IA™

ZHEJIANG **ROTORK ACTUATOR CO.,LTD**

ATTENTION : RED PLASTIC PLUGS IN CONDUIT ENTRIES ARE FOR TRANSIT ONLY.
FOR LONG TERM PROTECTION FIT SUITABLE METAL PLUGS.

Intelligent Electric Actuator

IA/IM Range Installation And Maintenance Instructions

IA™

ZHEJIANG **ROTORK ACTUATOR CO.,LTD**

This manual provides instruction on:

* Manual and electrical (local and remote) operation.
* Preparation and installation of the actuator onto the valve.
* Subsequent commissioning and adjustment of the primary settings for correct valve operation.
* Comissioning and adjustment of the secondary settings to suit site–specific control and indication requirements.
* Maintenance–troubleshooting.

THE ROTORK IA/IM RANGE–THE NEW SERIES VALVE ACTUATOR THAT YOU CAN COMMISSION AND INTERROGATE WITHOUT REMOVING ELECTRICAL COVERS.

Using the supplied infra–red setting Tool to access the actuator set up procedures, 'point and shoot' setting of torque levels, position limits and all other control and indication functions can be made safely, quickly and conveniently, even in hazardous locations. The IA/IM allows commissioning and adjustment to be carried out with the main power supply to the actuator switched on or off.

Standard diagnostics access information about the control system, valve and actuator status in the form of display icons and help screens.

Instantaneous valve torque and position can be monitored on the actuator with a single key press of the Setting Tool.

The on board Datalogger captures operational and valve torque data enabling informed maintenance choices to be made. IA/IM Insight software for PC and PDA allows the Datalogger to be interrogated, as well as the complete actuator set up to be configured and recorded.

The actuator containing the Setting Tool will be identified with a yellow label on the terminal cover.

Contents

1 Safety

This manual is produced to enable a competent user to operate, adjust and inspect Rotork IA/IM range valve actuators.

The electrical installation, maintenance and use of these actuators should be carried out in accordance with the National Legislation and Statutory Provisions relating to the safe use of this equipment, applicable to the site of installation.

If the actuator has nameplates indicating that it is suitable for installation in Hazardous Gas Areas then the actuator is suitable for use in Zone 2 explosive atmospheres only. Temperatures has been indicated on the actuator nameplate.

Only persons competent by virtue of their training or experience should be allowed to install, maintain and repair Rotork actuators. Work undertaken must be carried out in accordance with instructions in the manual. The user and those persons working on this equipment should be familiar with their responsibilities under any statutory provisions relating to the Health and Safety of their workplace.

WARNING:
Motor Temperature

With excessive use the motor surface temperature could reach 132℃(270°F)

Thermostat Bypass

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

Enclosure Materials

IA/IM10 to IA/IM35 are manufactured from aluminium alloy with stainless steel fasteners and the thrust bases are manufactured in cast iron, IA40 to IA95 enclosures are manufactured in aluminium alloy and cast iron with stainless steel fasteners and the thrust bases are manufactured in cast iron.

The user must ensure that the operating environment and any materials surrounding the actuator cannot lead to a reduction in the safe use of, or the protection afforded by, the actuator. Where appropriate the user must ensure the actuator is suitably protected against it's operating environment.

2 Storage

If your actuator cannot be installed immediately store it in a dry place until you are ready to connect incoming cables.

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

The Rotork doublesealed construction will preserve internal electrical components perfectly if left undisturbed.

It is not necessary to remove any electrical compartment covers in order to commission the IA/IM actuator.

Rotork cannot accept responsibility for deterioration caused on-site once the covers are removed.

Every Rotork actuator has been fully tested before leaving the factory to give years of trouble free operation, providing it is correctly commissioned, installed and sealed.

3 Operating your IA/IM Actuator

3.1 Operating by Hand

Fig 1

To engage handwheel drive depress the Hand/Auto lever into "Hand" position and turn the handwheel to engage the clutch. The lever can now be released when it will return to its original position. The handwheel will remain engaged until the actuator is operated electrically When it will automatically disengage and return to motor drive. If required The Hand/Auto Lever can be locked in either position using a padlock with a 6.5mm hasp.

3.2 Operating Electrically

Check that power supply voltage agrees with that stamped on the actuator nameplate. Switch on power supply. It is not necessary to check phase rotation.

Do not operate the actuator electrically without first checking, using the infra-red Setting Tool, that at least the Primary Settings have been made(refer to Section 7.2 page 15)
Selecting Local/Stop/Remote Operation

The red selector enables either Local or Remote control, locked in each position using a padlock with a 6.5mm hasp.

when the selector is locked in the Local or Remote positions the Stop facility is still available. The selector can also be locked in the Stop position to prevent electrical operation by Local or Remote control.

Fig2

Local Control

With the red selector positioned at Local(anti-clockwise) the adjacent black knob can be turned to select Open or Close. For Stop, turn red knob clockwise.

Remote Control

Rotate the red selector to the Remote position (clockwise), this gives remote control only for Open and Close but local Stop can still be used by truning the red knob anti-clockwise.

3.3 Display-Local Indication

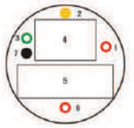


Fig3 The Actuator Display

The display consists of;
1. Red-position indication lamp
2. Yellow-position indication lamp
3. Green-position indication lamp
4. Liquid crystal display screen(LCD)
5. Liquid crystal display screen(LCD)
6. Infra-red Signal Confirm tion indicator(Red)
7. Infra-red sensors

On power up the actuator's liquid crystal display screen is back–lit with a "soft amber" light and one of the indicator lamps will be on, dependent on position. The display screen will show percentage open or an end of travel symbol.(See Figs 4.1,4.2 and 4.3)

As standard, red lamp signifies valve open, yellow intermediate, and green lamp signifies valve closed. Open and closed colour functions can be reversed on request.

Open

Red indicator and open symbol displayed

Fig 4.1

Mid Travel

Yellow indicator and percentage open valve displayed

Fig 4.2

Closed

Green indicator and closed symbol displayed

Fig 4.3

With the main power supply switched off, the liquid crystal display screen is powered by a battery and continues to display actuator position. However, the battery does not support screen back–lighting, or position indicator lamps.

3.4 Display–Moving states Indication

This display consist of:

–Normally moving states Indication

–Alarm Indication

3.4.1 Normally Moving states Indication

–Display valve position and setting position

–Display valve position and the percent of the torque

Press the ⬇ key while local control or stop selected. The Display will be changed from Valve position & setting position to valve position & percent of the torque. The time retained is about 30 seconds.

The first status Display

Fig 5.1 Stop state

Fig 5.1 Closing

Fig 5.3 Opening

The second status Display

Fig 6.1 Stop state

Fig 6.2 Closing

Fig 6.3 Opening

3.4.2 Display–Alarm Indication

Alarm Indication

1.Valve Alarm

2.Control Alarm

3.Actuator Alarm

3.4.2.1 Valve Alarm

1.Torque Tripped Alarm

2.Valve Stalled Alarm

The actuator will be "trip–off" if the value of torque more than configured torque value. And electrical operation in the same direction is inhibited. The alarm will remain displayed until entering setting state. Close torque tripped as shown fig 7.1; Open torque tripped as shown fig 7.2.

Trip–off Alarm indication

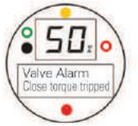


Fig 7.1

Fig 7.2

Valve stalled Alarm indication

Fig 8.1 Close Stalled

Fig 8.2 Open Stalled

The control circuits are detecting the valve position while actuator moving. If the control system of the actuator sent a instruction to run. The control system will send the valve stalled Alarm and jump off the contact of the relay when the circuits can't detect any changes of the valve position in 7 seconds. The operation in the same direction is inhibited.

Note: Entering setting states. The stalled alarm protect will be release.

3.4.2.2 Control Alarm

1.ESD Alarm

Fig 9 ESD Alarm

The position of the actuator can be preseted to open close or stay put while an ESD signal is present. Once the ESD signal disappear. The control alarm will not be displayed on screen.

Fig10 Signal Lost Alarm

The position of the actuator can be preseted to open close or stay put and the screen will display the signal lost of the control Alarm while the input control signal is lost. Once the signal appear. The control alarm will not be displayed on screen.

3.4.2.3
Actuator Alarm

1.Phose lost Alarm
2.Inner Communication Error Alarm
3.Overheating Alarm
4.Battery low Alarm
5.Local Module Error Alarm
6.Torque Module Error Alarm
7.24V Error Alarm
8.PV Module Error Alarm
9.Extension Module Error Alarm
10.Main Module Error Alarm

Phase lost Alarm

Fig 11

The actuator will send a instruction to cut-off the power supply of the motor and display the Alarm on screen while it check the one of the phase voltage lost, until supply is Normally. The alarm will be disappear.

Inner communication Alarm

Fig 12

The actuator display alarm and disable electric operation while the control circuit can't receive any signals of the valve position. The Alarm release until the control circuit receive the signals again.

Over heating Alarm

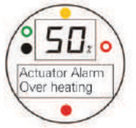


Fig13

Once the temperature of the motor raise to the limited value. The alarm display on screen and disable the electric operation. The alarm display will be disappear until the temperature cold down under the limited value.

Battery low Alarm

Fig 14

The battery alarm screen. Fig 14 is displayed when the actuator detect it,s battery as being low. The battery low alarm will be disappear until exchanging battery.

Local module Error Alarm

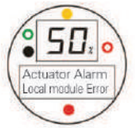


Fig15

The local module error alarm Fig 15, is displayed when the connection between the local PCB in the controller house and main PCB or the selector out of the question.

Torque module Error Alarm

Fig 16

The actuator display the torque module error alarm while the control circuit checked the torque signal of the torque module circuit out of the range.

24V Error Alarm

Fig17

The actuator display the 24V error alarm when the control circuit detected the failure.

PV module Error Alarm

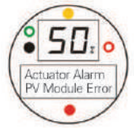


Fig18

The actuator display the PV module error once the position circuit is failure.

Extension module Error Alarm

Fig19

It is failed between the communication or connection extension module and main module The actuator display the extension module error alarm.

Main module Error Alarm

Fig20

The actuator display the main module error alarm when the communication between the control circuit chip and the memory is failed.

4 Preparing Drive Bush

4.1 IA/IM10 to IA/IM35 thrust buse types A and Z machining

Removal of Drive Bush for machining

Fig21 Bronze Drive Bush Fitted into Thrust Taking

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.

Before machining the drive bush the thrust bearing must be removed.

Fig22 Thrust Base assembly

1.Locate and loosen the locking socket set screw(s) in the bearing stop ring.

2.Unscrew the bearing stop from the drive bush. slide the bearing off the drive bush.

3.Machine drive bush to suit the valve stem, allowing generous clearance on the screw thread for rising stem valves.

Re–assembly

1.Remove all swarf from the drive bush, ensuring the O rings on the drive bush and bearing stop ring(where fitted) are undamaged ,clean and greased.

2.slide the bearing assembly onto the drive bush and ensure it is fitted down to the drive bush shoulder.

3.Screw the stop ring with the locking socket set screw(s) uppermost on to the drive bush until it comes to a stop–hand tight and lock with the locking socket set screws. the locking socket set screws must be done up tight to prevent the assembly working loose.

4.Refit the drive bush assembly into the base casting on the actuator, ensuring that the slots in the drive bush are located into the drive dogs of the hollow output shaft.

5.Refit the base plate and secure with cap–headed

4.2 IA/IM10 to IA/IM35 Non–Thrust Base Type B

Undo the four set screws securing the base plate to the gearcase and remove the base plate.

The drive bush and its retaining clip can now be seen.

Types B3 and B4 removal:

(refer to Fig23)

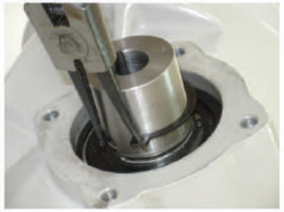


Fig23

Using external circlip pliers, expand circlip while pulling on the drive bush. the drive bush will detach from the actuator centre column with the circlip retained in its groove.

Re–assemble

To clean and grease the drive bush and circlip. Put the circlip into the drive bush's groove, using external circlip plier. expand the circlip while pushing on the drive bush into the centre column.

It is enable the drive bush will be retained in its groove with the actuator

4.3 IA40 to IA95 thrust Base types A and Z

Removal of drive Bush for Machining

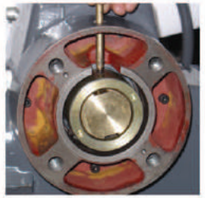


Fig24 locating set screw

Engage "hand" and turn handwheel until set screw is visible through hole in actuator base.

Loosen set screw and unscrew retainer using hammer and punch. Remove drive bush and machine to suit valve stem or gearbox input shaft.

Allow generous clearance on screw thread for rising stem valves.

Fig25 Removal of retainer

Fig26 Type A drive bush

If the actuator has a type A drive bush (fig26) this can be fitted in position 1 or 2 to suit the position of the valve mounting flange.

Fig27 Type A drive bush in position 1

Fig28 Type A drive bush in position 2

If the actuator has a type Z3 drive bush (fig29) this can only be fitted below the actuator base (fig30).

Fig29 Type Z3 drive bush

Fig30 Type Z3 drive bush in position 3

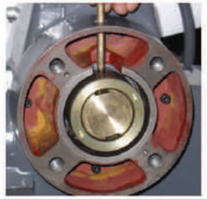


Fig31 Tightening Retainer set screw

Re–Assembly

Having confirmed the position required, insert the machined drive bush ensuring that the actuator output shaft dogs are in full engagement with the bush. Fit drive bush retainer securely, turning clockwise until fully tightened using hammer and punch. Rotate by handwheel to align retainer set screw with hole in the side of base and tighten.

4.4 IA40 to IA95 Non–Thrust Base Type B Type B1

Output shaft bored and keyed to ISO5210 standard. There is no drive bush to machine.

Types B3 and B4

Identical drive bushes secured by cap headed screws.

B3 is supplied pre–machined to ISO 5210 standard.

B4 is supplied blank and must be machined to suit the input shaft of the gearbox or valve that it will drive.

5 Mounting the actuator

Refer to weight page23

Ensure the valve is secure before fitting the actuator as the combination may be top heavy and therefore unstable.

If it is necessary to lift the actuator using mechanical lifting equipment certified slings should be attached as indicated in fig.32 for vertical valve shafts.

At all times trained and experienced personnel should ensure safe lifting, particularly when mounting actuators.

WARNING:
The actuator should be fully supported until full valve shaft engagement is achieved and the actuator is secured to the valve flange.

A suitable mounting flange conforming to ISO 5210 must be fitted to the valve.

Actuator to valve fixing must conform to Material Specification ISO Class 8.8, yield strength 628 N/sq mm.

WARNING:
Do not lift the actuator and valve combination via the actuator. Always lift the valve/actuator assembly via the valve.
Each assembly must be assessed on an individual basis for safe lifting.

Fig 32

5.1 Rising Stem Valves–Top Mounting

a) Fitting the Actuator and Base as a Combined Unit–All Actuator Sizes.

Fig 33

Fit the machined drive bush into the thrust base as previously described, lower the actuator onto the threaded valve stem, engage "hand" and 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.

B) Fitting Thrust Base to Valve–Actuator Sizes 10 to 35 only

Fit the machined drive bush into the thrust base as previously described. Remove the thrust base from the actuator, place it on the threaded valve stem with the slotted end of the drive bush uppermost and turn it in the opening direction to engage the thread. Continue turning until the base is positioned onto the valve flange. Fit securing bolts but do not tighten at this stage. Lower the actuator onto the thrust base and rotate the complete actuator until the drive dogs on the actuator output shaft engage into the drive bush. Actuator flange should now be flush with base flange.

Continue to turn actuator until fixing holes align. Using bolts supplied fix actuator to thrust base and tighten down Open valve by two turns and firmly tighten down fixings onto valve flange.

5.2 Valve with Gearbox–Side Mounting

Check that the mounting flange is at right angles to the input shaft, and that the drive bush fits the shaft and key with adequate axial engagement. Engage "hand", offer up actuator to the input shaft and turn handwheel to align keyway and key. Tighten mounting bolts.

5.3 Non–Rising Stem Valves–Top Mounting

Treat as for side mounting except that when thrust is taken in the actuator, a thrust nut must be fitted above the drive bush and securely tightened.

5.4 Handwheel Sealing

Ensure that sealing plug in centre of handwheel (or spindle cover tube depending on which is fitted) is sealed with PTFE tape and fully tightened, ensuring that moisture does not pass down the centre column of the actuator.

5.5 IML Linear Drive Unit

The IM range of actuators are suitable for modulating control duty of up to 1200 starts per hour in accordance with IEC 34–1 to S4 50%.

IML Consists of a lead screw assembly arrangement attached to the base of the actuator in order to provide a linear output stroke between 8mm minimum and 115mm maximum.

The IML can be supplied with or without a yoke mounting adaptor . This adaptor consists of four pillars and a base flange to suit the valve.

5.6 IML Adjusting Linear Stroke

With actuator securely fitted to valve, but with the linear drive disconnected, ensure valve is at its fully closed (down) position.

Turn the actuator handwheel clockwise. The linear drive will move down towards the valve spindle. Normally the actuator spindle end is near the top of the valve spindle. And it is convenient to screw the connecting bolt tighten between the actuator spindle and the valve spindle. If the distance between two spindles is too longer. It is necessary to machine the pillars or the connecting nut. The valve of Hmin should be expressed in order.

Fig 34

6 Cable Connections

WARNING:
Ensure all power supplies are isolated before removing actuator covers.

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

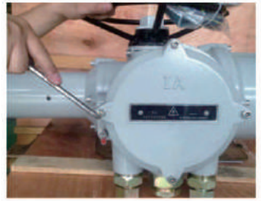
A switch or circuit breaker must be included in the wiring installation of the actuator. The switch or circuit breaker shall be mounted as close to the actuator as possible and shall be marked to indicate that it is the disconnecting device for that particular actuator. The actuator must be protected with over current protection devices rated in accordance with Rotork Electric motor performance data for IA/IM range actuators.

6.1 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, however it must not be used alone as the protective earth connection.

6.2 Removing Terminal Cover

Using a 6mm allen key loosen the four captive screws evenly. Do not attempt to lever off the cover with a screwdriver as this will damage the "O" ring seal and may damage the flame path on a certified unit.



Actuators containing a setting tool fitted to the inside of the terminal compartment cover are identified with a selfadhesive yellow label on the outside of the terminal compartment cover.

The wiring code card fixed in the cover is particular to each actuator and must not be interchanged with any other actuator. If in doubt check the serial number on the code card with that of the actuator.
A plastic bag in the terminal compartment contains:
Terminal screws and washers.
Spare cover"O" ring seal.
Wiring diagram.
Instruction book.

6.3 Cable Entry

Only appropriate certified Explosion-proof entry reducers, glands or conduit may be used in hazardous locations.
Remove red plastic transit plugs. Make cable entries appropriate to the cable type and size. Ensure that threaded adaptors, cable glands or conduit are tight and fully waterproof. Seal unused cable entries with a steel or brass threaded plug. In hazardous areas an appropriately certified threaded blanking plug must be used.

6.4 Connecting to Terminals

On EExde enclosure units connections to the power and control terminals must be made using AMP type 160292 ring tabs for power and earth terminals and AMP type 34148 ring tabs for the control terminals.
Refer to the wiring diagram inside the terminal cover to identify functions of terminals. Check that supply voltage is the same as that marked on the actuator nameplate.
Remove power terminal screen.
Begin by connecting these cables and replace screen.
When all connections are made ensure wiring diagram is replaced in the terminal compartment.

6.5 Replacing Terminal Cover

Ensure cover "O" ring seal and spigot joint are in good condition and lightly greased before refitting cover.

7 Commissioning

7.1 The Setting Procedure

The Rotork IA/IM range of actuators is the first that enables commissioning to be carried out without removing covers.
Setting torque, limit and other functions are achieved by using the Infra-Red Setting Tool. The Setting Tool is certified Intrinsically safe to allow commissioning in hazardous areas.
All the commissioning functions are stored in nonvolatile memory in the actuator. The Setting Tool enables the user to view all the functions in turn via the actuator display window. As each function is viewed its setting can be checked and, if required, changed within the bounds of that function.
The setting procedure is divided into two stages.

1.Primary Functions

Settings for end of travel limit actions, torque valves, limit positions etc.

2.Secondary Functions

Settings covering the control, indication and optional equipment functions.

7.2 The Setting Tool

All IA/IM actuator functions are configured before dispatch to Rotork standard default settings unless alternatives have been specified with the order. Should difficulty be encountered during commissioning the default settings can be reinstated, returning the actuator configuration to its original manufactured state. Site commissioning can then begin again.
The default function should be used with caution as settings selected after manufacture may be essential for the safe operation of the valve and/or plant.

Specification

Enclosure	IP67
Certification	Eex ia IIC T4(intrinsically safe)
power supply	9V Battery(supplied and fitted)
operating range	0.75(from actuator display window)

Name	Instruction
1. ⬇	Display next function down Decrease value
2. ⬆	Display last function or increase value
3. ⬅	Enter displayed value or option setting
4. ➡	Return back displayed status

Infra-red local operation

5. ⬇	Key	Stop actuator
6. ⊖	Key	Open actuator
7. ⏼	Key	Close actuator

8.Infra-red Transmitter Window

Fig 36 The setting Tool

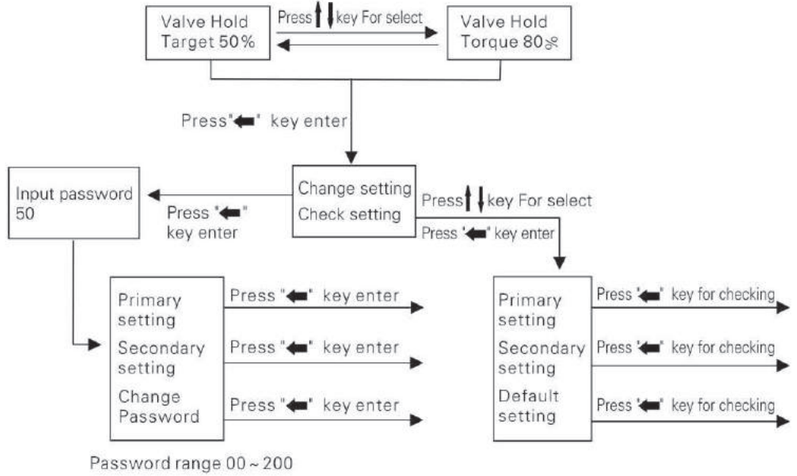
Setting Tool Battery Replacement

Battery status can be checked by looking at the Infrared transmitter window while pressing any Setting Tool button. A flashing red indicator should be seen.
Battery replacement must be carried out in safe area. To replace the battery remove the six cap-head screws in the back of the Setting Tool. Remove the back cover to expose the battery.
In order to maintain hazardous area certification fit only Duracell Mn1604 or Rayovac Alkaline Maximum NoAL-9V battery types. Refit cover ensuring red indicator LED faces the transmitter window in the back over.
When a button is depressed the Setting Tool transmits the relevant instruction to the actuator by infrared pulses and must therefore be directly in front of the actuator indicator window and at a distance not greater than 0.75m.

7.2 Setting Functions

Parameters for the actuator

With actuator securely mounted on the valve. Connecting the mains supply. Turn the red selector to the local or stop position. Then it can be setting. It is the valve position display screen on top of the display display window. The other display screen display the moving states. The display screen of valve position only display the change of the valve position. The display screen of the moving states changes with the different of the functions and parameters.



Password range 00 ~ 200

7.2.1 Primary setting

The display window of primary setting.

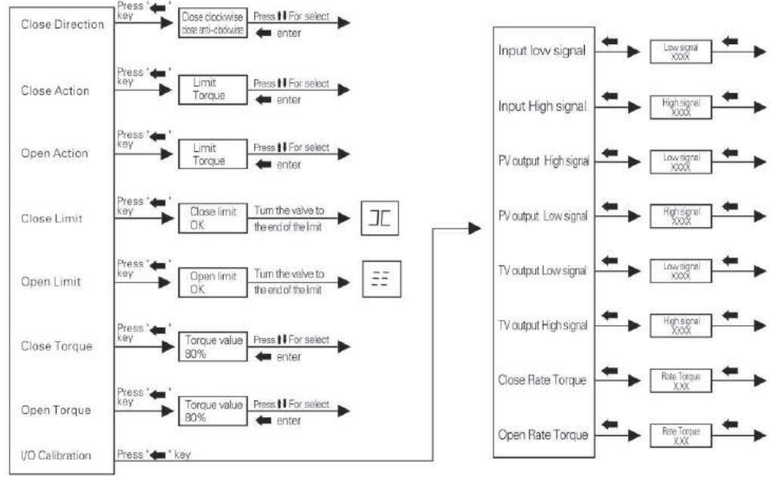
The close direction should be the same as the handwheel direction Labels.

Conversion handwheel direction labels are available.

The closing torque value can be varied between 40% and Rated (100%) in 1% increments. Press ⇑⇓ key to adjust the value.

The opening torque value can be varied between 40%~140%, in 1% increments. Press ⇑⇓ key to adjust the value.

Note: Setting the close action or open action as the "limit" mode. Then the value of the torque is the protect value of the torque. If setting the close action or open action as the "Torque" mode. The value of the torque is the limited value of the torque.



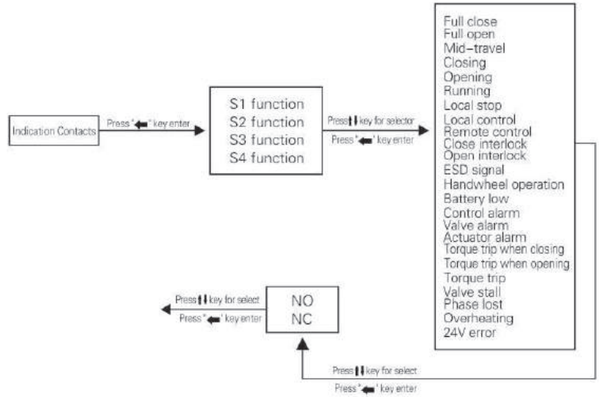
7.2.2 secondary setting

The function of secondary setting

- Indication contacts
- Control method
- CPT
- Point signal
- Remote control source
- Interrupt
- Extra indication contacts

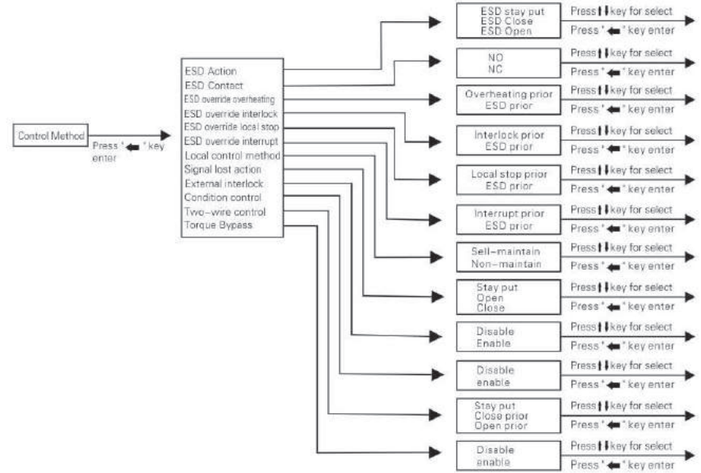
7.2.2.1 Indication contacts

Indication contacts S1′ S2′ S3′ S4,every contact can be set as fellow functions.



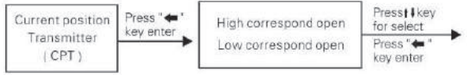
7.2.2.2 The setting of control method

Once the control system of the actuator receive a ESD signal, the ESD signal will override any signals or provided by the local or remote, ESD signal can be set overriding overheating of motor, interlock.

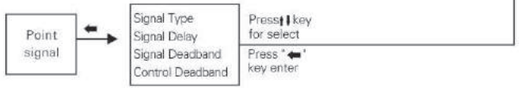


7.2.2.3 Current Position Transmitter (CPT)

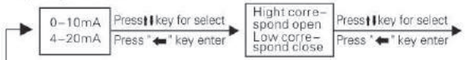
The function of the current position transmitter of the actuator is to generate an analogue signal 4–20mA. Correspond with the valve position. With"High correspond open". The CPT operates closed=4mA open=20mA; If closed=20mA open=4mA is required to select low correspond.



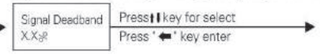
7.2.2.4 Point signal



Input signal mode



Signal Deadband setting: The adjusting range 0.1%~9.9%

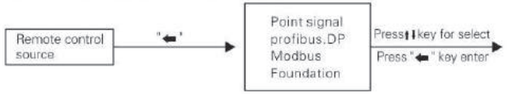


Control Deadband setting

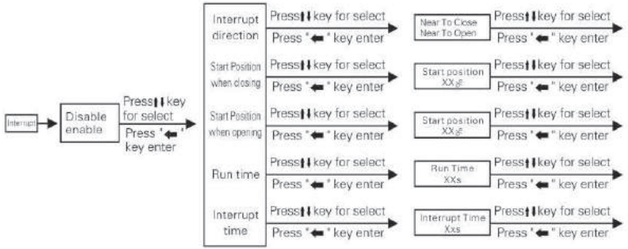
The range of the actuator control deadband can be set in 0.1%~9.9%

7.2.2.5 Remote control source

Remote control source mode as fellow:



7.2.2.6 Interrupt setting



Set Interrupt Direction to select Near To Close or Near To Open. That will determine the action of Start Position When Closing or Start Position When Opening. When Interrupt Direction set to Near to Close . Timer operation will start while closing and percentage open less than timer setting position; Timer operation will start while opening. and percentage open less than timer setting position; When Interrupt Direction set to Near to open Timer operation will start while closing and percentage open larger then timer setting position Timer operation will start while opening and percentage. Open

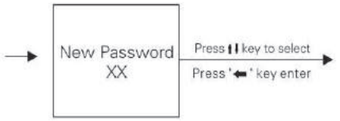
When interrupt timer operate, Actuator runs pulsed "stop/start" operation. Stop at interrupt time, Start at run time.

The time of the stop or start can be set. The range is in 1–99 seconds.

7.2.2.7 Extra indication contacts S5–S8

The way how to operate extra indication contacts S5–S8 is the same as the indication contacts S1–S4. It enables to select the functions you needed.

7.2.3 Change password



7.2.4 Default setting

All actuator functions and parameters are configured before dispatch to rotork standard default settings. If you meet question while adjusting or operating. It is possible to enable the default settings. You can enter the "default setting" to have a look about some functions or parameters. Then enter the change setting to change the function or to select the same parameter.

Default setting options

1′ Primary setting	
1.1 Close direction	Close clockwise
1.2 Close action	Close on limit
1.3 Open action	Open on limit
1.4 Close stroke	To set
1.5 Open stroke	To set
1.6 Close torque	80% of rated
1.7 Open torque	80% of rated

2′ Secondary setting

2.1 Indication Contact

2.1.1 S1 Indication contact	close	Normally open NO
2.1.2 S2 Indication contact	open	Normally open NO
2.1.3 S3Indication contact	close	Normally closed NC
2.1.4 S4Indication contact	open	Normally closed NC

2.2 Control Method

2.2.1 ESD action	Stay put
2.2.2 ESD contact	Normally open NO
2.2.3 ESD override over heating	Overheating prior
2.2.4 ESD override interlock	Interlock prior
2.2.5 ESD override local stop	Local stop prior
2.2.6 ESD override interrupt	Interrupt prior
2.2.7 Local control method	Self–maintain
2.2.8 Signal lost Action	Stay put
2.2.9 External interlock	Disable
2.2.10 Condition Control	Disable
2.2.11 Two wire control	Close prior
2.2.12 Torque Bypass	Disable
2.3 Current position Indication	High correspond to open

2.4 Point signal

2.4.1 Signal delay setting	1.0s
2.4.2 Signal deadband setting	1.0%
2.4.3 Input signal mode	4–20mA
2.4.4 Control deadband setting	0.5%

2.5 Remote control source **Point signal**

2.6 Interrupt setting **Disable**

2.6 Extra indication contact

S5 indication contact	Close	Normally open	NO
S6 indication contact	Open	Normally open	NO
S7 indication contact	Torque tripped	Normally closed	NC
S8 indication contact	Remote control	Normally closed	NC

8 Weights and oil

Oil

Unless specially ordered for extreme climatic conditions, rotork actuators are dispatched with gearcases filled with SAE 8 OEP oil suitable for ambient temperatures ranging from –22°F/–30°C to 160°F/70°C.

NOTE* * Excludes second stage gearbox if fitted.

Actuator size		Net weight (Kg)	Oil capacity (L)
IA10	IM10	32	0.3
IA12	IM12	34	0.3
IA18		36	0.3
IA20	IM20	52	0.8
IA25	IM25	56	0.8
IA35	IM35	75	1.1
IA40		200	7.0
IA70		215	7.0
IA90		230	7.0
IA91		220	7.0
IA95		230	7.0

9 Note

9.1 IrDA communication function

IA/IM insight software tool for PC has been developed to enable the actuator configuration and onboard datalogger to be reconfigured and analysed.

To enable communication with IA/IM insight the actuator IrDA interface must be enabled.

A PC running IA/IM insight software may be located at the actuator or, using a cell phone link, at a remote site.

9.2 The technology for fieldbus

The technology for fieldbus refer to special publication.

10 Maintenance, monitoring and troubleshooting

Maintenance

Every rotork actuator has been fully tested before dispatch to give years of trouble–free operation providing it is installed, sealed and commissioned in accordance with the instructions given in this publication.

The IA/IM actuator's unique double sealed, non–intrusive enclosure provides complete protection for actuator component.

Covers should not be removed for routine

Inspection as this may be detrimental to the future reliability of the actuator.

The electrical control module cover is bonded by the rotork quality control seal. It should not be removed as the module contains no site–sericeable components.

All electrical power supplies to the actuator must be isolated before any maintenance or inspection is carried out, except replacement of the battery.

Electrical supplies must be isolated before actuator covers are removed refer to battery replacement instructions.

Routine maintenance should include the following:

*Check actuator to valve fixing bolts for tightness.

*Ensure valve stems and drive nuts are clean and properly lubricated.

*If the motorised valve is rarely operated, a routine operating schedule should be set up.

*Replace actuator battery every 5 years.

*Check the actuator enclosure for damage, loose or missing fasteners.

*Ensure there is not an excessive build up of dust or contaminant on the actuator.

*Check for any loss of lubricant.

The battery

The battery supports the actuator position updating circuits and the position(LCD) display when the main power supply is turned off. It ensures the current position is updated and displayed when manual operation takes place with the main power turned off.

The battery is not required to retain any actuator settings.

WARNING:

The battery holder in the actuator gear–case also protects the user from the hazardous live connections.

Inside the actuator and therefore it must not be damaged. The actuator must be isolated or disconnected if the battery holder has to be removed from holder has to be removed from the actuator gearcase.

A unique circuit has been incorporated into the battery function of the IA/IM, effectively reducing the overall drain and significantly increasing the battery life.

In normal circumstances battery replacement interval should not exceed 5 years. Ambient temperature and plant operating conditions may affect battery life.

Battery level status is indicated by an icon on the actuator display.

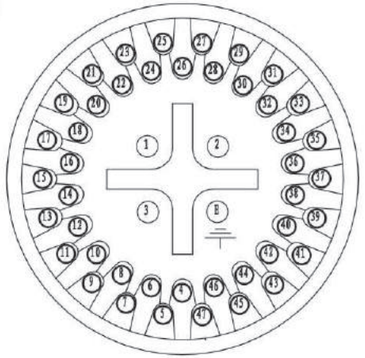
If the battery alarm is displayed the battery must be replaced.

Battery Replacement

If the actuator is located within a hazardous area permission must be obtained in the form of a "hot work permit" or other local regulation before removal and/or replacement of the battery.

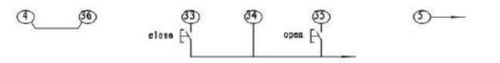
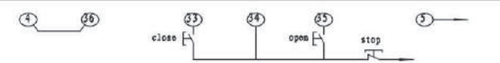
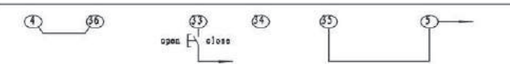
Removal of the battery with the main electrical power switched off will result in stored Datalogger records being lost. It is therefore recommended that the battery is replaced with the main electrical supply to the actuator switched on.

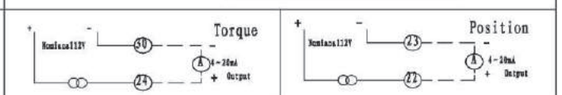
11 Basic wiring diagram：3110–100



Warn: Connect correct power supply refer to product label. Three phase power connect to terminal1、2、3, Single phase power connect to terminal1、2!

1, 2, 3 Power supply
E Earth wire
4 Internal 24VDC supply (-)
5 Internal 24VDC supply (+)
6, 7 Indication contact S1, close, normally open
8, 9 Indication contact S2, open, normally open
10, 11 Indication contact S3, close, normally closed
12, 13 Indication contact S4, open, normally closed
14, 15 Indication contact S5, close, normally open
16, 17 Indication contact S6, open, normally open
18, 19 Indication contact S7, torque trip mid travel, normally open
20, 21 Indication contact S8, torque trip mid travel, normally open
22 Valve postion signal output (+)
23 Valve postion signal output (-)
24 Valve torque signal output (+)
25 ESD signal
26 Analogue signal input (+)
27 Analogue signal input (-)
28
29
30 Valve torque signal output (-)
31 ESD、open interlock、closeinterlock、common-Ve
32
33 Remote close
34 stop/maintain control
35 Remote open
36 Remote close、remote open、stop/maintain common-Ve
37 Open interlock
38 Close interlock
39 Manual/auto
40
41 Manual/auto common-Ve
42, 43, 44 Monitor relay

IA/IM Circuit diagram	ESD control circuit	
	Open/close push-to-runcontrol	
	Open/close maintained control with mid-travel reveso	
	Open/stop/close maintained control	
	Two-wire control; energize to open, de-energize to close	
	Two-wire control; energize to close, de-energize to open	

IA/IM Circuit diagram	Open/close interlock	
	Remote torque, position indication	
IM Only	Analogue folomatic control only	
	Analogue folomatic control with internally fed remote manual override	

Appendix: Upper connect diagram for internal power, For external power, Replace connection to termimal 4、5 with connect to external power line.