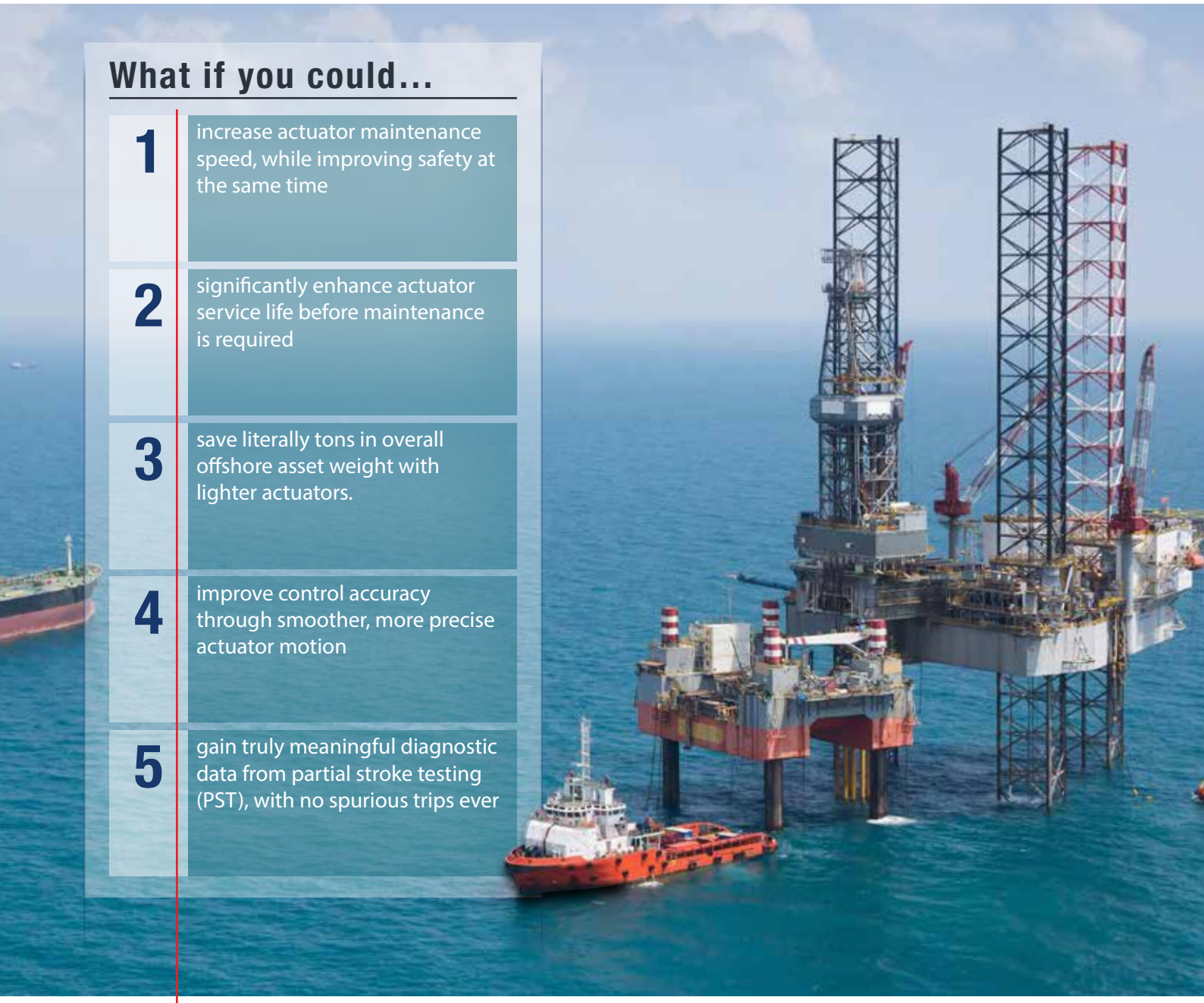
The Leader in Actuator Technology

QTRCO



What if you could...

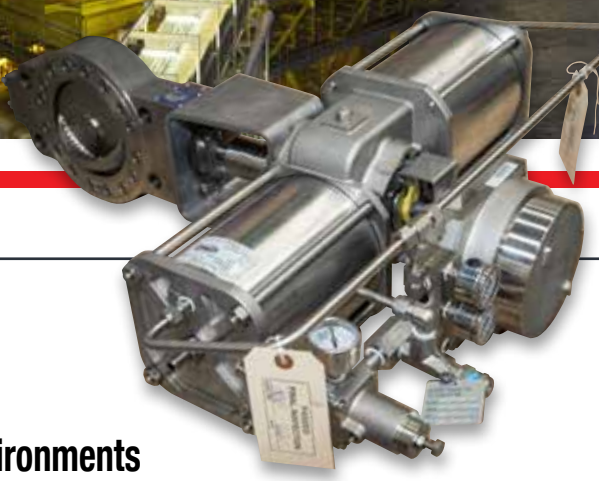
1. increase actuator maintenance speed, while improving safety at the same time
2. significantly enhance actuator service life before maintenance is required
3. save literally tons in overall offshore asset weight with lighter actuators.
4. improve control accuracy through smoother, more precise actuator motion
5. gain truly meaningful diagnostic data from partial stroke testing (PST), with no spurious trips ever

Actuating Offshore Success

Valve Actuators Designed For The Harshest Saline Environments

wegman

Est. 1797



All Stainless Actuator and accessories for use on Angola FPSO

BUILT TO LAST & EASY TO MAINTAIN

Maximum corrosion resistance, not only externally but internally too

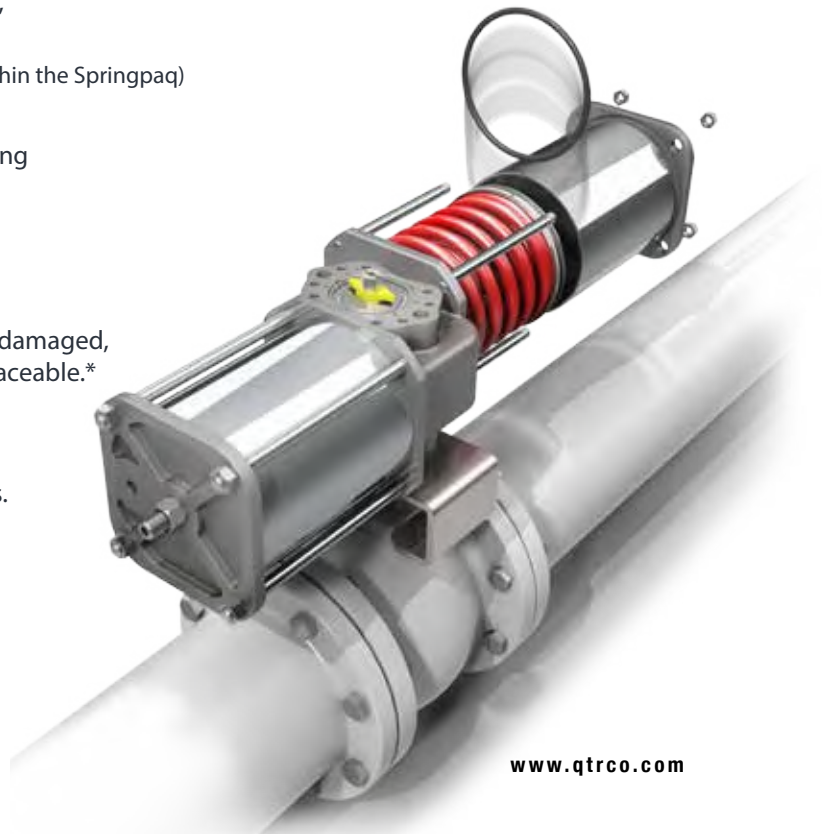
- All external pressure containing materials – CF8M (316) Stainless Steel.
- 316 Stainless Steel Cylinders
  (other materials are available if required. Contact Qtrco for more details)

Stainless Steel Construction For Offshore and Saline Environments

Basic maintenance safely performed

WITH THE ACTUATOR STILL ON THE VALVE.

1. Remove the air supply lines, end cap and cylinder
   (springs are safely retained within the Springpaq)
2. The piston seal and wiper ring is then easily replaced.
3. The stainless steel cylinder resists scratching but if it is damaged, it too is independently replaceable.*
4. Reinstall the cylinder, end cap and air supply lines.
   (No need to reset switches or positioner)



*With our spring return actuators, the cylinder can just be turned end for end and reinstalled as the cylinder length provides for an entirely new sealing surface.

We have approximately 1,000 actuators installed on seven vessels with the earliest put into service in 2001. It is still true that there has never been a reported failure.

I have asked our maintenance and field personnel on each vessel about the actuators and have never received a negative comment.

—

Scott Lambert,
Group Leader
Stimulation Mechanical Engineering
BAKER HUGHES

Never Compromising Safety

Captured Springs located inward of the pistons safely provide access for on-the-valve replacement of worn or contaminant damaged piston seals.

SAFETY

We feel strongly that our actuators shouldn't cause injury to anyone. Thus, we have made safety an integral part of our rotary and linear actuator design, specifically the springs, which can cause serious harm to personnel or damage other equipment if not captured.

All springs are safely captured within the force module.

Even if the end cap and cylinder are removed, there is no risk to plant or personnel when working on or using these actuators.

TYPICAL EXAMPLE:

On an offshore installation requiring five off 4" and 6" 1500# trunnion mounted ball valves, three off 12" 600# valves and one off 24" 600#, the **weight savings would be over 5.5 Tonnes**

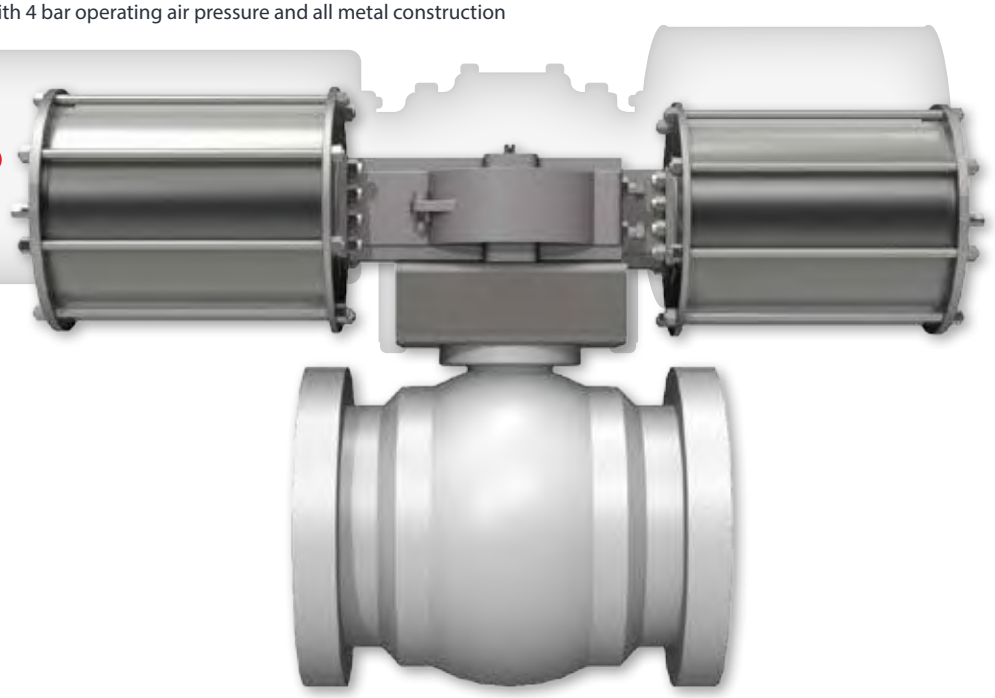
SIGNIFICANT OFFSHORE WEIGHT SAVINGS:

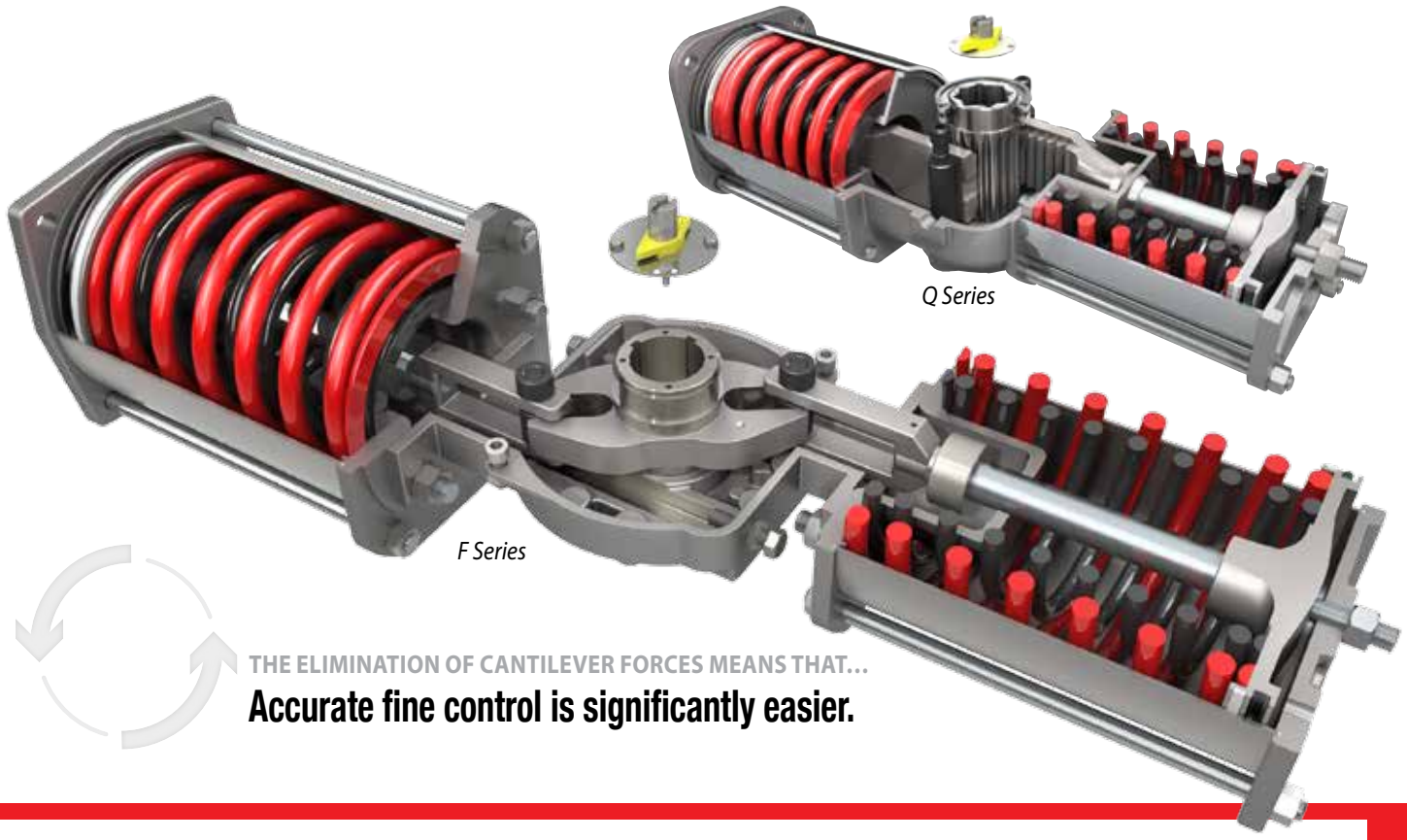
Space & Weight Savings

Trunnion Ball Valve Size	4" 600lb	4" 1500lb	6" 600lb	6" 1500lb	12" 600lb	18" 600lb	24" 600lb
Operating Torque (Nm) includes 2 x safety factor	576	1,534	1,290	4,000	8,870	23,164	30,150
QTRCO (Kg) 316 stainless steel construction	54	99	101	458	458	1,141	1,518
Traditional Scotch Yoke (Kg)	202	282	273	500	902	1,816	2,457
Difference (Kg)	**148**	**183**	**172**	**42**	**444**	**675**	**939**
Weight Savings	73%	65%	63%	8%	49%	37%	38%

Based on spring close model actuator with 4 bar operating air pressure and all metal construction

Average = 48%





Q Series

F Series

THE ELIMINATION OF CANTILEVER FORCES MEANS THAT...

Accurate fine control is significantly easier.

BALANCED FORCE DESIGN FOR ULTIMATE CONTROL

Force & Weight Distribution

- **Offset cylinders** align the piston axis with the pinion gear pitch circle and/or yoke pitch circle diameter, eliminating the cantilever forces inherent in many actuators.
- **Low friction rollers** maintain correct engagement for absolutely exceptional cycle life. The rollers are further augmented by guide slots in the body of larger F series actuators

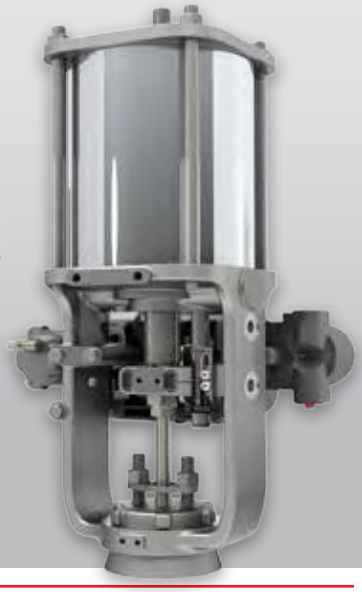
The QTRCO design prevents stuttering and the balanced forces reduce the level of hysteresis in the drive train.

- Actuators can be retrofitted to existing valves to gain weight, size and control benefits. Our team is happy to help with service & selection.

Critical Service Control Butterfly Valve for BP

The same attention to detail applies to linear control

- Same materials of construction as rotary actuators
- Higher pressure capability than diaphragm actuators and longer stroke
- Piston avoids hysteresis caused by uneven diaphragm up and down motion
- Fully retrofittable to existing control valves if required



ASSURING SIMPLE, SAFE OPERATION

The XRCISER™ Partial Stroke Testing Device

OFFERS CAPABILITIES UNMATCHED BY ANY OTHER PSTD

- A modular add on to the standard actuator (retrofittable if required)
- Designed to allow safe reliable partial stroke testing using full actuator power, with no spurious trips during testing – EVER

No Spurious Trip During Testing - EVER

1. Provides 100% of actuator torque
2. Will not disrupt plant operation
3. No Overtravel, No Timeouts
4. Will not prevent valve closure in case of an emergency
5. **True Installed Diagnostic Performance Information**

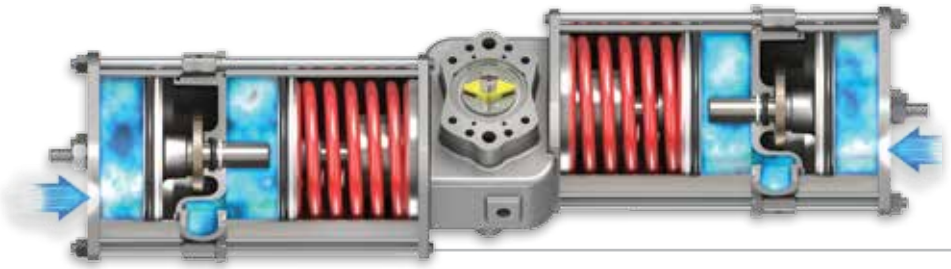
Qtrco can offer advice on and supply control architecture to allow users to gain maximum benefit from Xrciser, from simple systems to full SIL3 capability as required

Meaningful Diagnostic Data

Better Decisions & Less Unplanned Downtime

For the first time ever, the user can get true meaningful diagnostic data about not only valve motion capability, but about how much margin of safety is still left in the drive train.

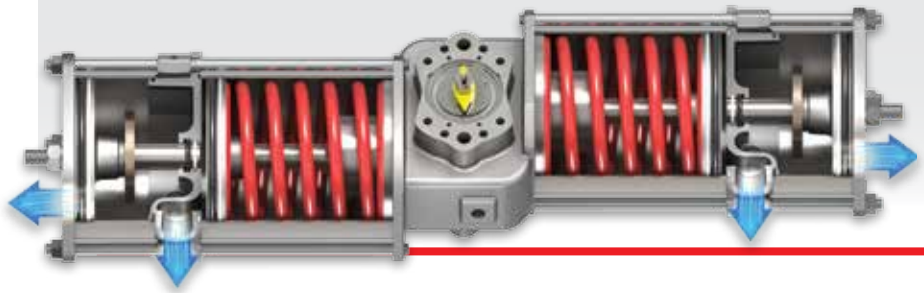
1. Normal Service
Primary pistons are pressurized and the valve is in the full travel position



2. Tandem Pistons Pressurized
readiness is confirmed by proximity and pressure switches, the valve remains in the full travel position

3. Partial Stroke Test
pressure is exhausted from primary pistons and the springs push the primary piston outward, the pressurized tandem piston limits the travel to 15° (or customer specified amount), then actuator returns to normal service

The XRCISER® Never Compromises Safety



Emergency Shutdown
if in the midst of testing an emergency occurs, exhausting primary and tandem piston pressure allows immediate full valve closure

THE QTRCO STANDARD WARRANTY – FAR BEYOND THE NORM

QTRCO will during the period of 3 years from the date of original invoice, repair or replace (at QTRCO's sole option) any QTRCO actuator that fails in service regardless of the number of cycles, provided always that the actuator was installed correctly, properly maintained/serviced and applied as per the original user application specifications. The actuator must be returned to QTRCO within the 3 year warranty period at the sender's cost. The warranty does not apply to any freight or other charges.

PROVEN PERFORMANCE
in the Harshest Saline Environments

"This actuator and over sixty other QTRCO actuators in the Baytown facility have served with zero failures during the 10 year time period they have been in use"

— Shane Miller
Pure Salt Baytown, LLC

Major offshore companies already using the benefits of QTRCO actuation:

- Baker Hughes
- BP
- Marathon
- Petrobras
- Statoil
- Total
- ENI
- Maersk Oil
- Apache
- KeppelAmFELS
- US NAVY

In the UAE QTRCO is now Approved by ADMA OPCO, ZADCO and ADNOC

The Leader in Actuator Technology

QTRCO

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