GRAT®
Simple & Reliable

WA-20

IoT Mini Electric Actuator

Instruction Manual

- Please read this instruction manual carefully before installation and use.
- Retain this manual for future reference.
- Ensure proper use of the product by thoroughly understanding the contents of this manual.

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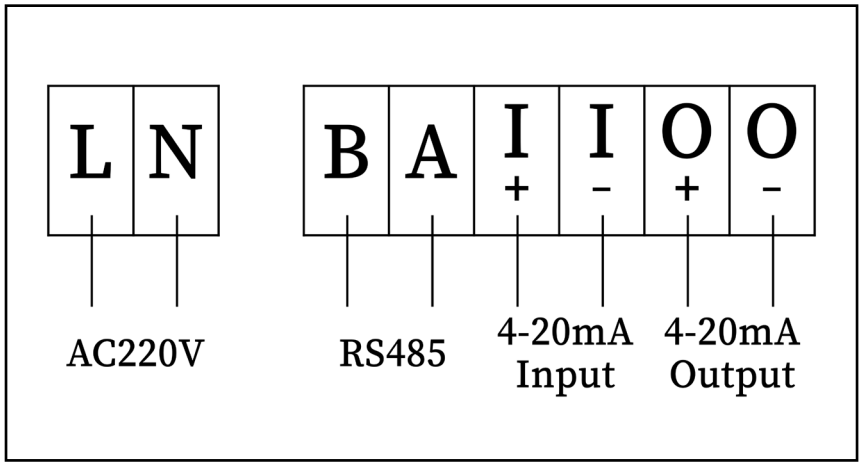
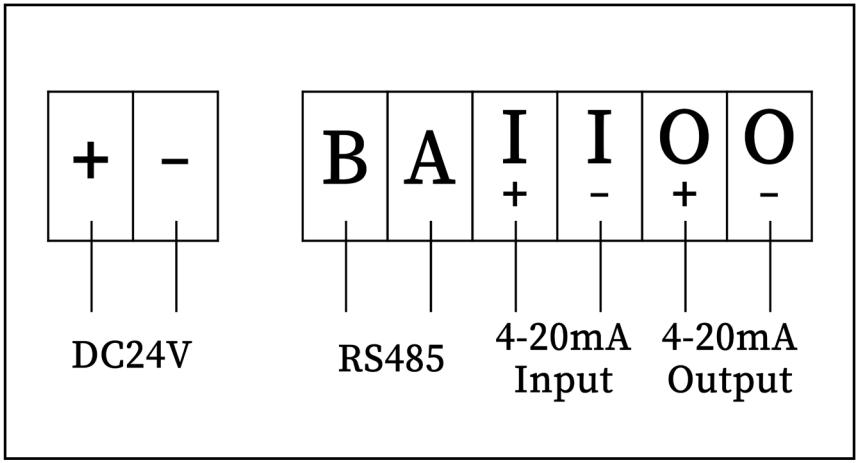
Electrical Wiring Diagram

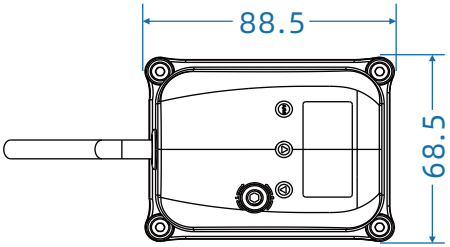


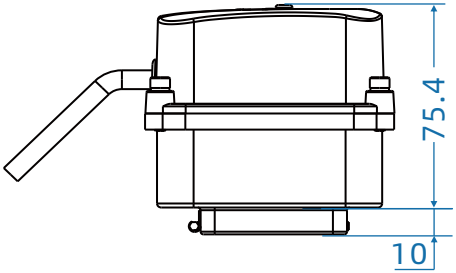
AC 220V

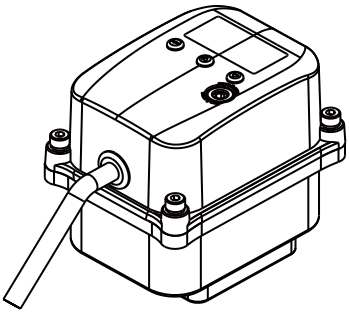


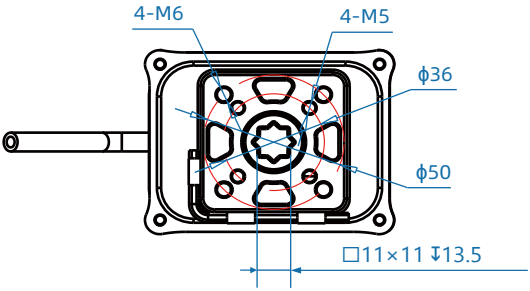
DC 24V

Dimensional Drawing



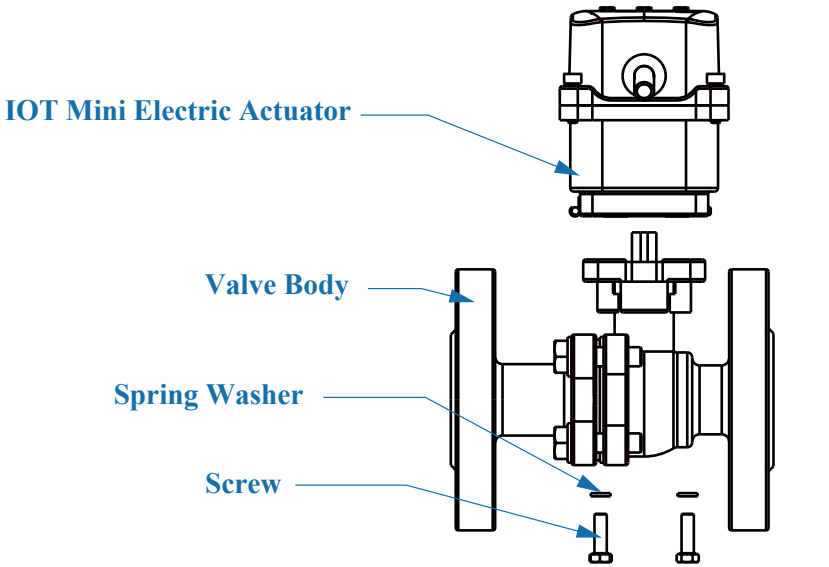


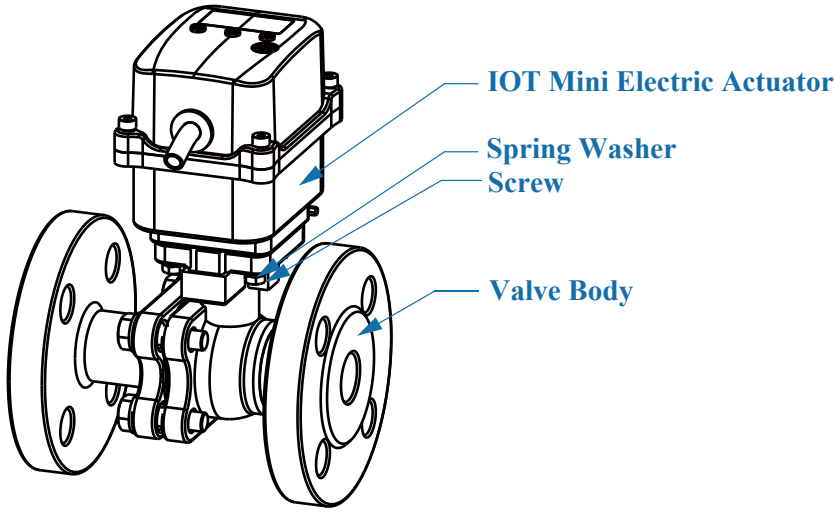




Note: Octagonal.opt.□9×9,□11×11

Valve Body Assembly Drawing





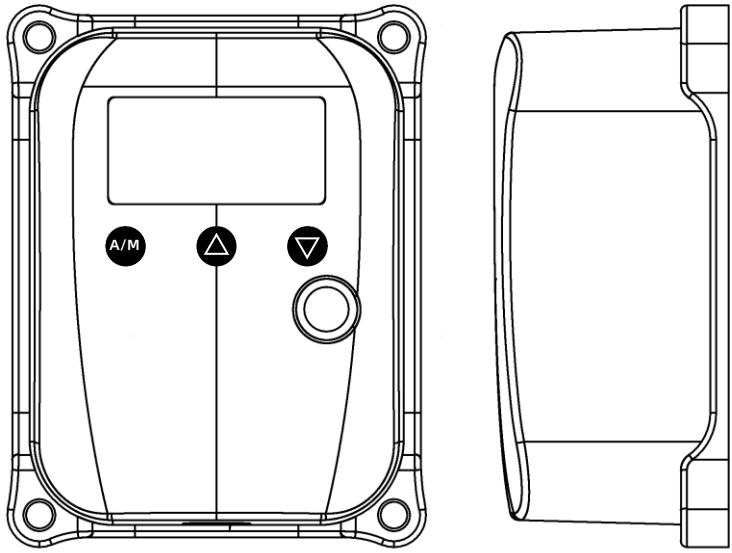
Technical Specifications

- Rated Voltage: AC220V/DC24V
- Rated Torque: 20N·m
- rated power:10W
- Compatible Valve Ball valves of DN25 and below
- Speed Control Method: PWM stepless speed regulation, ensuring smooth operation
- Adjustable Range: 30%–100%
- Control Mode: Modulating (encoder-based)
- Communication Protocol: Modbus-compatible
- Control Accuracy: ±0.5%
- Drive Motor: High-performance brushless motor with built-in overload protection
- Stroke Time: 15–25 sec (0–90°)
- Position Display: Real-time OLED display with Chinese interface for status and parameter monitoring
- Manual Override: Hex key operation
- Housing Material:
  Upper enclosure: Integrated ABS housing + TPE buttons + PC lens
  Lower enclosure: Die-cast aluminum
- Output Shaft: Recessed octagonal (11×11 mm)

EA-20 IOT intelligent electric actuator is the latest ultra-small compact electric actuator developed by our company. It is used for switch, or regulating the opening of valves such as butterfly valves, ball valves, and wind valves. It can be used in industrial automation control systemsin food, environmental protection, papermaking, chemical, power, and other industries.

Button defintion

Button name	Button function
A/M (Confirm) Button	1. Short press - Switches between "Local" and "Remote" modes; 2. Long press for 3 seconds - Enters the menu interface; 3. In the setting menu, a short press saves the changes made to parameters.
△(Plus) Button	1.In local mode, pressing the "plus" button opens the valve; 2. In the setting menu, it serves as the "scroll up/increase" button.
▽(Minus) Button	1.In local mode, pressing the "minus" button closes the valve; 2. In the setting menu, it serves as the "scroll down/decrease" button.



Outline Drawing Diagram

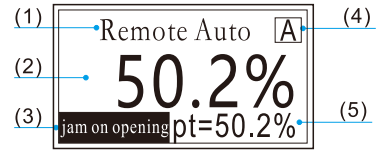
Display Screen

The actuator is equipped with a dot-matrix graphic Display screen, with the functional areas of its layout as follows:

(1) Control Mode Display Area: Displays the current operating mode of the actuator.

(2) Valve Position Display Area: Shows the real-time valve opening percentage.

(3) Operation Status & Alarm Information Area (see the later section "Alarm Information").



(4)Input signal indication;

A- Input/output signal is 4~20mA;

V-Input/output signal is 0~10V;

V1 - Input/output signal is 1~5V;

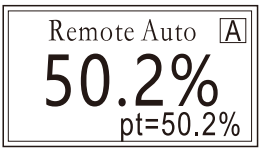
M - Input/output signal is RS485;

(5) Target Valve Position Percentage (Remote Setting)

Operating Instructions

Local and Remote Control Switching

●Press the "A/M" button to switch between local (on-site) and remote control modes.



Manual Operation on Site

●**Manual Operation:** In local mode, press and hold the "△" button, and the actuator will move in theopening direction. Once the button is released, the actuator will stop. The same applies whenpressing the "▽" button for the closing direction.

●**Continuous Operation:** Press and hold the "△" button for more than 3 seconds, and the actuatorwill start moving in the opening direction. After releasing the button, the actuator will continue tomove in the opening direction until a stop condition is met (such as over-torque or reaching theopen limit). The same applies to the "▽" button for the closing direction.

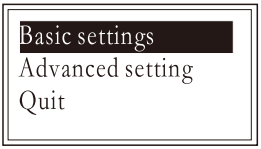
Entering The Menu

⚠ **Note 1:** During menu operations, if no key is pressed within 1 minute, the display will automatically return to the non-setting screen. Additionally, after completing each menu operation, use the return key repeatedly until exiting the setting screen; only then can the valve opening percentage (as shown on the non-setting screen) be visible when the motor is running.

Note 2: When you enter the menu, each menu item first displays the stored value from your last setting. Use this feature to check your previous settings.

Enter the setting menu

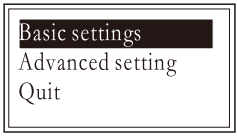
1: Enter the setting menu: In the standby interface, press the"AM" button for about 3 seconds to enter the setting menuscreen.



2: Move to select the menu: Use the "up" or "down" buttonsto select the required item, and then press the "confirm" button,which will enter the corresponding menu.

Basic Settings

Entering Basic Settings



Access Basic Settings

1.Select the "Basic Settings" option and press the "Enter" key to enter the "Enter Basic Password" submenu.

2.Use the "+" key to increment the digit by 1.

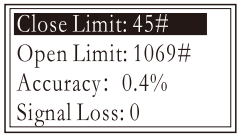
3.Press the "Enter" key to move to the next digit.

4.After setting all three digits, press "Enter" to confirm.

If the password is correct, the system will proceed to the menu.

If "Password Error" is displayed, re-enter the password.

Calibration of Close Limit



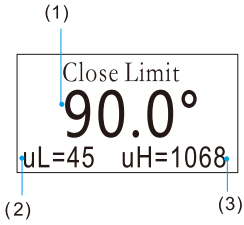
1.Select "Calibrate Zero Position": The right side of the row displays the last calibrated zero position value (0~4095) from the absolute encoder.

2.Enter "Calibrate Zero Position" Menu:

Press the "Enter" key to access the calibration menu.

3.Adjust Motor Position: Use the "+" (Increase) or "-" (Decrease) keys to rotate the valve to the desired zero position.

4.Save Zero Position: Press "Enter" to confirm and save, then return to the previous menu.



5.Cancel Calibration (No Save): Press "+" and "-" simultaneously to exit without saving changes.

Functional Description

(1) Real-Time Valve Stroke Angle Calculation (Zero to Full Position)

Formula: When uH≥uL: Angle value=(uH-uL)÷ 4096 * 360°

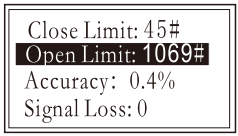
When uH<uL:Angle value=(4096 + uH -uL): 4096* 360°

(2) uL (Zero position value)=position value of thecorresponding encoder(0~4095).

(3) uH (Full position value)=position value of thecorresponding encoder(0~4095).

Note: When calibrating the zero position, uL will changewith the valve position, while uH remains constant.

Calibration of Open Limit

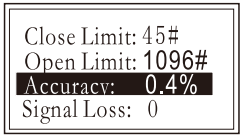


Calibration of open limit operation is the same as close limit calibration, please refer to the operation ofclose lirnit calibration.

Note: When calibrating the open limit, uH will change with thevalve position, while uL remains unchanged.

Accuracy Adjustment

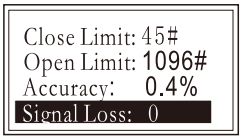
This function is effective in remote automatic control mode. In this mode, the actuator calculates the desired valve position value based on the control current and compares it with the current valve position. If the absolute value of the difference is greater than the deadband value, the actuator starts to move, bringing the current valve position closer to the target position. If the absolute difference between the current valve position and the desired valve position is within the deadband range, the actuator stops moving. Setting an appropriate deadband can prevent the actuator from oscillating near the given valve position.



Select "Signal Loss": The right side of this line will display the previous setting value (0.3% to 9.9%). Users can use the "increase" and "decrease" buttons to change the deadband value. After selecting the desired deadband value, use the "confirm" button to save the modification.

Entering Basic Settings

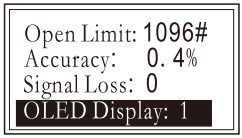
When the actuator operates in remote automatic control mode and the control current is less than half of the lower limit current, the actuator considers the control signal to be lost, referred to as "signal loss". The signal loss defines the position the actuator should move to when a signal loss occurs. This item has three selectable options: "hold position", "fully closed", and "fully open". "Hold position" means to maintain the current position.



Select "Signal Loss": The right side of this line will display the previous setting value ("hold position", "fully closed" or "fully open"). Use the "plus" and "minus" buttons to select the desired value, and use the "confirm" button to save the modification.

Entering Basic Settings

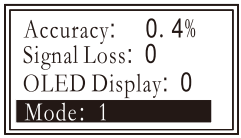
When the actuator needs to be installed in reverse in special fields, its display can be controlled by this setting. This item has two selectable options: "Normal display" and "Reverse display". "Normal display" means the display is as usual, while "Reverse display" means the display direction is reversed.



Select "OLED Display": Enter this item to display the previous set value ("normal display" or "reverse display"). Use the "increase" and "decrease" buttons to select the desired value, and use the "confirm" button to save the modification.

Entering Basic Settings

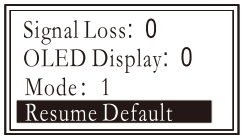
This feature is for on-site control modes, where "Inching" means that in the local mode, when the "△" button is pressed, the valve will open, and it will stop when released, and will continue to open if held for more than 3 seconds. The same applies to the "▽" button. "Maintain" means that in the local mode, when the "△" button is pressed, the valve will open, and it will continue to open even after the button is released until the stop condition is met (such as torque overload, reaching the closed limit position, etc.). The same applies to the "▽" button.



Select the " Mode" : Enter this item to display the previous set value ("Inching" or "Maintain"). Use the "increase" and "decrease" buttons to switch the setting value between "Inching" and "Maintain". Use the "confirm" button to save the selected setting value.

Resume Default

This function is used to restore the parameter values saved at the factory.



Select the "Resume Default" : If the menu settings are messed up during the process, this item can be used to restore all factory default settings. Use the "confirm" button to confirm and restore factory default settings.

Advanced Setting

Enter Advanced Setting

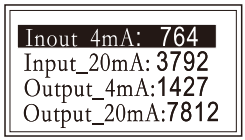
Enter Advanced Settings:
Select the "Advanced Setting" item and press the "Confirm" button to enter the "Please Enter Basic Password" submenu.

- Use the "increase" button to add 1 to the number.
- Press the "confirm" button to switch to the next number.
- After setting the three-digit number, press the "confirm" button to confirm.

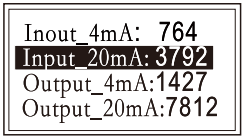
If the password is correct, you will enter the menu; otherwise, it will prompt a password error, and please re-enter.

Input Signal Calibration (4~20mA/0~10V/1~5V)

When the input signal sent by the user to the actuator differs from the actuator's previous calibration value, this function can be used to re-calibrate the current issued by the user. This ensures that the actuator and the user's input signal sending device share the same measurement standard, thereby improving the accuracy of the actuator's control.



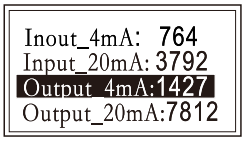
Seleet the "Input 4mA" : It will display the control current value (mA) collected by the actuator corresponding to the parameter value. At this time, users can send a low-end signal (4mA) of the control current to the actuator, and press the "confirm" button to save the collected current parameter value after the value stabilizes.



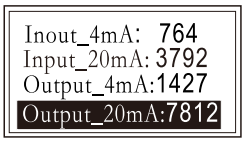
Seleet the "Input 20mA" : This will display the parameter value corresponding to the control current (mA) measured by the actuator. At this point, the user can send a high-end signal (20mA) of the control current to the actuator, and press the "Confirm" button to save the measured current parameter value after the value stabilizes.

Output Signal Calibration (4~20mA/0~10V/1~5V)

When the signal output by the actuator differs from the standard value, this function can be used to re-calibrate the output, so that the actuator's output signal reaches the standard value to improve the accuracy of the actuator control.
Take 4~20mA as an example: Connect OUT+ to the positive terminal of the ammeter and OUT- to the negative terminal of the ammeter.



Select the "Output 4mA" : Adjust the parameter value by pressing the "increase" or "decrease" button. Check the digital display of the ammeter; when the ammeter stably displays (4.0mA), press the "confirm" button to save the low output signal current parameter value.



Seleet the "Outpnt 20mA" : Adjust the parameter value by pressing the "increase" or "decrease" button, and check the digital display of the ammeter. When the ammeter stably displays (20.0mA), press the "confirm" button to save the high output signal current parameter value.

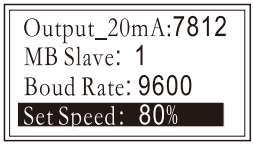
Set Mobbus Slave Address

Select the "MB Slave": Set the slave address by pressing the "increase" or "decrease" button; the slave address range is (1~254). Press the "confirm" button to save.

Set Band Rate

Select the "Baud Rate": Choose the baud rate by pressing the "increase" or "decrease" button; the default baud rate is 9600.

Set Rate of speed

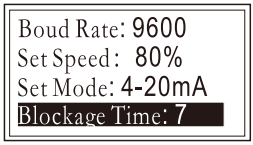


Select the "Set Speed" : Set the motor speed by pressing the "increase" or "decrease" button; the range is (30%~100%). Please choose a different speed for different application occasions. The lower the speed, the higher the precision, but the longer the stroke time.

Set Mode

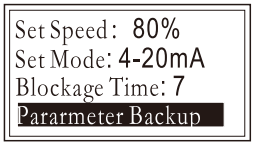
Select the "Set Mode" : Set the working mode by pressing the "increase" or "decrease" button. You can choose 4-20mA, ModBus, 0-10V, or 1-5V. Please select a different working mode for different application occasions. After switching the working mode, the input and output signals need to be re-calibrated.

Set Blockage Time (defaut 7 seconds)



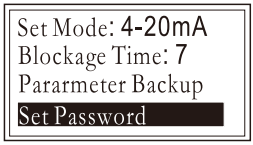
Seleet the "Blockage Time" : Set the blockage time by pressing the "increase" or "decrease" button. During the opening or closing process of the valve, if the motor encounters a jam and exceeds the set time for this item, it will report the fault "jam on opening" or "jam on closing," and the motor will stop running.

Parameter Backup



Select the "Parnmeter Backup" : After the parameters are set, you can select and back up the parameters using the "decrease" button. When you choose to restore factory settings, you can recover the currently backed-up parameters.

Set Password (Default Password 333)



Seleet "Set Password": Set the password for advanced settings using the "increase" or "decrease" buttons; the range is 000 to 999. Press "Confirm" to save. The default password for advanced settings is 333.

Operation & Debugging

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