



RAIII/RQIII/RQMIII Range Electric Actuator

Operation Manual



WENZHOU RICH MEASURE & CONTROL EQUIPMENT CO.,LTD.

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1 Important Notes

- Please read this manual entirely before attempting to install or operate your RAIII/RQIII/RQMIII actuator. A full understanding of the installation and operation options will assist you in installing the actuator. RAGA has designed the RAIII/RQIII/RQMIII Series actuator for long operational device even in the harshest environments. Flexible control and protection options are provided to ensure the actuator meets your requirements.
- All actuator enclosures are sealed by O-rings, and cable entries are supplied with threaded plugs to protect the terminal compartment until the unit is wired. If the actuator cannot be installed immediately, it is recommended that it be stored in a clean, dry place, preferably in an area that is not subject to severe fluctuations in temperature.
- Disconnect all incoming power before opening any cover on the actuator. The user/operator must ensure that safe working practices are employed at all times and are in accordance with local or national standards that are enforced at the particular site of usage.
- To install and commission the actuator, only the terminal compartment cover needs to be removed. Settings for commissioning the actuator are done externally therefore, no other covers need to be removed. The actuator was assembled in ideal dry conditions and the total sealing of the enclosure protects all electrical components against deterioration.

NOTE: Removal of any cover, apart from the terminal compartment will invalidate the unit warranty. Exposure of actuator components to an environment that results in deterioration of internal components will also invalidate the unit's warranty.

- During final field installation, ensure that all cable entries are correctly sealed in accordance with National Standards or Regulatory Authorities. All temporary transit plugs must be removed and any unused cable entries closed in an approved manner.

2 Installation

2.1 Application of the Drive Bush

2.1.1 Thrust Base Type

1) Turn actuator onto its side, remove the two cap-headed screws holding base plate onto thrust base, pull out the drive bush complete with its bearing assembly. Remove the thrust bearing of the drive bush's double end (The two thrust bearings stopper ring near the mid bulgy – shoulder of the drive bush may not be removed.) (Refer to Fig.1-1).

2) According to the thread dimension of the valve stem, apply the internal screw thread of the drive bush.

3) Remove all swarf from the drive bush and others that require removal, ensuring that they are in good condition, clean and greased. According to the above steps in reverse, we can refit the drive bush and base assembly on the actuator, ensuring that the slots in the drive bush are located into the drive dogs of the hollow output shaft. (The bearing modules must be topped up lubricating oil).

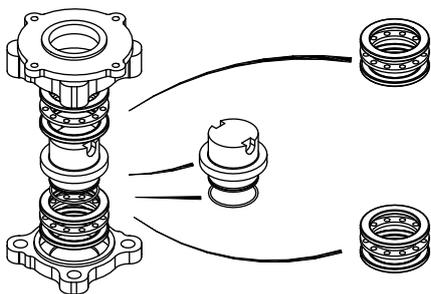


Fig. 1-1

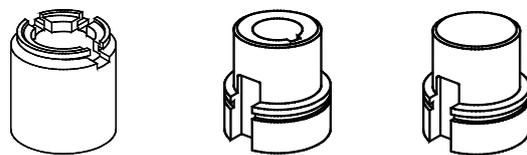


Fig. 1-2

2.1.2 Non-Thrust Base Type (Refer to Fig. 1-2).

1) Turn actuator onto its side, remove the base, the retaining clip on top of the drive bush can now be visible.

2) Turn the retaining clip slots until the drive dogs of the output shaft are reached, or with a screwdriver seek out the retaining clip, we can remove the drive bush. According to the connection mode of the configured value, we can machine the hole of the drive bush shaft, key seat or combinative-dogs, and refit them assembly on the actuator. Then fit on the retaining clip and base. Before fitting on the base, daub between base and drive bush with any lubricating – oil is required.

NOTE: Removal of any cover, apart from the terminal compartment, will invalidate the unit warranty. Exposure of actuator components to an environment that results in deterioration of internal components will also invalidate the unit's warranty.

2.2 Installation of the actuator

2.2.1 Installation with the Visible stem valves

2.2.1.1 Install the Thrust Base Type

1) According to the requests of the clients when leaving factory the screw thread inside the drive bush has been machined well. As a combination of actuator and drive bush, it is assembled with a valve.

Firstly use the hand – operating step available, then place the actuator onto valve, put the screw thread of the actuator and the valve stem in position, wind the handwheel in the opening direction to engage the drive bush onto the stem. Continue winding until the actuator is firmly down on the valve flange. Wind two further turns, fit securing bolts and tighten fully.

2) If the clients apply the internal screws of the drive bush, according to above 1.1, apply and fit in the drive bush. According to the above “ a ” diagram, fit them in this assembly.

2.2.1.2 Installing the Non – thrust Base Type

Ensuring that the drive bushes of the non- thrust type have been installed, fit the actuator and valve as a combined unit.

Firstly use the hand – operating option of the actuator available, then place the actuator onto the valve, let the valve stem into the hole of the drive bush or the combinative – dog of the drive bush is secured to the combinative – dog of the valve, wind the handwheel in opening direction until the actuator is firmly down on the valve flange. Wind two further turns, fit securing bolts and tighten fully.

2.2.2 Installation with the valve with gear case

Firstly check that the drive bush, input shaft, key and key seat are all properly fitted. First the base and drive bush assembly on the actuator, then place the actuator onto the flange of the gear case correctly, place the input shaft of the gear case into the hole of the drive bush shaft, wind the handwheel, ensuring that the key is located into the key – seat of the drive bush, then fit securing bolts and tighten fully.

2.2.3 Installation with the hidden – stem valve

According to the section 2.1.2, use the same way to assembly but if the actuator will support thrust, use the thrust – type connection with thrust bearing.

2.2.4 Handwheel Sealing

Ensure that the sealing plug in center of the handwheel is sealed with PTFE tape and fully tightened ensuring that moisture does not pass down the output shaft of the actuator.

2.2.5 Connecting to Terminals and Cable Entry

1) According to the control orders, connect the power wires and signal wires.

2) The actuator has high-specialization earth terminals in order to ensure that persons operating the actuator as well as the equipment are safe. The actuator should be earthed properly as standard.

3) Only appropriate certified explosion – proof entry reduces, glands or conduit may be used in hazardous locations. Ensure that threaded adaptors, Seal unused cable entries with a steel or brass threaded plug. In hazardous areas an appropriately certified threaded blanking plug must be used.

2.2.6 Mounting the LCD Screen Correctly

When the actuator is located on the different orientations, in order to make the actuator have the natural direction of the LCD display, that is to say the characters have natural display direction, the LCD screen of the actuator provides four sorts of settings:

1) Installing the actuator in the horizontal direction (the handwheel is upturned), the LCD screen is mounted with a natural position.

2) The actuator is installed conversely (the handwheel is gadarene), the characters are displayed reversely.

3) Installing the actuator in the leftward direction (the handwheel is leftward), the LCD screen is mounted near by the side of the flange.

4) Installing the actuator in the rightward direction (the handwheel is rightward), the LCD screen is mounted near by the side of the flange. The characters are displayed reversely.

3 Operation

Position limits calibration – can be performed one of two ways, electrical operation(See **Section 3.3, Electrical Operation Feature**)

and handwheel operation(See **Section 3.4, Handwheel Operation Feature**).

The actuator has been configured with all customer-specified parameters and no further calibration should be necessary. If full valve data was not provided when ordering or if changes are needed for parameters, see **Sections 4** .

3.1 Intrinsically Safe Setting Tool. (Fig. 3-1)

The Setting Tool is used to be not alter the type to actuator parameter setting. If you want to use the Setting Tool, you must set the Mode Knob to the “**LOCAL**” or “**STOP**” position beforehand. When a button is depressed on the Setting Tool, the relevant instruction is transmitted to the actuator via infra–red pulses. The Setting Tool must be pointed directly to the front of the actuator indicator window and at a distance no greater than 1.00m. The following describes Setting Tool button functions:

↓ : Down Button. It is used for selecting the next item of the current menu. When the last item is reached, pressing the Down Button again will return selection to the first item of the current menu.

+ : Plus Button. Increase / Change displayed function’s value or option setting.

– : Minus Button. Decrease / Change displayed function’s value or option setting.

↵ : Enter Button. Enter displayed value or option setting or affirm and save the selected settings.

↶ : Return Button. Return from current menu to previous menu.

Notice: When Mode Knob is set to the “**LOCAL**” position, pressing the “+” button and “↓” button simultaneously will cause the actuator to execute the “Local Opening” action. Pressing the “–” button and “↵” button simultaneously will cause the actuator to execute the “ Local Closing” action.

Setting Tool Model: RAIII/RQIII/RQMIII;

Explosion–Proof Mark: Exia IIcT4;

Explosion–Proof Certificate Number: CNex01.767;

Working Condition: Temperature: -30℃~+50℃, Relative Humidity: ≤95%, Atmospheric pressure :0.86 MPa~1.06 MPa, Power Supply: two common size 5 batteries.

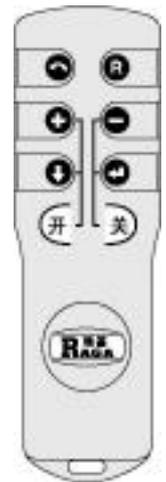


Fig. 3-1

Setting Tool Notes: 1. Do not remove the back cover in the hazardous areas of the device; 2. Do not replace or alter the components and configuration if they affect the Explosion–Proof capabilities of the Setting Tool; 3. The Setting Tool should be cleaned with a cleaning agent or damp cloth.

Please pay attention: Setting Tool is not available if: 1) the red knob is lying in the “**REMOTE**” position, 2) in the “**LOCAL**” position with the motor is running , 3) the motor is stopped but still in the non-action pause (2 seconds) after each motor motion.

3.2 The Actuator Display

After powering up and initialization, the actuator’s liquid crystal display (LCD) screen shows the percentage value of the valve’s opening degree with in a large font (figure 3-2). Alarm information area is on the bottom right corner. When the valve reaches the limited positions the display shows with the simulant icon of the butterfly valve (Figure 3-3a b)

Place the red knob in the “**STOP**” or “ **LOCAL**” position and press any key except “**R**” on the Infra-red setting tool will enter the “**SETUP**” mode and cause the **LCD** to show the main menu(Figure 3-4). From the main menu you can enter in the parameters setting, parameters checking and status interrogating menu.

Please pay attention: When carrying out menu operation, if user has no key operation for 1 minute long, the **LCD** will return normal shows (Figure 3-2 or Figure 3-3). Besides, after carrying out the menu operation, use the “↶” key until you make the **LCD** display as required.

The first value to be displayed is the setting value that was displayed from the last time after entering the menu. User can check the setting value last time by availing oneself of the trait.

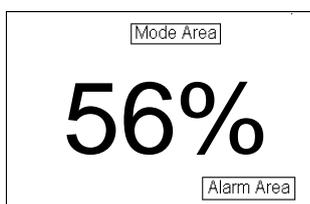


Fig.3-2 percentage for valve

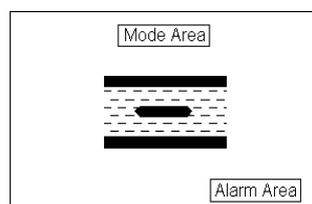


Fig.3-3a display for valve open

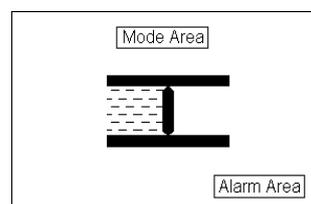


Fig.3-3b display for valve closed

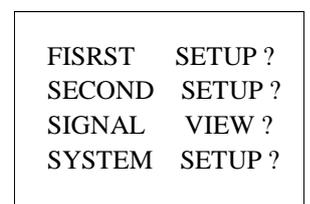


Fig.3-4 display for the menu

3.3 Calibrate – Position Limits

1. Install the RAIII/RQIII/RQMIII actuator on the valve.
2. Refer to the nameplate for the correct main power supply voltage.
3. Place the red Knob in the “**LOCAL**” position, then enter the “**SETUP**” mode by pressing any key (except “R” key) on the Infra-red setting tool. Switch the menu page in **CHANGE POSITION LIMIT** which is described in section 4.12.
4. Calibrate end position limits with electrical operation or handwheel operation.

Once the Close Position Limit have been calibrated, use “+” or “-” key to ensure that the message “**CLOSE LIMIT**” has been displayed in the last row on the LCD screen. And press “Enter” key to save the Close Position Limit. To save the Open Position Limit by the same way .The distinction is ensures that the massage displayed in the last row on the LCD screen is “**OPEN LIMIT**”.

3.4 Electrical Operation Feature

This feature allows for quick and simple calibration. To set the position limits electrically, enter the “**CHANGE SETTINGS**” mode via the “**SETUP**” mode.

Place the red knob in the “**LOCAL**” position. Move the black knob in the intended direction.

3.5 Handwheel Operation Feature

Depress the declutch lever, and at the same time slowly rotate the handwheel until the clutch is fully engaged. You will, change the valve position by rotating the handwheel.

3.6 Enter the Setup Mode

Place the red knob in the “**STOP**” or “**LOCAL**” position ,and press any key except “R” on the Infra-red setting tool will enter the “**SETUP**” mode.

3.7 Commissioning the Actuator

Before attempting to commission the actuator, verify that the actuator is installed correctly on the valve and main power is “**ON**.” The RAIII/RQIII/RQMIII actuator may be commissioned without removing any covers. No special tools are required.

For Local positioning the actuator:

1. Place the red knob in the “**LOCAL**” position.
2. Move the black knob to the “**OPEN**” or “**CLOSE**” position.

3.7.1 Default Configuration Set

Unless otherwise specified, RAIII/RQIII/RQMIII actuators are shipped with the following configuration:

- Open seating =position , when Open stopped by position limit.
- Close seating =position, when Close stopped by position limit.
- Local control=Inching.
- Close direction =CW , clockwise to close.

3.7.2 View the Existing Settings

All the existing setup data may be viewed on the LCD display by following a simple step-by-step dialogue.

1. Enter the “**SETUP**” mode as detailed in **Section 3.6, Enter the Setup Mode**.
2. Press “↓” key to select witch settings group you like to view. Use “←” key to enter the menu deeper. A”↻” operation will cause the action that return to the previous menu or exit the “**Setup Mode**”.

3.7.3 Setting Position Limits

This section will advise how to configure end-of-travel limits. The actuator’s position limits may be set by manual operation or electrical operation.

WARNING: If the actuator will not move after setting the limits, the limits have been set incorrectly. Set Close Position Limit Again (with Handwheel Operation)

1. Enter the “**SETUP**” mode as detailed in **Section 3.6, Enter the Setup Mode**.
2. Select the “**FIRST SETUP?**” and press “←” key , then press the “↓” key until screen prompt reads “**CHANGE POSITION LIMIT,**”.

3. Place the red knob in the “**LOCAL**” position. Move the black knob in the intended direction. The “**CHANGE POSITION LIMIT /CLOSE LIMIT OK?**” or “**CHANGE POSITION LIMIT /OPEN LIMIT OK?**” should be displayed.
4. Engage manual override as detailed in **Section 3.8.1, Manual Operation**.
5. Ensure the valve is fully closed /open.
6. When the valve is in the desired position, Press “**↵**” key , and the close /open position limit is set.
7. Check the position limit setting as follows:
 - Move the valve in the open /close direction. The close /open lamp should extinguish with approximately one turn of the handwheel.
 - Move the valve back in the close direction and check that the close /open lamp illuminates just before the full close position is reached.

3.8 Operating the RAIII/ RQIII/ RQMIII Actuator

3.8.1 Manual Operation

Operate the actuator with the handwheel as follows:

1. Depress the declutch lever and, at the same time, slowly rotate the handwheel until the clutch is fully engaged.
2. Release the lever and it will return to its original position. The clutch will be retained in the handwheel mode by spring-loaded latches. Manual operation is now possible and the actuator can only be returned to motor operation by energizing the motor. Energizing the motor will trip the spring-loaded latch and allow the clutch to disengage from the handwheel and re-engage with the gear drive. To prevent unauthorized manual operation of the actuator, the declutch lever may be padlocked in “**MOTOR**” mode.

3.8.2 Electrical Operation

Before applying power to the actuator, check that the supply voltage details on the nameplate are correct for this installation. An incorrect supply connected to the actuator terminals could cause fuses to blow or cause permanent damage to the electrical components in the unit. Apply power to the actuator but do not operate the actuator without first checking that it has been set up and configured correctly for its intended application.

3.8.3 Local Control

Once the position limits have been set (see **Section 3.7.3, Setting Position Limits**), the actuator can be controlled locally from the control panel.

1. Place the red knob in the “**LOCAL**” position.
2. Select “**OPEN**” or “**CLOSE**” via the black knob. If maintained control has been selected, the actuator will continue to run when this control knob is released. The actuator may be stopped at any time by placing the red selector knob in the “**STOP**” position, or the direction may be reversed or stopped using the black knob. If non-maintained control mode (inching) has been selected, the actuator can be inched to any intermediate position by holding the black control knob in the desired position, “**OPEN**” or “**CLOSE**,” for as long as necessary. The actuator will stop when the knob is released.

3.8.4 Remote Control

Once the position limits have been set, and “**REMOTE**” mode is enabled:

1. Place the red knob in “**REMOTE**” to permit command control by a remote device. Local “**OPEN/CLOSE**” mode will be prevented.
2. Rotating the red knob to the “**STOP**” position will automatically stop the actuator regardless of the remote control signal. The red selector knob may be locked in or out of any of its three positions “**LOCAL/STOP/REMOTE**,” using a padlock.

3.8.5 Local Indication

The LCD displays status and valve position. In normal operation mode, the top line always displays “**Control Mode**”, the middle two line displays “**XX % OPEN**,” while the bottom line displays “**STATUS**”.

4 Customizing the Actuator

The actuator settings can be customized; i.e., the default settings can be changed and the purchased options can be configured.

• Password Entry. *Default = 0(NULL)*

Unauthorized entry to the “**CHANGE SETTINGS?**” mode is prevented by a password protection feature. If password protection is not required, the password may be set to “0”. The user will not be prompted to enter a password when the password is set to “0”

1. Enter the password digit by digit. The password is a three-digit number, ranging from 0-255. The factory default is 0.
2. If the wrong password is entered, re-enter the correct one.

The menu flow figure see figure 4 -1 as follows.

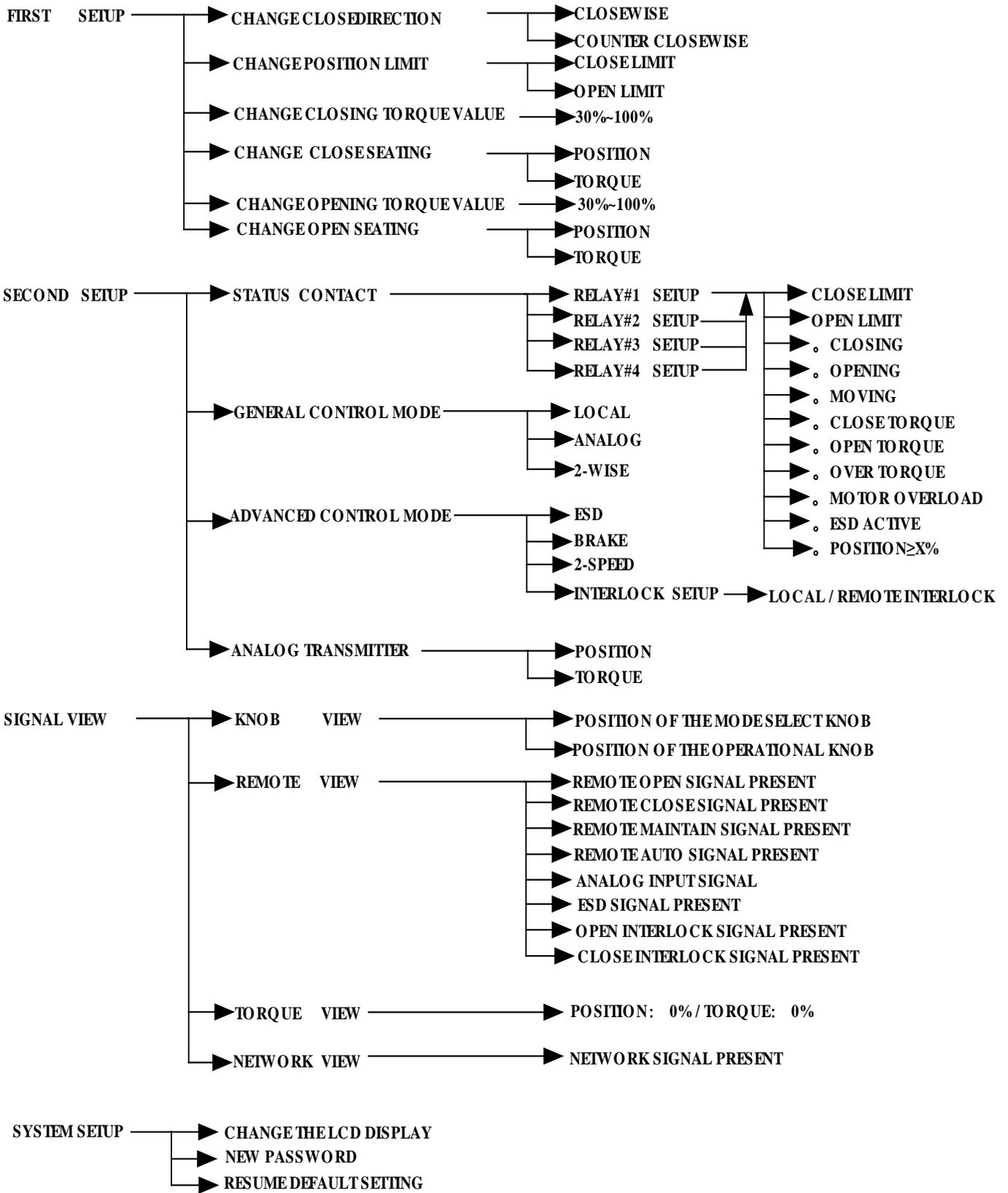


Fig. 4 – 1 Menu flow figure

4.1 First Setup

4.1.1 Close Direction

Default = CW to Close

The clockwise (CW) rotation is required for majority of valves when closing.

1. Engage manual override and check whether the valve closes with **CW** or **CCW** rotation of the handwheel.

2. Enter the "SETUP" mode, switch the menu page to **CHANGE CLOSE DIRECTION**, see figure 4-2, then choose **CLOCKWISE** or **COUNTERCLOCKWISE** which is decided by the result of check above. Press "↵" key to save.

4.1.2 Set Position Limits

1. Set closed valve position. At the "CHANGE POSITION LIMIT / CLOSE LIMIT OK?" prompt, move the red knob to "LOCAL." Hold the black knob in the "CLOSE" position until the valve has reached the desired position. Press "↵" to save.
2. Set the open valve position. At the "OPEN LIMIT-OK?" prompt, move the red control knob to "LOCAL." Hold the black control knob in the "OPEN" position until the valve has reached the desired position. Press "↵" to save.
3. Inspect the valve is operating correctly. The position calibration should now be complete. The actuator will function as commanded. Inspect for correct operation by running actuator electrically.

4.1.3 To Close Torque Valve or to Open the Torque Valve

The output torque from the actuator to close or open the valve may be configured between 30% and 100% of the rated torque value (as stated on the actuator nameplate), in 1% increments or decrements (unless limited by the factory) by using "+" or "-" key.

Should the user select a maximum torque setting less than 100% due to valve or gearbox limitations, if the maximum allowable % setting does not equal 100% (e.g. 85%) then the maximum torque value has been limited. It is intended to limit the maximum output torque capability of the actuator in order to prevent possible damage to the valve and actuator resulting from excessive torque.

4.1.4 Close Seating

Default = Position Seating

1. Configure the actuator to close on "TORQUE" limit for seating valve types such as wedge gate and globe.
2. Select "POSITION" limit for valve types such as ball, butterfly, plug, sluice gate, parallel slide, knife gate and through conduit.
3. Enter the the "SETUP" mode, switch the menu page to CHANGE CLOSE SEATING, see figure 4-2, then choose TORQUE or POSITION by pressing "+" or "-" key. Press the "↵" for saving and the "↶" to the previous menu.

4.1.5 Open Seating

Default = Position Seating

1. Configure the actuator to close on "TORQUE" limit for seating valve types such as wedge gate and globe.
2. Select "POSITION" limit for valve types such as ball, butterfly, plug, sluice gate, parallel slide, knife gate and through conduit.
3. Enter the "SETUP" mode, switch the menu page to CHANGE CLOSE SEATING, see figure 4-2, then choose TORQUE or POSITION by pressing "+" or "-" key. Press the "↵" to save

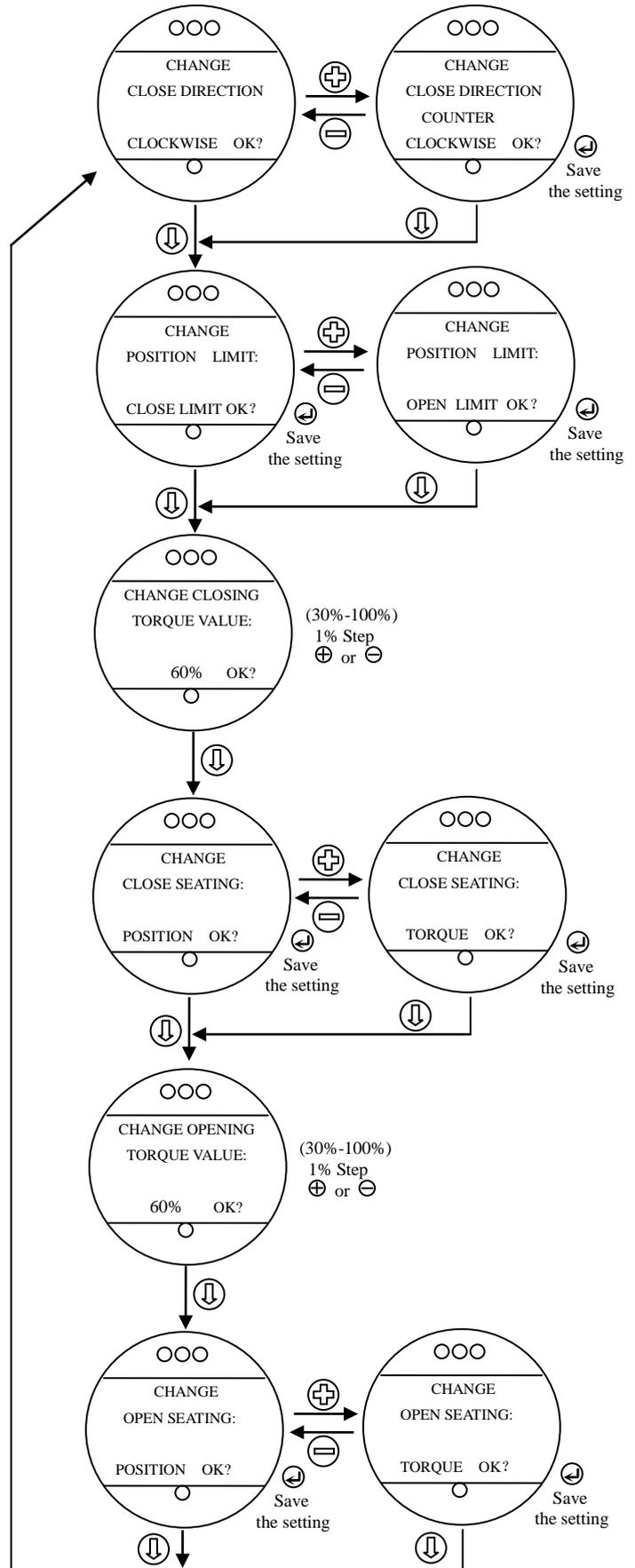


Fig. 4-2 First setup

and the "↶" to go to the previous menu.

4.2 Second Setup

The second setup flow figure, see figure 4 -3 as follows:

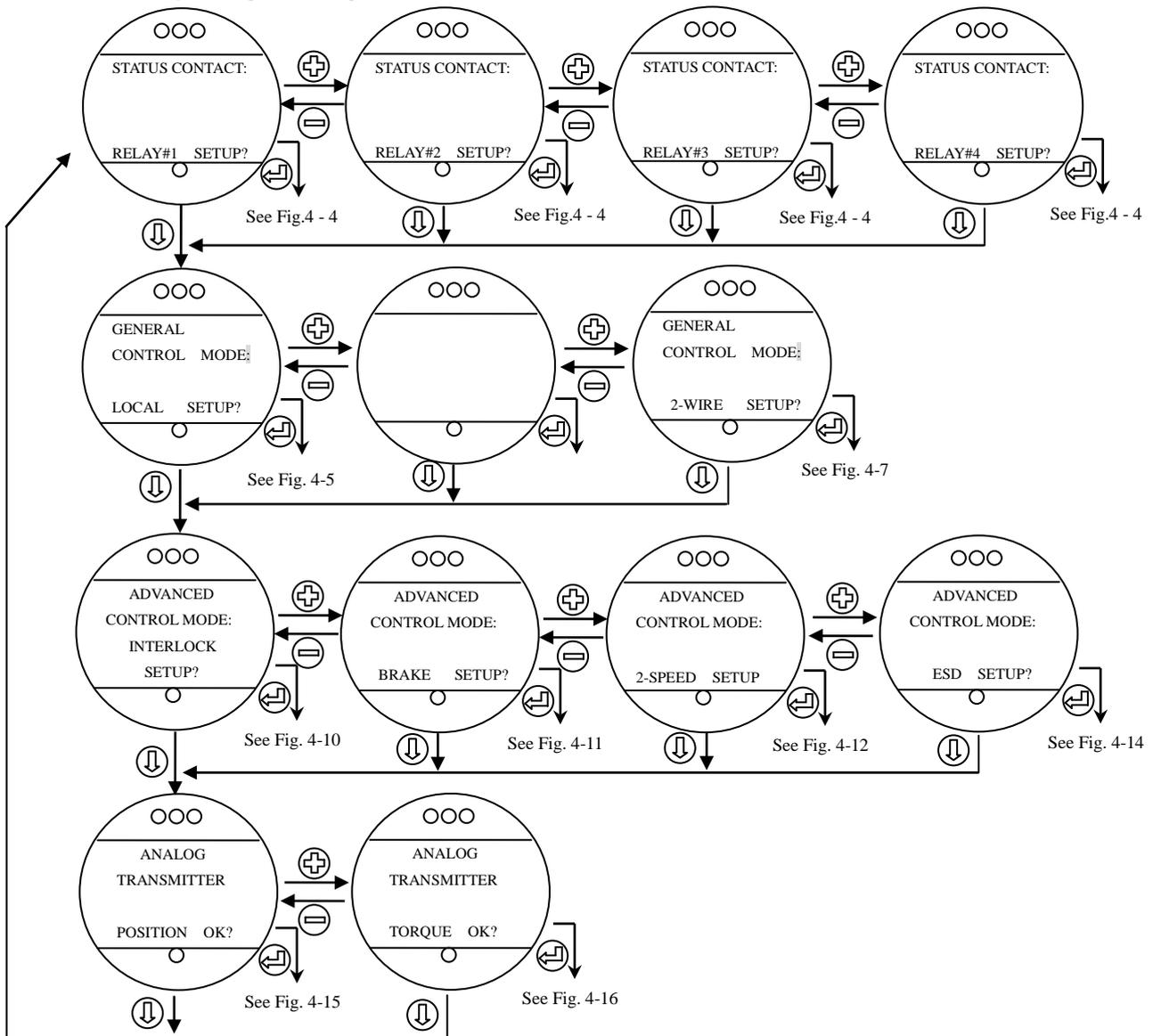


Fig. 4-3 Second setup

4.2.1 Status and Alarm Contacts

The status and alarm contacts allow the ability to wire to existing switches for visibility of operation or fault conditions. (See wiring diagram for contact ratings.) The status contacts (AS) and optional alarm contacts (AR) may be configured to have any one of the following functions:

- **"CLOSE LIMIT"** – valve closed **"(0% OPEN)"**
- **"OPEN LIMIT"** – valve open **"(100% OPEN)"**
- **"CLOSING"** – valve closing
- **"OPENING"** – valve opening
- **"VALVE MOVING"** – either direction
- **"CLOSE TORQUE"** – torque switch trip at **"CLOSING"**
- **"OPEN TORQUE"** – torque switch trip at **"OPENING"**
- **"OVERTORQUE"** – torque switch trip in mid-travel
- **"MOTOR OVERLOAD"** – the motor overload, the valve can't open.

- “ESD ACTIVE” – ESD signal active
- “POSITION $\geq XX\%$ ” – \geq valve position, 1~99% open

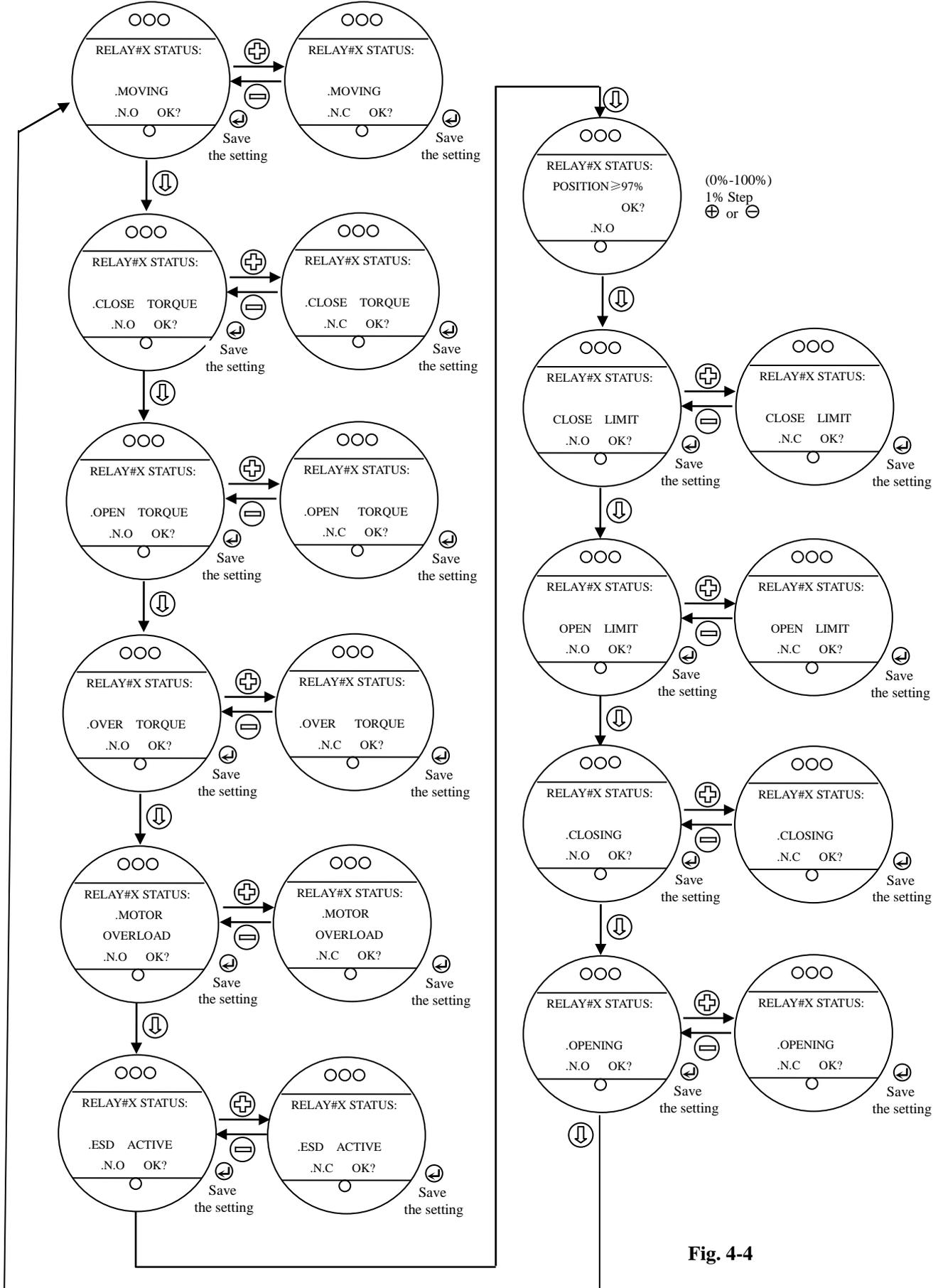


Fig. 4-4

4.2.2 General Control Mode / Local

“LOCAL CONTROL MODE” changes how the local control switches and display are used from the default settings.

Default = Inching Mode

- **Maintain mode:** the unit will operate continually in either direction when the black knob is actuated and released, until the position of the black knob is changed or the red knob is changed from “LOCAL” to either “STOP” or “REMOTE.”
- **Inching mode:** the unit will operate only when the black knob is held in the open or close position. If the black knob is released, the unit will stop.

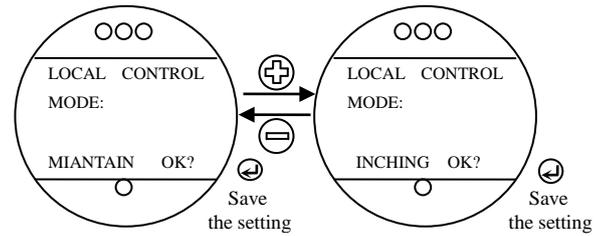


Fig. 4-5

4.2.3 General Control Mode / MODBUS

Detailed in 《RAIII/RQIII/RQMIII MODBUS Series Electric Actuator Operation manual 》

4.2.4 General Control Mode / PROFIBUS

Detailed in 《RAIII/RQIII/RQMIII

PROFIBUS Series Electric Actuator

Operation manual 》

4.2.5 2-Wire Control Mode

For 2-wire remote control wiring refer to

Fig. 4 – 8. The digit in circles are the code in the wiring terminal box.

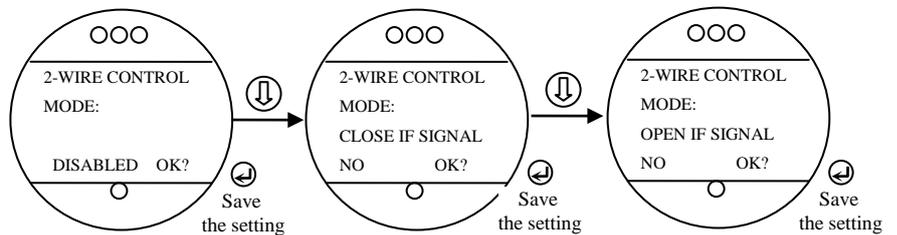


Fig. 4-7

- **Open If Signal On** – the actuator will open the valve while signal is on, or else close the valve while having no signal.
- **Close If Signal On** – the actuator will close the valve while signal is on, or else open the valve while having no signal.

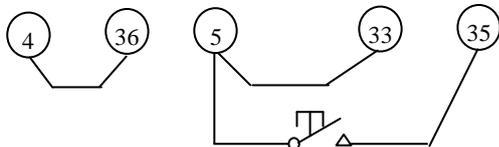


Fig. 4-8a DC power supply within
Open if signal is on or else close

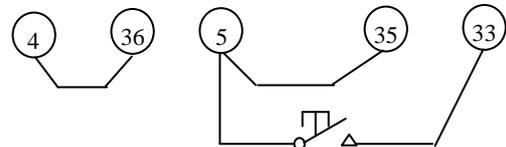


Fig. 4-8b DC power supply within
Close if signal is on or else open

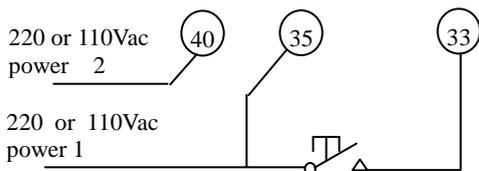


Fig. 4-8c AC power supply outside
Open if signal is on or else close

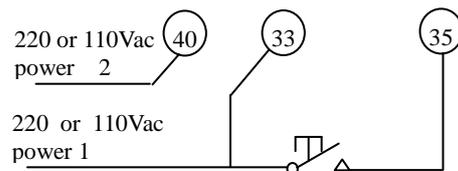


Fig. 4-8d AC power supply outside
Close if signal is on or else open

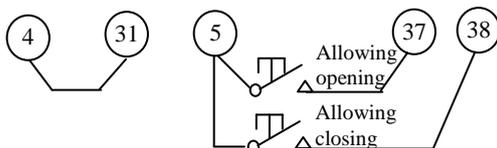


Fig. 4-9a DC power supply within
Wiring for opening and closing

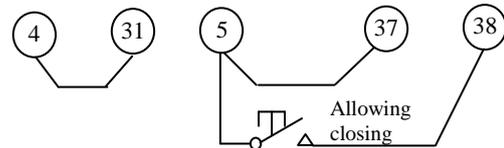


Fig. 4-9b DC power supply within
The wiring for only close interlock

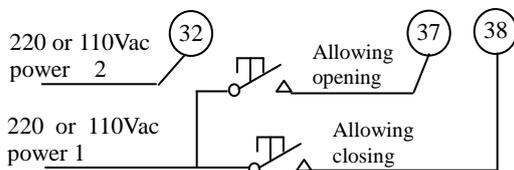


Fig. 4-9c AC power supply outside
Wiring for open and close interlock

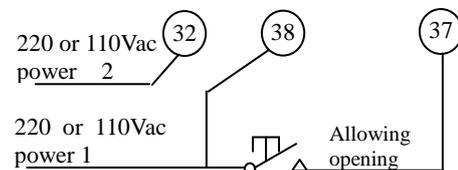


Fig. 4-9d AC power supply outside
The wiring for only open interlock

- **Disable** –2-wire remote control will be ignored.

4.2.6 Advanced Control Mode /Interlock

For safety, the actuator may be configured as Local Interlock or Remote Interlock. It means that have only Local or remote control signal will not make the actuator run unless an additional signal that came from external element is added. see **Fig. 4 – 9**.

- **Local Interlock** – enable or ignore the Interlock function in the local control mode

If this function is enabled, any of the local controls will not make the actuator run without an additional signal.

- **Remote Interlock** – enable or ignore the Interlock function in the local control mode.

If this function is enabled, any of the remote control will not make the actuator run without an additional signal.

4.2.8 Advanced Control Mode /Brake

Brake Time With Turn in Reverse is used to give an reverse energy to the motor and make the motor stop quickly so that we can obtain accurate valve position control(see **Fig. 4-11**), Switch the menu to “**ADVANCED CONTROL MODE: /BRAKE SETUP?**”, then press “**↵**” to the further menu “**BRAKE WITH TURN IN REVERSE /xx% OK?**”. Use “**+**” or “**-**” key to change the setting, and “**↵**” key to save.

4.2.9 Advanced Control Mode /Two-speed Timer

The optional two-speed timer extends the operating time of the actuator in the closing or opening direction by making the motor go **ON** and **OFF**. The pulsing may be applied to full valve ravel or only a part of it. The **ON** and **OFF** pulse times are adjustable.

1. Switch menu to “**ADVANCED CONTROL MODE: / 2-SPEED SETUP ?**”, see **Fig. 4-12**. Press “**↵**” to enter the routine procedure.

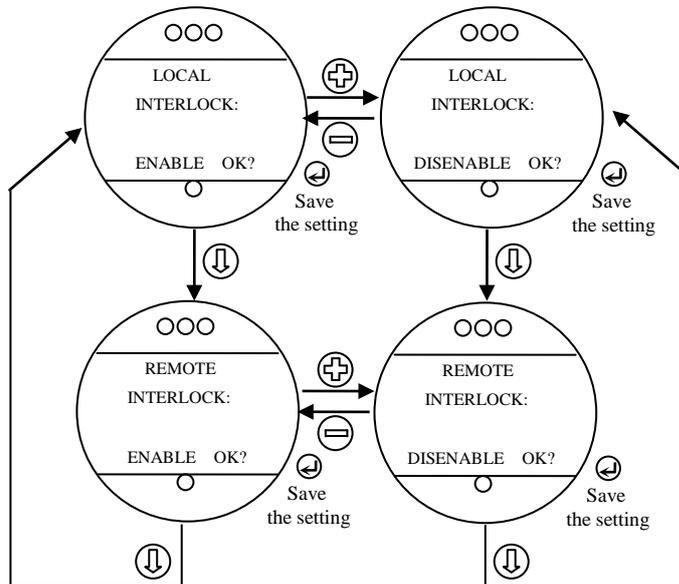


Fig. 4-10

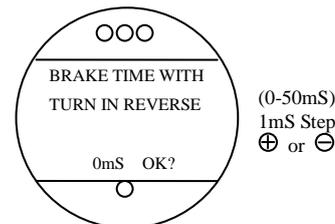


Fig. 4-11

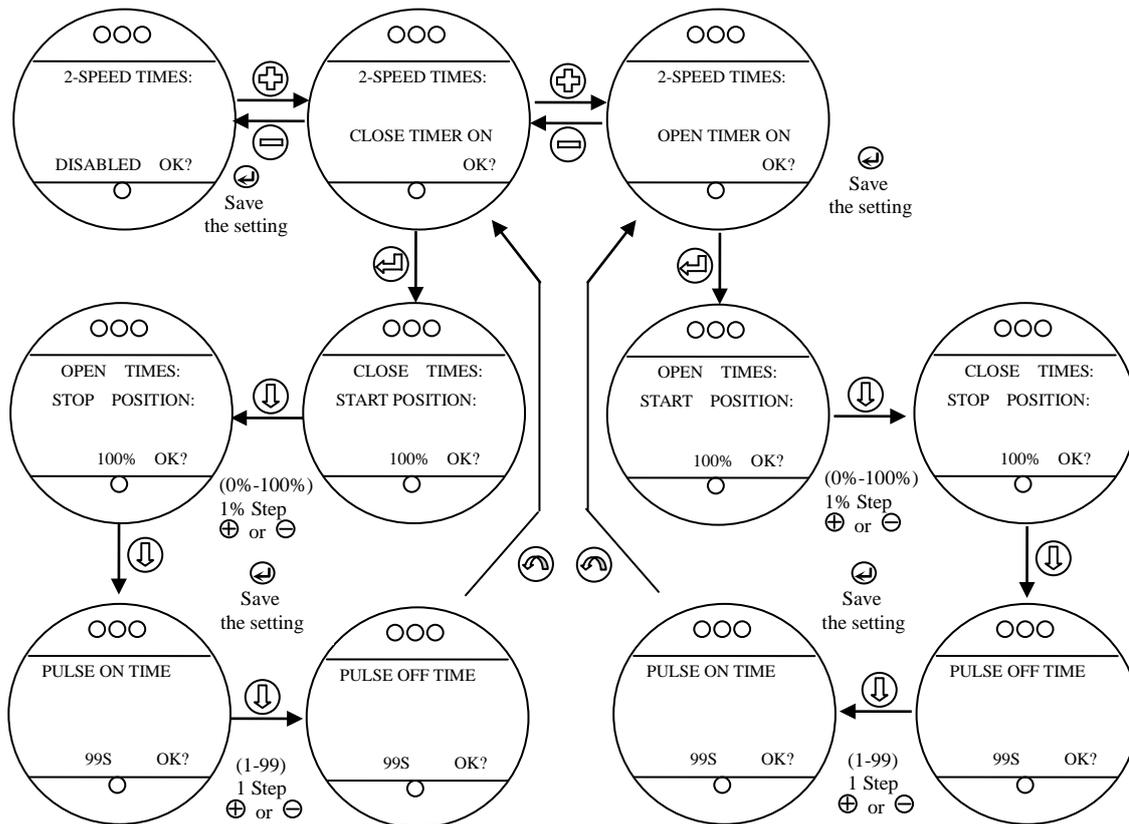


Fig. 4-12
11

2. When “2-SPEED TIMERS /CLOSE TIMER ON” or “2-SPEED TIMERS /CLOSE TIMER ON” you desired are displayed, Press “**↓**” key to set the routine procedure. If Select “2-SPEED TIMERS /DISABLE”, Press “**↓**”, no further menus will be displayed, and the actuator will prevent this function.

• **Start Position**

If the **Close** or **Open** timer has been switched **ON**, pulsing will start when the set point is reached in the selected direction and the actuator will continue pulsing until the valve reaches the desired “**STOP**” position. Select “**NO**” until the display indicates the required value of percentage **OPEN** at which the pulsing should start. Adjustable in 1% increments are as listed: Closing = 0% to 99%. Opening = 1% to 100%.

• **Stop Position**

If the **Close** or **Open** timer has been switched **ON**, pulsing will commence as the valve moves out of its close position and the actuator will continue pulsing until stopped at the set point. Select “**NO**” until the display indicates the required percentage of value open at which the pulsing should stop. Variations in 1% increments as are listed: Closing = 0% to 99%. Opening = 1% to 100%.

• **Pulse Time – ON**

This mode allows user to change the **ON** pulse time from the default setting.

Default Setting = 2.0 Second

Select “**NO**” until the required length of **ON** pulse is displayed. Range between 1 and 99 seconds, in 1 second increments.

• **Pulse Time – OFF**

This mode allows user to change the **OFF** pulse time from the default setting.

The timing operation for **ON** pulse time and the **OFF** pulse time is as follows(Fig. 4-13):

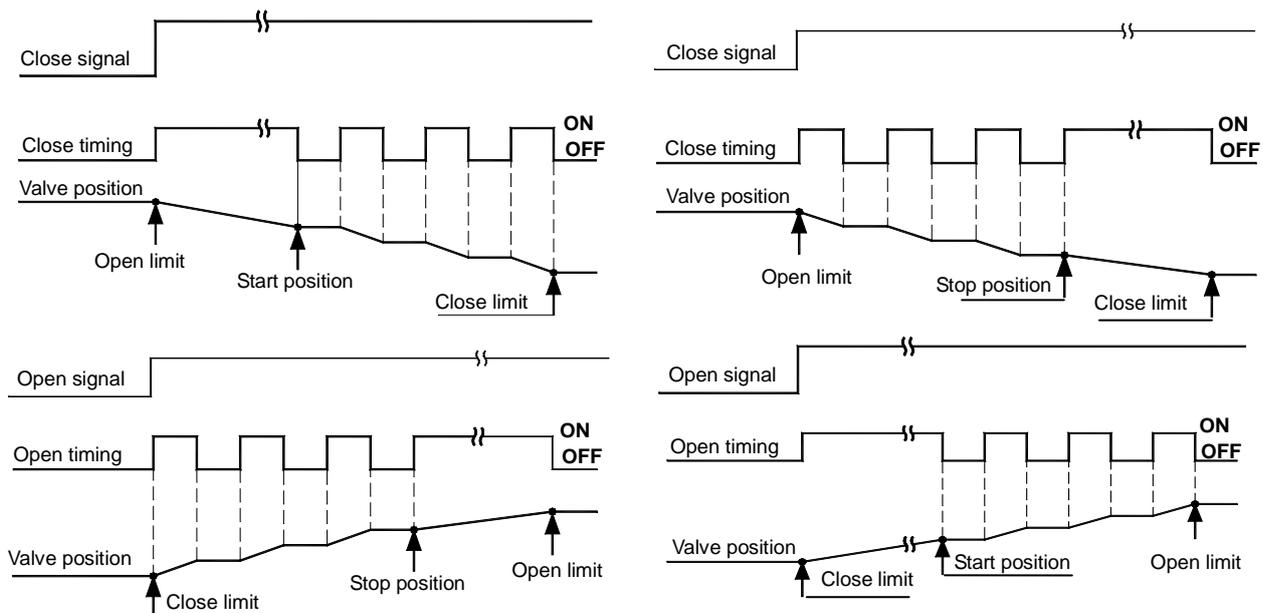


Fig. 4-13

4.2.10 Advanced Control Mode / ESD (Emergency Shutdown)

An external signal may be applied to the actuator in emergency shutdown mode(**ESD**) and will override existing command signal, moving the valve to the required emergency position.

• **ESD CONTROL**

Default Setting is: DISABLE

Switch menu to “**ESD CONTROL / ENABLE OK?**” or “**ESD CONTROL / DISABLE OK?**”. Use “**+**” or “**-**” key to change the setting, and “**↓**” key to save the setting.

- a. To select “**ENABLE**” –To activate **ESD CONTROL** activate.
- b. To select “**DISABLE**” –To deactivate the **ESD CONTROL** inactivate.

• **ESD ACTION**

Default Setting is: STAY PUT

Switch menu to “**ESD ACTION / STAY PUT OK?**” or “**ESD ACTION / OPEN OK?**” or “**ESD ACTION / CLOSE OK?**”. Use “**+**” or

“ — ” key to change the setting, and “ ↵ ” key to save the setting.

- To select “**STAY PUT**” – When an **ESD** signal is applied the actuator will stop in the present position.
- To select “**OPEN**” –When an **ESD** signal is applied the actuator will be opened.
- To select “**CLOSE**” –When an **ESD** signal is applied the actuator will be closed.

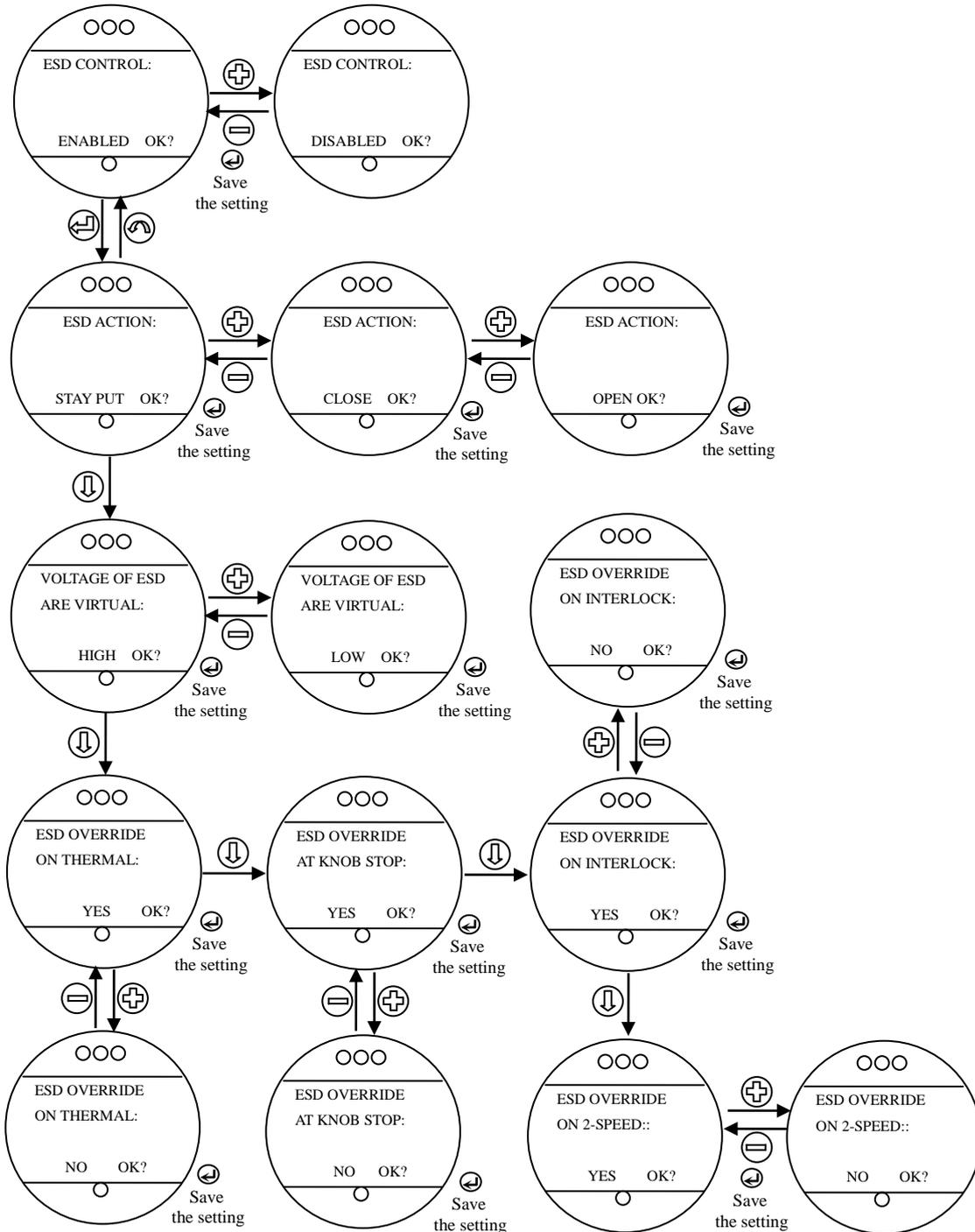


Fig. 4-14

• **Reading estimates of the ESD Voltage level**

The voltage value that the actuator can respond to an applied **ESD** signal derived from an external element.

The Default Setting is: High

Switch menu to “**VOLTAGE OF ESD ARE VIRTUAL / LOW OK?**” or “**VOLTAGE OF ESD ARE VIRTUAL / HIGH OK?**”. Use “+” or “-” key to change the setting, and “↵” key to save the setting.

- To select “**LOW**” – The low voltage is active for the applied **ESD** signal.
- To select “**HIGH**” –The high voltage is active for the applied **ESD** signal.

• **ESD Override Thermostat**

It may be desirable that **ESD** override some events. These events bypassed are selectable.

Default = NO

Switch menu to “**ESD OVERRIDE ON THERMAL/ NO?**” or “**ESD OVERRIDE ON THERMAL/ YES?**”. Use “**+**” or “**-**” key to change the setting, and “**↵**” key to save the setting.

- To select “**YES**” – When an **ESD** signal is applied, the thermostat will automatically be bypassed.
- To select “**NO**” –When an **ESD** signal is applied, the thermostat will not be bypassed.

• **ESD Override At Knob Stop**

Default = NO

Switch menu to “**ESD OVERRIDE AT KNOB STOP/ NO?**” or “**ESD OVERRIDE AT KNOB STOP/ YES?**”. Use “**+**” or “**-**” key to change the setting, and “**↵**” key to save the setting.

- To select “**NO**” – When an **ESD** signal is applied, the red knob at “**STOP**” position will not be bypassed.
- To select “**YES**” – When an **ESD** signal is applied, the red knob at “**STOP**” position will automatically be bypassed.

• **ESD Override Interlock**

Default =NO

To Customize the Settings:

Switch menu to “**ESD OVERRIDE INTERLOCK NO?**” or “**ESD OVERRIDE INTERLOCK YES?**”. Use “**+**” or “**-**” key to change the setting, and “**↵**” key to save the setting.

- To select “**YES**” – **ESD** overrides the inhibiting of the **Interlock** to control the actuator priority.
- To select “**NO**” –The inhibit of **Interlock** to control the actuator priority overrides **ESD**.

• **ESD Override 2-Speed**

Default =NO

Switch menu to “**ESD OVERRIDE 2-SPEED/ NO?**” or “**ESD OVERRIDE 2-SPEED/ YES?**”. Use “**+**” or “**-**” key to change the setting, and “**↵**” key to save the setting.

- To select “**YES**” – ESD overrides the inhibiting of **2-SPEED** to control the actuator priority.
- To select “**NO**” – The inhibit of **2-SPEED** to control the actuator priority overrides ESD.

4.2.11 Control Source

The Control Source option provides options for the selection of control signals. Use “**+**” or “**-**” key to change the setting, and “**↵**” key to save the setting.

4.2.12 Analog Transmitter

The APT(Analog Position Transmit) option provides a 4-20 mA feedback signal proportional to valve position. APT is connected at terminals 45 and 46 for 4-20 mA current output.

NOTE: If the APT option was not purchased, the function will not be supply. To purchase, please communicate with the **RAGA** agent.

4.2.12.1 Analog Position Transmitter

• **APT Polarity**

Default =20 mA To OPEN, 4 mA To CLOSE.

Switch menu to “**APT POLARITY/ 20 mA = CLOSE LIMIT OK?**” or “**APT POLARITY/ 20 mA = OPEN LIMIT OK?**”. Use “**+**” or “**-**” key to change the setting, and “**↵**” key to save the setting.

- To select “**CLOSE LIMIT**” – The **20 mA** responds to the actuator closed.
- To select “**OPEN LIMIT**” – The **20 mA** responds to the actuator open.

• **Calibrate Low Signal For APT**

Calibrate the 4mA analog position signal transmitted to user’ control system or a calibrator.

• **Calibrate High Signal For APT**

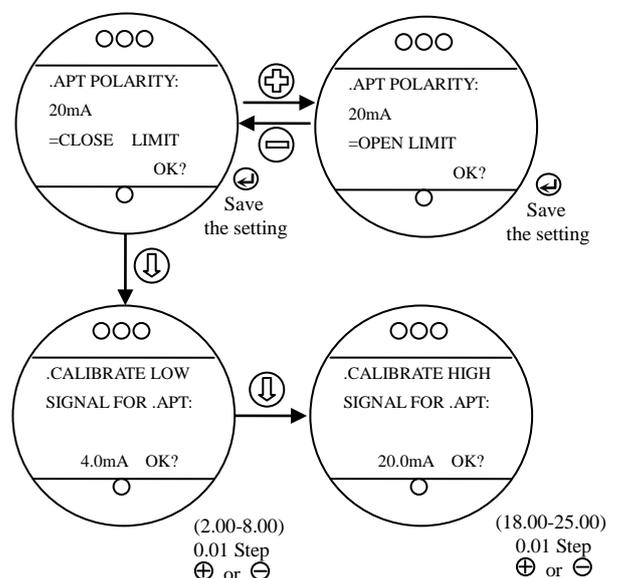


Fig. 4-15

Calibrate the 20mA analog position signal transmitted to user' control system or a calibrator.

4.2.12.2 Analog Torque Transmitter

• ATT Polarity

Default =20 mA To MAXIMUM, 4 mA To MINIMUM.

Switch menu to ".ATT POLARITY/ 20 mA = MAXIMUM OK?" or ".ATT POLARITY/ 20 mA = MINIMUM OK?". Use "+" or "-" key to change the setting, and "↵" key to save the setting.

- To select "MAXIMUM" – The 20 mA responds to the maximum torque of actuator.
- To select "MINIMUM" – The 20 mA responds to the minimum torque of the actuator.

• Calibrate Low Signal For ATT

Calibrate the 4mA analog torque signal transmitted from user' control system or a calibrator. Use "+" or "-" key to change the setting, and "↵" key to save the setting.

• Calibrate High Signal For ATT

Calibrate the 20mA analog torque signal transmitted from user' control system or a calibrator. Use "+" or "-" key to change the setting, and "↵" key to save the setting.

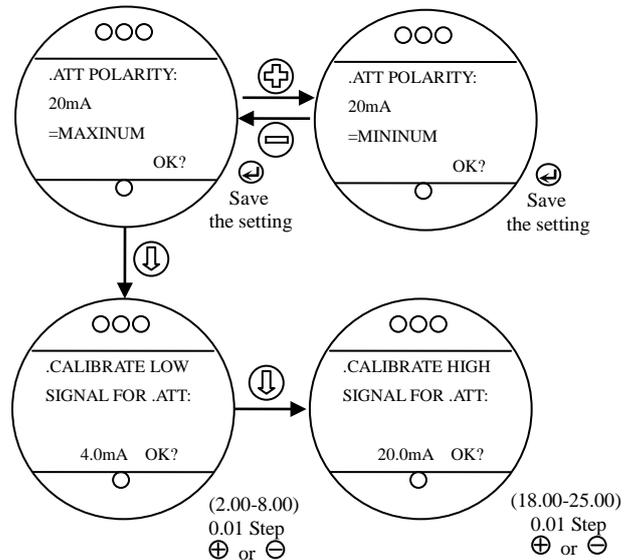


Fig. 4-16

4.3 Signal View

4.3.1 Knob Positioning

- Position of the operational knob – Display the position of the black knob.
- Position of the mode select knob – Display the position of the red knob.

4.3.2 Remote View

- Remote Open Signal – Check the remote open status signal as to whether it is present or not ?
- Remote Close Signal –Check the remote close status signal as to whether it is present or not ?
- Remote Maintain Signal –Check the remote maintain status signal as to whether it is present or not ?
- Remote Auto Signal –Check the remote auto status signal as to whether it is present or not ?
- ESD Signal –Check the ESD signal status as to whether it is present or not ?
- Open Interlock Signal –Check the remote open interlock signal status, whether it is present or not ?
- Close Interlock Signal –Show the remote close interlock signal status,

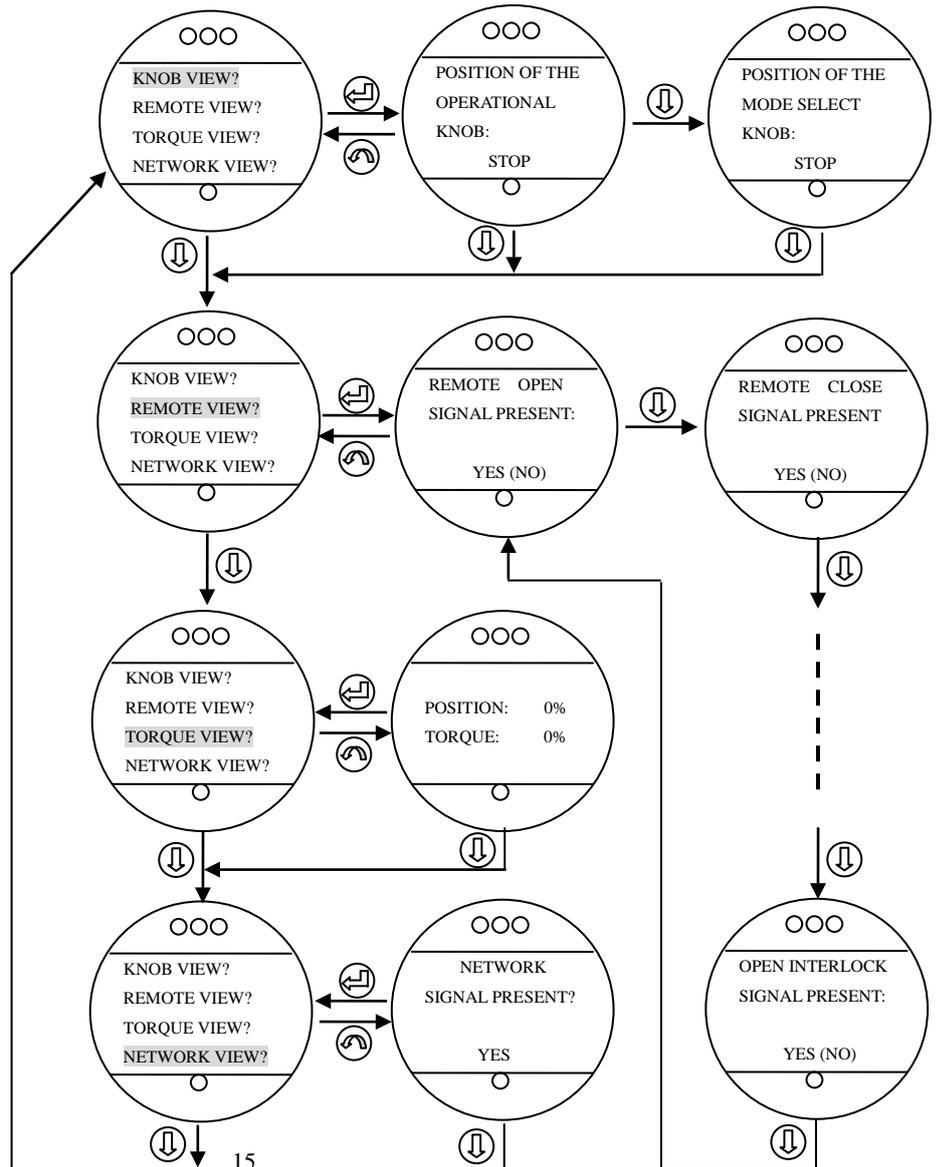


Fig. 4-17 Signal View

whether it is present or not ?

4.3.3 Torque View

The information contained in the “**TORQUE VIEW**” dialog shows indication of the condition of the valve position in the second row of the LCD screen and the real time torque in the third row. It can give an indication of a change in the process conditions such as an increase in pressure.

- POSITION – the real time valve position
- TORQUE – the real time torque

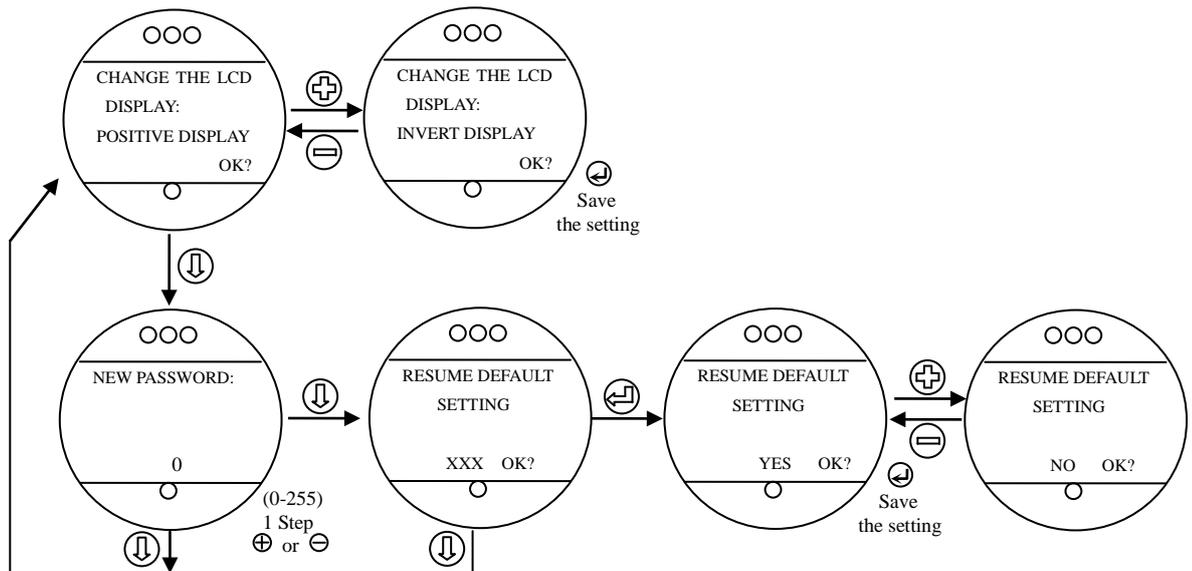
4.3.4 Network View

Through this option the user may know whether the signal from the MODBUS card or PROFIBUS card is present and ready.

4.4 System Setup

4.4.1 LCD Display Mode

This option will make the display rotate 180 degree.



4.4.2 New Password

The password may be changed from the default of “0” to a customer selected encryption as indicated in Fig. 4-18.

4-18.

Fig. 4-18 System Setup

The new

password becomes effective as soon as pressing the “**↵**” key to the “**NEW PASSWORD?**” display.

NOTE: Take care to record the new password in a secure location to ensure its retrieval in the future, yet prevent unauthorized access to the actuator “**SETUP**” routine. If password protection is not required, the password may be set to “0.” The user will not be prompted to enter a password when the password is set to “0.”

4.4.3 Resume Default Settings

All the configuration parameters can be resumed via this step. Press “Enter” and “**RESUME DEFAULT SETTING / YES OK?**” will be displayed, then press “Enter” again to make the operation effect.

5 Alarm Information

When the actuator is running, the corresponding alarm information will be displayed in the alarm area of the LCD screen and it also will give indication to users:

• OP. OVERTORQUE

The actuator will stop if the torque overrides the setting value, when the actuator is opening.

• CL. OVERTORQUE

The actuator will stop if the torque overrides the setting value, when the actuator is closing.

Notice: The actuator will not run in close or open direction once the “**CL. OVERTORQUE**” or “**OP. OVERTORQUE**” appear. The restriction can be disabled on condition that the actuator runs a bit of space close to or on a resetting of the protection setting value for torque trip.

• LOST PHASE

The actuator will stop if the phase of the power supply is lost.

• **MOT. OVERTHERMAL**

The actuator will stop if the temperature of the motor over-heats.

• **OP. INTERLOCK**

The actuator will not run if the “INTERLOCK” is configured as “ENABLE” and the open “INTERLOCK” signal is non-existent
inexistent, when the actuator is attempting to open.

• **CL. INTERLOCK**

The actuator will not run if the “INTERLOCK” configured as “ENABLE” and the close “INTERLOCK” signal is non-existent when the
actuator is attempting to close.

• **MOT. OVERLOAD**

The actuator will stop if the valve position is unchanged in 5s~10s, after the actuator starts up at the position limits.

• **ESD CLOSING**

The actuator is closing if the “ESD” is configured as “ENABLE” and “CLOSE” and the “ESD” signal is present.

• **ESD OPENING**

The actuator is opening if the “ESD” is configured as “ENABLE” and “OPEN” and the “ESD” signal is present.

• **ESD PRESENT**

The actuator not run if the “ESD” is configured as “ENABLE” and the “ESD” signal is present and actuator has moved the expectant
position.

• **POWER LOST**

The power supplied actuator has been lost .

• **TURN DIR. ERROR**

The actuator will stop if the direction of axis of rotation is turning the opposite direction.

• **POS. ERROR**

The actuator will stop if the valve position is unchanged while the actuator is moving.

• **LOST ANALOG**

The actuator will perform the task for the setting if the analog control current is lost.

• **OP. & CL. SIG. ON**

The actuator will stop or not run if the “2 WIRE CONTROL MODE “ is configured as “DISABLE” and the open and close signals for
remote are present simultaneously.

• **OVER POS. LIMIT**

The valve position value is greater than the encoding position value given by the actuator when valve matches with the actuator and
setting position limits.

• **LOST BUS SIGNAL**

The actuator will perform the task for the setting if the bus control signal is lost.

6 Lubrication and Maintenance

To ensure the actuator’s secure running, RAIII/RQIII/RQMIII range actuator must be be lubricated on it’s table, or else the
dependability of the actuator can not be ensured. The temperature range of the environment is -30°C ~ +70°C (-22F ~ -160F). In
extreme climates a special prescript may be required.

Movement Viscosity at 100°C, flash point of 150°C at minimum, and solidifying point at not more than -45°C.

Lubrication table

Manufacture factory	Lubrication trademark
Beijing Changcheng Lubrication CO.,LTD	Burthen vehicle gear wheel oil
USA	Mobil SAE80EP

If your actuator has run for six months, change the lubrication once a year.

Lubrication Capacity

Actuator Spec	Capacity	Actuator Spec	Capacity	Actuator Spec	Capacity
RAIII7A~11A	0.3L	RAIII70A~95A	7.0L	RQIII100~300	7.0L
RAIII13A~16A	0.8L	RQIII003~014	0.3L	RQMIII03~06	0.3L
RAIII30A	1.1L	RQIII020~040	0.8L	RQMIII12~20	0.8L
RAIII40A	7.5L	RQIII060	1.1L	RQMIII54	1.1L

7 Machine Maintenance

If your actuator has run for six months, you must tighten the installation bolts.

Every actuator has been fully tested before leaving the factory to ensure years of fault free operation, providing the product is correctly commissioned, installed and sealed.

If your actuator can not be installed immediately, store it in a dry place until you are ready to connect input cables.

Don't pull out the connector cable entry plugs until you are ready to connect input cables.

8 Trouble-shooting

8.1 OP. & CL. OVERTORQUE

- Reason 1: The protection setting value for torque trip is too small.
Process 1: Increase the protection setting value for torque trip by using the Setting Tool.
- Reason 2: The type selecting of the actuator does not match with the condition of the point.
Process 2: Change suitable type actuator.

8.2 LOST PHASE

The lost phase of the actuator is either static and in-processing. In the "local control" mode, you can make the actuator open or close with the black knob. If the "lost phase" is presented immediately, it is the static loss phase. Or if the "lost phase" is presented late 1~2 seconds, it is the movement lost phase.

8.2.1 The static lost phase

- Reason 1: One phase in three phases of power supply for the actuator is lost.
Process 1: Check-up the voltages of power supply terminals in the terminal box of the actuator, look for the reason and eliminate the problem.
- Reason 2: The expeditious fuse has been damaged in the terminal box of the actuator(RQMIII type only) .
Process 2: Change the fuse.
- Reason 3: The wire connects are not reliable in the actuator.
Process 3: Re-connect the wire in the actuator .
- Reason 4: Some elements has been damaged on the power board in the actuator.
Process 4: Change the power board in the actuator.
- Reason 5: Some elements has been damaged on the main board in the actuator.
Process 5: Change the main board in the actuator.

8.2.2 The movement lost phase

- Reason 1: The wire connects are not reliable in the actuator.
Process 1: Re-connect the wire in the actuator .
- Reason 2: The connect wires of ac contactor in the actuator is loose or the contactor has been damaged (RQIII type only) .
Process 2:Re-rivet the connect wires of ac contactor or to change the contactor.
- Reason 3: The connect wires of solid relay in the actuator is loose or the solid relay has been damaged (RQMIII type only) .
Process 3:Re-rivet the connect wires of solid relay or to change the solid relay.
- Reason 4: The motor in the actuator has been damaged.
Process 4: Change motor in the actuator.
- Reason 5: Some elements has been damaged on the power board in the actuator.

Process 5: Change the power board in the actuator.

- Reason 6: Some elements has been damaged on the main board in the actuator.

Process 6: Change the main board in the actuator.

8.3 MOT. OVERLOAD

- Reason: The type selecting of the actuator does not match with the condition of the spot.

Process : Change more rating torque actuator.

8.4 POWER. LOST

- Reason 1: The expeditious fuse has been damaged in the terminal box of the actuator(RQMIII type only) .

Process 1: Change the fuse.

- Reason 2: The fault of power supply of the user.

Process 2:Inspect the power source and remove the fault.

- Reason 3: The fuse has been damaged on the power board in the actuator.

Process 3: Change the fuse.

- Reason 4: The transformer has been damaged in the actuator.

Process 4: Change the transformer in the actuator.

- Reason 5: Some element has been damaged on the power board in the actuator.

Process 5: Change the power board in the actuator.

8.5 MOT. OVERTHERMAL

- Reason 1: The motor turns for long time, the temperature of motor is over 130°C.

Process 1: Suspend the motor turning, and to resume the motor turn after the temperature drop to 90°C.

- Reason 2: Some element has been damaged on the power board in the actuator.

Process 2: Change the power board in the actuator.

- Reason 3: Some elements has been damaged on the main board in the actuator.

Process 3: Change the main board in the actuator.

8.6 POS. ERROR

- Reason 1: The electric/Hand-wheel clutch lever of the actuator has been Locked .

Process 1: Operate electrically the actuator and turn the hand-wheel at the same time and to ensure the clutch to the electric operation position.

- Reason 2: The wire connects are not reliable in the actuator.

Process 2:Re-connect the wire in the actuator .

- Reason 3: The connect wires of ac contactor in the actuator is loose or the contactor has been damaged (RQIII type only) .

Process 3: Re-rivet the connect wires of ac contactor or to change the contactor.

- Reason 4: The connect wires of solid relay in the actuator is loose or the solid relay has been damaged (RQMIII type only) .

Process 4:Re-rivet the connect wires of solid relay or to change the solid relay.

- Reason 5: The motor in the actuator has been damaged.

Process 5: Change motor in the actuator.

- Reason 6: Some elements has been damaged on the power board in the actuator.

Process 6: Change the power board in the actuator.

- Reason 7: Some elements has been damaged on the main board in the actuator.

Process 7: Change the main board in the actuator.

8.7 OVER POS. LIMIT

- Reason : The valve position value is more than the encoding position value afforded by the actuator.

Process : Communicate with the **RAGA** customer Service Agent .

8.8 Invalidation in remote voltage signal control mode

- Reason 1: The mode selection knob (red knob) not placed at the remote position.

Process 1: Place the mode selection knob at the remote position.

- Reason 2: Some element has been damaged on the knob board in the actuator.

Process 2: Change the knob board in the actuator.

- Reason 3: The remote voltage signal is not existed in the terminal box in the actuator.

Process 3: Check-up the signal wires from the centre control room to the actuator and ensure correct wires.

- Reason 4: The wire connects are not reliable in the actuator.

Process 4: Re-connect the wire in the actuator .

- Reason 5: Some elements has been damaged on the main board in the actuator.

Process 5: Change the main board in the actuator.

8.9 Invalidation in remote current signal control mode

- Reason 1: The mode selection knob (red knob) not placed at the remote position.

Process 1: Place the mode selection knob at the remote position.

- Reason 2: The right voltage signal on terminal 39 has not been give in the terminal box in the actuator.

Process 2: Give the right voltage signal to terminal 39 (see 《RQIII/RQMIII Series Electric Actuator Selection Manual 》).

- Reason 3: The parameters about **Analog Control** do not be set fully.

Process 3: Study the content of the section **4.2.5 Analog Control** and reset these parameters.

- Reason 4: Some element has been damaged on the analog board in the actuator.

Process 4: Change the analog board in the actuator.

- Reason 5: Some elements has been damaged on the main board in the actuator.

Process 5: Change the main board in the actuator.

8.10 The air switch tripping operation of user when the actuator is electrified

- Reason 1: The air switch of user's power supply system is damaged or has little capacity.

Process 1: Change the air switch.

- Reason 2: The power supply line connection is mistaken connected.

Process 2: Connect the power supply line correctly.

- Reason 3: The solid relay has been damaged(RQM type only) or the ac contactor has been damaged in the actuator(RQ type only).

Process 3: Change the ac contactor or the solid relay in the actuator.

- Reason 4: The motor has been damaged in the actuator.

Process 4: Change the motor in the actuator.

8.11 The exterior of the actuator seeps oil

- Reason: The Oil tie screw of the actuator is loose.

Process: Tighten firmly the screw and apply an oil stain wipe.

9 Actuator Control

The wiring code card fixed in the terminal cover is particular to each actuator. The RAIII/RQIII/ RQMIII actuator wiring code, please refer to Fig. 9-1. The means of each terminal refer to the Table 9-1.

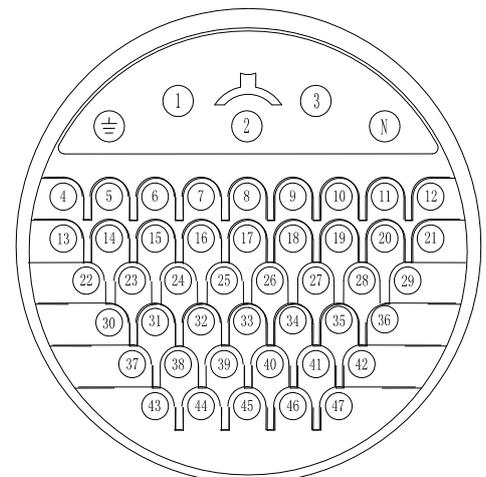


Fig. 9-1

Table 9-1 terminals description

NO	NAME	OPERATION
----	------	-----------

⏏	EARTH	Grounding
1	380VAC1(220VAC)	Input AC380V
2	380VAC2	
3	380VAC3(220VAC)	
4	DC 0V	DC 24V “-” output
5	DC 24V	DC 24V “+” output
6	S1 relay port 1	Indication S1 relay port 1
7	S1 relay port 2	Indication S1 relay port 2
8	S2 relay port 1	Indication S2 relay port 1
9	S2 relay port 2	Indication S2 relay port 2
10	S3 relay port 1	Indication S3 relay port 1
11	S3 relay port 2	Indication S3 relay port 2
12	S4 relay port 1	Indication S4 relay port 1
13	S4 relay port 2	Indication S4 relay port 2
14	QC relay port 1 *	Close over torque protection indication relay port 1
15	QC relay port 2 *	Close over torque protection indication relay port 2
16	QO relay port 1 *	Open over torque protection indication relay port 1
17	QO relay port 2 *	Open over torque protection indication relay port 2
18		
19		
20		
21	Torque feedback signal - *	Torque current analogue signal feedback port -
22	Valve position feedback signal +	Valve position current analogue signal feedback port +
23	Valve position feedback signal -	Valve position current analogue signal feedback port -
24	Torque feedback signal + *	Torque current analogue signal feedback port +
25	ESD	Emergent (ESD) active signal input port
26	Valve position input signal + *	Valve position current analogue signal input port +
27	Valve position input signal - *	Valve position current analogue signal input port -
28		
29	O relay port 1 *	Valve position fully open indication relay port 1
30	O relay port 2 *	Valve position fully open indication relay port 2
31	Interlock low voltage port	Interlock low voltage common-port
32	Interlock high voltage port	Interlock high voltage common-port
33	Remote close	Remote close input port
34	Stop/maintain	Stop/maintain input port
35	Remote open	Remote open input port
36	Remote low voltage port	ESD, remote open/close, stop/maintain low voltage common-port
37	Open interlock	Open interlock input port
38	Close interlock	Close interlock input port
39	Manual/automatic port	Manual/automatic signal input port
40	Remote high voltage port	Remote high voltage common-port
41	Manual/auto low voltage port	Manual/automatic low voltage common-port
42	Monitor relay port 1	Monitor relay normal common port
43	Monitor relay port 3	Monitor relay normal open port
44	Monitor relay port 2	Monitor relay normal close port
45	Manual/auto high voltage port	Manual/automatic high voltage common-port
46	C relay port 1 *	Valve position fully close indication relay port 1
47	C relay port 2 *	Valve position fully close indication relay port 2
N		

Notice: Mark of “*” items is only used in type of extended mode actuator.

9.1 Local controls

Two knobs are provided on the actuator electrical control cover. One for local/stop/remote selection and the other for the open/close control. Local control may be configured for maintained or push to run operation.

9.2 Remote manual controls

The power supply for remote control circuits are provided as DC 24V by actuator internal supply or DC/AC 24V~60V, DC/AC120V~220V by external supply (all the numbers shown in the Fig. means the terminal port number). Shown circuit Fig. 9-2 to 9-4 were DC 24V actuator internal power supply, Fig. 9-5 to 9-7 were DC or AC 24~60V external power supply, Fig.9-8 to 9-10 were AC 120~220V power supply.

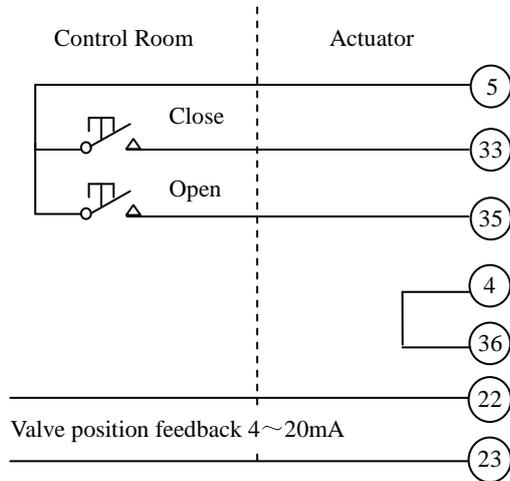


Fig. 9-2 Push to run open/close control, preventing intermediate is possible.

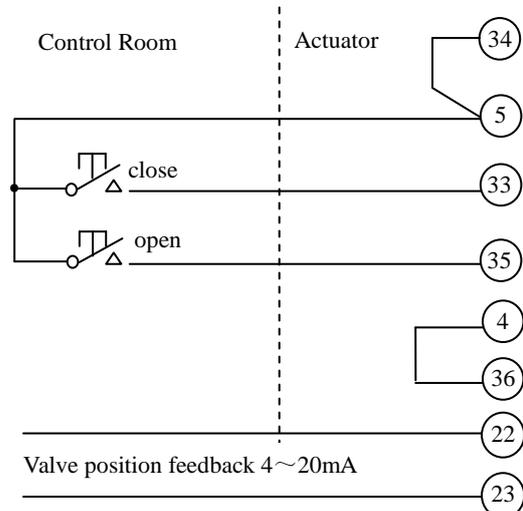


Fig. 9-3 Maintained open/close control, preventing intermediate position is impossible

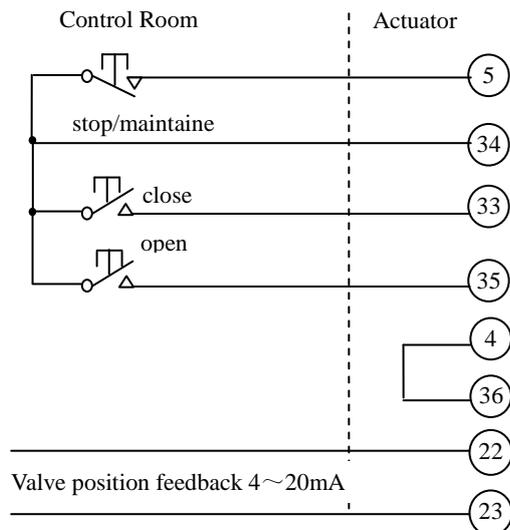


Fig. 9-4 Maintained open/close/stop control

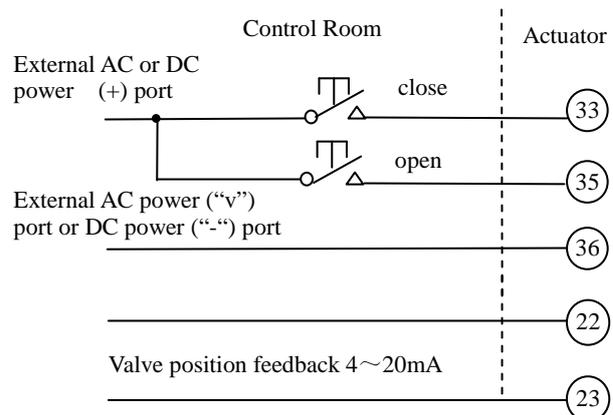


Fig. 9-5 Push to run open/close control, valve intermediate positioning is possible

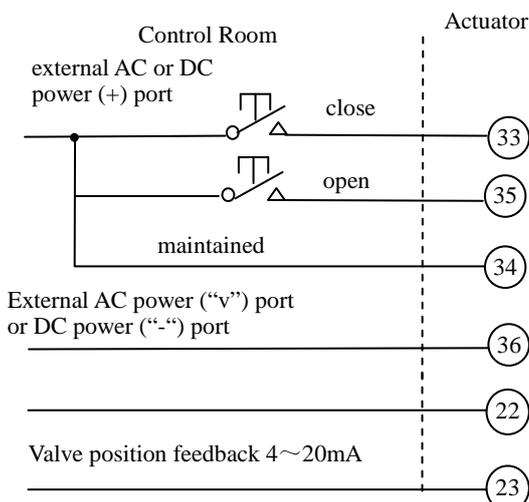


Fig. 9-6 Maintained open / close control, stopping intermediate position is impossible

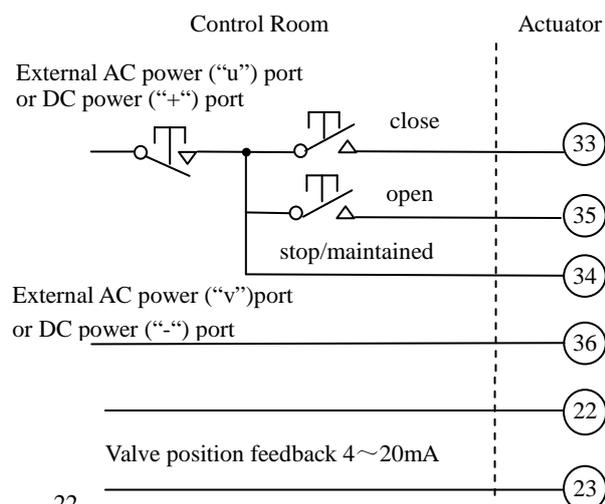


Fig. 9-7 Maintained open/close/stop control

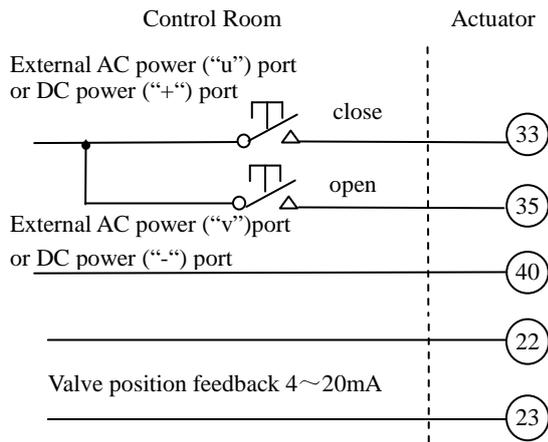


Fig. 9-8 Push to run open/close control, stopping intermediate position is possible

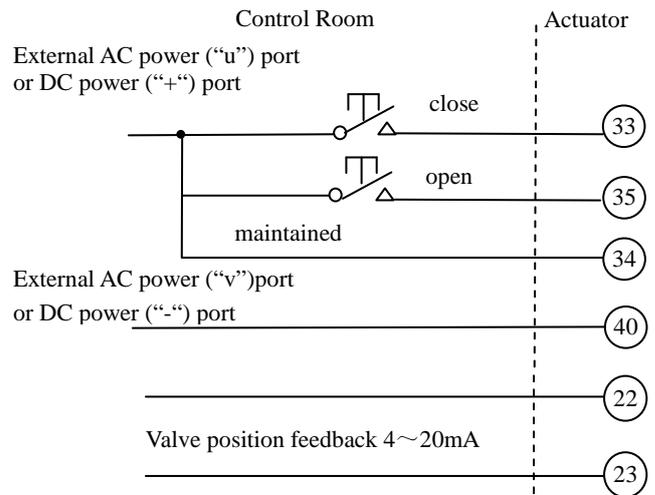


Fig. 9-9 Maintained open / close control, stopping intermediate position is impossible

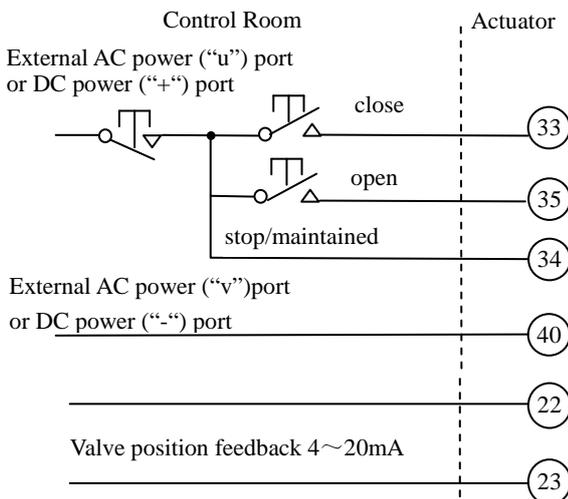


Fig. 9-10 Maintained open / close/stop control

9.3 State indication relay

Four state indication relay are provided, each one independently configurable using the RAIII/RQIII/ RQMIII setting tool to signal one of the following:

- valve position
Fully open, fully close or any intermediate positions .
- status
Valve opening, closing, moving .
- valve alarms
Motor tripped on torque when open, close or when the valve is jammed.
- actuators alarms

Each contact can be configured to either “normally open” or “normally close”. Contacts are rated at 5A/250VAC or 5A/30VDC (see Fig. 9-11).

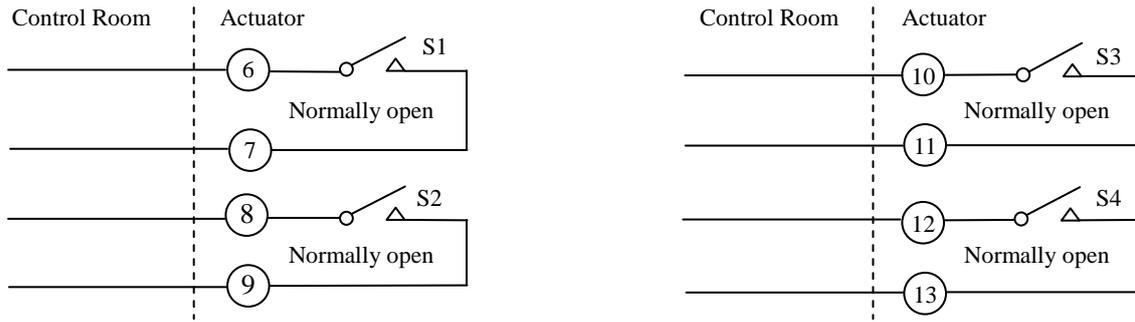


Fig. 9-11 State indication relays

9.4 Monitor relay

An independent relay with a volt-free changeover contact used for monitoring actuator electrical availability. Contact rating 5A/250VAC or 5A/30VDC.

The relay will de-energise under one, or a combination of the following conditions:

- loss of one or more of the power supply phases
- loss of control circuit supply
- loss of the I_c
- motor thermostat tripped

Refer to Fig. 9-12.

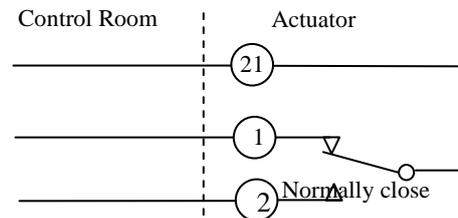


Fig. 9-12 monitor relay wiring diagram

9.5 R relay

It is an independent relay to indicate the red knob in or not in the remote position.

Refer to Fig. 9-13

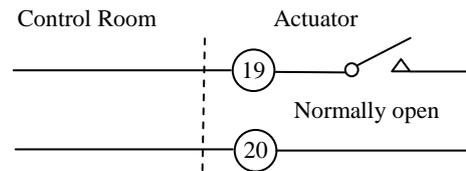


Fig. 9-13 R indication relays

9.6 Emergency shut down (ESD)

An active ESD signal will override any local or remote control signal. The ESD input operates from a separate common to that used for open, close.

The following ESD options can be configured:

- ESD signal
 - Active high, active low
- ESD action
 - Close, open, maintain
- ESD override
 - Motor thermostat, stop, interlock, dual-speed

9.7 Interlocks

External hardwired interlocks for opening, closing or both directions can be configured to inhibit local and remote operation until the external contacts are made. Interlocking circuits may be added with any of the remote control circuits. The interlock inputs operate from a separate common allowing for isolation between the safety system and operation control system

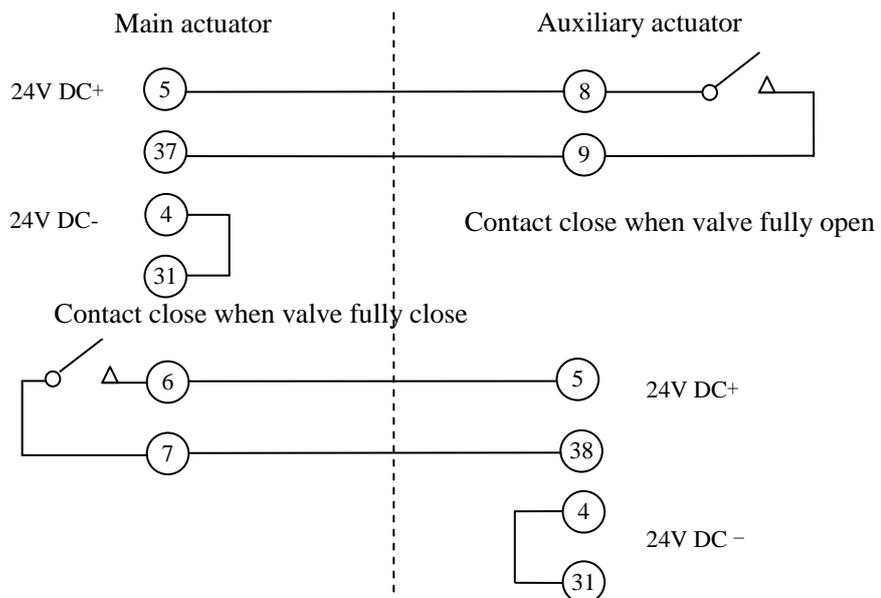


Fig. 9-14 interlock

(refer to Fig. 9-14).

9.8 Actuator extra functions option(efer to Table 9-2).

Table 9-2 actuator optional circuit and wiring diagram number

Item	Extra functions					Wiring diagram number
	1	2	3	4	5	
option al Circuit	To add an open over torque and a close over torque indication relays	To add a full open and a full close indication relays of the valve	To add analog current signal input for control	To add valve position current signal transmitter	To add torque current signal transmitter	
√	—	—	—	—	—	* 00-00-1
√	√	—	x	x	x	* 01-xx-1
√	—	√	x	x	x	* 02-xx-1
√	√	√	x	x	x	* 03-xx-1
√	x	x	√	—	—	* xx-01-1
√	x	x	—	√	—	* xx-02-1
√	x	x	√	√	—	* xx-03-1
√	x	x	—	—	√	* xx-04-1
√	x	x	√	—	√	* xx-05-1
√	x	x	—	√	√	* xx-06-1
√	x	x	√	√	√	* xx-07-1

NOTE: “—” means you do not select; “√” means you already select; “*” RAIII/RQIII: * =1, RQMIII: * = 2.

Example: If you selected 1,3,4 functions, the wiring diagram number is 101-03-1。

9.8.1 Extra relay

The extra relay option provides four additional changeover relays. The extra relay functions are show below:

- Valve position opens fully
- Valve position closes fully
- Closes over torque
- Opens over torque

9.8.2 Analogue signal current transmission

The system provides a 4~20mA current analogue signal proportional to the valve position. Available at terminals 22 and 23, the maximum external impedance that may be connected to the signal is 500 ohms at nominal supply voltage.

9.9 Analogue signal control

The RAIII/RQIII/ RQMIII actuator analogue signal proportional controllers enable the actuator to automatically position a valve in proportion to an analogue current or voltage. A signal derived from the actuator's non-contacting position sensor is electronically compared with a signal proportional to the input signal. The difference between them triggers the open or close contactor in the direction that will cancel the error. The valve position is therefore automatically adjusted in proportion to analogue signal. Unnecessary frequent operation can be prevented by the adjustable deadband and the Motion inhibiting Timer features.

- action on loss of input signal: stay-put, move to high or low signal position. Response on loss of signal will occur if signal falls below 50% of set “low” signal.

9.10 Fieldbus control

9.10.1 Modbus communication

Signal or dual MODBUS modules may be included in the RAIII/ RQIII/ RQMIII actuator to provide remote serial communication to the control functions and for status feedback data. The field network uses an RS485 data highway, either 2 or 4 wires, and can be duplicated where a disabling is required. The communication is half duplex and the protocol used is Modbus RTU with data rates up to

38 K baud. The actuator variables necessary to set up the system are programmable over the infra-red data link.

Modbus module advantages:

- cable cost reduction
- installation cost reduction
- simple to configure
- simple to use
- widespread open standard protocol
- many compatible devices available

redundant configuration available

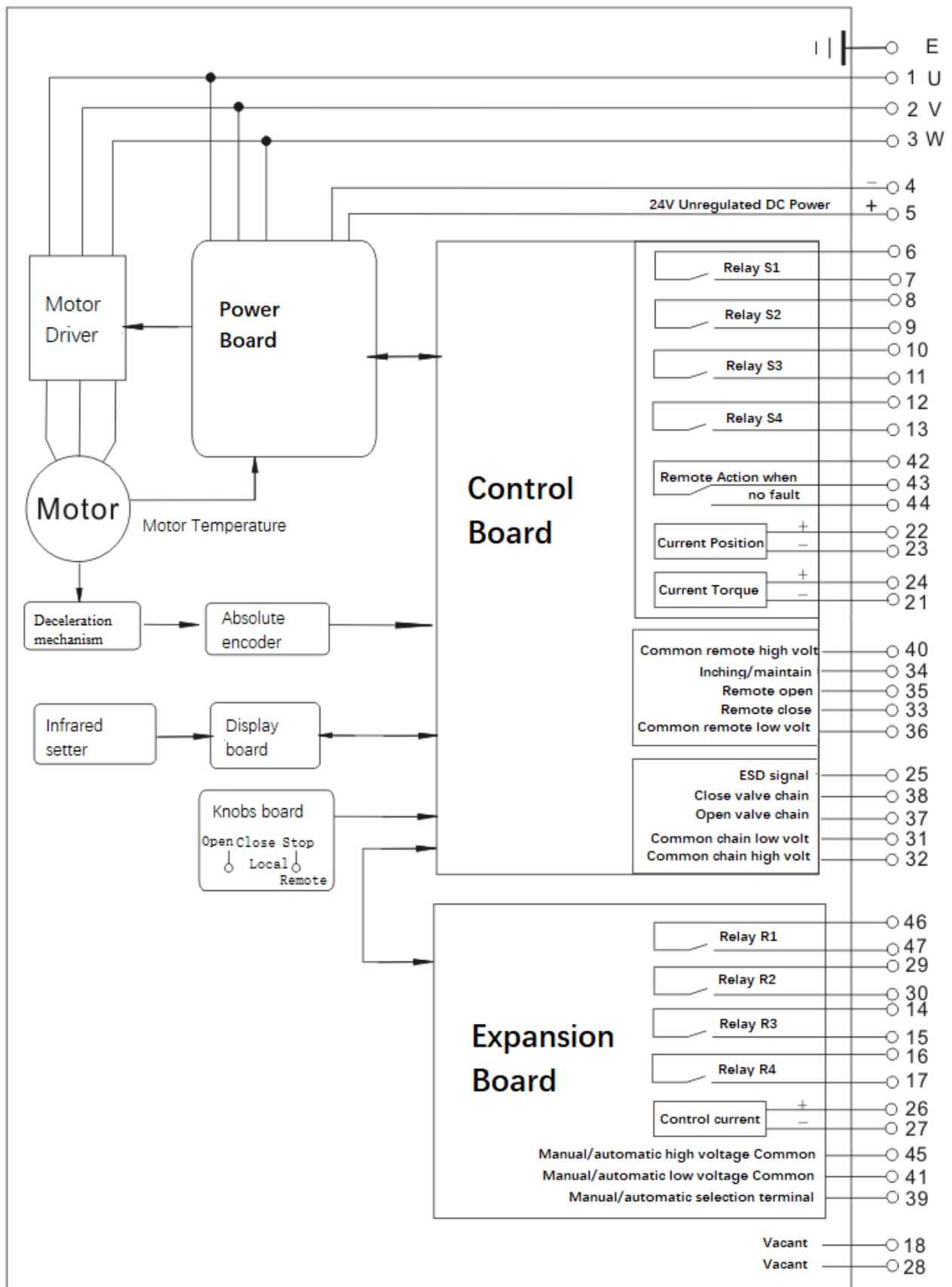
9.10.2 Profibus communication

Profibus connectivity is possible by fitting the DP interface module within the RAIII/RQIII/ RQMIII actuator. This allows the RAIII /RQIII/ RQMIII actuator to be integrated into a standard Profibus network. Full compatibility with the fieldbus standard EN 50170 is provided and the module carries Profibus certification for inter-operability. The network allows full control of the actuator and feedback of status data to the host. The RAIII/RQIII/ RQMIII actuator Profibus module has two communication ports to facilitate redundant fieldbus wiring where reliability is paramount, data rates up to 1.5 M baud are supported.

Profibus module advantage

- cable cost reduction
- installation cost reduction
- simple to configure and use
- devices independently approved
- widespread open standard protocol
- large number of compatible devices available
- redundant configuration available

RAGA multi-turn actuator wiring diagram of the internal structure :



* Terminal 4 and terminal 36 will be short in factory.



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