
Title: Rack & Pinion Pneumatic DSA Fitting to i-RSVP
Reason for use: Information
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- Typically the Pneumatic Rack & Pinion (R&P) actuators supplied by DES Ltd have standard seals rating the actuators to 80C; however increasingly DES Ltd are starting to supply these actuators with Viton seals to rate the actuators to around 120C+. Despite this, DES Ltd still 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 melt the rubber seals and thus hinder its operation and efficiency leading to the eventual failure.
- The common causes of valve failure usually compromises of three faults: incorrect setting of actuator mechanical stops; 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 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 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.
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.

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3. Before attaching actuator, please rotate the valve to the fail safe default position of the actuator or in the case of the actuator being double acting, to the position the actuator was supplied in.
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 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 R&P DSA, there are two studs with locking nuts on the actuator either at the base of the actuator or at the top part of the pinion. 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 R&P DSA, the valve should be fully open, and the manufacturer's machined profile on the supplied stem adaptor is touching the Mechanical Position Stop (MPS) on the valve mounting pad (please see p8 of the Mogas IOM manual also).



Machined Profile of the Stem Adaptor and the Mechanical Position Stop (MPS)

- If the ball of the valve has encroached into the flow path (look up the bore of valve if in workshop) unwind the R&P DSA mechanical stop until full bore and adaptor makes contact with the MPS and then set stop. Make sure the mechanical stop is held in position when tightening the locking nut.
8. Setting the close stop on the actuator, the valve should be cycled fully closed (clockwise) until the manufacturer's machined profile on the supplied stem adaptor is touching the 'MPS' on the valve mounting pad. At this point, the actuator stop should be wound in until just touching the travel quadrant, then the mechanical stop locking nut should be tightened. Make sure the mechanical stop is held in position when tightening the locking nut.
 9. The pneumatics are sized based on guaranteed minimum air supply. DES Ltd should have specified that a Pressure Control Valve or air filter regulator is used with a maximum air supply stipulated in order to make sure the actuator does not exceed the Mast Limiting Torque. If this has not been specified, please ask DES Ltd to confirm.

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.