Section 3.2.4 Automatic Control Valves and Actuators

- **Rotary Valves**
- **Butterfly and Ball Valves**
- **Solenoid Valves**
- **Actuator, Motor Driven, Spring Return**

AUTOMATIC CONTROL VALVES – pre-maintenance procedure

This procedure applies to all types of automatic control valves and requires that before any maintenance is undertaken all safety precautions must be adhered to including system isolation. Care must be taken to ensure that any maintenance does not unduly interfere with environmental operating conditions.

1. Inspect, where changes, disconnections or unrecorded settings are found, report and discuss with client.

2. Note any settings made; i.e. min/max travel,
   balancing valve settings etc.

3. Check valve body and fixings for any signs of corrosion or mechanical damage.

4. Check that pipe flange or screw connections are not leaking.

5. Where fitted, check that the actuator yoke and linkages are secure and not bent or damaged (see page 33).

6. Check correct installation of valve with reference to both type and manufacturer.

There are a large number of valve manufacturers who each call for specific maintenance and lubrication procedures for their products and to avoid undue repetition in the maintenance schedules the following terms have been used in the schedules.

Manufacturer's maintenance instructions.

Manufacturer's lubrication instructions.

ROTARY VALVES – shoe or slipper

ITEM	FREQ.	ACTION	NOTES
1. Operational status	12m	a) Operate and check for correct rotary travel. b) Refer to manufacturer's maintenance instructions.	Check by operation of the actuator, see notes on motor driven actuators.
2. Let by.	12m	Check that valve is not letting by excessively.	
3. Glands/spindle condition.	12m	a) Inspect for gland leakage, refer to manufacturer's maintenance instructions.	Normally 'O' ring seals are fitted and cannot be adjusted, replace if leaking and inspect spindle for wear.
	12m	b) For lubrication refer to manufacturer's lubricating instructions.	
4. Overall condition.	12m	Inspect for external deterioration.	Refer to pre-maintenance procedure.

BUTTERFLY AND BALL VALVES

ITEM	FREQ.	ACTION	NOTES
1. Operational status	12m	a) Operate and check for correct rotary travel. Refer to manufacturer's maintenance instructions.	Check by operation of the actuator, see notes on)tor motor driven actuators.
2. Let by.	12m	Check that valve is not letting by excessively.	
3. Glands/spindle condition.	12m	a) Inspect for gland leakage, refer to manufacturer's maintenance instructions. b) For lubrication refer to manufacturer's lubrication instructions.	Normally 'O' ring seals are fitted and cannot be adjusted, replace if leaking and inspect spindle for wear.
4. Overall condition.	12m	Inspect for external deterioration.	Refer to pre-maintenance procedure

SOLENOID VALVES

ITEM	FREQ.	ACTION	NOTES
1. Operational status	12m	a) Operate and check for correct linear travel. b) Check for solenoid noise i.e. buzzing.	Check by operation of the solenoid. Check supply voltage and that polarities are correct – refer to manufacturer's instructions. Noise can be due to dirty pole faces, remove coil and clean pole faces.
2. Let by.	12m	Check that valve is not letting by excessively.	
3. Glands/spindle condition.	12m	a) Inspect for gland leakage, refer to manufacturer's maintenance instructions. b) Inspect and check for wear and corrosion of the spindle. c) For lubrication refer to manufacturer's lubricating instructions.	Adjust or replace seals as necessary. This can cause leakage or damage to the gland seals, if there are any signs of deterioration the spindle should be replaced – this will involve the removal of the valve.
4. Overall condition.	12m	Inspect for external deterioration.	Refer to pre-maintenance procedures.

ACTUATORS – pre-maintenance procedures – all types

Should any discrepancies occur with the following checks the client should be informed as soon as possible to avoid the possible uneconomical running of his plant.

The frequency of checks should be used as a minimum in the event that the actuator is performing a safety function (i.e. on a fire and smoke damper). Lives and property could depend upon this actuator working properly.

1. Cables. Check for signs of heat, damage, chafing or water ingress.
2. Mounting. Check mounting is in accordance with the manufacturer's recommendation.
3. Anchor points. Check security.
4. Mechanical protection. Check for soundness.
5. Earth bonding. Check connection.
6. Actuator torque. Check torque with a torque wrench. This check is of particular importance on spring return type actuators because the spring will only have a maximum life span. Elasticity of the spring and hence the torque will reduce with time, if the torque is insufficient to complete the action, this could be a hazard to life and property.
7. Working conditions. Check actuator is operating within its design ambient conditions.

MOTOR DRIVEN ACTUATORS

ITEM	FREQ.	ACTION	NOTES
1. Electricity supply.	12m	Check supply voltage and that polarities are correct.	If supply voltages are not found, check to see if supply is via a controller. Refer to manufacturer's data sheet.
2. Control signal.	12m	Check for presence and that polarity is correct.	Refer to manufacturer's data sheet. The previous note can also apply to the control signal.
3. Auxiliary control functions i.e. on/off switches, frost protection, position indicators, feedback potentiometers.	12m	Check operation.	See relevant manufacturer's data sheet and auxiliary section.
4. Manual operation (if fitted).	12m	Check to prove actuator will mechanically open/close valve or damper to its working limits.	Ensure that the actuator is returned to the **"auto"** position after check is completed. If the actuator is of the direct coupled type, ensure that the clamp assembly is not worn and the fixings are tight.
5. Actuator position on power failure.	12m	Check for correct position for application when power fails.	This will entail interrupting the power to the actuator at a convenient point. **Do not forget to reconnect the supply** when the check is complete.
6. Reaction to safety signal i.e. fire/smoke.	6m	Check that the actuator assumes correct position (if applicable).	The signal could be in any form from a fusible link in the supply or gear box to an independent signal from a control. If the actuator is integrated into the fire alarm circuit, checks may have to made whilst a fire drill is in operation. See manufacturer's data sheet on this actuator and relevant control and/or sensor section.
7. Reaction to control signal.	12m	Check for correct response to signal.	See the relevant controls section.
8. Running time (if applicable).	12m	Check	See manufacturer's data sheet.

POWER FAIL-SPRING RETURN ACTUATOR

ITEM	FREQ.	ACTION	NOTES
1. Electricity supply.	12m	Check supply voltage and that polarities are correct.	If supply voltages are not found, check to see if supply is via a controller. Refer to manufacturer's data sheet.
2. Control signal.	12m	Check for presence and that polarity is correct.	Refer to manufacturer's data sheet. The previous note can also apply to the control signal.
3. Auxiliary control functions i.e. on/off switches, frost protection, feedback potentiometers position indicators.	12m	Check operation.	See relevant manufacturer's data sheet and auxiliary section.
4. Manual operation (if fitted).	12m	Check to prove actuator will mechanically open/close valve or damper to its working limits.	The actuator may be fitted with the facility to manually wind up the spring, if so the spring must be wound up with the recommended tool. See the manufacturer's data sheet. If the tool is capable of being removed, do so at the end of the test and ensure that the actuator is left in the original position. Ensure that the actuator is returned to the "auto" position (if fitted) after check is completed.
5. Actuator position on power failure.	12m	Check for correct position for application when power fails.	This check must be performed before power is restored to the system or actuator.
6. Running times of spring and motor.	12m	Check.	Times should be within the tolerances specified in the manufacturer's data.