VATAC

Intelligent Electric Actuator

AVA, AVAM,AVAMD, AVAT (AVAQ) , AVATM Range

Instruction

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1. General Instructions of VATAC Actuator

VATAC Actuator can be commissioned without opening the electrical cover. Using the supplied infra-red setting tool to access the actuator set up procedures, setting of torque values, position limits and all other control, and indication functions can be made quickly and conveniently even in explosion proof locations. The actuator allows commissioning and adjustment to be carried out whenever the main power supply to the actuator been switched on or off.

The motor of VATAC on/off actuator is S2-15min short time duty, and the duty of modulating one is S4-50%.

The ambient standard operating temperature of VATAC actuator is from -30°C to 70°C.

Help menus can diagnose the status of the control system, valve and actuator. This function will greatly shortens users' troubleshooting time and brings more convenience on using.

This instruction enable users to install, operate, adjust and inspect VATAC actuators easily.

If the actuator has a nameplate with the sign of explosion-proof, the actuator is suitable for use in Zone 1 and Zone 2 explosive atmospheres only. It should not be installed in atmospheres where ignition temperature is less than 135°C.

Under no circumstances should any modification or alteration be carried out on the actuator as this will invalidate the conditions under which its certification have been granted.

The actuator should be moved to a non-hazardous area for repair or maintaince. Only the trained persons can be allowed to install, maintain and repair the actuator. Work undertaken must be carried out in accordance with outlines in the manual.

Warning:

Motor Temperature

With excessive use, the motor surface temperature could reach 132°C (270°F).

Motor Thermostat Bypass

If the actuator is configured to be motor thermostat bypass, when using the ESD function, the hazardous area certification will be invalidated.

Enclosure Materials

AVA01 to AVA06 enclosures are manufactured in aluminum alloy with stainless steel fasteners and the thrust bases are manufactured in cast iron. AVA07 to AVA10 enclosures are manufactured in aluminum alloy and cast iron with stainless steel fasteners and the thrust bases are manufactured in cast iron.

Users must ensure that the working environment is good, and the actuator itself should not afford the protection function. Users must suitably protect the actuator against its working environment.

Actuator Storage

If your actuator cannot be installed immediately, store it in a dry place.

If the actuator has been installed, but cannot be cabled, it is recommended that the plastic transit cable entry plugs be replaced with metal plugs, which are sealed with PTFE tape.

2. Mounting the VATAC Actuator

2.1 Mounting the Actuator with Drive Base

Normally, the VATAC actuator is mounted on the valve with drive base. There are two kinds of bases: thrust base and non-thrust base. Both of their key parts are drive bush which are directly mounted on the valve stem. The drive bush for thrust base has the type of trapezoidal screw threads, and for non-thrust base has the key, three jaws or square shaft. In general, the drive bush is either machined depending on the data of valve factory or machined by users (It should be removed before machining).

The flange standard of drive bases are under national standard. For multi-turn actuators, flanges are F07, F10, F14, F25, F30, F35 and F40; for quarter-turn actuators, flanges are F07, F10, F12 and F14. However, the flange can be machined depending on drawing on request.

The actuator can be mounted on the valve directly with the drive base (except unmachined) before leaving the factory.

a) Before the thrust actuator is mounted on the valve, enable the drive bush onto the threaded valve stem, then engage "hand" and wind the handwheel anticlockwise to engage the drive bush onto the stem. Continue winding until it closes to the valve flange, then wind two or more turns, fit securing bolts tighten fully.

b) When the non-thrust actuator is mounted on the valve, place the drive bush on the valve stem, fit securing bolts tighten fully.

There is a hollow shaft in AVA range actuator which is for the rising stem valve. In order to ensure that moisture does not intrude into the hollow shaft of the actuator, PTFE tape should be winded around the cover and fully tightened.

2.2 Mounting the Linear Actuator

Comparing VATAC actuator installation of linear range to that of other range which is with drive bush. The common point is that both of them have the same actuator and a thrust base, but the different point is that the linear one has a transforming bracket and a screw, of which one end are trapezoidal screw threads, and the other end is hexagon column.

Assemble the actuator with a screw and a bracket, couple the bracket to the valve flange with fasteners, and couple the screw to valve stem with wafer nuts.

Note: The valve should be at its fully closed position when coupling.

2.3 Mounting the Actuator with Gearbox

Usually, a part-turn valve needs a 90°gearbox, and a large torque multi-turn valve needs a bevel gearbox or a spur gearbox.

Gearbox has a removable drive bush which is machined depending on the diameter of the valve stem and connections.

Gearbox is always coupled to the damper with a rocker and spherical linkage.

2.4 Cable Connections and Wiring Diagram

Check that power supply voltage whether agrees with that stamped on the actuator nameplate.

The breaker or fuse for the actuator should be selected depending on the rated current of the motor.

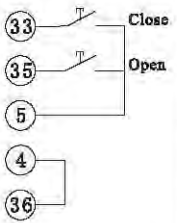
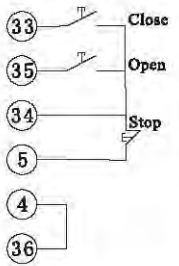
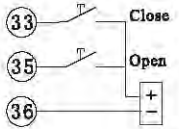
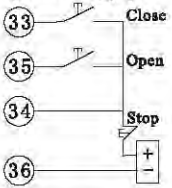
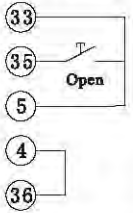
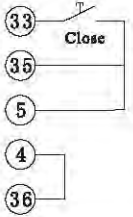
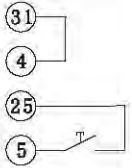
Earth/Ground Connections

A lug with a 6mm diameter hole is cast adjacent to the conduit entries for attachment of an external protective earthing strap by a nut and bolt. An internal earth terminal is also provided.

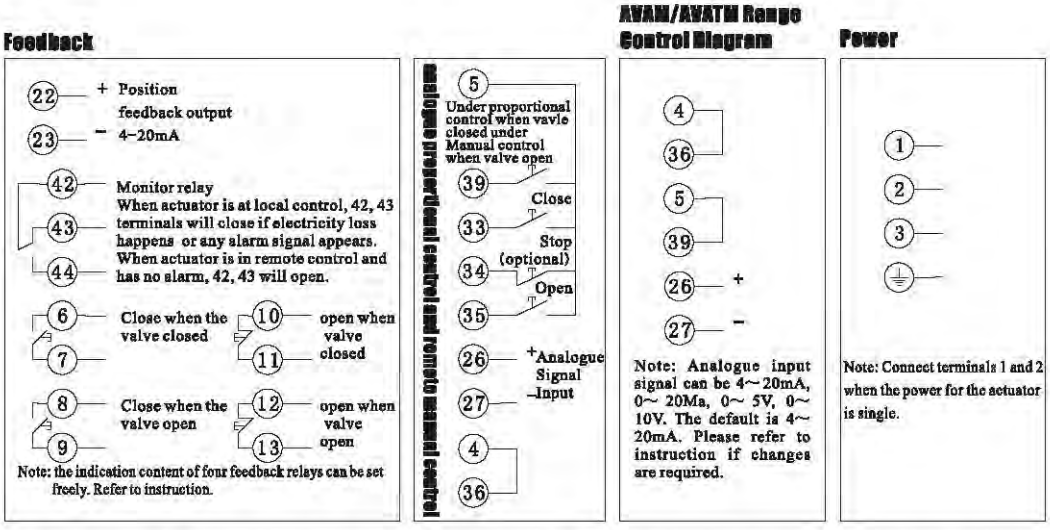
Cable Entry

In explosion-proof zone, explosion-proof cable joint should be used at the cable entry. Make the cable joint appropriate to the outer diameter of the cable. Ensure that cable glands or conduit are tight and fully waterproof. Seal unused cable entries with a steel or brass threaded plug.

AVA/ AVAT Range Control Diagram

step control of internal power supply	Self-maintained control of internal power supply	step control of external power supply	self-maintained control of external power supply	2-wires control	2-wires control	ESD
				Valve open when contact closed Valve closed when contact open The function require that opening valve is set to be preferential	Valve close when contact closed Valve open when contact open The function require that closing valve is set to be preferential	ESD can be set to close valve, open valve and stay put
						

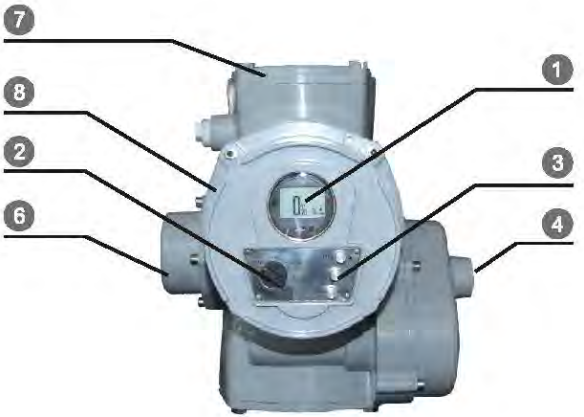
Note: Internal power supply voltage is 24VDC.
When the external control voltage is 20-60V DC/AC, the common terminal is 36.
When the external control voltage is 60-120V AC, the common terminal is 40.



Replace the terminal cover after connections, insure good "O" ring seal and transverse plane, and hard tighten screws.

3.Operating VATAC Actuator

3.1 Each Parts Names of the Actuator



1.Display Screen

2.Local, Stop, and Remote

3.Local Operating Button

4.Handwheel or Rocking handle(install when using)

5.Hand/Auto lever

6. Motor

7.Connection Terminal Cover

8.Electric Control Box

9.Protective Sleeve for Hollow Shaft

3.2 Manual Operation

Depress the Hand/Auto lever into "Manual" status. Turn the handwheel to check whether it has engaged the clutch. When the valve value on the LCD changes while turning, the lever can now be released and it will automatically return to its original position. The "Manual" status will remain engaged until the actuator is operated electrically

If the lever can't be depressed into "Manual" status for the first time, turn the handwheel by 30° and depress the lever again.

When the actuator is operated electrically, its "Manual" status will automatically switch to "electrical" status.

Notice: Please do not depress the lever when the actuator is operating electrically.

If required, the Hand/Auto lever can be locked by a padlock with a 6.5mm hasp.

3.3 Electrical Operation

When the actuator wiring is finished, user should ensure that power supply voltage agrees with rated voltage stamped on the actuator nameplate before input electricity. It is not necessary to check phase rotation for VATAC actuator.

If the actuator is mounted on the valve for the first time, the position limit should be carried out before electrical operation (refer to primary setting), so that its travel range can be made suitably.

It is strongly recommended that set position limit by manual. Fully open the valve by handwheel and set open limit position, then fully close the valve by handwheel and set closed limit position, at last set torque protection value and open-closed action (refer to primary setting)

Local Electrical Operation

There is a black knob on the actuator for Local, Stop and Remote. When Local operation is required, select "Local" and press Open or Close button at right side. The actuator will open or close accordingly. Pressing Stop, the actuator will stop.

Remote Control

Selecting Remote, the actuator will open, close and stop according the order from control room. Remote control can't be operated unless the external control cable is connected according to the VATAC wiring diagram.

4.Function Commissioning of VATAC Actuator

4.1 The Setting Tool

Specification

Enclosure: Ip67

Certification: Eex ia II C T4(intrinsically safe)

INT SAFE, Class I &II,DIV 1 GROUPS A B C D E F G

Power Supply:9V Battery (supplied)

Operating Range: 0.75m (should be exactly in front of the display window)

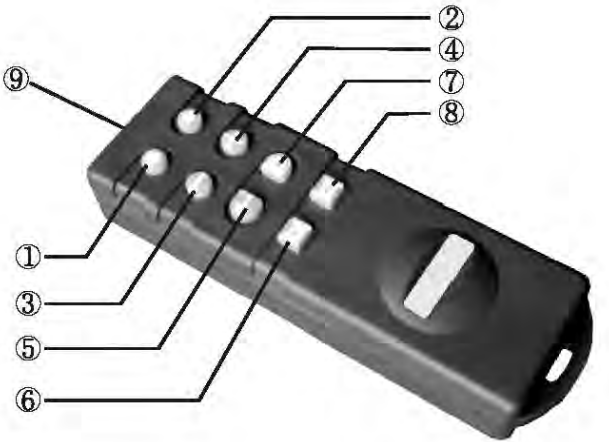
Key-press Instruction

1. Display next menu down
2. Display next menu across
3. Decrease/change displayed function's value or option setting
4. Increase/change displayed function's value or option setting
5. Enter/Stop

Infra-red Local Operation

6. Close actuator
7. Stop actuator
8. Open actuator
9. Infra-red transmission window

When a button is depressed, the Setting Tool transmits the relevant instruction to the actuator by infra-red, therefore ,the Setting Tool must be in front of the display screen directly. Then the actuator will carry out relevant functions or actions. When the actuator receives the infra-red instruction, the red indicator lamp under LCD and a communication icon in the top right corner of LCD will flash.



Setting Tool Battery Replacement

Battery status can be checked conveniently by looking at whether the Setting Tool can transmit infra-red or not. A flashing red indicator should be seen while depressing any Setting Tool button. To replace the battery remove the six hexagon sockets head cap screws in the back of the Setting Tool. Remove the back cover to expose the battery. Battery replacement must be carried out in a safe area.

4.2 LCD of the Actuator

4.2.1 The Components of Display:

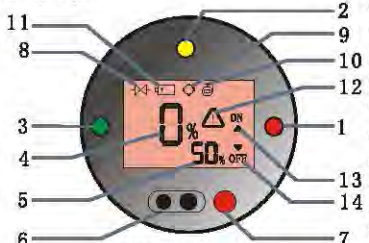


Fig. 4. 2. 1

1. Red fully open indicator lamp
2. Yellow Mid travel indicator lamp
3. Green fully closed indicator lamp
4. opening range of valve position
5. Torque value
6. Infrared communicator
7. Communication indicator lamp
8. Valve alarm
9. Control alarm
10. Actuator alarm
11. Battery alarm
12. Alarm indication (It appears when having any of the alarm conditions)
13. Upward arrowhead means opening, and "ON" means fully open
14. Downward arrowhead means closing and "OFF" means fully closed.

On power up the actuator's liquid crystal display screen is back-lit with a "primrose yellow" light and one of the position indicator lamps will be on. The display screen will show opening range of valve position, torque value of the actuator, and others. With the power supply cut off, the liquid crystal display screen keeps displaying by a back-up battery. The screen back-lit and position indicator lamps will be cut off for saving electricity.

Fully Open

When the valve is fully open, the display screen will show 100% valve position, upward arrowhead, and "ON" with a lighted red indicator lamp.

Fig. 4. 2. 2

Fully Close

When the valve is fully closed, the display screen will show 0% valve position, downward arrowhead, and "OFF" with a lighted green indicator lamp.

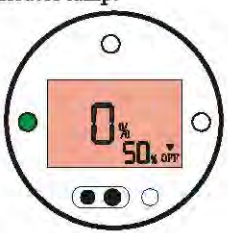


Fig. 4. 2. 3

4.2.2 Display- Alarm Display

The top portion of the display incorporates valve, control, actuator, and battery alarm indications. Each icon represents certain alarm conditions. Help Menu are also available to assist in determining the actuator operational and alarm status.

Valve Alarm

The valve alarm will appear when the actuator tripped off, it is result from the configured torque has been exceeded.

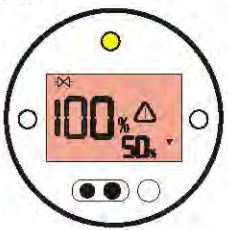


Fig. 4. 2. 4

The possible causes are:

- Valve jammed.
- Valve process conditions changed (increase in pressure, flow etc.)

The valve status now should be inspected. It can't be operated electrically until the valve problem is surely resolved.

Once the actuator has tripped off, electrical operation in the same direction is inhibited. The icon will remain displayed until move in the opposite direction.

The valve alarm icon will not be displayed when the actuator has move to the end of travel, which is preset.

Control Alarm

It displays when the remote control system maintains an active ESD or interlock signal (the interlock function or conditional control having been enabled). Local and Remote operation will be inhibited at the same time. (Refer to Advanced setting [A1] ESD, [A8] External Interlocks and [A9] Conditional Control).Please study the remote control condition of the actuator.

Fig. 4. 2. 5

Actuator Alarm

The actuator alarm icon is displayed when CPU detects a problem from the inner or outer of actuator. Electrical operation will be inhibited while it alarms (except 24V alarm).

The possible causes are:

- Transformer thermostat tripped
- 24V internal power supply alarm
- Power supply fault
- Torque inspection system alarm

Please refer to help menu to identify the specific causes of the alarm.

Fig. 4. 2. 6

Battery Alarm

The battery alarm icon is displayed when CPU detects its battery is low or discharged.

When the secondary setting [OS] menu is set "on", both the battery and actuator alarm icons will be displayed. When the battery is low, the function [OS] is inhibited to operate.

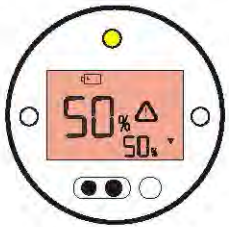


Fig. 4. 2. 7

When the battery alarm icon is displayed, the battery should be replaced immediately.

Most of the AVA range batteries are located on the connections terminal cover, which are tightened by a steel cover and opened by an inner hexagonal wrench. For some of the AVA range and AVAT range, the battery is installed in the electric control box, so it is necessary to open the control box when replacing the battery.

Battery replacement must be carried out in a safe area, or make sure there is no explosive gas or moist air nearby.

4.3 Instruction of the Setting Procedure

VATAC adopts non-intrusive design for the operation and setting of the actuator. The user can use the setting tool to set torque, position limit and other functions without opening electric control box, which ensures the security of the internal electronic and electric device. The setting tool is certified Intrinsically safe to allow use in explosion-proof areas.

All the actuator's setting values are stored in its EEPROM memory in the actuator, so the data will not lose even if power losing. Users can look over the actuator's functions and setting values with setting tool. The setting value can be changed under requirements.

When setting, press"Downward" key of the setting tool to enter the next menu, press"Rightward" key to enter right side menu(refer to Picture 4.3.1); press +or - key to change spare optional value and then press"Enter"key to confirm. When the setting is effective, the crossband in the top of the screen will flash.

The menu of the setting procedure is circular, namely, as long as press "Downward" or "Rightward" key all the time, it'll return to its original menu.

The setting procedure has two steps: primary setting and advanced setting. There is an additional help menu for users to diagnose all kinds of failures.

Entering Setting Procedure

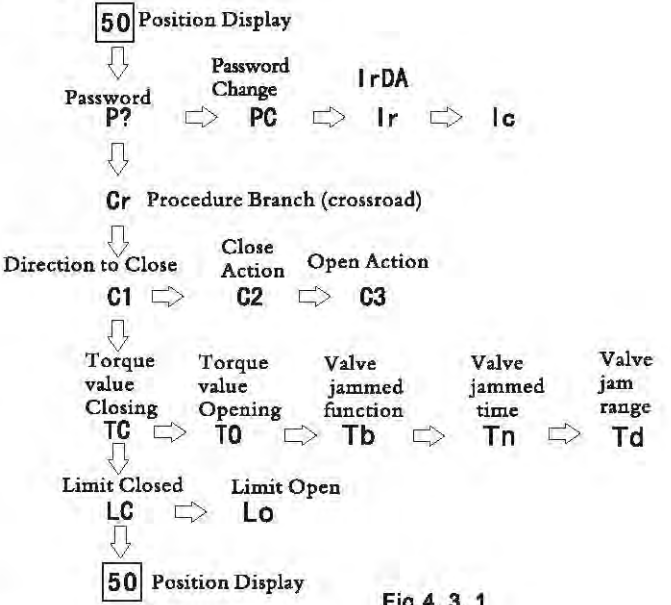


Fig.4. 3. 1

Turn the knob (local/ stop/ remote) to local or remote, put the setting tools directly in front of the actuator's screen and press "Downward"key, and then the password protection menu will be displayed(refer to picture 4.3.2). For changing the set value, VATAC actuator must be entered correct password. The factory's default password is 33. If the password is not changed, press"Enter"key directly, and password 33 will flash. Meanwhile, a crossband will appears in the top of the screen (refer to picture 4.3.3). Now you can enter the next menu and operate. If there is no crossband, users can only observe all options but can't change any value.

VATAC actuator's password can be scrolled through from 00-99. Use+or- key to lookup set password, and press "Enter" key.

Fig. 4. 3. 2

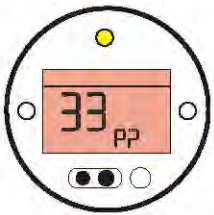


Fig. 4. 3. 3

Changing Password

After finishing password confirmation (refer to picture 4.3.3), press "Rightward"key to enter password changing menu (refer to picture 4.3.4), find a password you want by using + or - key, and press "Enter"key. Likewise, the figure you selected will flash, which means new password has been effective. If you want to enter menu setting next time, you should use new password. Users must make a record after new password setting to avoid troubles when using.

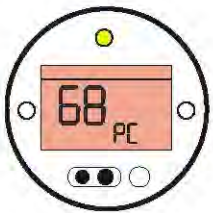


Fig. 4. 3. 4

4.4 Primary Setting

Primary setting is mainly for valve opening actions, valve opening direction, torque protection value, position limit and so on.

When the actuator has been installed on the valve and electrified correct power supply, position limit setting is the most important thing. Usually, it can be operated electrically as long as the actuator has had position limit. "Usually" means that valve opening direction is clockwise, and the actuator matching is correct.

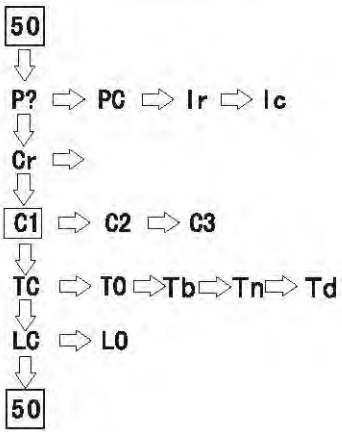
After entering the procedure and input a correct password, press "Enter"key. (See 4.3 Entering setting procedure)

Press"Downward"key to enter the next menu [Cr] which is a procedure branch. Press"Rightward"key to enter advanced setting. If you press "Downward"key, it will enter [C1]. (Refer to picture 4.4.1)

4.4.1 Direction of Valve Opening and Actions of Valve Opening & Closing

Valve Closing Direction [C1]

This function is for adjusting valve opening direction. According to industry custom, the clockwise usually is the closing direction.



Valve closing direction has option [A] and option [C]. Option [A] is anti-clockwise closing, and option [C] is clockwise closing.

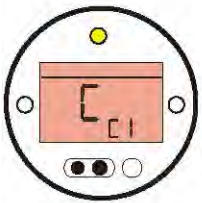


Fig. 4. 4. 1

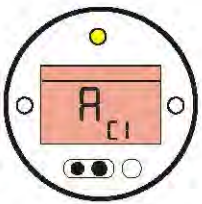
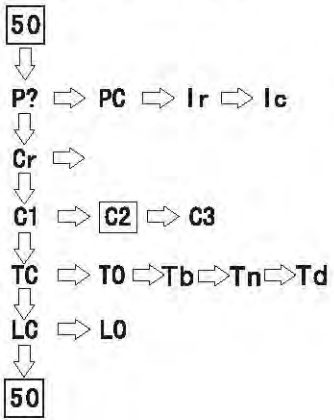


Fig. 4. 4. 2

Select correct valve closing direction with + or - key, and press "Enter"key. (refer to picture 4.4.1 and 4.4.2, default is [C])

Valve Closing Action [C2]



The actuator's optional valve closing action has [CL] (close on limit) and [Ct] (close on torque), It is suggested to close on limit, which is default.

Fig. 4. 4. 3

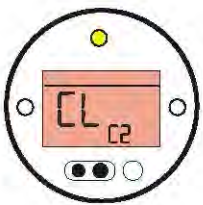


Fig. 4. 4. 4

Select correct valve closing action with + or - key, and press"Enter" key. (refer to picture 4.4.3 and 4.4.4)

Close on limit is an action that utilizes the elements of Hall Sensor, and stocks the whole travel data of the valve into the memorizer. When it is selected close on limit, the actuator will monitor the valve data ever and again while working. When it is in the end of the valve, the actuator will stop automatically.

Close on torque utilize torque sensor of the actuator. When the valve torque exceeds the set torque value of the actuator, the actuator will trip off automatically. When it is close on torque, the torque value should not exceed 80%. See next point for details, which is torque value of valve closing and opening.

Valve Opening Method [C3]

The actuator's optional valve open action has [OL] (open on limit) and [Ot] (open on torque). It is suggested to open on limit, which is default.

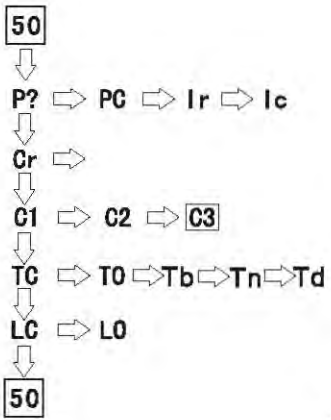


Fig. 4. 4. 5

Fig. 4. 4. 6

Select correct valve opening action with + or - key, and press"Enter" key. (refer to picture 4.4.5 and 4.4.6)

Open on limit utilizes the elements of hall sensor, and stocks the whole travel data of the valve into the memorizer. When it is selected to open on limit, the actuator will monitor the valve data ever and again while working. When it is at the end of the valve, the actuator will stop automatically.

Opening on torque is an action to utilizes torque sensor of the actuator. When the valve torque exceeds the set torque value of the actuator, the actuator will trip off automatically. When it is selected to open on torque, the torque value should not exceed 80%. See next point for details, which is torque value of valve closing and opening.

4.4.2 Torque setting of the Valve Opening and Closing

Torque Value Closing [Tc]

VATAC actuator utilizes torque sensor to make real-time measure for the torque value in the on/off procedure. When the measured torque value is larger than the set value, the actuator will trip off immediately, and appear a torque alarm (refer to 4.2.4). It is generally used for the protection action.

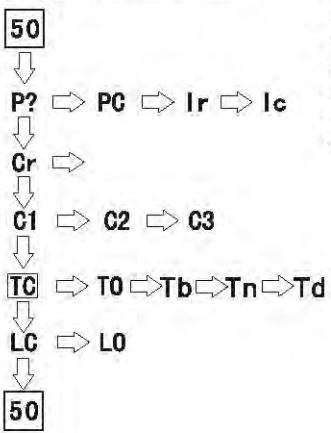


Fig. 4. 4. 7

Options for torque value closing are 40%-100%, and in 1% increments. The value is equal to the percent multiplied by rating torque. Select appropriate value with + or - key, and press"Enter" key. (refer to picture 4.4.7)

Torque Value Opening [To]

VATAC actuator utilizes torque sensor to make real-time measure for the torque value in the on/off procedure. When the measured torque value is larger than the set value, the actuator will trip off immediately, and appear a torque alarm (refer to 4.2.4). It is generally used for the protection action.

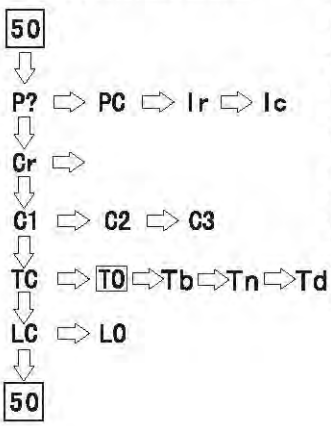


Fig. 4. 4. 8

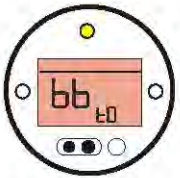


Fig. 4. 4. 9

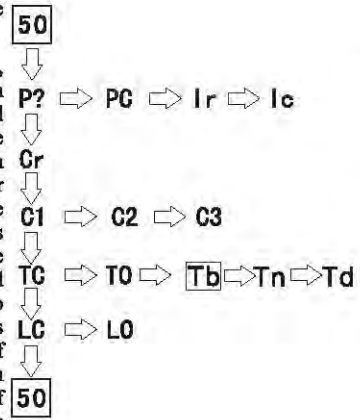
Options for torque value opening are 40%-100%, and in 1% increments. The value is equal to the percent multiplied by rating torque. Select appropriate value with + or - key, and press"Enter" key. (refer to picture 4.4.8)

Within a small range of valve opening (valve position is 0%-5%), intensified torque [bb] can be Selected. Intensified torque is 1.4 times of the rating torque.(refer to picture 4.4.9)

Valve jam function [Tb]

Actuator can be configured to use the valve jam protection function.

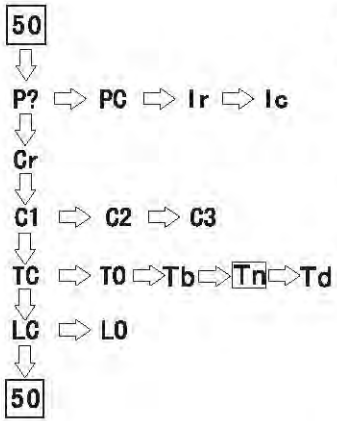
That is when the valve overtorques, if there is no jam protection function, the actuator motor will stop and torque alarm will be shown; if using jam protection function, the actuator will return for a proper valve percentage on the opposite of the actual needs direction (The max. value of the valve percentage is the jammed valve open range Td), and then go on running in the actual needs direction. This is the procedure of one-time valve jam protection. Tn is used to limit the allowed times of the valve jams protection. When the valve jam times for the actuator reach Tn, the actuator motor will stop and torque alarm will be shown.



Valve jam times[Tn]

[Tn] is used to limit the valve jam times.

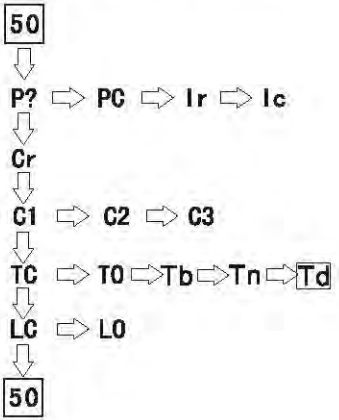
Use + or - key to get the valve jam times. The valve jam times can be set between 1-45, and the default value is 3.



Valve jam range[Td]

Td is used to set the valve jam percentage, that is the max. reversed movement valve percentage of the actuator when valve jams.

Use + or - key to get the valve jam percentage. The valve jam percentage can be set between 1-50%, and the default value is 5%.



4.4.3 Position Limit

When the actuator has been installed on the valve, limit must be set prior to electrical operation. Limit setting is one of the most important commissioning works. The purpose of it is to store the set data of valve travel range into memorizer.

Setting Limit Closed [LC]

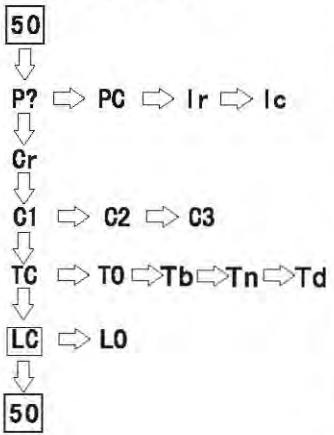
Before setting limit closed, tighten the valve manually first, keep pressing the setting tool"Downward" until enter menu [LC] (refer to picture 4.4.17), and press"Enter"key. Meanwhile, keep pressing, and the original value of the valve position will be changed to 0%.

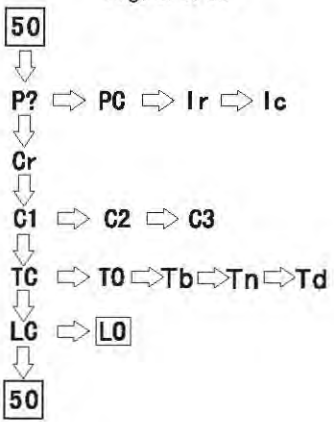
Fig. 4. 4. 17

Fig. 4. 4. 18

Setting Limit Open [LO]

Before setting limit open, open the valve manually, and leave a certain room. Keep pressing the setting tool"Downward" until enter menu [LC], press"Rightward"to enter right menu [LO](refer to picture 4.4.18), and press enter key. Meanwhile, there is a flashing of red indicator lamp on the right of screen, and the original value of the valve position will be changed to 100%.





Manual position limit

Users can use manual position limit when power is cut, then the power of actuator is supplied by battery, so sufficient battery capacity should be ensured, the manual position limit only suitable for small valve and the valve should be easy operated by manual.

Limit procedures are as follows:

1. Trigger mainboard: the indication lamp will light when mainboard been triggered, if users don't operate in 5 seconds, the lamp will extinguish and the mainboard will get into status of sleep.

2. Trigger method: For AVA series, depress hand/auto lever, then turn the handwheel to trigger the mainboard; For AVAT series, install the rocking handle , then turn the rocking handle, the mainboard will be triggered.

3. Wind to full close manually, rewind for one turn, enter into menu [LC], press "Enter", a crossband will display in the screen, close limit finish.(Procedure refer to P18)

4. Wind to full open manually, rewind for one turn, enter into menu [LC], press "Enter", a crossband will display in the screen, open limit finish.(Procedure refer to P18)

To access the Secondary menu, press"Downward"to find Procedure Branch Crossroad[Cr], then press"Rightward"to find [r1] according to the instruction of picture 4.5.1.

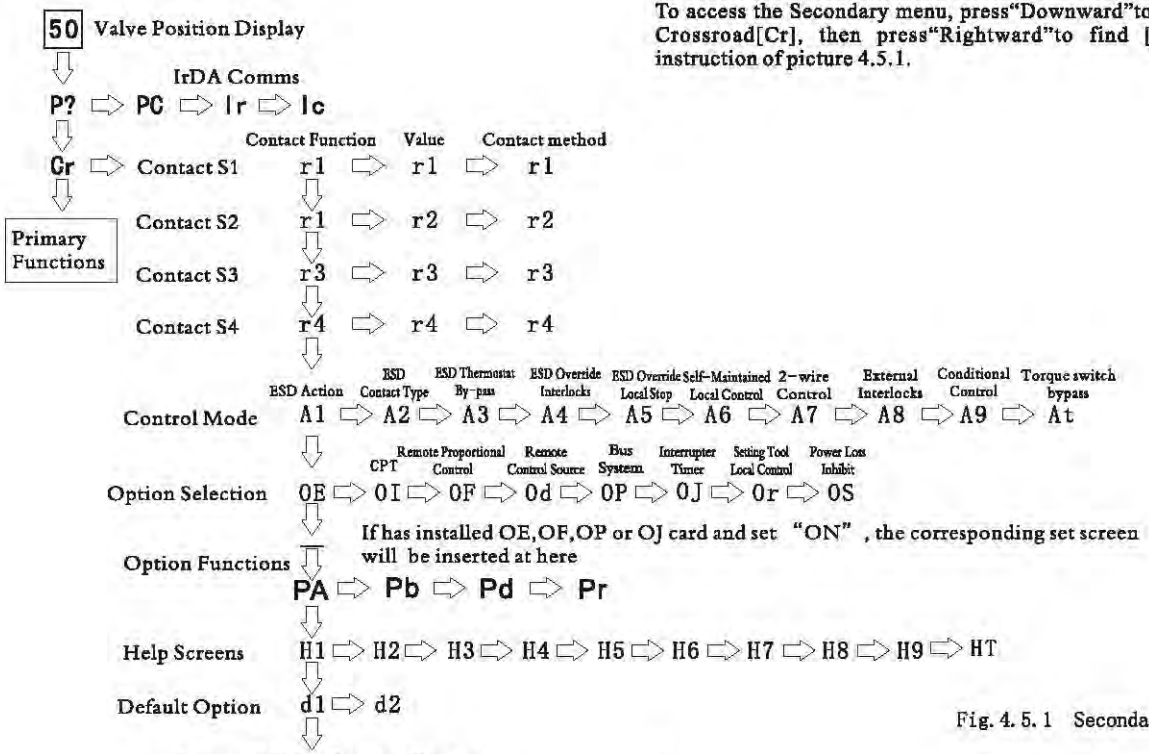


Fig. 4. 5. 1 Secondary Functions

4. 5 Advanced setting

4.5.1 Indication Contacts [r1], [r2], [r3] and [r4]

Indication Contacts [r1], [r2], [r3] and [r4] are four relays indicating all kinds of functions. Each of them can be set one of the following functions:

[CL] closed end position
[OP] open end position
[Po] intermediate position
[TC] torque trip close
[TO] torque trip open
[TT] torque trip any position
[TI] torque trip mid travel
[DC] actuator closing
[DO] actuator opening
[D?] actuator rotating
[St] motor stalled
[BA] battery low
[HA] hand operation
[BL] blinker
[LS] local stop
[OI] open interlock
[CI] close interlock
[IL] interlock active
[ES] ESD signal
[LP] lost phase
[Lo] local selected
[RE] remote selected
[AA] actuator alarm *
[24] 24V power failure
[RR] motor running
[UA] Valve alarm *
[Ht] thermostat tripped
[CA] control alarm *
[RP] relay parity

Each relay contact form can be set normally open [NO] or normally closed [NC]. The procedures for setting up contacts [r2], [r3] and [r4] are the same as those shown for [r1].

Unless specified with order, the default settings for indication contacts are as follows:

r1 - [CL] closed, [no] contact normally open

r2 - [OP] open, [no] contact normally open

r3 - [CL] closed, [nc] contact normally closed

r4 - [OP] open, [nc] contact normally closed

Select correct indication functions with +or - key, and press"Enter" key. Refer picture 4.5.2 and 4.5.4.

When the R contact function is set to [Po], the required intermediate position value must be set. No other functions require the value to be set. The valve can be set from 1% open to 99% open in 1% increments. See picture 4.5.3

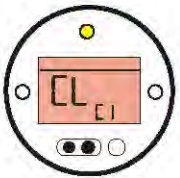


Fig. 4. 5. 2

Fig. 4. 5. 3

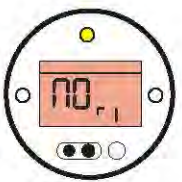


Fig. 4. 5. 4

4.5.2 Control Mode setting

The control mode is used to set functions of actuator under conditions of emergency shut down, local control, remote control interlocks etc.

There are 10 control functions:

A1 ESD action (ESD)

A2 ESD contact type

A3 ESD thermostat bypass

A4 ESD override interlock control

A5 ESD override local control

A6 Maintained local control

A7 2-wire remote control

A8 External interlocks

A9 Conditional control

At Torque switch bypass

ESD Direction [A1]

ESD is a function when emergency appears. It can be set as follow:

[CL] Close on ESD,

[SP] Stay put on ESD

[OP] Open on ESD

Fig. 4. 5. 5

ESD needs a support from the remote control wiring. For the connection method, please refers to VATAC wiring diagram. When ESD contact type [A2] is set to normally open [no], one of remote high-level signal will enable the actuator to work in [A1] set direction. When ESD contact type [A2] is set to normally closed [nc], one of remote low-level signal will enable the actuator to work in [A1] set direction. Select correct indication functions with +or - key, and press"Enter"key. Refer to picture 4.5.5. The default setting is Stay Put.

ESD Contact type [A2]

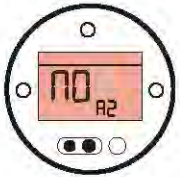


Fig. 4. 5. 6

There are two types: [nc] and [no]. The default setting value is [no], namely the contact is normally open.

When the contact is normally open, the actuator responds to remote high-level ESD signal.

When the contact is normally closed, the actuator responds to remote low-level ESD signal.

Select correct indication functions with +or - key, and press"Enter" key. Refer to picture 4.5.6. The default setting is [no].

ESD Thermostat Bypass [A3]

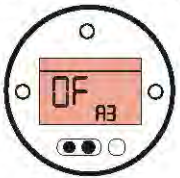


Fig. 4. 5. 7

The function is set to check whether the actuator can be thermostat bypass when ESD signal appears. Namely, when there is temperature alarm, whether ESD signal can override temperature alarm and drive the actuator.

The function has two options:[OF], ESD can't override thermostat bypass

[ON], ESD override thermostat bypass

Select correct indication functions with +or - key, and press"Enter" key. Refer to picture 4.5.7. The default setting is [OF].

Warning: actuator explosion-proof certification is invalidated while the thermostats are bypassed.

ESD Override Interlocks [A4]

Fig. 4. 5. 8

The function is set when ESD signal appears, whether the actuator can override interlocks to have an action. (When the interlocks is not set, this function is no need to be set.)

The function has two options:

[OF], ESD can't override interlocks

[ON], ESD override interlocks

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.8. The default setting is [OF].

ESD Override Local Stop [A5]

Fig. 4. 5. 9

The function is set when ESD signal appears, whether the actuator can override local stop to have an action.

The function has two options:

[OF], ESD can't override local stop

[ON], ESD override local stop

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.9. The default setting is [OF].

Maintained Local Control [A6]

Fig. 4. 5. 10

Maintained control is needed when operating the local knob of the actuator, namely, set this function when the actuator is in electric control.

The function has two options:

[OF], local pointing control

[ON], maintained local control

Select correct indication functions with +or - key, and press"Enter" key. Refer to picture 4.5.10. The default setting is [ON].

2-Wire Remote Control [A7]

Fig. 4. 5. 11

The method of 2-wire control is adopting 2 wires when the actuator in remote control. One is connected with common end, the other one is connected with valve open (or valve closed). Valve closed (valve open) short circuit with control source end. So the actuator is normally closed (normally open) without inputting control signal, while the actuator carries out the priority and advanced order. Refer to wiring diagram.

There are three options:

[OP] Open priority

[SP] Stay put

[CL] Close priority

Select correct indication functions with +or - key, and press"Enter" key. Refer to picture 4.5.11. The default setting is [OP].

External Interlocks [A8]

Fig. 4. 5. 12

This function is set open/closed for external interlocks of the actuator.

[OF] disuse external interlocks

[ON] use external interlocks

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.12. The default setting is [OF].

Note: If interlock is only needed in one direction, it will be necessary to connect with relative terminals of the other direction on terminal compartment.

External Conditional Control [A9]

Where a high level of safety integrity is required, Conditional Control can be set. In this mode two signals are required for remote operation. Remote control will be conditional on both a control signal (open or close) and the appropriate interlock signal being applied simultaneously. Failures or a spurious signal will not cause operation.

Interlocks [A8] must be [ON]. Interlock signals are not required for local control.

[OF] disuse external conditional control

[ON] use external conditional control

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.13. The default setting is [OF].

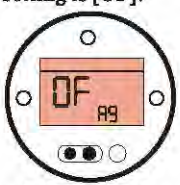


Fig. 4. 5. 13

Torque Switch Bypass [A9]

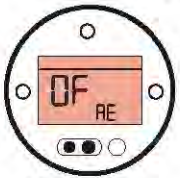


Fig. 4. 5. 14

[OF] not bypassing

[on] bypassing

If it is set [ON], the torque switch will be bypassed from position 0% to 5% when opening and from position 100% to 95% when closing. Bypassing the torque switch makes torque in excess of rated and up to actuator locked torque for opening a "sticky" valve. Outside these positions, torque setting will revert to torque set value of [TC] and [TO]. Refer to primary setting.

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.14. The default setting is [OF].

Optional Contact

There are four additional contacts as option: S5[r5], S6[r6],S7[r7]and S8[r8].

If the actuator has installed the optional contacts, the setting method is as same as S1-S4. Please refer to P19, section 4. 5.

The default setting of optional contacts are as follows:

S5[r5] close limit indication

S6[r6] open limit indication

S7[r7] torque tripped mid travel

S8[r8] remote selected

Note: If the actuator haven't installed optional contact, any setting of S5-S8 will have no influence on actuator.

Extra Contact display [OE]

Fig. 4. 5. 15

If customers need extra indication contacts, VATAC actuator can provide Option [OE] which is set to realize this function.

There are two options:

[ON] turning on extra contacts

[OF] not turning on extra contacts

The setting method of extra contacts r5, r6, r7, r8 are identical to that of r1, r2, r3.

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.15. The default setting is [OF].

Position Transmitter Option [OI]

Fig. 4. 5. 16

The actuator has valve position transmitter, which can provide 4-20mA analogue valve position feedback.

It's an optioal function, the power can be supplied by internal or

External source.

There are two options:

[HI] 20mA current corresponds to valve fully open

[LO] 20mA current corresponds to valve fully closed

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.16. The default setting is [HI].

Remote Proportional Control [OF]

Fig. 4. 5. 17

Remote proportional control is a switch, which is used to control actuator, with analogue signal (usually 4-20mA)
Only the modulating actuator has this function. Moreover, only when proportional control [Od] (generally 4-20mA control) is set [Ob], this option will be effective.
[OF] not turning on remote proportional control
[ON] turning on remote proportional control
Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.17. The default setting is [OF].

Remote Control Source [Od]

The setting of remote control source is determined by the option function card installed, option values are:

[Ob] option Folomatic

[Op] enable Bus Contorl

[OF] all remote controls are invalid

[rE] standard hard-wired remote control

Remote control source is set [rE] as default.

Use + or - to adjust remote control source [Od].

Press "Enter"

The displayed value will flash to indicate that it has been set.

When use Modbus communication card, set content including: value of remote control source [Od] should be [OP], value of setting tool local control [Or] should be [rE], [PA]- Bus address, [Pr]- communication baud rate.

When use Profibus communication card, set content including: value of

card, set content including: value of remote control source[Od] should be [OP], value of setting tool remote contorl [Or] should be [rE],[PA]- BUS address.

Fig. 4. 5. 18

Setting screen open

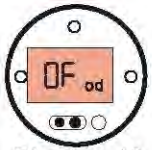


Fig. 4. 5. 19

Setting screen close

System control source[OP]

Bus operation instruction

1.Two communication cable of RS485 connect with "41" and "45" of external wiring terminal. "41 " to "B", "45" to "A".

2.Connect "4" and "36", "5" and "39" on external wiring terminal with wire.

3.The last actuator should be installed with terminating resistance by jumping wire, there is a terminating resistance switch on the communication card, switch to "ON" to enable the terminating resistance, "OFF" to disable it. The default settting is "OFF".

4.Set every acutator's address, the address range from 1 to 255, ensure no same address exist, address set menu is "PA". Relative Bus set menus are: value of "od" should be "OP"; value of "Or" should be "rE".

PA- Bus address

Use this to set every physical address, every actuator's address of work station should be unique. The address range from 1 to 255, the default address is 1.

Use+or - to acquire suitable address.

Press "Enter"

The displayed value will flash to indicate that it has been set.

Pr- communication baud rate

When using Modbus,suitable communication baud rate should be set according to the requirment of work station. While using Profibus, there is no need to set communication baud rate.(Bus control section refer to bus network control instruction).

The communication speed of our actuators are as follows:

[1]=300b/s

[2]=600b/s

[3]=1200b/s

[4]=2400b/s

[5]=4800b/s

[6]=9600b/s

[7]=19200b/s

[8]=38400b/s

[9]=57600b/s

Use+or - to choose suitable communication baud rate.

Press "Enter", the displayed value will flash to indicate that it has been set.

Interrupter Timer [OJ]

This function is not provided for the moment.

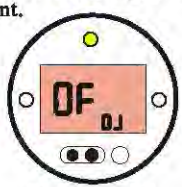


Fig. 4. 5. 20

Setting Tool Control [OR]

Fig. 4. 5. 21

This function sets the setting tool whether it can be used to local open and closed.

[on] setting tool local open/closed enabled (it is available when local/stop/remote knob is turned

to Local).

[OF] setting tool local open/closed disabled

[rE] Actuator is set remote operation in the software (it is especially useful when local/stop/remote knob is removed on purpose)

Select correct indication functions with +or - key, and press"Enter" key. Refer to picture 4.5.21. The default setting is [OF].

Prohibit Operation with Battery Invalidation [OS]

Fig. 4. 5. 22

If the handwheel has been operated when power loss, low battery and no display appear, the valve position data will be incorrect. At this moment, although the main power reverts, the actuator will not be allowed to operate unless old batteries are replaced.

If disable this function, the important thing is do not to operate the actuator manually during power loss and low battery. At this moment, hand/auto switch lever can be locked at auto to prevent manual operation.

[On] Prohibit operation after power loss

[OF] Allow Operation after Power Loss

Select correct indication functions with +or - key, and press"Enter" key. Refer to picture 4.5.22. The default setting is [OF].

4.5.4 Control Selection of Remote Proportion

Option Folomatic

Folomatic (proportion) controller is used to control valve position(analog).

Folomatic is an additional control unit. Please check whether the wiring diagram has this function.

Before setting, please make sure that the remote control source [Od] has been set at [Ob].

Display of Folomatic setting can be set OFF(invisible), to give users additional protection.

If choose ON, the relative additional function display will be visible and adjustable.

NOTE: If Folomatic card has been installed, ON/OFF setting in Folomatic screen will not influence operation of Folomatic, because the card has loaded all default values.

This manual assumes all Folomatic functions have been checked or set, and lists all display of Folomatic set in sequence.

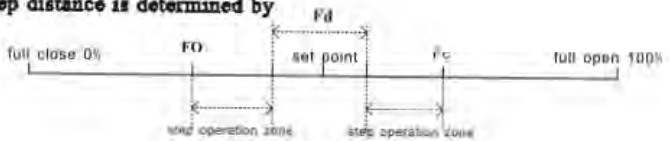
When set, the actuator should be at status of Local or Stop, and add point signal form terminal 26(+) and 27(-).(refer to wiring diagram)

Modulating actuator can control valve position accurately.

Users can use Fc,Fo,Fp to reach much higher accuracy.

In this picture, Fd is deadband of actuator, Fc is deadband critical excursion at close direction, Fo is deadband critical excursion at open direction. When opening the valve,

the actuator will change maintain operation into step operation in the step operation zone from Fo point until get into the range of Fd. When closing the valve, the actuator will change from maintain operation to step operation range of Fc until get into the range of Fd. The step distance is determined by Fp.



Setting of Fc, Fo and Fp is closely interrelated to working environment of actuator, and should be adjust according practical situation.

NOTE: Setting of Fc, Fo, Fp, Fd

please refer to P27.

Point Signal Type [F1]

Analogue control signal has current type and voltage type

[I] current signal control

[U] voltage signal control

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.23. The default setting is [I].

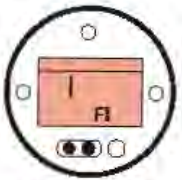


Fig. 4. 5. 23

Point Signal Range [Fr]

When [F1] is selected as current control:

[01] 0-10mA analogue control

[02] 0-20mA analogue control

[42] 4-20mA analogue control

When [F1] is selected as voltage control

[05] 0-5V voltage analogue control

[10] 0-10V voltage analogue control

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.24. The default setting is [42].

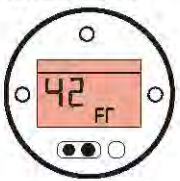


Fig. 4. 5. 24

Deadband critical excursion at close direction [FC]

Fig. 4. 5. 25

Use +or- to set deadband critical excursion, it can be set from 0 to 100, default value is 3.

Press "Enter"

The displayed option will flash to indicate that it has been set.

Pree "Rightward" display [FO]

Deadband critical excursion at open direction [FO]

Use +or- to set deadband critical excursion, it can be set from 0 to 100, default value is 3.

Press "Enter"

The displayed option will flash to indicate that it has been set.

Press"Rightward" display [Fd]

Deadband set [Fd]

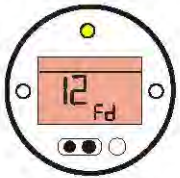


Fig. 4. 5. 26

If the modulating actuator can't stop at a certain place, namely, hunts or responds to certain unnecessary signal at a certain place, the deadband parameter should be increased. If more accurate control is needed, the deadband should be decreased. Range 00-100 corresponds to 0%-10% of control point signal.

Note: Maximum deadband is 10% of valve stroke. The deadband should normally not be less than 1%.

Select correct indication functions with +or - key, and press "Enter" key. Refer to picture 4.5.26. The default setting is [12], namely, the deadband set is 1.2% of valve stroke. namely disable.

The displayed option will flash to indicate that it has been set.

Press "Rightward" to display [FP]

Step distance [FP]

Use + or - to set step distance. The excursion value can be set from 0 to 20. The default value is 2.

Analogue threshold control [FS]

When using current analogue control, users can use this function to realize control the actuator by analogue signals. After enabling this function, when input current is 0-30% of set value, the actuator will close,when input current is 30-70% of set value, the actuator will stop, when input current is 70-100% of set value, the actuator will close.

This function is default set [OF], namely disable.

Use +or- to enable or disable this function.

Press "Enter"

The displayed value will flash to indicate that it has been set.

Press "Rightward"to display [Ft]

Inhibit Time [Ft]

Fig. 4. 5. 27

In order to prevent the actuator from working frequently within much short time or for rapidly fluctuating signal, it appears an appropriate delay to prevent unnecessary movement. Inhibit time is interval time both of two actions. The parameter is set to adjust interval time both of two actions. Second is the unit, and range of it is 00-100 seconds. It generally suggested that the setting of inhibit time should not less than 5 seconds.

Select correct indication functions with +or - keys , and press "Enter" key. Refer to picture 4.5.27. The default setting is [05].

Press "Enter"

The displayed option will flash to indicate that it has been set.

Press "Rightward"to display [FA]

Response on Loss of Point Signal [FA]

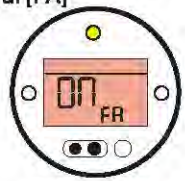


Fig. 4. 5. 28

This function is to set the actuator to respond or not when point signal loss happens. It is effective when the control signal is not zero, for instance 4-20mA.

[On] Respond but the actuator running direction is determined by [FF]

[OF] Respond to move to the valve position corresponding with low signal

Select correct indication functions by using +or - keys , and then press "Enter"key. See picture 4.5.28. The default setting is [ON].

Press "Enter"

The displayed value will flash to indicate that it has been set.

Note: [FA] can only be used in the signal range like 4-20mA,there should be no signal like 0

Press "Rightward"to display [FF]

Failsafe Action [FF]

It is necessary to set Failsafe action here when point signal enable to [ON].

[LO] move valve to position corresponding to minimum point signal

[SP] stay put on loss of point signal

[HI] move valve to position corresponding to maximum point signal

Select correct indication functions with +or- key, and press "Enter" key.

4.5.5 Help Menu

VATAC actuator has self-diagnosis function. Users can use help menu for quick troubleshooting.

Help screens instruction:

H1 Factors affecting electrical operation

H2 inspecting battery status and ESD input

H3 inspecting position limit and power supply status

H4 inspecting remote control input

H5 inspecting remote interlocks, local control input and motor thermostats

H6 inspecting torque switch status and infrared setting tool communication

H7 inspecting travel limit and remote indication output

H8 inspecting position devices

H9 Battery status

Ht software version No.

U inspecting date of control analogue

Factors Affecting Electrical Operation [H1]

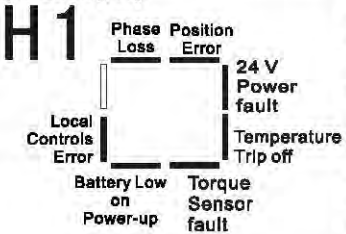


Fig. 4. 5. 33

POSITION ERROR

Bar ON = Current position error. During power up the actuator postion processor compares the current position to that stored in the Eeprom. If there is a discrepancy, it will display as a current position error. Re-setting of open and close limits should be carried out.

24V POWER SUPPLY ALARM

Bar ON = internal 24V power supply malfunction. If the actuator can't detect internal 24V power supply when having main power supply, this alarm will appears, and the actuator alarm will display in the screen at the same time. Note: internal 24V power supply is for remote control.

TEMPERATURE ALARM

Bar ON = temperature sensor tripped. When the motor temperature sensor tripped which caused by overheated, this alarm will appears and the actuator alarm will appears in the screen at the same time.

TORQUE ALARM

Bar ON = torque sensor tripped or malfunction. When the actuator torque on the travel exceeds that set, or the torque inspecting system malfunction, this alarm will appears and the actuator alarm will display in the screen at the same time.

LOW BATTERY ON POWER UP

Bar ON = low battery inspected. If [OS] is selected [ON], the actuator electrical operation will be prohibited until power revert.

Inspecting Battery Status and ESD Input [H2]

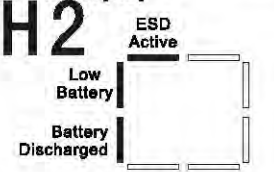


Fig. 4. 5. 34

BATTERY CAPACITY DISCHARGED

Bar ON = battery level discharged. The battery should be replaced and position reset.

LOW BATTERY

Bar ON = low battery. Bar ON when the battery is low but still able to support the necessary actuator functions

Bar OFF = battery OK

ESD SIGNAL EFFECTIVE

Bar ON = ESD signal present. ESD function will be determined by the settings on control mode configuration screens [A1] to [A5]. The actuator will not respond to any local or remote control when an ESD signal is maintained.

Inspecting Position Limit and Power Supply Status [H3]

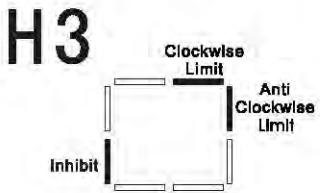


Fig. 4. 5. 35

CLOCKWISE LIMIT

Bar ON = actuator moved to clockwise limit of travel.

Anti-clockwise Limit

Bar ON = actuator moved to anti-clockwise limit of travel.

Phase Losing

Bar ON = Phase losing (3 phase actuator only)

Inspecting Remote Control Input [H4]

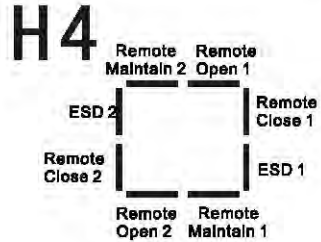


Fig. 4. 5. 36

REMOTE OPEN 1

Bar ON = remote open signal present

REMOTE CLOSE 1

Bar ON = remote close signal present

REMOTE OPEN 2

Bar ON = remote open signal present from Bus option Bus PCB

REMOTE CLOSE 2

Bar ON = remote close signal present from Bus option Bus PCB

ESD 1

Bar ON = ESD signal present

Bar OFF = ESD signal not present, and/or remote stop valid

ESD 2

Bar ON = ESD signal present from Bus option PCB

REMOTE MAINTAIN 1

Bar ON = remote maintain signal present

REMOTE MAINTAIN 2

Bar ON = remote maintain signal present from bus option PCB

All standard hard wiring remote input signal should be designed as "1".

When Modbus, Profibus or Foundation Fieldbus card has been installed, the remote control input should be designed as "2".

Inspecting Remote Interlocks, Local Control Input and Motor Thermostats [H5]

Fig. 4. 5. 37

OPEN INTERLOCK

Bar ON = open interlock effective

CLOSE INTERLOCK

Bar ON = close interlock effective

REMOTE CONTROL NOT SELECTED

Bar ON = remote control not selected

Bar OFF = remote control selected

LOCAL CLOSE SIGNAL NOT PRESENT

Bar ON = Local close signal not present

Bar OFF = Local close signal present

LOCAL OPEN SIGNAL NOT PRESENT

Bar ON = Local open signal not present

Bar OFF = Local open signal present

THERMOSTAT TRIPPED

Bar ON = Thermostat tripped. The actuator motor has thermostat switch. If the motor become overheated, the thermostat switch will trip and the actuator will prohibit electric operation. After the motor temperature falling down, the thermostat switch will automatically reset and the actuator can go on working.

LOCAL STOP NOT SELECTED

Bar ON = Local stop not selected
Bar OFF = Local stop selected

LOCAL CONTROL NOT SELECTED

Bar ON = Local control not selected
Bar OFF = Local control selected

Inspecting Torque Switch Status and Infrared Setting Tool [H6]

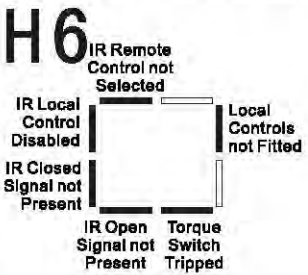


Fig. 4. 5. 38

When actuators are supplied for vandal proof applications, the local control knobs are removed to prevent unauthorized operation. The local control functions are then carried out by the Setting Tool.

LOCAL CONTROL NOT FITTED

Bar OFF = Local control fitted

Bar ON = Local control not fitted (vandal proof)

TORQUE SWITCH TRIPPED

Bar OFF = torque switch tripped

INFRARED OPEN SIGNAL NOT PRESENT

Bar OFF = torque switch tripped

INFRARED CLOSE SIGNAL NOT PRESENT

Bar OFF = torque switch tripped

INFRARED REMOTE CONTROL NOT SELECTED

Bar OFF = infrared remote control selected (Vandal proof).

When local control is not offered for vandal proof, the option selection screen [Or] must be set to [rE] for remote operation.

Inspecting Stroke Limits and Remote Indication Outputs [H7]

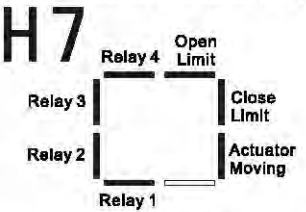


Fig. 4. 5. 39

OPEN LIMIT

Bar ON = actuator reaches fully open

CLOSE LIMIT

Bar OFF = actuator reaches fully close

ACTUATOR MOVEMENT

Bar ON = actuator moving

SWITCH CONTACTS R1, R2, R3, R4

Bar ON = r contact close

The bar will indicate the status of contacts.

Inspecting Position Devices [H8]

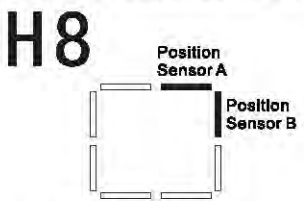


Fig. 4. 5. 40

VATAC actuator adopts two hall sensors to inspect position data and actuator action direction.

POSITION SENSOR A, B

Correct operation of the sensor is bar ON (and OFF) 12 times per output revolution. When the motor is running, the time for bar ON and OFF should be equal.

To observe this function, select manual operation and turn the actuator handwheel clockwise, starting with all sensors OFF:

Turn clockwise 30°

Sensor A	0	1	1	0	0
Sensor B	0	0	1	1	0

4.5.6 Default Setting Value [d1] and [d2]

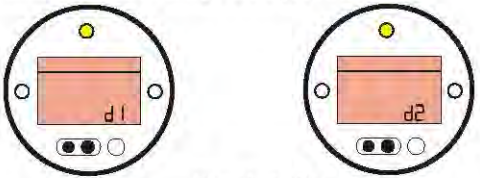


Fig. 4. 5. 41

Functions of all VATAC actuators are configured according to default settings before being dispatched, see following sheet. It surely can be set according to pointed content when ordering.

There are two fault settings:

[d1] = all parameter initialized

[d2] = limit number of turns initialized

If [d1] is entered, all primary and advanced function except position limit will be set fault. Refer to following sheet.

If [d2] is entered, position limit will be reset. The whole travel is 25 turns and the display screen shows 50% position.

As long as find the menu by using the setting tool and then press"Enter" key. See picture 4.5.41

4.5.6 VATAC Standard [d1]Default Setting

Function	[d1] default setting
[P?] Password	Unaffected will keep setting
[Ir] IrDA Monitor	[On] IrDA Available
[Ic] Mobile phone	[OF] Disable
Primary functions	
[C1] Close Direction	[C] Clockwise
[C2] Close method	[CL] Close limit
[C3] Open method	[OL] Open limit
[TC] Torque closed	[40] 40% Rated torque
[TO] torque Open	[40] 40% Rated torque
Advance settings	
[r1] Indication S1	r1 close, normally open
[r2] Indication S2	r2 open , normally open
[r3] Indication S3	r3 close, normally closed
[r4] Indication S4	r4 open, normally closed

[A1] ESD method[SP] ESD stay up

[A2] ESD contact type [NO] Normally open (ESD effective when closed)

[A3] ESD thermostat bypass[OF] Thermostats effective during ESD

[A4] ESD override interlocks[OF] Interlocks effective during ESD

[A5] ESD override local stop[OF] Local stop effective during ESD

[A6] Self-Maintained local control[On] self-Maintained in local control

[A7] 2-wires control[OP] 2-wire controlling, valve open in advance

[A8] Interlocks[OF]interlocks disused
[A9] Conditional control[OF] function disused
[OI] CPT[HI]4mA correspond to close 4mA
[OP] option remote proportional control [OF]
[Od] remote control source [rE] see fix or not
[Or] setting tool local control[OF] setting tool control disused
[OS] power loss prohibit [OF] no protection
Additonal contacts:
[r5] Indication S5 [CL]/[nO] close, normally open
[r6] Indication S6 [OP]/[nO] open , normally open
[r7] Indication S7 [tI]/[nO] torque trip mid travel, normally closed
[r8] IndicationS8 [rE]/[nO] open, normally closed

5.Maintance,inspection and trouble shooting

For long time no trouble operation, every actuator should be fully tested and installed, sealed, modulated according instruction. AVA and AVAT adopt special double sealed and non-intrusive enclosure, which can realize exhaustive protection of actuators.
Users should not open terminal cover when do routine examination. There is no need to open the terminal cover and adjust the internal electrical control parts which are sealed by VATAC Quality Control Department.
The power of actuator should be isolated before examination and maintance, except battery replacement.
The power of actuator should be isolated before open the terminal cover, except battery seal plug.
routine examination including:
1. Check the securing bolts between actuator and valve are tightened.
2. Ensure the cleanness and lubrication of valve stem and coupling.
3. A operating plan should be made when motorized valve seldom be operated.
4. Battery should be replaced every 5 years.

Battery of actuator

Battery is used to support the valve position detection and display when power is cut off. In case power has been cut off, battery can ensure the transfer of valve position and display on screen when manual operation.
It can also support data recording when data logger is installed.

Warning:
Battery seat which located on the ctuator enclosure should not be damaged on explosion-proof zone. If users need to get battery seat out, the power of actuator should be isolated or cut first.
AVA/AVAT has added a special circuit in battery function. It can reduce battery consumption and increase its life.
The battery has a life about 7 years.
There is a icon on the screen to indicate the battery capacity.
To avoid data lose, recommend to replace battery when main power is on. If main power is not available and the battery is discharged, check the valve position after replacement of battery.

Battery disassembly
Choose Local Stop, disassemble the battery which located at the top of enclosure, beside handwheel. It is in the seal plug which has a tag on it.

Use a 6mm Allen key to remove the control box, ensure the "O" ring is still on the control box, disconnect the wire of battery, pull the battery out from the plastic seal hole.

Battery Model

For Europe explosion-proof(CENELEC), FM or CSA certificate actuators, only use 9V manganese dioxide battery. U1 certificate or same standard can also use it.

For water tight actuator, 9V manganese dioxide battery or other 9V battery which applied same standard are available.

Replacement of Battery

Insert the battery into the rubber seal hole, reconnect the battery wire to the battery terminal, reinstall the control box and ensure the "O" ring is correctly installed. Use 6mm Allen key tight the control box.

Trouble shooting

eg. When power is connected, but the display backlight is off and the valve indication light is off.

When power is connected, the backlight should be on. (refer to P8, section 4. 2)

Check whether the power is normal and agree with the value on the nameplate. Measure the voltage of terminal 1, 2 and 3.

When power is cut off, the battery can support to indicate valve position of liquid crystal screen.

If display blank, the battery should be replaced and the travel limit should be reset.

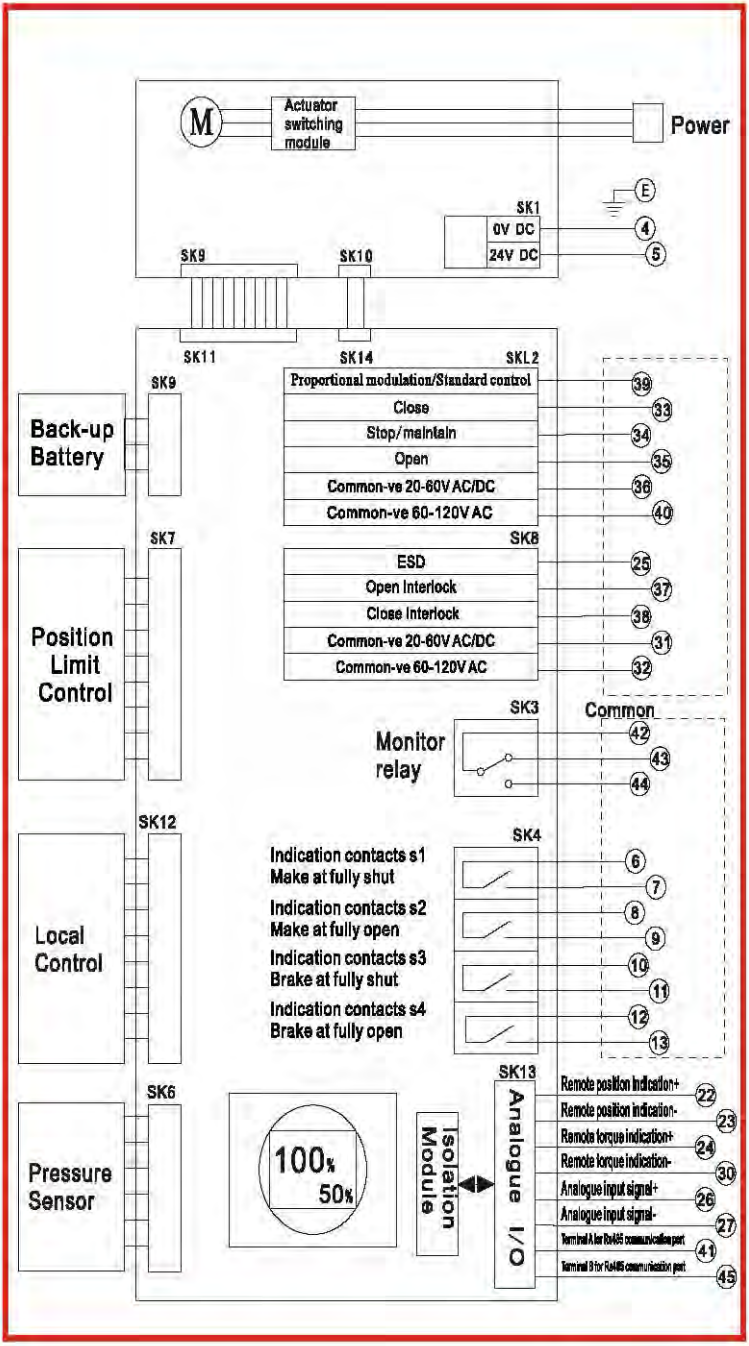
6.Weights and Lubrication

Unless specially ordered for extreme climatic conditions, VATAC actuators are dispatched with gearcases filled with GL-5 75W/90 lubricant suitable for ambient temperatures ranging from 22°F/30°C to 160°F/70°C.

Note: Excluding secondary gearboxes.

Weights and lubricant capacity

Part No.	N/W (Kg)	Lubricant capacity (L)
AVA01	32	0. 3
AVA02	32	0. 3
AVA03	32	0. 3
AVA04	52	0. 8
AVA05	52	0. 8
AVA06	75	1. 1
AVA07	200	6. 5
AVA08	230	7. 0
AVA09	220	7. 0
AVA10	230	7. 0
AVAT01	24	1. 5
AVAT02	24	1. 5
AVAT03	24	1. 5
AVAT04	35	1. 5
AVAT05	35	1. 5
AVAT06	35	1. 5


M
Actuator switching module
Power
E
SK1
0V DC
24V DC
4
5
SK9
SK10
SK11
SK14
SKL2
Back-up Battery
SK9
Proportional modulation/Standard control
Close
Stop/maintain
Open
Common-ve 20-60V AC/DC
Common-ve 60-120V AC
39
33
34
35
36
40
SK7
SK8
Position Limit Control
ESD
Open Interlock
Close Interlock
Common-ve 20-60V AC/DC
Common-ve 60-120V AC
25
37
38
31
32
SK3
Common
Monitor relay
42
43
44
SK12
SK4
Local Control
Indication contacts s1
Make at fully shut
Indication contacts s2
Make at fully open
Indication contacts s3
Brake at fully shut
Indication contacts s4
Brake at fully open
6
7
8
9
10
11
12
13
SK6
SK13
Pressure Sensor
100%
50%
Isolation Module
Analogue I/O
Remote position indication+
Remote position indication-
Remote torque indication+
Remote torque indication-
Analogue input signal+
Analogue input signal-
Terminal A for RS485 communication port
Terminal B for RS485 communication port
22
23
24
30
26
27
41
45