
Title: IQT ¼-Turn Electric Actuator Fitting to C-Series
Reason for use: Information
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- The Rotork IQT range is rated to 80C maximum thus DES Ltd supply a mounting kit in order to protect the actuator from any conducted or radiated heat that the valve can give out when under temperature. However this does not mean that when lagging the valve after installation, it can be lagged right up to the actuator. This will create a heat spike which will eventually ‘cook’ the electrics and thus hinder its operation and efficiency leading to the eventual breakdown.
- The common causes of valve failure usually compromises of four faults: incorrect setting of actuator mechanical stops & electrical limits; or valve stem being driven into valve; or ball being reversed so that unlapped side of ball paired with lapped seat.
- DES Ltd is providing this report is a guide to handling the valve and actuator packages when installing and commissioning them on site.
- Please note: **Clockwise to close; Counter Clockwise to open.** Mogas Ball Valves have a 96° travel, allowing an extra 3° of travel either side of open or closed. This is to allow thermal expansion of the stem under temperature.

Actuator Installation:

- Ideally the valve actuator packages supplied by DES Ltd will be Factory Acceptance Tested at the DES Ltd workshop, and thus will have the appropriate Mechanical and Electrical limits set, including ideal rotational speeds where appropriate.
- When the DES Ltd actuators are removed for welding & PWHT, please mark the bracket and actuator so that when the actuator is re-installed, if the marks line up, no electrical or mechanical limit adjustment is required. The only point that **Mogas** and **DES Ltd** stress when welding is to leave the valve open. This will allow the free movement of air/heat in the line otherwise the ball in the closed position will act as a barrier and allow the heat to build up around the ball and hence conduct through the stem. Further to this, do not insulate or wrap the thermocouples around the entire valve.
- Where ever possible, try and fit site supplied actuators to the valves in workshop as opposed to in line. It is easier to check to see if the valve is fully open (smooth bore) or fully closed.

Workshop/In line Installation:

1. Set valve to fully open position. This is your reference point to establish the fully open stop.

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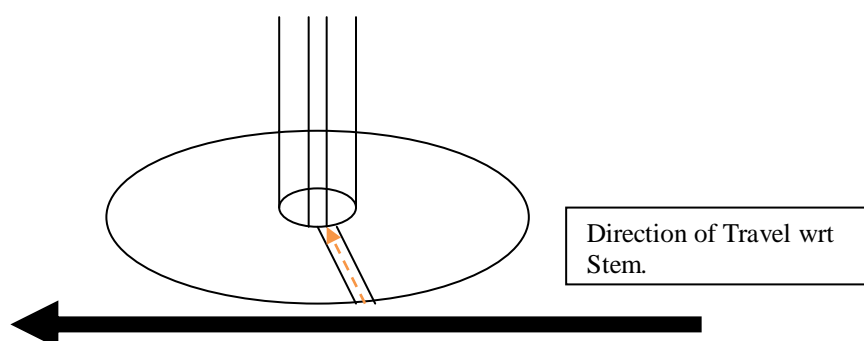
2. Attach Mounting Bracket (adaptor plate) and Stem Adaptor (stem coupling). Please do not tighten bolts as you may need the initial play later to help line up the bolt holes for the actuator/gearbox.
3. Before attaching actuator, please ensure that the actuator is fully open (rotate counter clockwise fully).
4. Attach the actuator to the mounting bracket ensuring that a slide fit has occurred between the male insert of adaptor (coupling) and the female connection of the gearbox/actuator drive bush. If you cannot achieve a slide fit, **DO NOT FORCE THE ACTUATOR** on to the coupling. This will potentially cause the stem to be pushed in and thus rolling the ball off the seat (guaranteed leakage). Please use emery cloth or any other means necessary to ensure a slide fit.
5. Once the actuator has been successfully placed on to the valve, this is where all the nuts & bolts need to be tightened. Please note that all fittings should come with Norlock or other type of shake-proof washers, if not please inform DES Ltd or supply own. This helps to secure actuator to the valve, especially under any continuous vibration which may cause the actuator to shake loose.
6. When adjusting the closed/open stops on the IQT, there are two studs with locking nuts on the actuator opposite the local control display. The left hand stop will allow you to adjust the open position of the valve. The right hand stop adjusts the closed position.
7. Setting the open stop on the IQT, the valve should be fully open, however make sure that the stop is unwound slightly to allow for an extra ½ turn allowance for the actuator electrical limits (if applicable). If the ball of the valve has encroached into the flow path (look up the bore of valve) cycle the IQT until full bore and then set the open stop by ‘feathering’ in the Mechanical stop until it touches the IQT quadrant.

If the stops are being set when the valve is installed in-line, there are scribe lines on Valve Stem and Gland flange. On the C-Series range, the scribe line in the closed position will be pointing downstream in line with the flow and will be in line (roughly) with the scribe line on the flange. In the open position, the scribe line will be perpendicular to the flow. (Remember: Clockwise to Close, etc...)

To set the open stop, please cycle the valve so that the scribe line on the stem just over travels the scribe line on the flange (by ½-width of scribe line), then set the IQT Mechanical Stop.

8. To set the closed stop, wind the IQT clockwise from the open stop and over-travel by ½-width of scribe line, that is where closed stop is. (See below diagram) then set IQT Mechanical Stop.

Please note: There is an allowance for a 5% Over/Under Travel in the Mogas design. However the above ensures that you are well within tolerance.



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Workshop/In line Electrical Set-up:

1. To engage the Rotork setting tool to the IQT, please follow the Rotork IQT IOM manual. Once you are into the IQT setting menu, you will first off need to confirm the Rotation of the actuator, i.e. clockwise to close, counter clockwise to open.
2. Then confirm close/open action, either on limit, or torque. In most cases, this will be set to limit.
3. Then the IQT torques need to be set next. Even though the actuator is set to go out on limits, the torques are set so that the actuator does not exceed the mast limitation.

The Maximum Torque Figures as per the differential pressure is as follows:

C-Series Model	C-Series Mast Limitation Torques	Differential Pressure	Auma Part-Turn Model Max Torques	SQ Torque Setting
Gen-X 600#	686Nm max	Up to 69 Barg	IQT500 = 500Nm	100% (500Nm)
Gen-X 1500#	2,000Nm Max	Up to 136 Barg 136 – 240 Barg	IQT1000 = 1,000Nm IQT2000 = 2,000Nm	100% (1,000Nm) 75% (1,500Nm)
SC-3PC 2500#	3,456Nm Max	Up to 154 Barg	IQT2000	100% (2,000Nm)
C-Series (TBC)	TBC		TBC	TBC

4. Make sure the actuator has manually cycled the valve either fully open or closed. Before setting IQT Limit stops, please back off ¼ to ½ a turn away from where Mechanical stops have been set at each end of the cycle. Then confirm the Actuator Limit on the setting menu. Please note that this has to be conducted for both open and closed, so once one electrical limit has been set, the valve needs to be manually cycled in the opposing direction in order to set the other in exactly the same manner.
5. Ideally the speed setting should be set for the IQT actuators as well; typically DES Ltd recommend approximately 15s to open and close as the maximum operating time, quicker if possible.

The speed setting is set as a percentage of the minimum to maximum operating time with a 100% being the minimum operating time.

IQT Model	Minimum Operating Time	Minimum IQT Speed Setting
IQT125	5s	35%
IQT250	8s	65%
IQT500	15s	100%
IQT1000	30s	100%
IQT2000	60s	100%

6. When electrically cycling the valve open and closed, it would do well to check the actual valve stops as well to double check that there is no significant under or over-travel. So when cycling the valve open and closed electrically, check that the scribe line on the stem just passes the scribe line on the flange by ½-width of scribe line (see schematic above). If the scribe line on the valve stem in either open or closed as gone past more than the ½-width of a scribe line, return to step 2 and instead of backing of ½ a turn, back off ¼ a turn instead.

If the scribe line on the valve stem in either open or closed has NOT gone past the ½-width of a scribe line, return to step 2 and instead of backing of ½ a turn, back off ¾ turn instead.