1. INTRODUCTION

Where Kinetrol actuators and springs (size 10 and above) are used in high cycle, severe duty applications, the following checks and repairs are recommended. This document is intended to supplement the normal actuator/spring instructions (ref. TD 104 and TD 129).

2. MAINTENANCE INTERVALS

Under "normal" working conditions where the actuator/spring temperature is within specified limits, the air quality is acceptable (ISO8573-1 Class 5.5.5), side loads (TD28) & end loads (TD129) on the actuator are within specified limits and the environment is not highly corrosive, actuators and springs should be run without maintenance for over one million cycles. If any of these conditions are outside of these limits earlier maintenance may be necessary.

Section 5 contains a chart with suggested checks and time or cycle intervals.

3. PRE-MAINTENANCE CHECKS

If an actuator is not performing as required, then the following checks can be made to establish the cause and whether dismantling and repair are necessary.

3.1 External Air Leakage.

The easiest way to detect external air leakage (eg between case halves) which may be suspected is to use a "soapy water" test. Actuator shaft seals are not primary air seals and therefore a small leakage from these will not indicate imminent actuator failure. However, shaft seals thought to be in poor condition may fail to prevent the ingress of external solids or liquids into the actuator and remedial action would be advised .

3.2 Internal Air Leakage.

The internal leakage found with a Kinetrol actuator should be low, but small amounts of wear between the vane seal and internal case profile may occur in service resulting in increased leakage without serious loss of actuator performance. As a guide, a leak rate bellow approximately 10% of the flow capacity of the air supply should not seriously effect actuator output torque. The easiest way to check for internal leakage is to place a hand over the non-pressurised outlet port; if the hand is pushed away by the air, leakage may be considered high and the actuator can be dismantled for further investigation.

3.3 End of Travel Stop Damage.

The internal end stops on the vane of models 18 and above are tubular steel construction (except model 60 which is polymer). If they receive impact they will deflect but if the impact is severe, they will collapse in preference to damaging the actuator case. The angle of travel of the actuator should be checked at regular intervals to ensure that these have not been damaged. If the travel increases by more than 2° each end of travel, then they should be inspected for damage. This inspection can be achieved by either using a "boroscope" to view the actuator internally or by dismantling the actuator.

Smaller models have polymer vane end stops which absorb energy in the same way as the larger tubular steel end stops. Again if the angle of travel of the actuator is found to increase the actuator can be dismatled and the parts replaced.

If this occurs, it is likely that the load inertia is high and the travel time low (see TD 37 for limits). A ‘sticky’ load where the actuator is held at mid-stroke and suddenly released, can also cause this damage. Such a problem should be resolved to allow the full life potential to be realised.

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3.4 Eccentric Vane Shaft Movement.
The vane square may be seen to move from side to side when the air pressure is reversed in the actuator. A movement of more than 0.5mm indicates the need to disassemble for shaft bearing/case replacement. Springs are unlikely to exhibit this feature.

Refer to TD28 for limits of sideload. If caused by load missalignment, dowel holes are provided on some actuator and spring sizes to assist in alignment during assembly.

3.5 Atmospheric Corrosion.
Corrosion of the external vane or spring shaft surface will not normally affect the performance of the actuator or spring, but excessive corrosion may cause wear of the shaft seal and may allow ingress of dirt or water to the internal surface of the actuator and bearing area and cause early failure of the spring. If this has occurred, then replacement is recommended.

If severe corrosion is seen on the external case surface, replacement is advised. Discuss Kinetrol for higher corrosion resistant alternatives.

4. CHECKS ON DISMANTLED ACTUATORS
After 1 million cycles, or earlier if a problem is encountered, it is recommended that the actuator/spring is dismantled and the following checks on the components are made:

4.1 Inspect seal surfaces for seal edge wear and damage and expanders for broken fingers. Vane seals, steel expanders and shaft seals should be replaced using the relevant seal kit as supplied by Kinetrol (refer to TD 104 and TD 129).

4.2 Light scoring of the internal case paint surface is common and normally effected by the air filtration level. If scorring is deep and/or large areas of paint missing, then case replacement may be necessary.

4.3 The vane sideplates near the stop screw contact area should be inspected for damage or indentation likely caused by excessive impact. If cracks are visible or the "stop tube" in a sideplate is not circular, the sideplate should be (section 3.3) replaced. The application conditions which led to such impacts should be eliminated – otherwise the damage may recur.

4.4 Case bearings will normally show some wear in the highly loaded bronze area. If earlier clearance checks (section 3.4) were OK, then the bearings need not be replaced. If the steel backing of the bearing is visible the bearings/case should be replaced. If the vane shafts show signs of a wear 'step' the vane may also need replacement.

4.5 Evidence of water/fluid ingress causing internal corrosion should be noted and parts replaced if this is thought to be excessive.

4.6 Spring units should be inspected internally for signs of water ingress and corrosion. Rubbing of internal parts should be determined and if any damage to the spring is observed, contact Kinetrol with details/photos for advice on the course of action.

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If unsure on any of the above points, contact Kinetrol for further advice – photos will help in a diagnosis of conditions and serial number(s) essential to establish the age and part type make-up or the actuator/spring. The serial number can be found on the actuator/spring label. To ensure the best response, please include operating conditions of the actuator/spring.

5. SUGGESTED MAINTENANCE PERIOD TABLE

Maintenance Schedule Period				
Work to complete	Month*	Year*	Cycles*	Ref Document
External visual check of actuator, spring casing and switch box for damage to paint, physical impact, environmental corrosion and cracks in cast housings.	6	1	100,000	-
External visual check of actuator, spring and switch box shafts & squares for wear and environmental corrosion where visible.	6	1	100,000	-
External visual check of shaft concentricity/sideways movement.	6	1	100,000	
Check that actuator & spring operates the valve within the desired travel time and that the operation is smooth.	6	1	100,000	-
Removed build-up of suface dirt & dust.	-	1	200,000	-
Verify operation. Check that the actuator operates the valve below the designed air pressure and the spring returns the valve above the designed minimum air pressure.	1	1	200,000	-
Check actuator for external & excesive internal leakage.	-	1	200,000	TD138
Check that actuator and/or spring mounting screws to the valve are tightened to the correct torque. Refer to TD111 unless different values specified by valve provider.	-	1	200,000	TD111
Actuator seal replacement.	-	4	1,000,000	TD129, TD104
Remove spring and/or spring pack & check for evidence of water or dirt ingress and for internal wear between moving parts.	-	4	1,000,000	TD129, TD138, TD104

Note: * Time period or cycle count can be used or a mixture of both or which ever limit is reached first.