moisture, no corrosion, no loose
9		Inspect the sound of the Open and close action,Maintenance if necessary	No abnormal sound
10	Half year	Inspect the manual devices of the valve ,Open and close the valve one time	Flexible, normally open
11		Inspect the open in place and the close in place signal	Normal control
12		Inspect the display	Normal display
13		Not too much dirty and dust on the actuator	Keep the actuator clean and visible
20	Every year	Regular performance check	Qualified

8 Dimension and Weight

The specific overall and installation dimensions of the actuator shall be subject to the production drawings.

8.1 Actuator Outline and Installation Dimension

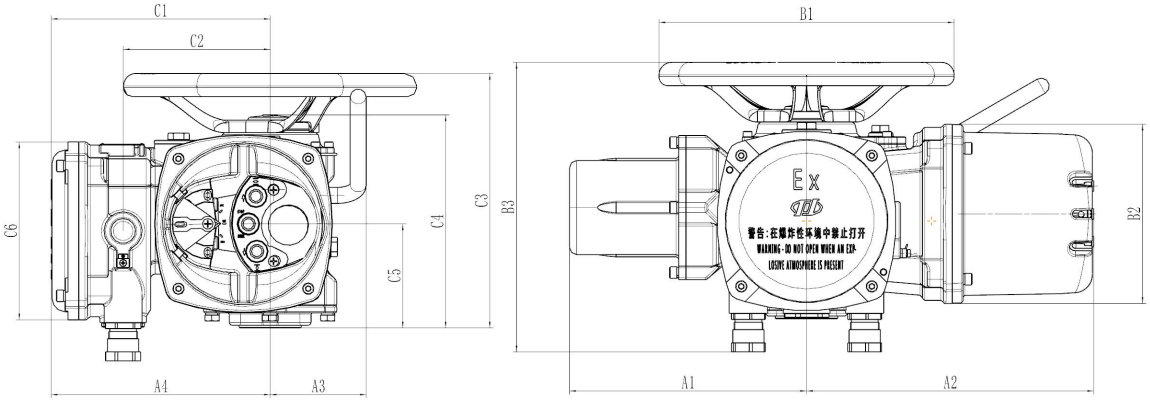


Fig8.1a M8□10dⅢA-40dⅢA Outline

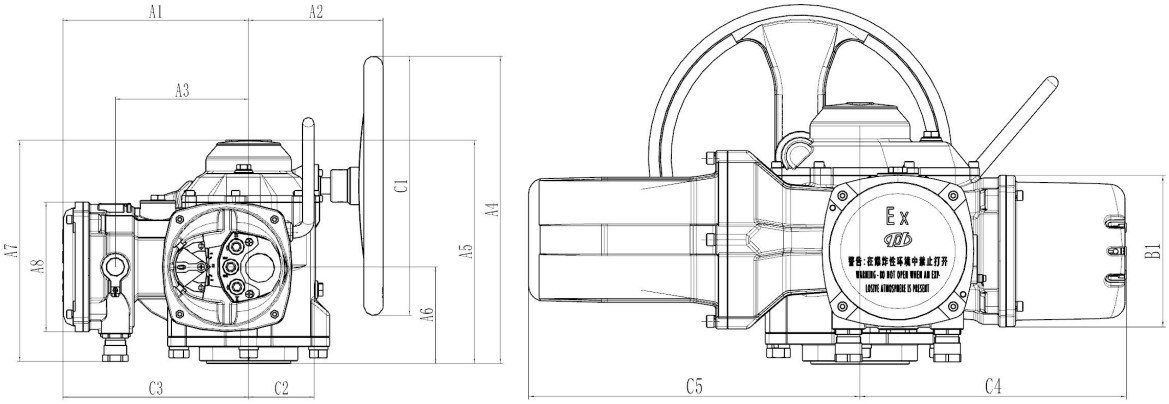


Fig8.1b M8□50/60dⅢA Outline

Table8.1 Actuator Installation Dimension

Model / Paramete	M8□10d	M8□20d	M8□25d	M8□30d	M8□35d	M8□40d	M8□50d	M8□60d
ISO5210	F10	F10	F10	F14	F16	F16	F16	F16
A1	265	265	316	316	381.5	381.5	286.5	286.5
A2	321	321	360	360	346	346	207.5	207.5
A3	108	108	115	115	115	115	205.5	205.5
A4	246.5	246.5	255	255	261	261	474	474
A5	/	/	/	/	/	/	344.5	344.5
A6	/	/	/	/	/	/	149	149
A7	/	/	/	/	/	/	341.5	341.5
A8	/	/	/	/	/	/	200	200
B1	Φ330	Φ330	Φ400	Φ400	Φ480	Φ480	200	200
B2	200	200	200	200	200	200	/	/
B3	323	323	337	337	375	375	/	/
C1	246.5	246.5	255	255	261	261	Φ400	Φ400
C2	165.5	165.5	174	174	180	180	101	101
C3	286	286	334	334	377	377	286.5	286.5
C4	239.5	239.5	288	288	316.5	316.5	351	351
C5	117	117	138	138	153	153	437	437
C6	200	200	200	200	200	200	/	/
Weight/kg	29	30	40	41	55	58	75	78

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