

Edition: V1.2

Date of Formation: January. 2009

AVAR

Economic Electric Valve Actuators

AVAR Series

INSTRUCTION

Read this carefully before modulation and use

1 Introduction of Common Practice	1
2 Installation	2
2.1 Installation for the Actuators with Drive Bases	2
2.2 Connection and Connection Icons	3
3 Operations	4
3.1 Names of Spare Parts	4
3.2 Manual Operations	5
3.3 Electric Operations	5
4 Function Setting	6
4.1 Liquid Crystal Displays	6
4.2 Illumination to Procedure Setting	7
4.2.1 Stair Menu	7
4.2.2 Language Settings	8
4.2.3 Commissioning	8
4.2.4 Observing	13
4.2.5 Diagnosis	14
5 Weight and Lubricant	15

1. AVAR Actuator Description

AVAR actuator can be configured through local 4 buttons without removing the covers, which insure a safe and time-saving setting-up of the Torque value, Position Limit and other controlling and indicating functions, even in hazard circumstance like nuclear application. Set-up data will be saved in the memory even in case of power break.

No battery is needed as back-up power for this range.

AVAR range is Quarter-turn. Travel Angle: $90^{\circ} \pm 5^{\circ}$.

Motor of AVAR on-off actuator is short-time working duty, S2-15min, and S4-50% for modulating ones.

Standard working temperature is -20°C to 70°C. Enclosure IP67.

Diagnosing system can be picked up to find out solutions in case of break-down, which enables a quick trouble-shooting.

This manual is for end-users to know the configuration, operation and commission.

If ex-proof mark shows on the nameplate, the actuator may be applied to explosive gas of Zone 1 and 2 and with the ignition point higher than 135°C.

No change is allowed in any case because it will make the achieved approval void.

Maintain should be adopted in safe area with the actuator being removed.

Only the trained people can install, maintain and repair these actuators under the instruction of this manual.

Warning

Motor Temperature

Extreme surface temperature of AVAR motor can reach 132°C(270°F).

Motor Thermostat Bypass

If the actuator is set up to bypass the motor temperature protection, with ESD on, the certificate for hazard area will be invalidated.

Cover Material: Aluminum Alloy.
Fastener Material: Stainless Steel.
Base Material: Cast Iron.

Worm Gear Material: Aluminum and Bronze.

Worm Shaft Material: Alloyed Steel

Please ensure a good application environment. Please protect actuator from danger.

If the actuator will not be installed immediately, store it in a dry place.

If the actuator has been installed without cabling, it is recommended that the plastic transit cable entry plugs are replaced with metal plugs which are sealed with PTFE tape.

Cable Connection:

Please ensure a powered-off state when removing the cover.

Ensure a safe earthing cable connection.

Please check the voltage and end position before operating the actuator.

2. AVAR Installation

2.1 Actuator Installation with Drive Coupling



Fig. 2. 1

AVAR actuator is quarter-turn, mostly used to butterfly valves, ball valves, dampers.

Popular coupling will be Non-thrust drive coupling as key and square shaft.

Drive bases are machined according to ISO Standard, that is F05,

F07, F10, F12 and so on. We can make as per your drawings. Please inquiry for extra charge.

Actuators are connected to drive bases which enable an immediate installation to valves when ex-works unless more machining is needed to the drive bush.

When installing actuators to valves, please fit the actuator drive bush into valve shaft and tighten mounting bolts.

2.2 Cable connection

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

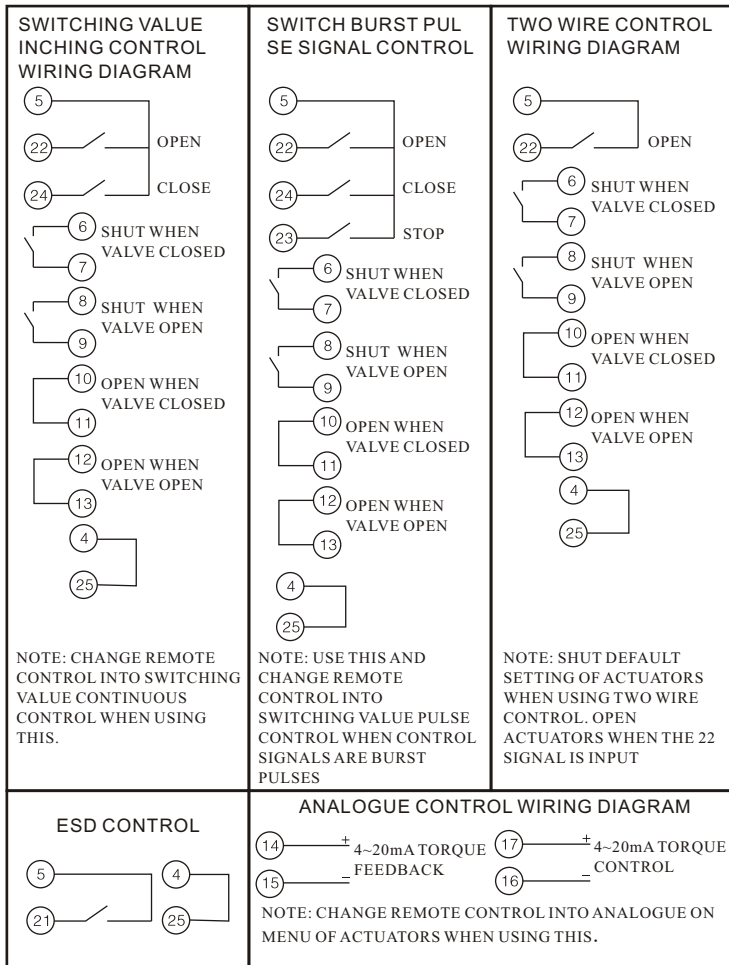
A circuit breaker and fuse must agree with motor rating circuit. The bag inside cable box has cabling screws, gasket, O ring seal and specification.

Cable Entry

Two 1" NPT cable entries

Tie-in of the cable should fit the outside diameter. Ensure cable glands are tight and fully waterproof. Seal unused cable entries with a steel or brass threaded plug.

AVAR WIRING DIAGRAM



When all connecting are made, ensure O ring are in good condition and screws are tightened.

3 Operation of AVAR Actuator

3.1 Part Name

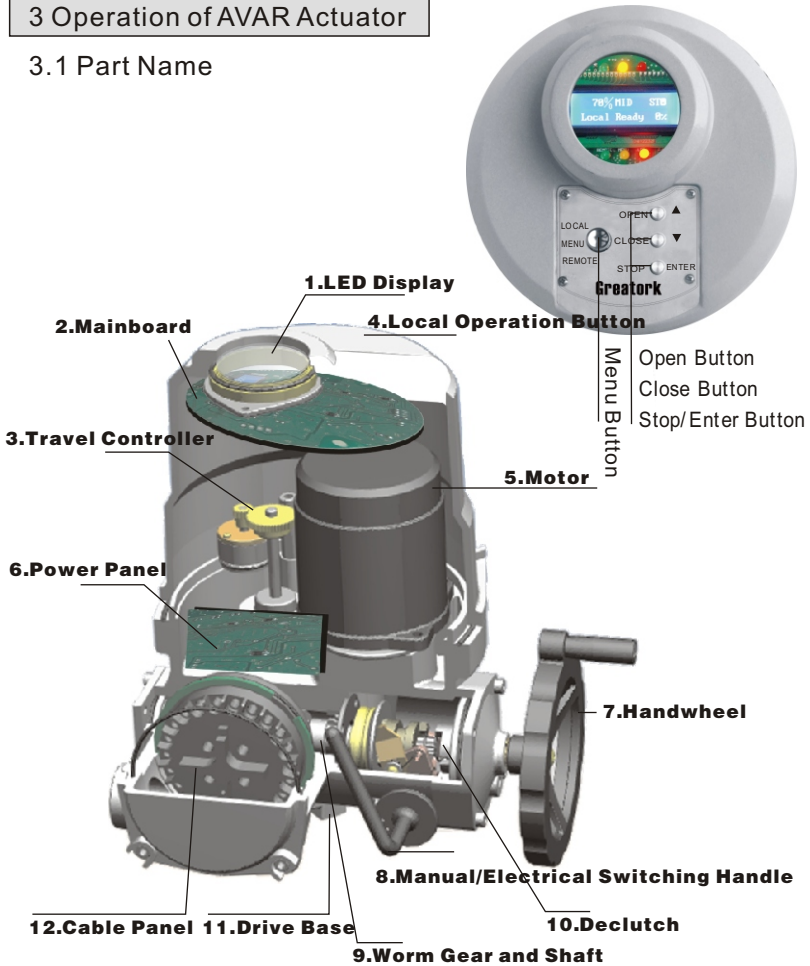


Fig. 3. 1

Left of the Local operation panel, you will find Remote/Local/Menu button. Press Remote/Local/Menu button to change the status among Remote/Local/Menu.

Right top is Open button, also Up button during Menu setting-up

Right middle is Close button, also Down button during Menu setting-up

Right bottom is Stop button, also Enter button during Menu setting-up

3.2 Manual Operation

Depress Manual/Electrical Switching lever into manual status. Turn the hand wheel to engage the clutch. If the value of LED display changes with the turning of the hand wheel, release the lever and the lever will return to its original position. The hand wheel will remain engaged until the actuator is operated electrically.

If the actuator fails to be changed to manual status after first depressing the lever, please turn the hand wheel a 30 degree and depress the lever again to change to manual status.

When using electrical operation, the actuator will change automatically from manual status to electrical status.

Warning: Please DO NOT depress the hand lever when actuator is electrically operated.

If required, the lever can be locked by a 3.5mm hasp to either electrical status or manual status.

3.3 Electrical Operation

Check the power supply voltage to agree with that stamped on the actuator nameplate before the power is on. It is not necessary to check the phase rotation of AVAR range.

Please limit the position of the actuator before operation electrically when the actuator is firstly installed to the valve. (See 4.3.3 Commissioning)

Ensure the proper traveling range of the actuator.

Manual operation is strongly recommended during setting-up of limit position. Please use the hand wheel to open the valve and set up the Open Position. Use the hand wheel to close the valve and set up the Close Position. (See 4.3.3 Commissioning) Set up torque

protection value and methods of opening and closing valves. (See 4.3.3 Commissioning)

Local Control

There are four buttons on the actuator panel. Press Remote/Local/Menu button to change the status among them. When the LED display shows "Local ready", it means the actuator is in Local status. Press "Open" or "Close" button to open or close the valve. Press "Stop" to stop the present action.

Remote Control

Use Remote/Local/Menu button until the LED shows "Remote Ready". The actuator receives the order of opening, closing or stopping action from remote controlling center. Remote control is applicable with the right cable connection.

4. Function Detting-up of AVAR Actuator

4.1 LED Display

1. Green Close Indication. Sparkle during Valve Closing
2. Yellow Midway Indication
3. Red Open indication. Sparkle during Valve Opening
4. Green Remote
5. Yellow Menu
6. Red Local
7. Valve Position
8. Display Action Status, Open, Close, Stop
9. Display Control Status, Local, Remote, Menu
10. Torque Value Percentage

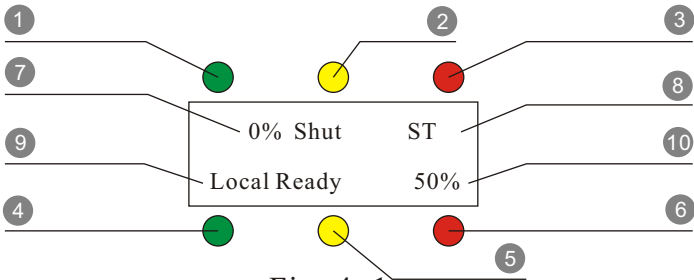
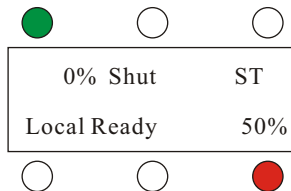


Fig. 4. 1

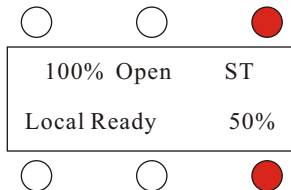
Actuator Close

LED will display as this when valves are closed



Actuator Open

LED will display as this when valves are opened



4.2 Setting-up Program

4.2.1 Junior function Menu

Four buttons are on the actuator panel.

Press the bigger button, Remote/Local/Menu button, actuator will

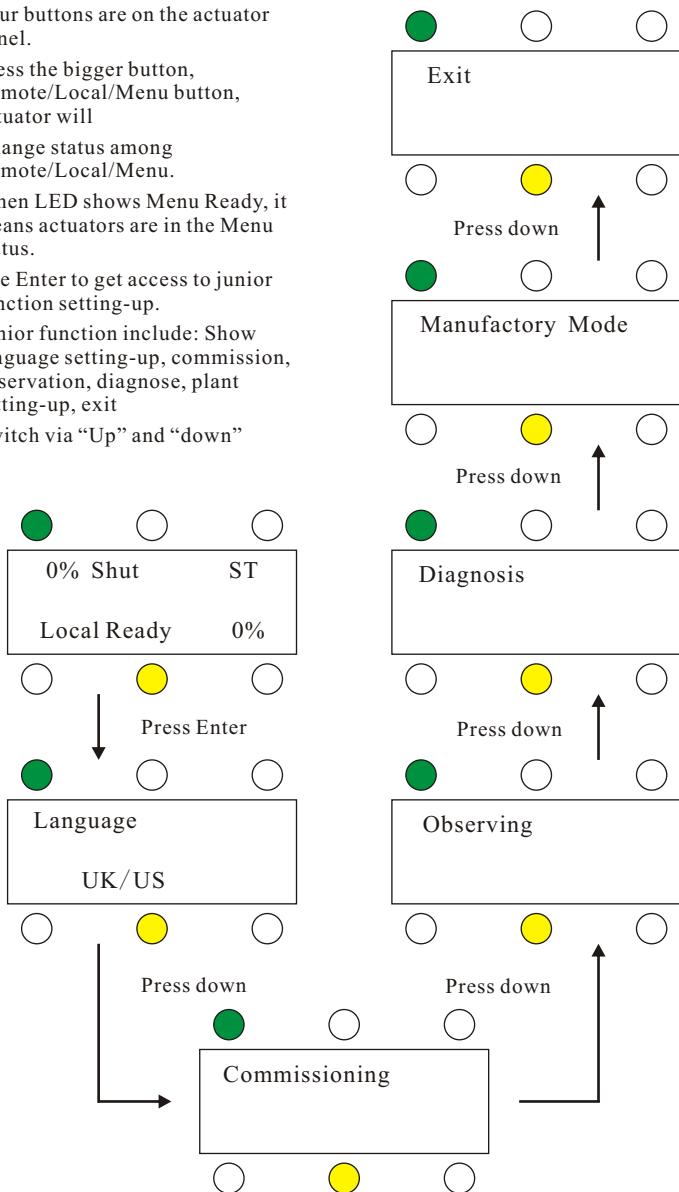
Change status among Remote/Local/Menu.

When LED shows Menu Ready, it means actuators are in the Menu status.

Use Enter to get access to junior function setting-up.

Junior function include: Show language setting-up, commission, observation, diagnose, plant setting-up, exit

Switch via "Up" and "down"



4.2.2 Show Language Setting-up

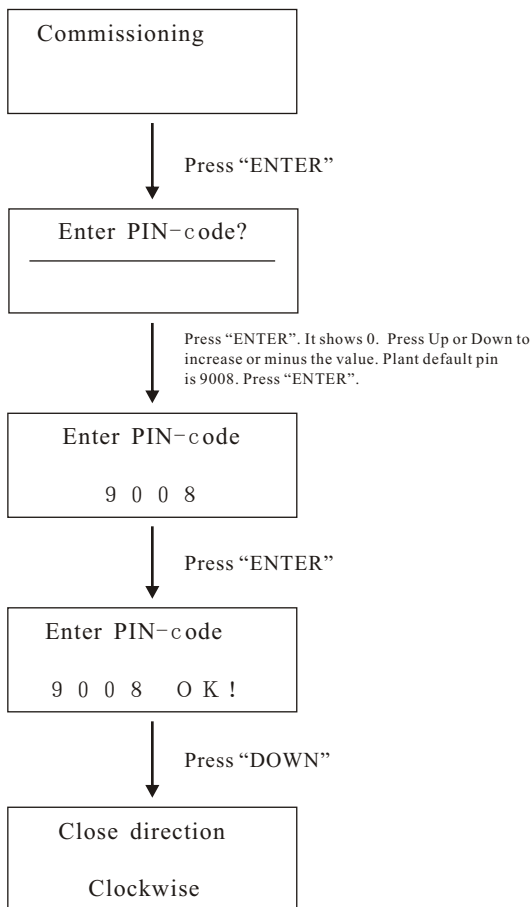
Show language setting-up. Option will be UK/UK.

4.2.3 Commissioning

Commissioning is a most important menu when factions should be changed. For example, a closing torque need to be changed. Please find closing torque menu with default value 100%. If you want to change it

to 80%, please follow this instruction. Press "ENTER" to Activate the menu. Press "DOWN" until it shows 80% and press Enter.

Note: Functions show below is default value.



Cut-off mode cl
travel-depends 1

Travel depends and torque depends modes are optional

Travel depends means when it reaches the pre-set position of valve, it stops action and the valve position shows 0%.

Torque depends means when it reaches the pre-set torque, the actuator stops as an open end.

Press "DOWN"

Cut-off mode op
travel-depends 1

Travel shut-down and torque shut-down modes are optional.

Press "DOWN"

Max. cl. torque
1 0 0 %

40%, 50%, 60%, 70%, 80%, 90%, 100% are optional.

Take 100% for example, it means the protection torque is 100% of rated torque.

Press "DOWN"

max. op. torque
1 0 0 %

40%, 50%, 60%, 70%, 80%, 90%, 100% are optional.

Take 100% for example. It means the protection torque is 100% of rated torque.

Press "DOWN"

time torque. block
5 seconds

5, 10, 15, 25 and 30 seconds are optional.

Take 5 seconds for example. When locked rotor of a motor occurs, power will cut off in 5 seconds to protect motor from being damaged.

Press "DOWN"

dc-brake
ON

Enabled and disabled are optional.

If it is enabled, the motor will be braked by direct currents.

Press "DOWN"

Enabled and disabled are optional.

Enabled status keeps the motor working under the normal temperature. If the function is disabled, the motor is likely to be damaged by over heating

Make sure actuators are off. It is best to shut actuators off manually before pressing "ENTER"

At this time valve position shows 0% and the green indicating light for closing is on

Make sure actuators are off. It is best to shut actuators off manually before pressing "ENTER"

At this time valve position shows 100% and the red indicating light for opening is on

4–20mA and 0–20mA are optional

It is used to choose types of control signals.

0%–99% are optional increasing 1 by 1. The decreasing of deadband increases the precision of actuators' position and danger from actuators' shake. Therefore, it is a must to choose a suitable number to ensure their precision and prevent actuators from over shaking.

numbers increase 1 by 1 from 0 to 10 seconds. It is the interval time for actuators to react the next order. If it is too short, there is danger of over reaction.

options:

Bus Continuous Control: Please use this while taking bus as a switch pulse control

Switch Continuous Control: Please use this while analogue signals are crawl control

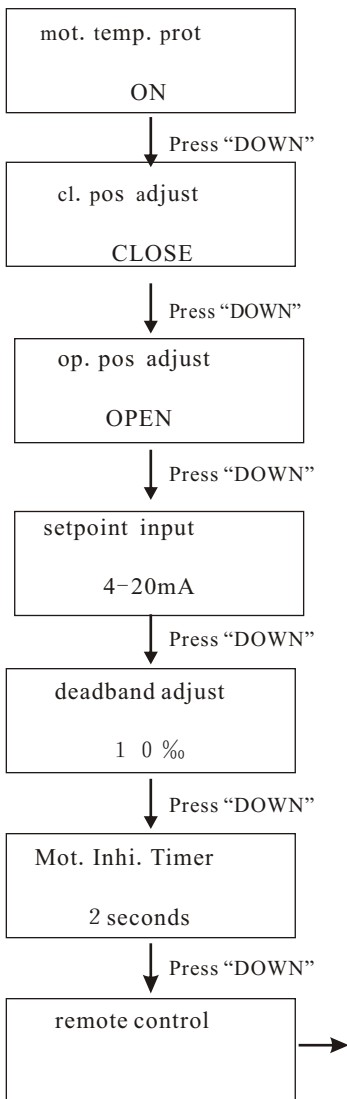
Analogue 3-way Control: Please use this while taking analogue as a switch pulse control. The actuator close the valve when less than 9.3mA, open the valve when more than 14.6mA, stop if it is other mA.

Bus Preset: Please use this while taking bus as a modulating control

Analogue Preset: Please use this while taking analogue as a modulating control.

Two Wire Control: Please use this while it is chosen.

Switch Pulse Control: Please use this while switch signals are burst pulse and actuators are remaining signals.



binary output 2
tot. opened

↑ Press "DOWN"

output state 1
ON

Normal opening and closing are optional
It is used to set the feedback contactor S1.
Note: there are four switch outputs in AVAR actuators

↑ Press "DOWN"

binary output 1
tot. closed

Every switch feedback of AVAR can be set to have the following function. Contactors also can be set.
options: 1. Closing operation 2. Opening operation 3. Maintenance 4. Over heating alarm 5. local 6. ready+local 7. Ready 8. operation 9. Faults 10. Over torque for opening and closing 11. Over torque for opening 12. Over torque for closing 13. Fully opening

↑ Press "DOWN"

readback output
4 - 20 mA

0-20mA and 4-20mA are optional
It is used to choose the types of valve feedback

↑ Press "DOWN"

emergency pos
keep pos.

Opening, closing, staying up are optional
When actuator takes ESD wire connection, value of the function should be chosen.

↑ Press "DOWN"

open circ. beh
keep pos.

Opening, closing, staying up are optional
It is used to set states of actuator's, when control signal of analogue opens.



Enter PIN-code
9 0 0 8 OK!

↑ Press "DOWN"

Return to Menu

↑ Press "DOWN"

mlfb-number
90

These are identifications for actuators' software given by manufacturers

↑ Press "DOWN"

output state 4
OFF

↑ Press "DOWN"

binary output 4
tot. opened

↑ Press "DOWN"

output state 3
OFF

↑ Press "DOWN"

binary output 3
tot. closed

↑ Press "DOWN"

output state 2
ON

4.2.4 Observing

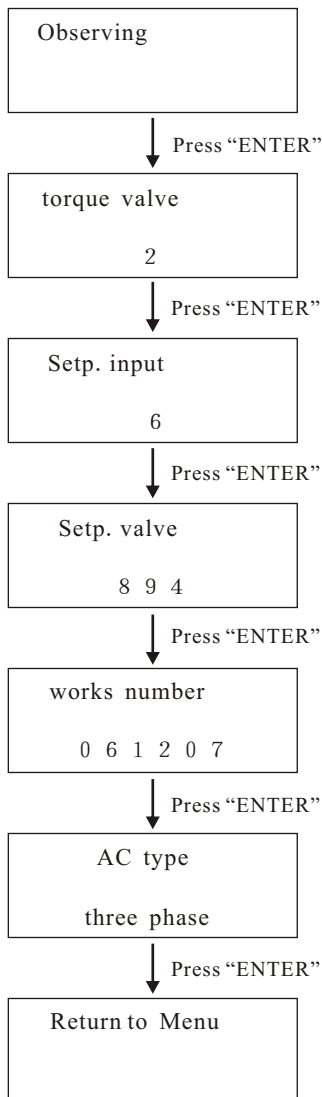
This is a parameter tested by torque testing facility, which is used to adjust torques

It is used to adjust numbers when exterior analogue is input and test survey menu whether any analogue signal is input.

It is used to indicate numbers of valve position sensor corresponding to present valve position and adjust numbers when valve terminal position is set as well as there is something wrong with valve position setting. The normal number is from 200 to 1800.

It is used to indicate that manufacturing order number

It is used to indicate that style of power and phase are 380V three-phase power supply



4.2.5 Diagnosis

Diagnosis

Using diagnostics menu can find out faults and reasons in actuators so as to provide some possibilities to get rid of the faults immediately

↓ Press "ENTER"

Motor Temperat.
ready

Actuators will cut off because of over heating protection when motors are over heated, showing the signals accordingly The max temperature of motor is 132°C.

↓ Press "DOWN"

power phase
ready

It is uses to alarm for phase

↓ Press "DOWN"

jammed motor
ready

It will alarm when locked rotor occurs for the reasons that valve jammed, torque over, phase lost, voltage low, mechanical faults and wrongs with motor itself occur

↓ Press "DOWN"

TL-cl or TL-op
ready

Reasons for cutting down: 1. Valve is blocked or jammed 2. Conditions for valve operation change 3. Set numbers of torque is too low 4. Over torque occur. At this moment, the state of valve should be examined. Make sure the faults have been removed. Then, electric operation is allowed.

Because of Cutting down of torque, operation on the same direction is forbidden. The faults will be removed by operating actuators on the opposite direction

↓ Press "DOWN"

endpos setting
ready

There will be something wrong when valve position is not right. every number of valve position correspond to a number of valve position sensor. The normal full opening and closing numbers are from 200 to 1800, which can be observed as immediate valve position in survey menu. E.g., when an alarm occurs after setting the position of closing terminal, there must be something wrong with valve position after observation of diagnostics menu. The numbers for full closing are less than 200 after once more observation; therefore, it is necessary to modulate closing terminal once more or the position of

↓ Press "DOWN"

Posind
ready

relaxation or that the number of valve sensor is not at the normal range will lead to cutting off the circuit of valve sensor.

Otherwise there is something wrong with the sensor itself

↓ Press "DOWN"

Return to menu



Press "ENTER" to return to superior menu

5.Weight and Lubricant

Mechanical gear chamber is filled with 0# semi liquid lubricating grease to ensure that it is unnecessary to exchange for normal use except that there is a special demand to be used in an extreme weather. Working temperature is from -20°C to 70°C.

Weight

Model	Net Weight
AVAR-1000	25KG
AVAR-500	17KG
AVAR-200	13.5KG

AVAR actuators can maintain several years of operation without any faults due to scientific design, advanced machining and correct packing.

If you need any technology support or spare parts, please contact local agents or contact us directly offering models and series numbers. We promise to serve you best wherever you are in the world.

If you need any technology support or spare parts, please contact local agents or contact us directly with models and series numbers. We promise to serve you best wherever you are in the world.

To improve our products, we keep the rights of modify the designs without previous notice. The latest products and data are available on our website:

WWW.GREATORK.COM

E-mail: greatork@greatork.com