



# rotork

ROTORK  RANGE

Installation and  
Maintenance Instructions

Publication number E170E Mark 1  
Date of issue 12/99



This instruction manual provides instruction on :-

- \* Manual and electrical (local and remote) operation.
- \* Preparation and installation of the actuator on to the valve.
- \* Subsequent commissioning and adjustment of the Primary Settings for correct valve operation.
- \* Commissioning and adjustment of the actuator Secondary Settings to suit site specific control and indication requirements.
- \* Maintenance - Troubleshooting.
- \* Sales and Service.

## **THE ROTORK IQ RANGE - THE WORLDS FIRST 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 quickly and conveniently even in hazardous locations.

Standard diagnostics access information about the control system, valve and actuator status in the form of actuator display Help Screens.

Instantaneous torque and position can be monitored on the display with a simple key press of the setting tool.

The actuator containing the setting tool will be identified with a yellow label on the terminal cover.

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This manual is produced to enable a competent user to install, operate, adjust and inspect Rotork IQ range valve actuators.

The electrical installation, maintenance and use of these actuators should conform to the requirements of the “Electricity at Work Regulations 1989” and the guidance given in the “16th edition of the IEEE Wiring Regulations”, also any other National legislation applicable. The user should therefore make himself familiar with these regulations and other Statutory Provisions relating to the safe use of this equipment. Also the user should be fully aware of his duties under the Health and Safety Act 1974.

The mechanical installation should be carried out as outlined in the manual and also in accordance with the relevant British Standard Codes of Practice.

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 1 and Zone 2 explosive atmospheres only. They should not be installed in atmospheres where gases are present with an ignition temperature less than 135° C. unless suitability for lower ignition temperatures has been indicated on the actuator nameplate. Any test instruments applied to the actuator should be of equivalent certification. The electrical installation, maintenance and the use of these actuators should be carried out in accordance with BS 5345 Part 1 1976 and BS 5345 Part 3 1979.

No inspection or repair should be undertaken unless it conforms to the requirements given in these standards, and under no circumstances should any modification or alteration be carried out on the actuator as this could

very well invalidate the conditions under which the certification was granted

Access to live electrical conductors of the actuator is forbidden in the hazardous area unless this is done under a special permit to work, otherwise all power should be isolated and the actuator removed to a non hazardous area for repair or attention.

Only persons competent by virtue of their training and experience should be allowed to install, maintain and repair these actuators and they should carry out this work in accordance with the instructions given in the manual. The user and those persons working on this equipment should be familiar with their responsibilities under the Health and Safety at Work etc. Act 1974 and relevant Statutory Provisions relating to their work.

### **WARNING Motor Temperatures**

With excessive use motor surface temperature could reach 132° C.

Should further information and guidance relating to the safe installation, maintenance and use of the Rotork IQ Range actuator be required, this will be provided on request.

### **WARNING:**

With respect to the handwheel operation of Rotork electric actuators, under no circumstances should any additional lever device such as a wheel-key or wrench be applied to the handwheel or in order to develop more force when closing or opening the valve as this may cause damage to the valve and/or actuator or may cause the valve to become stuck in the seated/backseated position.

## 2

### Storage

If your actuator cannot be installed immediately store it in a dry place until you are ready to wire up.

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

The Rotork double sealed 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 IQ 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 IQ 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 and it will return to its original position. 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 7mm hasp.

#### 3.2 Operating Electrically

Check that 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.** (See section 8)

#### Selecting Local/Stop/Remote Operation

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

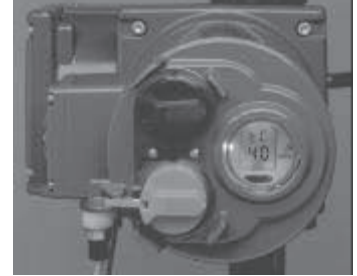


Fig. 2

#### Local Control

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

#### Remote Control

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

### 3.3 Local Valve Position Indication

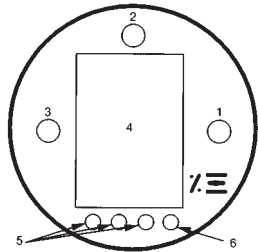


Fig. 3 The Actuator Display

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. Infra-red sensors
6. Infra-red signal confirmation indicator (Red)

The liquid crystal display screen has 2 modes of position indication:

1. Valve position - power on
2. Valve position - power off

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. Colour functions can be reversed on request.

#### Automatic Self Test & Diagnosis (ASTD).

On Actuator power up, in the unlikely event of a diagnosed actuator problem electric operation will be inhibited and the Help Screen 7 (H7) alarm displayed (indicator lamps will flash and the LCD will indicate Help Screen 7; (H7) with a number between 1-7). (Refer to page 52 for information)

#### Open

Red indicator and open symbol displayed

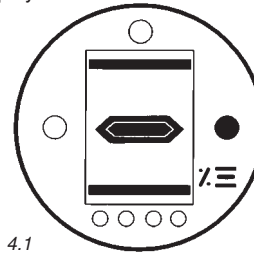


Fig. 4.1

#### Mid Travel

Yellow indicator and percentage open value displayed

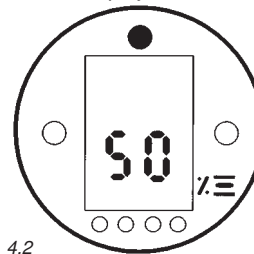


Fig. 4.2

#### Closed

Green indicator and closed symbol displayed

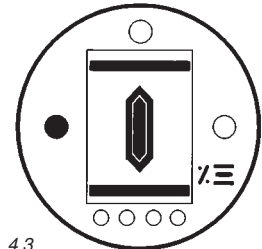


Fig. 4.3

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

## Preparing Drive Bush

### 4.1 IQ7 to IQ35 - Thrust Base Types "A & Z"

#### Removal of drive bush for machining

Bronze bush fitted into thrust taking base.



Fig. 5

Turn actuator onto its side, remove the two cap head screws holding base plate onto thrust base, pull out the drive bush complete with its bearing assembly.

Before machining the drive bush, remove the thrust bearing from it as follows:-

1. Locate and loosen the grub screw in the steel bearing stop ring.



Fig. 6

2. Unscrew the bearing stop ring from the drive bush, slide the bearing off the drive bush. Keep the stop ring and bearing in a safe, clean place ready for re-assembly.
3. Machine the drive bush to suit the valve stem, ensure that the male thread on the bush is not damaged.

#### Re-Assembly

1. Remove all swarf from the drive bush, ensuring that the "O" rings on the drive bush and bearing stop rings are in good condition, clean and greased.
2. Slide bearing onto drive bush and ensure that it is fitted down to the shoulder.
3. Screw bearing stop ring with the grub screws uppermost onto the drive bush, tighten down and lock with one grub screw.
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 screws.

### 4.2 IQ7 to IQ35 - Non-Thrust Base Types "B"

Actuators for non-thrust applications have a steel bush with a spring clip.

This clip need not be removed

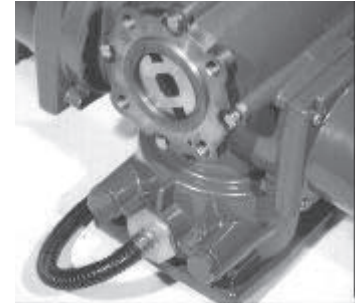


Fig. 7

A cast mounting plate is fitted to the actuator, which need not be removed.

#### Removal

Removal of the drive bush requires it to be tapped out from the top (handwheel end). Insert a suitable drift down the hollow output shaft and drive out.

#### Re-Fit

Machine the drive bush to suit, clean, grease and re-fit by tapping back into the actuator output shaft.

**4.3 IQ40 to IQ95  
Thrust Base Types "A & Z"**

**Removal of drive bush for  
machining**

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



*Fig. 8*

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 old rising stem valves.



*Fig. 9*



*Fig. 10*

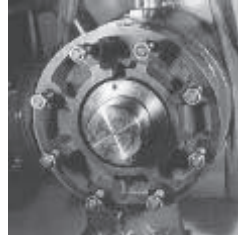
*Type A drive bush*

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



*Fig. 11*

*Type A drive bush in position 1*



*Fig. 12*

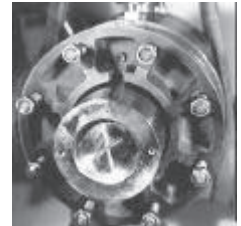
*Type A drive bush in position 2*

If the actuator has a type Z3 drive bush (Fig. 13) this can only be fitted below the actuator base (Fig. 14).



*Fig. 13*

*Type Z3 drive bush*



*Fig. 14*

*Type Z3 drive bush in position 3*



## 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 hand wheel to align retainer set screw with hole in the side of base and lock tight.

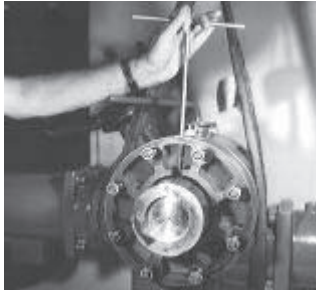


Fig. 15

### 4.4 IQ40 to IQ95 Non-Thrust Base Types "B"

#### Type B1

**Output shaft bored and keyed to ISO 5210 standard. There is no drive bush to machine.**

#### Type B3 & 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.



Fig. 16  
B3/B4 Drive Bush

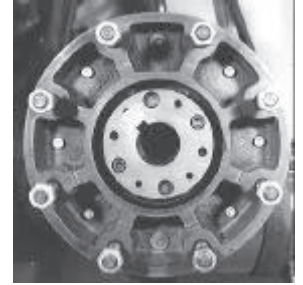


Fig. 17  
B3/B4 Drive Bush in Situ.

## Mounting the Actuator

Refer to Weights and Measures page 54 for Actuator weights.

Ensure the valve is secure before fitting the actuator as the combination maybe 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.18a for vertical valve shafts and Fig.18b for horizontal shafts.

Trained and experienced personnel should ensure safe lifting particularly when mounting actuators at other angles.

### **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 or USA Standard MSS SP101 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. 18a

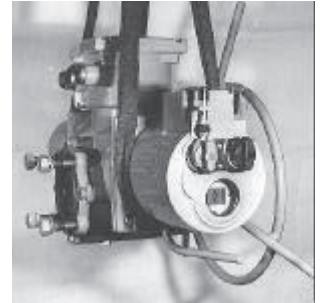


Fig. 18b

### 5.1 Rising Stem Valves - Top Mounting

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

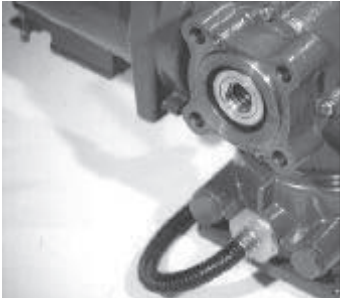


Fig. 19

Fit the machined drive nut 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 nut 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 :- 7 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 nut. Actuator flange should now be flush with base flanges.



Fig. 20

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 keyway 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 IQM Modulating Actuators

The IQM 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%.

IQM actuators have a dynamic braking facility as standard. If mechanical overrun of the actuator and valve prove to be excessive for accurate control, the brake can be enabled by fitting a link to the actuator terminal block as indicated by the wiring diagram. With dynamic braking enabled, motor heating effects increase and therefore the number of actuator starts should be reduced to prevent motor thermostat tripping. (Refer to publication E 410E for more information).

Commissioning of IQM range actuators is identical to the standard IQ.

(Refer to sections 7/8/9)

## 5.6 IQML Linear Drive Unit

Consists of a lead screw assembly arrangement attached to the base of the actuator in order to provide a linear output stroke between 8mm (3/8in) minimum and 120mm (4 3/4in) maximum.

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

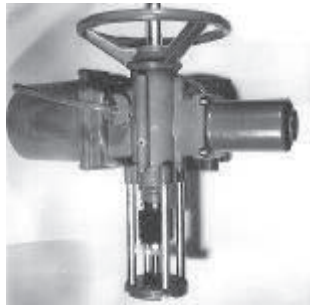


Fig. 21 IQML with Yoke



Fig. 22 IQML without Yoke

## 5.7 Adjusting Linear Stroke

With actuator securely fitted to valve, but with the linear drive disconnected, ensure valve is at its fully closed (Down) position. Remove cover tube from actuator and wheel, locate the down stop adjustment on the linear drive unit and with two spanners loosen the lock nut, run the lock nut and tubular down stop to the end of the thread.



Fig. 23 Down stop 2 spanners

Turn the actuator hand wheel clockwise, linear drive will go down toward valve spindle, couple linear drive to valve spindle.

Turn the tubular down stop clockwise into the actuator until it comes to a mechanical stop. If the valve must close onto its seat by "TORQUE ACTION" then back off (anti-clock) the down stop by one third of one turn (equivalent to 1mm). Run the lock nut down onto the tubular down stop and tighten with two spanners. There is no "up stop" (open) on the linear drive unit, the mechanical stop in the valve will give this position. Refit the top cover tube to the handwheel using teflon tape to seal the thread.

The linear drive unit is pre-packed with grease type Rocol MTS 1000, use this or an equivalent high temperature bearing grease.

A grease Nipple is situated in the base of the actuator to enable

lubrication of the lead screw. Periodically, dependant on usage and temperature, apply two pumps of a grease gun.

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

### 6.1 Earth/Ground Connections

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

### 6.2 Removing Terminal Cover

Using a 6mm allen key loosen the 4 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 flamepath on a certified unit.

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



Fig. 24

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.



Fig. 25

A plastic bag in the terminal compartment contains :-  
Terminal screws and washers  
Spare cover “O” ring seal, Wiring diagram and Instruction book.

### 6.3 Cable Entry

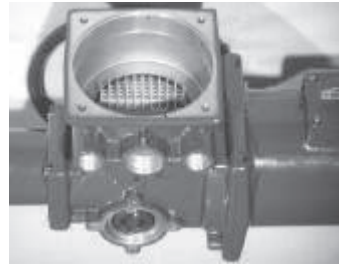


Fig. 26

### WARNING

Ensure all cables to be terminated are electrically isolated. Only Explosion proof certified entry reducers and glands 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 and cable glands are tight and fully waterproof. Seal unused conduit entries with a steel or brass threaded plug.

### 6.4 Connecting Terminals

On EExde enclosure units connections to the power and control terminals must be made using pre-insulated ring tags with a maximum tag thickness of 1mm for control and 2mm for power. 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 re-fitting cover.

### 7.1 The Setting Procedure

The Rotork IQ Range of actuators is the first that enables commissioning to be carried out without removing covers after cabling has been completed. Setting torque, limit and other functions is achieved by using the infra-red Setting Tool. The Setting Tool is certified Intrinsically Safe to allow commissioning in hazardous areas with power on.

All the commissioning functions are stored in non-volatile 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 Values, Limit Positions etc.
2. Secondary functions - Settings covering the control, indication and optional equipment functions.

**All IQ 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 re-instated, returning the actuator configuration to its original manufactured state. Site commissioning can then begin again.**

*(See section 9.10 page 42)*

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.

#### Positional Display

(This may be an open or closed symbol or a percentage open value).

#### Position Display

50

#### Torque and Position



refer to Section 10 Monitoring

#### Password

P?

→ PC

#### Setting Branch (cross-road)

Cr



**Primary Functions**  
Direction  
Limit Actions  
Torque Values  
Limit Positions

**Secondary Functions**  
Indication  
Contacts  
Control Mode  
Options  
Help Screens  
Defaults

**NOTE:** The primary functions must be commissioned first.






## 7.2 The Setting Tool

### Specification




Enclosure	IP67
Certification	EEx ia IIC T4 (intrinsically safe).
Power Supply	■ 9V Battery (supplied & fitted).
Operating range	0.75m (from actuator display window)

### Name

### Instruction

1.  Key\* Display next function down
  2.  Key\* Display next function across
  3.  Key Decrease/change displayed function's value or option setting
  4.  Key Increase/change displayed function's value or option setting
  5.  Key Enter displayed value or option setting
- \* Pressing the two arrow keys together returns the actuator display to the position indication mode

### Infra-red local operation (when enabled)

5.  Key Stop actuator
6.  Key Open actuator
7.  Key Close actuator
8. Infra-red Transmitter Window

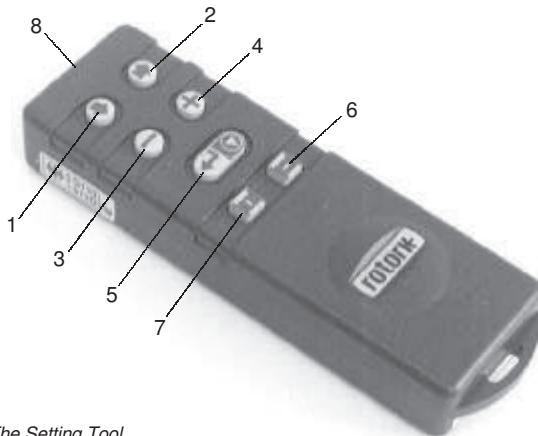


Fig. 27 The Setting Tool

■ Battery status can be checked by looking at the Infra-red transmitter window while depressing any setting tool button. A flashing red indicator should be seen.

To replace the battery remove the six caphead screws in the back of the tool. Remove the back cover to expose battery.

Take notice of the Approved Hazardous Area Battery Types

label on the inside of the cover for replacement battery types.

Refit cover ensuring red indicator LED faces the transmitter window in the back cover.

When a button is depressed the Setting Tool transmits the relevant instruction to the actuator by infra-red pulses and must therefore be directly in front of the actuator indicator window and at a distance no greater than 0.75m.



### 7.3 Entering the actuator setting procedure

With the actuator securely mounted on the valve, the mains supply on and local control or stop selected.

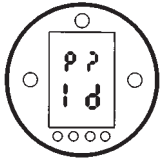
#### PRESS THE ↓ KEY

The actuator display will change and the Torque + Position display will be seen.

For instantaneous torque + position monitoring (refer to section 10, Monitoring, page 44).

#### PRESS THE ↓ KEY

The actuator display will change and the password protection display will be seen.



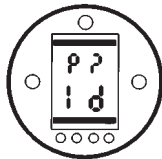
The Actuator function settings can be protected by the use of a password.

### 7.4 Setting Mode-Password

To enable setting and adjustment of the actuator functions the correct password must be entered. The factory set (default) password is [1d]. If the actuator has previously been set with a site password this must be displayed. Use the + or - keys to scroll through the available passwords 00 - FF (hexadecimal). With the correct password displayed press the enter key.

#### PRESS THE ↵ KEY

Two "setting" bars will appear and will remain visible on every function display screen.

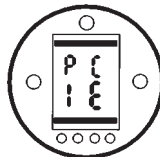


Default password, setting mode enabled

### 7.5 New Password [P?]

To configure a new password, the actuator must be in setting mode with the password display - setting mode enabled - showing, **PRESS ⇒ KEY**. The display will change to [PC]. Using the + or - key scroll through the available passwords until the desired password is displayed.

#### PRESS THE ← KEY

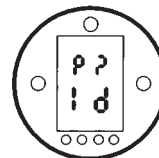


Password changed to [IE]

**NOTE:** The new password becomes effective the next time setting mode is entered

### 7.6 Checking mode

The actuator function settings can be checked without entering the correct password. The settings can only be viewed and not altered. The setting bars will not be seen.

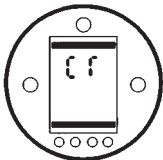


Password Display, checking mode

Once the procedure has been entered in the required mode **PRESS THE ↓ KEY** the procedure branch (cross-road) display can now be seen: (Refer to 7.7 page 16)

### 7.7 Procedure Branch - Cross-road

With procedure branch [Cr] displayed: (Refer to 7.6 page 15)



To access the primary settings press the ↓ arrow key.

(Refer to Section 8)

#### Commissioning Primary Functions

To access the secondary settings press the → arrow key.

(Refer to Section 9)

#### Commissioning Secondary Functions

### 7.8 The Actuator Display: Setting / Checking Mode

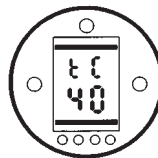
Actuator functions as laid out in the Primary and Secondary Commissioning stages, can be individually displayed by using the Setting tool arrow keys.

The ↓ arrow key will always display the FIRST function on the next level DOWN within the procedure. The → arrow key will always display the NEXT function on the SAME level and will wrap around the functions on same level. The actuator display indicator lamps will continue to indicate valve position.

Actuator functions are displayed in code form in the top portion of the liquid crystal display screen. The setting for the displayed function is shown in the lower portion of the screen. Depending on the actuator function displayed, its setting may be an option or a value. In setting mode the setting tool + or - keys will cause the setting to be changed. In checking

mode the settings cannot be altered.

In setting mode, once displayed, a new setting can be entered into the actuator memory by pressing the ← key. The setting will flash off and back on, confirming its selection.



#### TOP PORTION

Function e.g  
tC = Torque Close

#### LOWER PORTION

Function Setting  
e.g. Value = 40%

Typical Actuator Function Display -  
Setting Mode Enabled

### 7.9 Returning to Valve Position Display

There are four ways of returning to valve position display:

1. Approximately 5 minutes after the last setting tool operation the display will automatically return to position display.
2. Press the ↓ and → arrow keys together.
3. Press the ↓ arrow key until the display returns to position.
4. With any actuator Function Screen displayed, select Remote Control using the red Local/Stop/Remote selector.



Fig. 28

The actuators Primary Function settings affect the correct operation of the valve by the actuator. If the actuator has been supplied with the valve, the valve maker or supplier may have already made these settings.

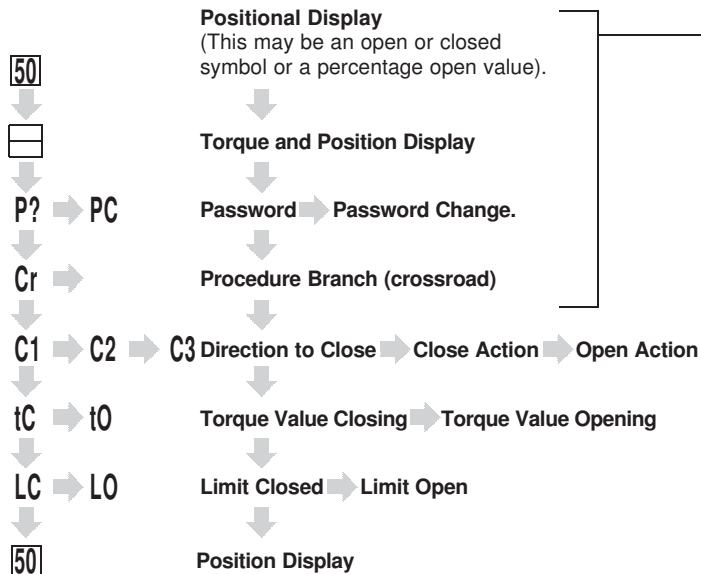
**ELECTRICAL OPERATION MUST NOT TAKE PLACE UNTIL THE PRIMARY SETTINGS HAVE BEEN MADE AND CHECKED.**

This instruction assumes Setting mode has been entered (*Refer to 7.4 page 15*) and that full primary settings must be set/checked.

**Viewing the Primary  
Function Settings**

With the actuator mounted on the valve, the mains supply on and local or stop control selected, point the Setting Tool at the actuator indicator window from a distance of less than 0.75m. By pressing the **↓** key and when appropriate, the **→** key, it is possible to move through the procedure, displaying the various functions and their settings as shown in Fig. 29, page 18. The right-hand side of Fig. 29 explains the function of each LCD display.

## Viewing the Primary Function Settings



Refer to section 7  
Commissioning Information

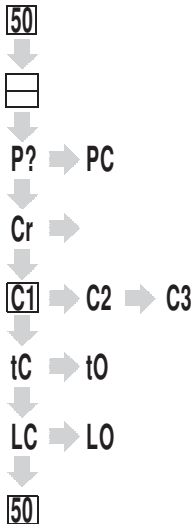
## INDEX TO PRIMARY FUNCTIONS

<b>C1</b>	<b>Direction to Close</b>	<b>Page 19</b>
<b>C2</b>	<b>Close Action</b>	<b>Page 20</b>
<b>C3</b>	<b>Open Action</b>	<b>Page 21</b>
<b>tC</b>	<b>Torque Value Closing</b>	<b>Page 22</b>
<b>tO</b>	<b>Torque Value Opening</b>	<b>Page 23</b>
<b>LC</b>	<b>Limit Closed</b>	<b>Page 24</b>
<b>LO</b>	<b>Limit Open</b>	<b>Page 25</b>

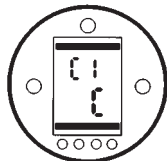
Fig. 29 Primary setting function displays

## C1 Direction to Close

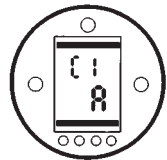
The actuator can be configured to be clockwise or anti-clockwise to close. Manually operate actuator and valve to establish correct closing direction. If the handwheel labelling is found to be incorrect please apply to Rotork for conversion labels.



Using the **+** or **-** key, display character conforming to correct closing direction.



**[C]** in the setting field indicating clockwise to close.



**[A]** in the setting field indicating anti-clockwise to close.

Having ensured that the display corresponds to the established closing direction.

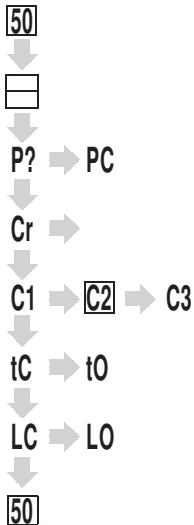
**PRESS THE ← KEY**

The displayed option will flash, indicating that it has been set.

**PRESS THE → KEY**

**C2****Close Action**

The actuator can be configured to close on torque for seating valves and limit for non-seating valves.

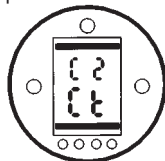


(Refer to valve manufacturer for recommended selection).

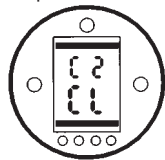
In the absence of valvemaker instructions refer to the following table

Valve type	“close”	“open”
Wedge gate or globe	“torque”	“limit”
Butterfly, thru conduit, ball, plug, sluice gate / penstock or parallel slide	“limit”	“limit”

Using the **+** or **-** key, display the desired option.



**[Ct]** in the setting field indicating close on torque.



**[CL]** the setting field indicating close on limit.

Having selected the required option

**PRESS THE ← KEY**

The displayed option will flash, indicating that it has been set.

**PRESS THE → KEY**

**NOTE:** When set to close on torque, the actuator will apply the value of torque as set for **[tC]** in seating the valve.

(Refer to tC page 22)

**C3****Open Action**

The actuator can be configured to open on torque for back seating valves or limit for non back seating valves (Refer to valve manufacturer for recommended setting). In the absence of valvemaker instructions set “Open Limit”.

50



P? → PC

Cr →

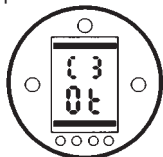
C1 → C2 → **C3**

tC → tO

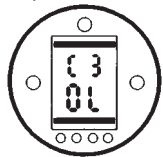
LC → LO

50

Using the **+** or **-** key display the desired option.



[Ot] in the setting field indicates open on torque.



[OL] in the setting field indicates open on limit.

**PRESS THE ← KEY**

The displayed option will flash, indicating that it has been set.

**PRESS THE → KEY**

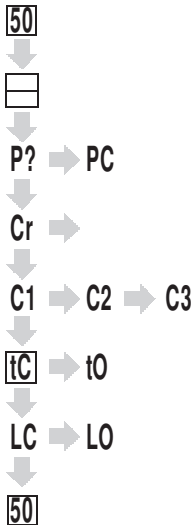
**NOTE:** When set to open on torque, the actuator will apply the value of torque as set for [tO] in back seating the valve.

(Refer to tO page 23)

## Torque Value Closing

The value of torque available in the close direction can be configured (Refer to valve manufacturer for recommended value).

The closing torque value can be varied between 40% and Rated, in 1% increments.



Using the **+** and **-** keys display recommended value.  
 In the absence of a recommended torque value, try a low setting and increase until satisfactory valve operation is achieved.

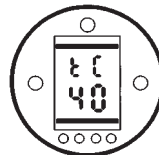
### PRESS THE ← KEY

The displayed value will flash, indicating that it has been set.

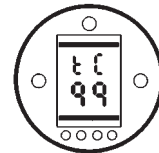
Should the set value of torque be developed in closing, the actuator will torque trip and stop.

### PRESS THE → KEY

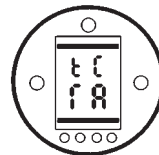
**NOTE:** Rated torque is quoted on the actuator nameplate.



40% of Rated Torque



99% of Rated Torque



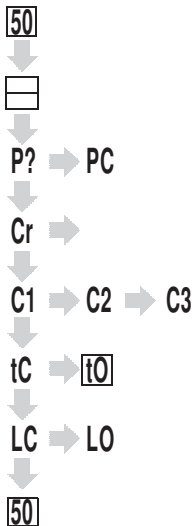
Rated Torque



**t0**

## Torque Value Opening

The value of torque available in the open direction can be configured.  
(Refer to valve manufacturer for recommended value).



The opening torque value can be varied between 40% and Rated, in 1% increments. In addition “boost” can be configured when no open torque protection is required.

**BOOST SHOULD NOT BE SELECTED WHEN THE ACTUATOR HAS BEEN CONFIGURED TO OPEN ON TORQUE** as in C3 page 21

unless back seating at rated torque is acceptable.

Using the **+** and **-** keys display the recommended torque value.

In the absence of a recommended torque value, try a low setting and increase until satisfactory valve operation is achieved.

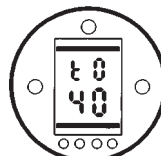
**NOTE:** Rated torque is quoted on the actuator nameplate. Boost torque is at least 140% of rated torque.

**PRESS THE ← KEY**

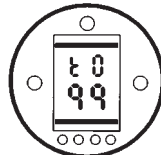
The displayed value will flash, indicating that it has been set.

Should the set value of torque be developed in opening, the actuator will torque trip and stop.

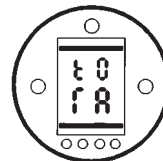
**PRESS THE ↓ KEY**



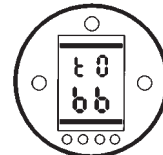
40%



99%



Rated



Boost

In checking mode, on pressing **↓** key after reviewing open torque setting, the display will revert to valve position.

**LC****Set Limit Closed**

**NOTE:** It is possible to set the Open Limit Position [LO] first.

50



P? → PC

Cr →

C1 → C2 → C3

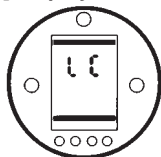
tC → tO

LC → LO

50

**NOTE:** When in checking mode Set Limit Closed [LC] does not appear.

With [LC] displayed



Limit closed

Move valve manually to the closed position. Allow for overrun by winding actuator output open up to one turn.

**PRESS THE ← KEY**

The two bars will flash and the closed indicator lamp will illuminate, indicating closed limit position has been set.

**PRESS THE → KEY**

To check closed limit position hand wind valve open one turn, when amber lamp should illuminate and the closed lamp should extinguish. Wind valve back closed one turn, when closed lamp should illuminate with the amber lamp extinguished.

**LO****Set Limit Open**

50



P? → PC

Cr →

C1 → C2 → C3

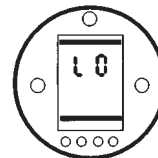
tC → tO

LC → LO

50

**NOTE:** When in checking mode Set Limit Open [LO] does not appear.

With [LO] displayed



Limit open

Move valve manually to the open position. Allow for overrun by winding actuator output closed up to one turn.

**PRESS THE ← KEY**

The two bars will flash and the open indicator lamp will illuminate, indicating open limit position has been set.

**PRESS THE ↓ KEY**

The open symbol (See Fig. 4.1) should now appear.

## Return to Positional Display

50



P? → PC

Cr →

C1 → C2 → C3

tC → t0

LC → L0

50

If the procedure has been followed as described, the positional display will indicate that the actuator is in the open position.

Select Remote Control, momentarily using the red Selector to exit setting procedure and then select required control: Local, Stop or Remote.

With the correct settings made electric operation can now be carried out safely.

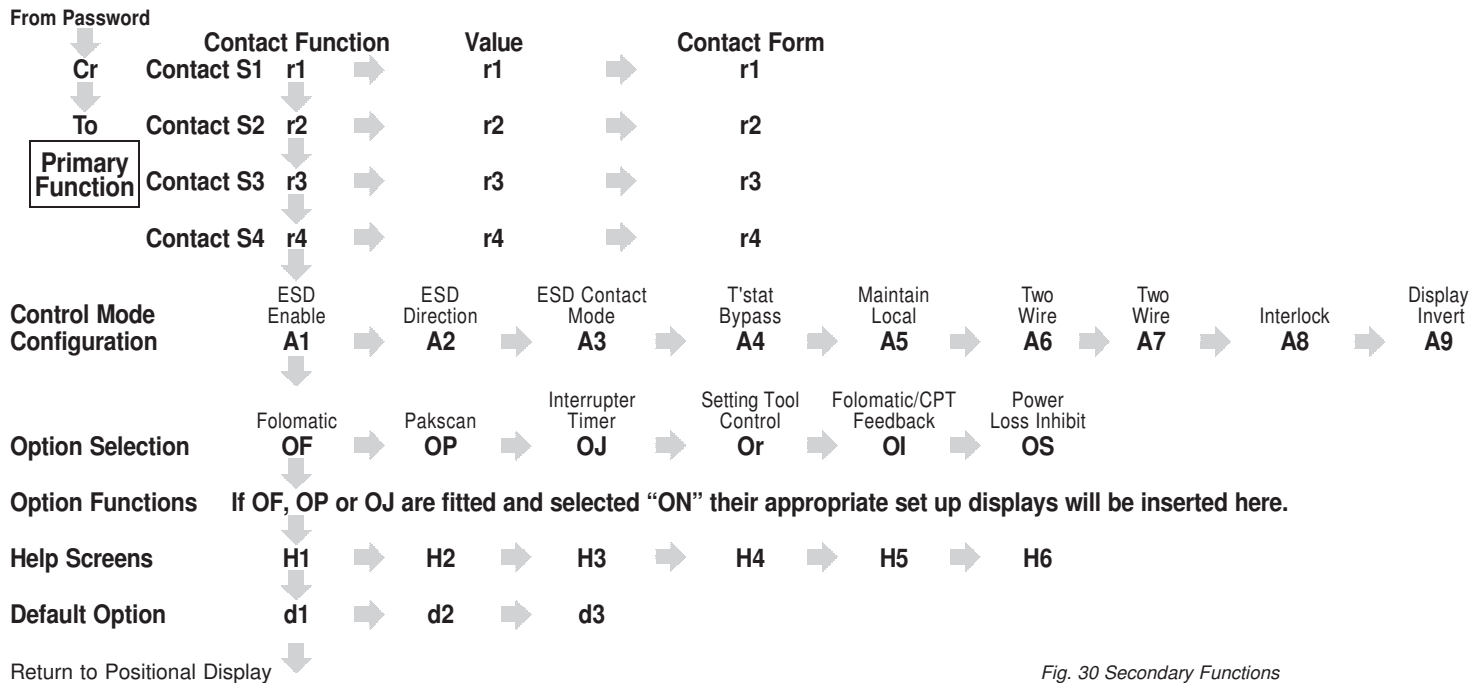


Fig. 30 Secondary Functions

SECONDARY  
FUNCTION INDEX

9.1	Accessing the Secondary Settings	page 27
9.2	Indication Contacts S1 - S4	28
9.3	Control Mode Configuration	29
9.4	Option Folomatic	32
9.5	Option Pakscan	34
9.6	Option Interrupter Timer	39
9.7	Option Setting Tool Local Control	41
9.8	Option CPT (Current Position Transmitter)	41
9.9	Option Power Loss Inhibit	42
9.10	Default Options	42
10.1	Help Screens refer to Section	46

Having established that the primary settings have been correctly set, the secondary settings can now be configured to suit site control and indication requirements.

It is possible to move through the various secondary functions as shown in Fig. 30 using the **→** and **↓** keys.

The actuator wiring diagram will indicate any Options fitted.

Options Infra-red Control **[Or]** and Power Loss Inhibit **[OS]** are standard features their use being optional.

In order to display the secondary functions it is necessary to press the **↓** key until **[Cr]** appears.

If you have chosen to enter secondary functions in the checking mode the display will be as Fig. 31.

If you have chosen to enter secondary functions in the setting mode the display will be as Fig. 32 (Refer to section 7).

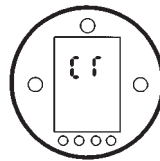


Fig. 31

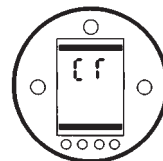


Fig. 32

**PRESS THE **→** KEY**

## 9.2 Indication Contacts S1 S2 S3 and S4

Indication contacts S1 [r1], S2 [r2], S3 [r3], and S4 [r4] may each be set to trip for any one of the following functions:-

CL	closed limit
OP	open limit
tt	torque trip mid travel
bA	battery low
dC	actuator closing
dO	actuator opening
d?	actuator moving
St	motor stalled
HA	handwheel operation
bL	blinker (moving)
tS	torque trip - any position
tO	torque trip - opening
tC	torque trip - closing
Po	intermediate position indication

S Contact form can be set normally open (NO) or normally closed (NC).

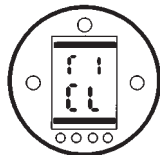
Procedure for setting up contacts S2, S3 and S4 are the same as those shown for S1.

### r1 Contact S1 : Function

Using the **+** or **-** key display the desired function.

**PRESS THE ← KEY**

The displayed function will flash indicating that it has been set.



Contact S1 has been configured to trip at valve closed limit.

**PRESS THE → KEY**

### r1 r1 Contact S1 : Value

When the S Contact function is set to [Po], the required intermediate position value must be set.

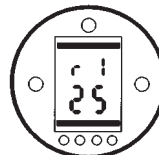
**No other contact function requires a value to be set.**

The value can be set from 1% open to 99% open in 1% increments.

Using the **+** or **-** key, display the required value.

**PRESS THE ← KEY**

The displayed value will flash indicating that it has been set.



Value set to indicate 25% open

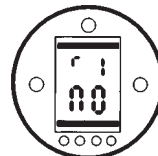
**PRESS THE → KEY.**

### r1 Contact S1: Contact Form

Use the **+** or **-** keys to select between [nO] (normally open) and [nC] (normally closed).

**PRESS THE ← KEY**

The displayed option will flash indicating that it has been set.



Contact S1 configured as a normally open contact

**NOTE:** If function [Po] is selected and it is configured as a normally open contact it will make at the set value with the actuator moving in the open direction.

To access S2 - S4

**PRESS THE ↓ KEY**

### 9.3 Control Mode Configuration

If it is necessary to change the default control configuration follow the instructions given in this section.

There are 9 configurable control functions as follows:-

- A1 ESD enable
- A2 ESD direction
- A3 ESD contact mode
- A4 Thermostat bypass
- A5 Local maintain
- A6 2 Wire control
- A7 2 Wire control
- A8 Interlock enable
- A9 Display invert

#### A1 ESD Enable

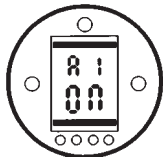
The default setting for Emergency Shut Down control is **[On]**.

With the actuator control set to Local or Remote, an ESD signal will override any existing open or close signal, moving the valve to the required emergency position. ESD will not override Stop control or an active interlock.

To disable ESD control press the **+** or **-** key. The display will change to **[OF]**.

#### PRESS THE KEY

The displayed option will flash indicating that it has been set.



ESD enabled

(Refer to A2, A3 and A4)

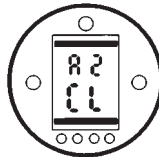
#### A2 ESD Direction

The default setting for Emergency Shut Down direction is close **[CL]**.

If the actuator is required to open the valve in the event of an ESD press the **+** or **-** key. The display will change to **[OP]**.

#### PRESS THE KEY

The displayed option will flash indicating that it has been set.



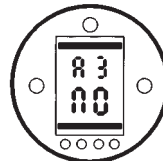
ESD set to close

#### A3 ESD Contact Mode

The default setting for ESD Contact Mode is **[nO]**. The actuator responds to an applied ESD signal derived from a external - normally open contact making. For ESD, where an external - normally closed ESD contact breaks and the signal is removed use the **+** or **-** key. The display will change to **[nC]**.

#### PRESS THE KEY

The displayed option will flash indicating it has been set.



Actuator shuts down when ESD signal is applied. If Pakscan FCU option is fitted, A3 must be set to **[nO]**.

## A4 Thermostat By-pass

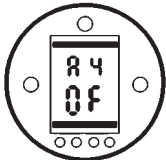
The default value for motor thermostat by-pass is enabled [ON].

The thermostat is normally in circuit. When an ESD signal is applied the thermostat will automatically be by-passed. To enable thermostat during ESD (thermostat by-pass disabled) A4 should be changed by pressing **+** or **-** key to display [OF].

**WARNING: Actuator hazardous enclosure certification is invalidated while the thermostat is By-passed.**

**PRESS THE ← KEY**

The displayed option will flash indicating that it has been set.



Thermostat by-pass disabled

## A5 Self-maintained Local Control

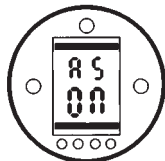
The default for local actuator pushbutton control is self-maintained [On].

If non-maintained (jogging, inching, push-to-run) actuator pushbutton control is required, press the **+** or **-** key.

The display will change to [OF].

**PRESS THE ← KEY**

The displayed option will flash indicating that it has been set.



Self-maintained local control

## A6 Two Wire Control

For 2-wire remote control form (d) and form (e) (Refer to actuator wiring diagrams).

The combination of settings for [A6] and [A7] give the following priorities.

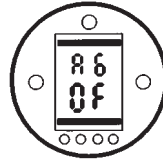
OF OF - Close priority  
On On - Open priority

The default condition is for both [A6] and [A7] to be [OF], giving Closed priority.

If you require to change the priority press the **+** or **-** key. The display for [A6] will change to [ON].

**PRESS THE ← KEY**

The displayed option will flash indicating that it has been set.



2-wire control - close priority

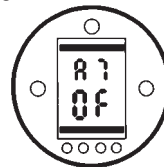
**PRESS THE → KEY**

## A7 Two Wire Control

Press the **+** or **-** key the display for [A7] will change to [On].

**PRESS THE ← KEY**

The displayed option will flash indicating that it has been set.



2-wire control - close priority



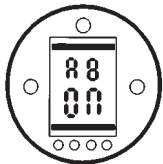
## A8 External Interlocks

Actuators are delivered with the interlock facility disabled. To enable the interlock facility use the **+** or **-** key to change the display from **[OF]** to **[ON]**.

### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

### PRESS THE **→** KEY



**NOTE:** If an external interlock is required in one direction only, it will be necessary to connect a link between the actuator terminals associated with the other direction.

## A9 Display Invert

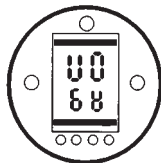
The default setting for display invert is **[Of]**. The display characters are oriented with the top towards the yellow indicator lamp.

To rotate the characters through 180° (bottom towards yellow lamp) press the **+** or **-** key.

The display will change to on **[On]**.

### PRESS THE **←** KEY

The displayed option will flash and the screen display will invert. All Position, Torque + Position, Help and Setting displays will be inverted.



Display inverted

## 9.4

### Option Folomatic

Setting instructions for actuators including a Folomatic (proportional) Controller for use in (analog) valve position control.

The Folomatic is an optional control device - Check actuator wiring diagram for inclusion.

Folomatic set up screens can be turned OFF to provide extra security.

Once selected ON the option function displays allow commissioning of the Folomatic to be undertaken.

**NOTE:** Turning ON/OFF the Folomatic set up screens (when fitted) does **not** affect its operation.

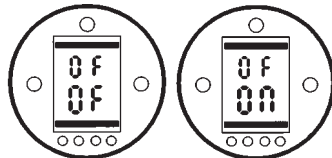
This instruction lists the Folomatic function displays in their sequence and assumes that all Folomatic functions are to be checked/set.

The actuator should be selected in Local or Stop with the set point signal connected to terminals 26(+) and 27(-) (Refer to Wiring diagram).

### OF

#### Display Folomatic Set Up Screens

The action of turning on the Folomatic option makes an additional series of settings available.



Folomatic Set Up screens OFF

Folomatic Set Up screens ON

Use the **+** or **-** key to select Folomatic Display **[ON]**.

#### PRESS THE ← KEY

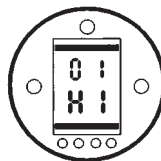
The displayed option will flash indicating that it has been set.

Press the **→** key until **[OI]** is Displayed.

### OI

#### Folomatic Feedback

Before commissioning of the Folomatic functions can begin, the Folomatic Feedback must be set to suit the applied set point signal.



With **[HI]** displayed, an increasing set point signal will correspond to valve opening. If a high set point signal is required to correspond to valve closing use the **+** or **-** key to change to **[LO]**.

#### PRESS THE ← KEY

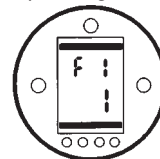
The displayed option will flash indicating that it has been set. If setting **[OI]** is modified after commissioning the Folomatic, it will be necessary to re-commission the Folomatic.

Press the **↓** key to access the Folomatic set up displays.

### FI

#### Set Point Signal Type

Using the **+** or **-** key select **[I]** for current set point signal or **[U]** for voltage set point signal.



Current mode selected

#### PRESS THE ← KEY

The displayed option will flash indicating that it has been set.

Press the **→** key to display **[Fr]**.

## Fr Set point Signal Range

Using the **+** or **-** key select **[05]**, **[10]** or **[20]** to correspond with the set point signals within the range of 0-5mA or volts, 0-10mA or volts or 0-20mA or volts. (i.e. 4 - 20mA).



0-20mA or Volt  
range selected

### PRESS THE **←** KEY

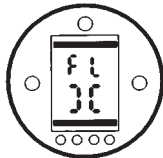
The displayed option will flash indicating that it has been set.

Press **→** key to display **[FL]**.

## FL Valve Position - LOW Set Point

### APPLY MINIMUM SET POINT SIGNAL

Using the **+** or **-** key select:  
**[ 1 ]** = valve closed  
**[01] to [99]** = percent open  
**[ ≡ ]** = valve open  
to correspond with the **LOW**  
set point signal.



Valve closed  
on **LOW** signal

### PRESS THE **←** KEY

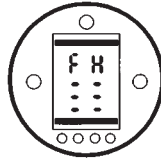
The displayed value will flash indicating that it has been set.

Press **→** key to display **[FH]**.

## FH Valve Position - HIGH set Point

### APPLY MAXIMUM SET POINT SIGNAL

Using the **+** or **-** key select:  
**[ 1 ]** = valve closed  
**[01] to [99]** = percent open  
**[ ≡ ]** = valve open  
to correspond with the **HIGH**  
set point signal.



Valve open  
on **HIGH** signal

### PRESS THE **←** KEY

The displayed value will flash indicating that it has been set.

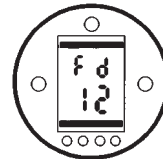
Press **→** key to display **[Fd]**.

## Fd Deadband Adjustment

If the actuator hunts or responds unnecessarily to a fluctuating set point signal the deadband must be increased. If more accurate control is required the deadband may be decreased.

Use the **+** or **-** key to select the Deadband width. Range 00 - 99 corresponds to 0% - 9.9% of setpoint signal.

**NOTE:** Maximum deadband is 9.9% of valve stroke. Normally minimum deadband should not be less than 1%.



Deadband set to 1.2%  
of Valve Stroke

### PRESS THE **←** KEY

The displayed value will flash indicating that it has been set.

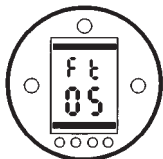
Press **→** key to display **[Ft]**.

## Ft Motion Inhibit Timer Adjustment

The Motion Inhibit Timer introduces a delay in the actuator response to a rapidly fluctuating set point signal, preventing unnecessary movement. Once the system stabilises the actuator will respond to steady changes in the set point signal as necessary.

Use **+** or **-** key to adjust motion inhibit time in seconds - range 0-99. Normally it is recommended that motion inhibit time should not be set to less than 5 seconds.

*(See note on page 41)*



Motion inhibit time set to 5 seconds

### PRESS THE **←** KEY

The displayed value will flash indicating that it has been set.

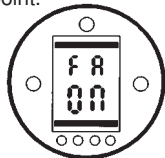
Press **→** to display **[FA]**.

## FA Action on Loss of Set Point Signal

Use **+** or **-** key to enable **[On]** or disable **[OF]** action on loss of set point signal.

**[ON]** - Failsafe as determined by **[FF]**.

**[OF]** - Failsafe to position corresponding to low set point.



Enabled

### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

**NOTE:** Failsafe action "ON" will be effective only for systems using an offset or live zero signal range, for example 4-20 mA.

Press **←** to display **[FF]**.

## FF Failsafe Action

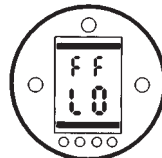
Failsafe action when **[FA]** enabled.

Use **+** or **-** key to select, on loss of set point signal:

**[LO]** - move valve to position corresponding to minimum set point.

**[SP]** - stayput on loss of set point

**[HI]** - move valve to position corresponding to maximum set point.



### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

Commissioning of the Folomatic is now complete. Remote control may be selected.

## 9.5 Option Pakscan

**Setting instructions for actuators including a Pakscan Field Control unit for use in conjunction with Rotork Pakscan 2-wire control system.**

**Pakscan (Field Control Unit) is an optional device - check wiring diagram for inclusion.**

Pakscan setup screens can be turned OFF to provide extra security.

Once selected ON the Pakscan option displays enable commissioning of Pakscan to be undertaken.

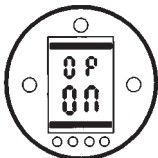
**NOTE:** Turning ON/OFF the Pakscan set up screens (when fitted) does **not** affect its operation.

This instruction lists the Pakscan function setup displays in their sequence and assumes that all Pakscan functions are to be set/checked.

## OP Display Pakscan Set Up Screens

The action of turning ON the Pakscan function makes an additional series of settings available.

Use the **+** or **-** key to turn ON the Pakscan set up display screens.



Pakscan set up screens ON

### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

Press the **↓** key to display Pakscan set up displays.

## PA Loop Address

The actuator Pakscan field control unit must be allocated a unique loop address.

The actuator must be in "Loopback" for its address to be set or changed. Loopback can be achieved in two ways:

1. Turn OFF the Master Station.
2. Disconnect the actuator from the 2-wire control loop.

Using the **+** or **-** keys display the required loop address.

Address to be set within the range 01 - FO (Hexadecimal).



### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

Press the **→** key to display **[Pb]**.

## Pb Loop Baud Rate Selection

The actuator Pakscan field control unit must be set up with the loop baud rate. For a Pakscan 2-wire control loop the selected baud rate must be common to the Master Station and all the Field Control Units included on the loop.

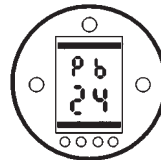
The actuator must be in "Loopback" for its baud rate to be set or changed.

Loopback can be achieved in two ways:

1. Turn OFF the Master Station.
2. Disconnect the actuator from the 2-wire control loop.

Using the **+** or **-** keys display the required baud rate.

- 01 = 110 baud
- 03 = 300 baud
- 06 = 600 baud
- 12 = 1200 baud
- 24 = 2400 baud



2400 baud rate set

### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

## PF Remote Auxilliary input

Press the **→** arrow key to display **[PF]**.

This facility is used when supplementary remote control or volt free digital auxiliary inputs are required in addition to Pakscan control or actuator status information. It is also possible to have a combination of both.

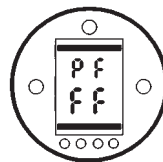
eg. Remote open and close pushbutton control (maintained operation) with tank level high and low alarm inputs.

Normally open or normally closed external contacts can be used.

There are numerous combinations of input function and form. The common combinations are listed below. Apply to Rotork for other options. Use the **+** or **-** keys to display the required option:

INPUT REQUIRED				CODE
ESD (NO)	STOP/MAINT	CLOSE	OPEN	= <b>[Fb]</b>
ESD (NC)	STOP/MAINT	CLOSE	OPEN	= <b>[F3]</b>
AUX4	STOP/MAINT	CLOSE	OPEN	= <b>[7F]</b>
AUX4	AUX3	CLOSE	OPEN	= <b>[3F]</b>
ESD	STOP/MAINT	AUX2	AUX1	= <b>[CF]</b>
ESD	AUX3	AUX2	AUX1	= <b>[8F]</b>
AUX4	STOP/MAINT	AUX2	AUX1	= <b>[4F]</b>
ESD	AUX3	CLOSE	OPEN	= <b>[bF]</b>
AUX4	AUX3	AUX2	AUX1	= <b>[0F]</b>

**NOTE:** All external contacts to be wired in accordance with publication E120E - Remote Control Circuits Forms a, b, c and f.



Remote auxiliary input selected for function/forms **FF**.

### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

## OF Pakscan Position Control

When valve position control is required via the Pakscan system additional setting must be made.

Return to valve position display by pressing the down and across arrow keys together.

After entering the correct password to put the actuator in setting mode:

Display **OF** - (Option Folomatic Screen)

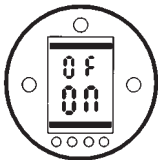
Folomatic set up displays are used for setting Pakscan Position Control Parameters.

**NOTE:** The actuator does not include a Folomatic.

## OF Display Pakscan Position Set up Screens

The Pakscan position control set up screens can be suppressed to provide extra security.

Use the **+** or **-** key to turn ON the Pakscan position set up screens.



Pakscan position control set up screens selected ON

### PRESS THE **←** KEY

The displayed option will flash indicating that it has been set.

Press **↓** to display Pakscan position control display screens.

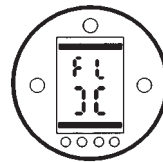
Once **[FI]** is displayed Press **→** key to display **[FL]**.

## FL Pakscan Valve Position - 0% DV

On receipt of a 0% desired valve (DV) command from the Masterstation, the actuator will respond by moving to the position as set for **[FL]**. The reported position, measured value (MV) will relate to the DV.

Use the **+** or **-** keys to display the valve position at, or nearest to the 0% (closed) valve position.

**NOTE:** On receipt of a digital command to close from the master station the actuator will move to its set closed limit position ignoring any other position that may have been entered.



0% DV = Valve closed

### PRESS THE **←** KEY

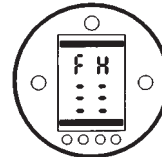
The displayed value will flash indicating that it has been set.

Press **→** key to display **[FH]**.

## FH Pakscan Valve Position - 100% DV

On receipt of a 100% desired value (DV) command from the masterstation, the actuator will respond by moving to the position as set for **[FH]**. The reported position, measured value (MV) will relate to the DV.

Use the **+** or **-** keys to display the valve position at, or nearest to the 100% (open) valve position.



100% DV - Valve open

**NOTE:** On receipt of a digital command to open from the master station the actuator will move to its set open limit position ignoring any other position that may have been entered.

### PRESS THE **←** KEY

The displayed value will flash indicating that it has been set.

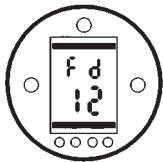
Press **→** key to display **[Fd]**.

## **Fd** Pakscan Deadband Adjustment

If the actuator hunts or responds unnecessarily to a fluctuating desired value the deadband must be increased. If more accurate control is required the deadband may be decreased.

The deadband is adjustable from **[00]** to **[99]** (0% to 9.9% of valve stroke).

Use the **+** or **-** keys to display the required setting.



Deadband set to 1.2%

### **PRESS THE ← KEY**

The displayed value will flash indicating that it has been set.

Press the **→** key to display **[Ft]**.

## **Ft** Pakscan Motion Inhibit Timer Adjustment

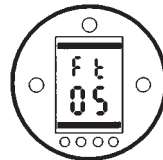
Whenever the actuator comes to rest, the Motion Inhibit Timer (MIT) is started. Further operation in response to a change in desired value is delayed until the MIT times out.

By adjusting the MIT time to suit the control application, unnecessary actuator/valve operation as a response to a rapidly fluctuating DV can be eradicated. Once a system stabilises and steady changes in DV take place the actuator will respond as necessary.

Rotork general advice is to set the longest possible motion inhibit time while maintaining an acceptable response time for control. This will maximise the working life of the actuator and valve.

Use the **+** or **-** keys to display the required setting.

Range 2 - 99 seconds.



Motion inhibit time set to 5 seconds.

### **PRESS THE ← KEY**

The displayed value will flash indicating that it has been set.



## 9.6 Option Interrupter Timer

### Setting instructions for actuator including an Interrupter Timer.

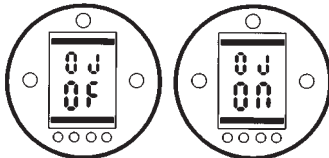
The interrupter timer enables pulsed “stop/start” operation by the actuator as a response to local and remote control commands. This effectively increases the valve stroke time and can be adjusted to prevent hydraulic shock (water hammer) and flow surges in pipelines.

The interrupter timer is an optional extra - check wiring diagram for inclusion.

## OJ Interrupter Timer Enabled / Disabled

When fitted, the timer will be made available for operation.

The Interrupter cannot be enabled or disabled using the setting Tool.



Interrupter timer disabled      Interrupter timer enabled

When the timer option is available an additional series of settings can be accessed by pressing the **↓** key

**NOTE:** If the timer option is not available pressing the **↓** key will not access to settings.

Press **↓** key to display interrupter timer set up displays.

## Jd Interrupter Timer - Direction

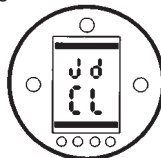
The default for timer direction is **[CL]**, timer operation will **start in closing** and **stop in opening** - pulsing operation around the close position.

If pulsing operation is required to stop in closing and start in opening - around the open position, use the **+** or **-** key.

The display will change to **[OP]**.

**PRESS THE **←** KEY**

The displayed option will flash indicating that it has been set.



Pulsed operation around the closed position.

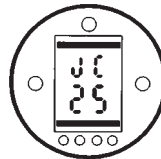
**NOTE:** Instructions **[JC]** and **[JO]** are for timer operation around the closed position. For timing around the open position, read stop for start **[JC]** and start for stop **[JO]**.

Press **→** key to display **[JC]**.

## JC Position in Valve Closing Stroke for Timer to Start

Using the **+** or **-** key select the position for the **TIMER TO START WHEN THE VALVE IS CLOSING**.

**[ ]** = valve closed,  
**[01]-[99]** = percentage open  
**[==]** = valve open



Timer set to start pulsing when closing valve reaches 25% open

**PRESS THE **←** KEY**

The displayed option will flash indicating that it has been set.

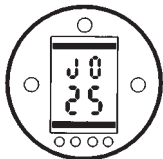
If the timing is not required in the closing stroke select **[JC]** to **[ ]** Valve closed position.

Press **→** key to display **[JO]**.

## JO Position in Valve Opening Stroke for Timer to Stop

Using the **+** or **-** key select the position for the **TIMER TO STOP WHEN THE VALVE IS OPENING**.

- [ 1 ] = Valve Closed
- [00]-[99] = Percentage Open
- [≡≡] = Valve Open



Timer set to stop pulsing when opening valve reaches 25% open

### PRESS THE ← KEY

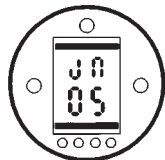
The displayed option will flash indicating that it has been set.

If the timing is not required in the opening stroke select [JO] to [ 1 ].

Press → key to display [JN].

## JN Contactor 'On' Time

Using the **+** or **-** key select the actuator run period in the range 1 - 99 seconds.



Actuator run period set for 5 seconds

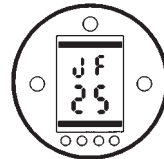
### PRESS THE ← KEY

The displayed option will flash indicating that it has been set.

Press the → key to display [JF].

## JF Contactor 'Off' Time

Using the **+** or **-** key select the actuator stop period in the range 1 - 99 seconds.



Actuator OFF period set for 25 seconds

### PRESS THE ← KEY

The displayed option will flash indicating that it has been set.

## Example

An actuator fitted with the interrupter timer and set as the example shown in these instructions would operate at:

Rated speed from full open to 25% open.

1/6 rated speed from 25% open to fully closed and from fully closed to 25% open.

Rated speed from 25% open to fully open.

## Note

With a Folomatic Option fitted AND the Interrupter Timer enabled, the Folomatic “Motion Inhibit Timer” must be adjusted to the same time as that set for the Interrupter Timer “Contactor Off”.

Failure to do so will cause the actuator response to defer to the lower time which may cause control or process problems.

For ‘ON’ and ‘OFF’ times in excess of 99 seconds apply to Rotork.

## 9.7 Setting Tool Control [Or]

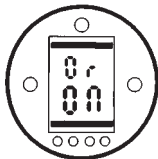
The default setting for Setting Tool control is [OF].

To enable Tool control press the **+** or **-** key to select [On].

### PRESS THE KEY

The displayed option will flash indicating that it has been set.

With the red control selector in Local, Setting Tool control keys are active (Refer to page 14).



Local Setting Tool control enabled

**Vandal resistant actuators ONLY**  
(red/black selectors not supplied)  
For control, the selection of [Or] is as follows:

[On] Local Setting Tool control only.

[OF] Local/ Remote control disabled.

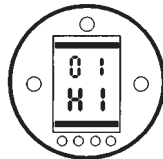
[rE] Remote control only.

## 9.8 CPT Current Position Transmitter [OI]

**Setting instructions for actuators including a CPT providing 4-20 mA analog position feedback.**

The CPT is an optional extra. It may be internally or externally powered.

Check wiring diagram for inclusion and connection details.



With [HI] displayed, the (CPT) 20 mA output will correspond to actuator fully open.

If 20mA is required to correspond to actuator closed use the **+** or **-** key to change to [LO].

### PRESS THE KEY

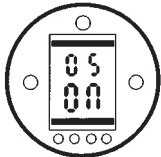
The displayed option will flash indicating that the option has been set.

**NOTE:** If the actuator has options Folomatic and CPT, redefining the CPT, will require the Folomatic to be re-commissioned.

(Refer to 9.4 Folomatic [OI] page 32)

## 9.9 Inhibit Operation After Power Loss [OS]

The default setting for this option is enabled [On]. This ensures that the actuator cannot be operated electrically if the position sensing circuits have not been updated after manual operation during a combined power failure and low battery condition - a black out.



This feature may be disabled by using the + or - key so that [OF] appears in the lower part of the display. If the feature is disabled it is important that the actuator is not manually operated during a power failure if the battery is low. Manual operation can be prevented by locking the actuator hand/auto lever in the auto position.

### PRESS THE ← KEY

The displayed option will flash indicating that it has been set.

## 9.10 Default Options [d1], [d2] and [d3]

All IQ actuator functions are configured before dispatch to a set of Rotork standard (default) settings. If requested, alternatives specified with the order will be used. When site commissioning using the setting tool takes place, entered settings overwrite the Rotork defaults and these “Current” settings are used by the actuator for operation along with the remaining unadjusted defaults.

Should difficulty be encountered during commissioning the default settings can be re-instated, returning the actuator configuration to its original manufactured state. Site commissioning must then begin again.

There are two levels of Default.

- D1 Rotork standard or Customers specified settings.
- D2 Rotork basic test settings.
- D3 Rotork only

**NOTE:** D1 will return the torque values to their default settings. The set limit positions are not changed.

D2 will reset the limit positions to 25 turns apart, the actuator being at the 50% position. The set torque values are not changed.

The functions associated with the Folomatic and Pakscan options are not altered by reinstating the defaults. The Interrupter timer option is unaffected by the D1 default but the D2 default will disable the option. Subsequent reinstating of D1 will re enable the timer but it will require all its functions resetting.

The following table indicates the Rotork Standard D1 and D2 default actuator function settings. The Current settings used in operation will be those as set using setting tool.

**NOTE:** The D1 default settings shown below are those used by Rotork when no alternative has been specified. On re-installing defaults all listed functions and their settings must be checked and if necessary adjusted to suit site operating conditions. Rotork reserve the right to modify default settings without notice.

<b>PRIMARY FUNCTION</b>	<b>D1</b>	<b>D2</b>
C1 Close direction	Clockwise	Clockwise
C2 Close action	Limit	Limit
C3 Open action	Limit	Limit
tC Close torque	40%	As set
tO Open torque	40%	As set
LC Close limit position	As set	25 turns from open
LO Open limit position	As set	25 turns from close
N/A Current position	As indicated	Position = 50%
N/A Close Colour	Green	Green

## SECONDARY FUNCTIONS

	<b>D1</b>	<b>D2</b>
r1 S1	Close N/O	Close N/O
r2 S2	Open N/O	Open N/O
r3 S3	Close N/C	Close N/C
r4 S4	Open N/C	Open N/C
A1 ESD	ON	ON
A2 ESD direction	Close	Close
A3 ESD on	Make contact	Make contact
A4 Thermo-stat bypass	ON	ON
A5 Local maintain	ON	ON
A6/7 2-wire priority	Close	Close
A8 Interlock facility	Off	Off
OF Option Folomatic menu	as fitted	Off
OP Option Pakscan menu	as fitted	Off
OJ Option Int. Timer menu	as fitted	Off
Or I-R Control	Off	Off
OI C P T (close)	4 MA	4 MA
Os Power loss inhibit	ON	ON

## 10 Maintenance, Monitoring and Troubleshooting

To reinstate D1 settings, with [d1] displayed:

### PRESS THE ← KEY

The setting bars will flash indicating the D1 defaults have been reinstated.

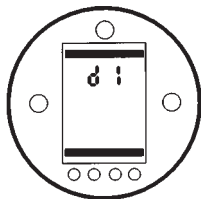
To reinstate D2 settings, with [d2] displayed:

### PRESS THE ← KEY

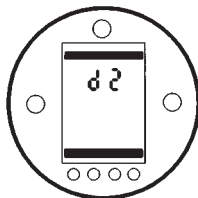
The setting bars will flash indicating the D2 defaults have been reinstated.

The Default settings for the listed Actuator functions are subject to change by Rotork and as such cannot be regarded as comprehensive.

**If the D1 or D2 defaults are reinstated using the default option, the current settings must be checked and adjusted using the Setting Tool to suit site operating conditions.**



D1 Displayed



D2 Displayed

### Maintenance

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

The IQ actuator's unique double sealed, non intrusive enclosure provides complete protection for the actuator components.

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 serviceable components.

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.

### The Actuator 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 support the EEPROM memory.

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

Tests show for a “typical” actuator, a battery life of 7 years can be expected.

**Allowing for a conservative margin, Rotork recommend that the battery should be replaced every 5 years.**

Battery level status indication is available as a standard feature (*Refer to Help screens -10.1 page 46 and S contacts Section 9.2 page 28*).

### **Battery Replacement**

Proceed as follows:

The actuator battery is located in a separately sealed compartment on the main electrical control module cover, to the left of the control selector knobs. If the actuator is located in a hazardous area a “hot work” permit must be obtained unless the actuator can be removed to a non hazardous location.

It is recommended that the Battery is replaced with the mains power turned ON.

For actuators shipped before 1998 with the optional Data-Logger fitted it is essential that battery replacement is undertaken with main power on, otherwise logged data will be lost. Alternatively, Logged Data can be downloaded and stored using the Rotork Communicator (*Refer to Publication E172E for information*).

For actuators shipped after 1997 the battery can be changed with the main power on or off.

- \* Undo the 4 caphead screws in the battery box cover and remove battery. Used batteries should be disposed of in accordance with the relevant regulations.
- \* Fit replacement battery: For GENELEC Actuator enclosures use a Duracell Procell MN 1604 9 volt 6LR61 Alkaline battery ONLY.

For Watertight (WT)- FM - CSA actuator enclosures Rotork recommend the use of an Ultracell Lithium U9VL 9 volt battery as it has a long shelf life but any equivalent may be used.

- \* Replace battery box cover. Ensure cover 'O' ring is in good condition and correctly fitted.
- \* Reset Limit Closed and Limit Open positions.

*(Refer to section 8 Commissioning Primary Functions LC and LO page 24)*

### **Oil**

Unless specially ordered for extreme climatic conditions, Rotork actuators are despatched with gearcases filled with SAE 80EP oil - suitable for ambient temperatures ranging from -22 F/-308C to 160 F/708C.

IQ Actuators do not require regular oil changes.

*(Refer to Weights & measures section 11, page 54)*

### **Monitoring**

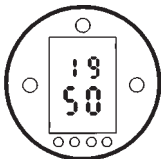
The IQ range of actuators are the worlds first to incorporate real time, instantaneous torque + position monitoring as standard.

Torque + position can be used to monitor valve performance during operation. The effect of process changes (differential pressure etc) can easily be evaluated. Tight spots in valve travel can be pinpointed as well as gauging torque developed through stroke for Torque Value Setting (*See pages 22, 23*).

Using the Setting Tool, the display can be set to indicate torque and position. With the actuator displaying current position and selected to local or stop.

### **Press the key**

The display will split, the top indicating the instantaneous torque, (% rated), the bottom indicating the measured position (% open).



Example shows 19% (of rated torque at 50% open position. Display torque range: [00] - [99] % of rated in 1% increments. For values of torque above 99% the display will indicate [HI].

Display position range:

[ I ] valve closed

[00] - [99] % open

[ ≡ ] valve open

For a stationary actuator the display will capture the last measured value.

To keep the torque + position display active press + or - keys. The display will remain active for approximately 5 minutes from the last key operation.

### Troubleshooting

The IQ range of actuators are the worlds first that can be commissioned and interrogated without removing electrical covers. Help screen diagnostics enable fast and complete fault finding to be carried out.

**With power On, the actuator display is not backlit. Position indicator lamp not illuminated.**

With mains power on, the actuators display should be backlit. (Refer to 3.3 - the Actuator Display.)

Check that 3 phase supply is available and is of the correct voltage as stated on the actuator nameplate. Measure Voltage phase to phase across terminals 1, 2 & 3 of the actuator terminal bung.

**With power Off, the actuator does not display position.**

With mains power off the actuator battery supports position indication liquid crystal display only. (Refer to 3.3 - the Actuator Display.)

If the display is blank the actuator battery must be replaced and limit reset.

(Refer to Section 10, Page 44 The Actuator Battery.)

### 10.1 Help Displays

With the actuator powered up and Local or Stop control selected, six help displays can be accessed using the Setting Tool.

(Refer to Section 9 fig 30 page 26 for their location.)

With remote selected press the ↓ key. The help screens will be displayed.

Each display uses bars to indicate the status of a particular control or indication function. Each bar reacts to changes in the status of its actuator function by turning "on" or turning "off"

For troubleshooting, access the following Help displays and refer to text:

**H1** - Factors inhibiting electrical operation and monitoring direction of movement.

**H2** - Monitor Local and Remote control inputs to the actuator.

**H3** - Monitor remote indication outputs derived by the actuator.

**H4** - Monitor the actuators position sensing devices.

**H5** - Monitor the actuators battery status and position limit status.

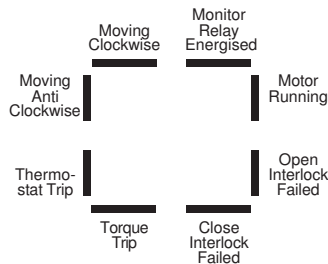
**H6** - Torque Trip, Flux and mains power supply monitoring.

Help screen bars marked  are undefined and may be ON, OFF or flashing.



## H1 Factors Inhibiting Electrical Operation and Monitoring Direction of Movement

# H1



### Monitor Relay Energised

#### Bar OFF= Monitor Relay de-energised

The monitor relay having a changeover contact rated at 8 Amp 240V AC, 30V DC, normally made between terminals 42 and 44 with its coil energised via the internal

control circuit supply, will de-energise in the event of the any of the following:

- Loss of one or more of the power supply phases.
- Loss of control circuit supply.
- Actuator selected for local control.
- Local stop selected
- Motor thermo-stat tripped.

### Motor Running

#### Bar ON = Actuator Motor running

Combined with Running Anti-clockwise or Running clockwise.

### Open Interlock Failed

#### Bar ON = Open interlock failed

Unauthorised Open electrical operation can be prevented by interlocking the actuator (open) control with an external contact. If external interlocks are not required the interlock function must be selected OFF.

*(Refer to Section 9 [A8] page 31)*

### Close Interlock Failed

#### Bar ON = Close interlock Failed

Unauthorised Close electrical operation can be prevented by interlocking the actuators (close) control with an external contact. If external interlocks are not required the interlock function must be selected OFF.

*(Refer to Section 9 [A8] page 31)*

### Torque Trip

#### Bar ON = Torque Trip

When the actuator generates a value of torque equal to that set for Open (when opening) or Close (when closing) it will stop, protecting itself and the valve from damage. This feature is known as Overtorque Protection. Once a torque trip has occurred, further operation IN THE SAME DIRECTION is prevented. This “latching” of the event protects the actuator and valve from repeated hammering against the obstruction as a response to a

maintained control signal. To “delatch” the actuator it must be reversed. For actuator torque adjustment (Refer to section 8. [tC] and [tO] pages 22 & 23).

### Thermo-stat Tripped

#### Bar ON = Thermo-stat tripped

The actuator motor is protected by a thermo-stat.

Should the motor get too hot the thermo-stat will trip and the actuator stops. On cooling the thermo-stat automatically resets, enabling operation. See the actuator nameplate for Motor rating.

### Moving Anti-clockwise

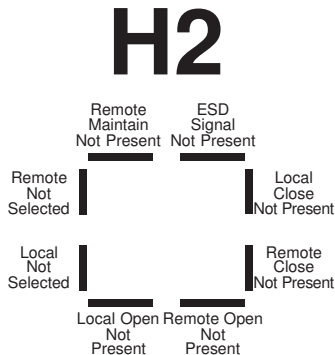
**Bar ON** = The motor is turning in an Anti-clockwise direction.

### Moving Clockwise

**Bar ON** = The motor is turning in a Clockwise direction.

**NOTE:** When motor drive is engaged, clockwise rotation will result in the actuator output moving Clockwise.

## H2 Monitor Local and Remote Control Inputs to the Actuator



### ESD Signal Not Present

**Bar ON** = ESD signal NOT PRESENT

**Bar OFF** = ESD signal PRESENT. When applied an Emergency Shut Down signal will override any existing local or remote control signal, causing the actuator to

respond in the way selected for ESD. An ESD signal will not override actuator selected to stop on its red selector knob. (Refer to Section 9- A1, A2, A3 & A4 pages 29 & 30)

The actuator will not respond to any local/remote control signal while an ESD signal is maintained.

### Local Close Not Present

**Bar ON** = Local Close SIGNAL NOT PRESENT.

**Bar OFF**= Local Close signal PRESENT.

### Remote Close Not Present

**Bar ON** = Remote Close signal NOT PRESENT.

**Bar OFF** = Remote Close signal PRESENT.

### Remote Open Not Present

**Bar ON** = Remote Open signal NOT PRESENT.

**Bar OFF**= Remote Open signal. PRESENT.

**Local Open Not Present**  
**Bar ON = Local Open signal NOT PRESENT.**

**Bar OFF= Local Open signal PRESENT.**

**Local Not Selected**  
**Bar ON = Local Control NOT SELECTED.**

**Bar OFF= Local Control SELECTED.**

**Remote Not Selected**  
**Bar ON = Remote Control NOT SELECTED.**

**Bar OFF= Remote Control SELECTED.**

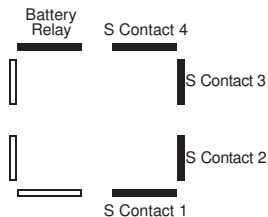
**NOTE:** When Remote is selected the actuator display will return to Position Mode.

**Remote Maintain Not Present**  
**Bar ON = Remote Maintain Signal NOT PRESENT (and/or Remote Stop ACTIVE)**

**Bar OFF= Remote Maintain Signal PRESENT**  
*(Refer to Actuator Circuit Diagram - Remote Control Circuits)*

### H3 Monitor Remote Indication Outputs Derived by the Actuator

## H3



#### Switch Contacts S1, S2, S3, S4

**Bar ON = S contact is CLOSE CIRCUIT.**

**Bar OFF = S contact is OPEN CIRCUIT.**

Bar indication is real time and reactive.

*(Refer to Section 9 [r1] page 28 for configuration of "S" contacts)*

**Battery Relay**  
Indicates contact status of optional Battery Alarm Relay.

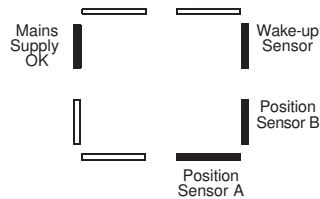
**Bar ON = contact is CLOSE CIRCUIT**

**Bar OFF= contact is OPEN CIRCUIT**

For a Low battery condition the relay contact will respond in a way dependent on whether it was configured to be N/C or N/O *(Refer to actuator circuit diagram).*

### H4 Monitor the Actuators Position Sensing Devices

## H4



#### Wake Up Sensor

The wake up sensor is used to "wake up" the position sensing circuit when manual operation starts with mains power off. This ultimately reduces the drain on the actuator battery. Correct operation of the sensor is indicated by the Bar being ON (and OFF) 24 times per output revolution. When the motor is running, ON and OFF bit duration should be equal.

### Position sensor B

Senses output rotation. Used for the position sensing circuit. Correct operation of the sensor is indicated by the Bar being ON (and OFF) 12 times per output revolution. When the motor is running, ON and OFF bit duration should be equal.

### Position sensor A

Senses output rotation. Used for the position sensing circuit. Correct operation of the sensor is indicated by the Bar being ON (and OFF) 12 times per output revolution. When the motor is running, ON and OFF bit duration should be equal.

For the two sensors; Wake Up, A and B, correct operation is indicated by the following truth tables:

With manual operation selected and turning the actuator in the indicated direction, starting with all sensor Bars OFF;

	— CLOCKWISE —→ 30°				
Sensor B	0	1	1	0	0
Sensor A	0	0	1	1	0
	30° ← ANTICLOCKWISE —				

When hand winding the actuator the bit duration will not be equal.

### Mains Supply OK

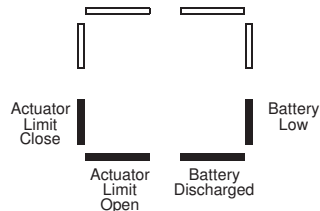
**Bar ON = Mains Supply OK**

**Bar OFF = Mains supply Fault:**

Incoming phase supply to actuator terminal 3 missing.

## H5 Monitor the Actuators Battery Status and Position Limit Status

# H5



### Battery Low

**Bar ON = Battery Level Low**

**Bar OFF = Battery Level OK**

Bar ON when the battery is low but still able to support the necessary actuator functions. The battery should be replaced at the earliest opportunity.

## Battery Discharged

### Bar ON = Battery Discharged:

ON when the battery is no longer able to support actuator functions. The battery must be replaced and Limit Positions reset.

### Actuator Limit Open

#### Bar ON when the set Open limit position is reached.

(Refer to Section 8 [LO] page 24)

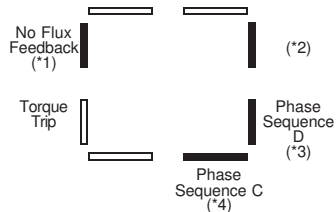
### Actuator Limit Close

#### Bar ON when the set Close limit position is reached.

(Refer to Section 8 [LC] page 24)

## H6 Torque Trip, Flux & Mains Power Supply Monitoring

# H6



### Phase sequence C and D: Bit ON = 1

C	D
0	0 = Apply to Rotork.
0	1 = Positive phase rotation sequence.
1	0 = Negative phase rotation sequence.
1	1 = Phase lost.

## Torque Trip

### Bar ON = Torqued off:

Actuator stopped by torque limitation.

(See also H1, "Torque Trip")

### No Flux Feedback

#### Bar ON - No flux Feedback.

The actuators motor flux is measured as part of the torque sensing circuits calculation of torque.

No flux feedback indicates a fault to the flux sensing circuit or a failure of the motor contactor to operate.

The actuator will not run.

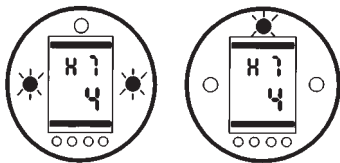
\*

## IQ10 DC Only

*1		Torque Sensor Failure
*2		Temperature Sensor Failure
*3	*4	
0	0	Apply to Rotork
1	0	Motor Over Temperature
0	1	Normal Operation
1	1	Apply to Rotork

(1 = Bar on)

## H7 Automatic Self Test and Diagnosis (ASTD)



On power up the actuator automatically tests its vital operational circuits and memory devices to ensure correct operation.

In the unlikely event of a device problem the IQ diagnoses the cause and will automatically present this information in the form of Help Screen 7 Alarm display.

Electrical operation can be inhibited to prevent possible damage to the actuator and valve.

The problem can then be accurately investigated and corrected by maintenance personnel.

ASTD is carried out every time mains power is applied and only in the event of a problem will H7 Alarm be displayed.

Help Screen 7 therefore cannot be accessed using the Setting Tool.

After circuits and communication are checked, ASTD tests for the following conditions:

- \* Actuator Position Error - the actuator current position is in error
- \* Black Out - the actuator was subjected to a combined mains supply and actuator battery supply failure (*Refer to The Actuator Battery p44*)
- \* Actuator configuration Error - the actuator configuration (settings) are in error.

Should any one (or combination) of these tests fail Operation will be inhibited \*, and an alarm displayed: the display lamps will flash and the appropriate H7 display will indicate the cause by using a number between 1 and 7.

Remote indication of inhibited operation will be indicated by the monitor relay.

**NOTE:** Operation will be inhibited a standard. Whether a combined mains and battery supply failure will inhibit operation is determined by the setting of OS (*Refer to 9.9 Inhibit Operation After Power Loss p42*).

The following table interprets all combinations of H7 alarm displays:

- H7 - 1 = Configuration error alarm
- H7 - 2 = Position error alarm
- H7 - 3 = Config error + Position error alarms
- H7 - 4 = Supply black out alarm
- H7 - 5 = Supply Black Out + configuration error alarms
- H7 - 6 = Supply Black Out + Position error alarms
- H7 - 7 = Config error + position error + Supply Black Out alarms

## Remedial Actions

**Position Error Alarm:** The actuator detects an error in its recorded position.

1. Using the setting tool enter the setting procedure.
2. Enter the correct password.  
*(Refer to section 7, p15)*
3. Reset Limit Closed and Limit Open.  
*(Refer to LC & LO, p24)*
4. With LC or LO screens displayed, select remote control using the Red selector.

**Black Out Alarm:** The actuator was subjected to a combined mains supply and actuator battery supply failure with Power Loss Inhibit (OS) selected ON.

*(Refer to the Actuator Battery p44 and Inhibit Operation after Power Loss (OS) p42)*

1. Replace the the actuator battery.  
*(Refer to p44)*
2. Using the setting tool enter the setting procedure.

3. Enter the correct password.  
*(Refer to section 7, p15)*
4. Reset Limit Closed and Limit Open.  
*(Refer to LC & LO p24)*
5. With LC or LO screens displayed, select remote control using the Red selector.

## Configuration Error Alarm

The actuator detects an error in its set up.

## To Override Alarm

1. Using the setting tool enter the setting procedure.
2. Enter the correct password.  
*(Refer to section 7, p15)*
3. Check all primary and secondary actuator function settings.  
*(Refer to sections 8, p17 and 9, p27)*
4. With any actuator function screen displayed, select remote control using the Red selector.
5. Power down the actuator and then power it back up.
6. Operate the actuator over the full valve stroke and monitor its performance.

Carry out the above remedial actions for the alarm as indicated by the displayed H7 number. Operation should then become available and the H7 alarm display cancelled.

**NOTE:** That both during and after an H7 alarm display, help Screens 1-6 are available for diagnosis.

If any of the remedial actions are unsuccessful, contact your nearest Rotork representative.

**Oil**

Unless specially ordered for extreme climatic conditions, Rotork actuators are despatched with gearcases filled with SAE 80EP oil suitable for ambient temperatures ranging from -228F/-308C to 1608F/708C.

**NOTE:** Excludes second stage gearbox if fitted.

Food grade lubricating oil is available as an alternative, contact Rotork.

Actuator Size	Nett Weight	Oil Capacity
IQ7	27 kg	0.3L
IQ10	30 kg	0.3L
IQ11	27 kg	0.3L
IQ12	30 kg	0.3L
IQ13	27 kg	0.3L
IQ14	46 kg	0.95L
IQ16	46 kg	0.95L
IQ18	30 kg	0.3L
IQ20	46 kg	0.95L
IQ25	46 kg	0.95L
IQ30	69 kg	1.1L
IQ35	69 kg	1.1L
IQ40	127 kg	4.0L
IQ70	197 kg	5.0L
IQ90	203 kg	5.0L
IQ95	203 kg	5.0L









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**E170E (PUB002-023)**

**Date of issue 12/99**

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