kentintrol

OPERATING & MAINTENANCE INSTRUCTIONS

CAGE GUIDED VALVES
Series 1200 Single Seated Globe Valve
Series 7200 Single Seated Angle Valve

ORIGINAL INSTRUCTIONS

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Introduction

Cage guided valves can be used in general purpose process flow applications such as the control of air, water, steam, oil, gases and chemicals. They are generally specified for higher duty applications where noise, cavitation, flashing, etc., are present. The plug head is usually of balanced construction to reduce the actuator shut off loads required. The flow characteristic is determined by the ports or the drilling of the cage flow path.

Safety

Before starting maintenance refer to publication 'Control Valve Safe Working Practices'.

The valve is a sensitive instrument and should be handled with care. Refer to publication 'Description of Operation, Lifting, Storage and Installation' for details of handling procedures.

Maintenance such as actuator diaphragm, gland packing, or trim replacement can be done without removing the valve from the line. Since most valve locations are not suited for repair operations, these instructions assume that the valve is taken to a workshop for servicing.
Note: Before commencing any maintenance work it is essential to ensure that valve is isolated, de-pressurised and at ambient temperature.

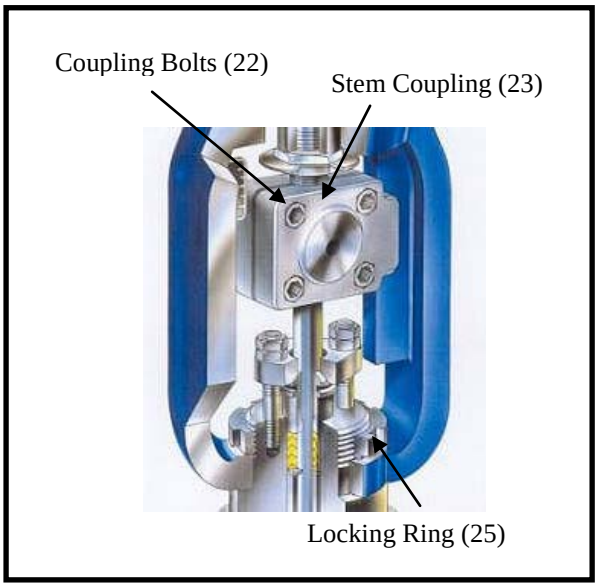
Disconnect all air and power supplies to the actuator and instrumentation. Remove the valve and actuator unit to the workshop

Disassembly

Removal of the actuator

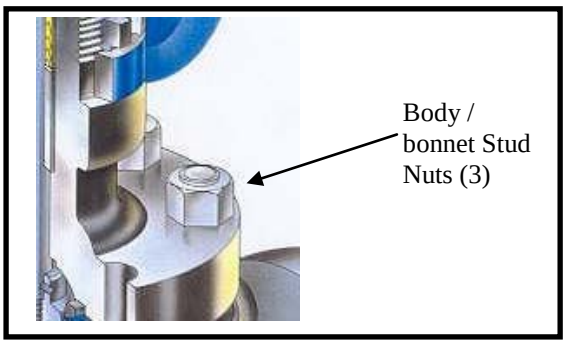
Before removing the actuator note the orientation with the valve body (1)

a) Ensure that the valve plug (8) is lifted off the seat ring (17).
   Apply air if necessary.
   Remove the coupling bolts (22), split and remove the stem coupling (23).
b) Using a drift, unscrew the hammer lug locking ring (25) off the bonnet (5) and lift the actuator clear of the valve taking care not to damage the valve stem (15), actuator or instruments.
   Refer to the relevant instructions for details of actuator and instrumentation maintenance.



Disassembly of the Valve

a) Remove the valve packing's (26) [refer to packing instruction booklet for details]
b) Remove the body/bonnet stud nuts (3).
   Note: On valves that have been in service for a long period, the studs may have rusted in position. Use suitable lubrication, or if necessary apply heat to loosen the nuts.



Note: If heat is applied discard studs and nuts after removal.

c) Ensuring a straight lift, so as not to cause damage to the valve stem (15) or valve internals carefully remove the bonnet (5).
Note: The valve plug and stem may lift with the bonnet, if so care must be taken to ensure that these do not drop out as they may cause damage or injury.
Once the bonnet (5) has been taken from the valve body (1), remove the valve plug (8) and valve stem (15) from the bonnet (5) at the earliest opportunity.

d) Remove and discard the body / bonnet gasket (4) and upper cage gasket (33).

e) Should the valve plug and stem assembly have remained in the valve body then utilizing a straight lift remove from the valve body.
Note: The valve plug and valve stem are usually supplied as a complete set, so separation of the valve plug and valve stem is seldom necessary. Should it be required to remove the valve stem (15) from the valve plug (8), drive out the plug stem pin (16) and unscrew the valve stem (15) from the valve plug (8).

f) There are many types of plug seal ring and wear strip configurations.
Important: note the type and orientation of each seal and wear strip fitted.
Remove and discard all the seals, and wear strip if fitted.

g) Lift the cage (19) from the valve body (1).

h) If fitted with a separate seat ring (17), lift from the valve body (1). Heating the valve body or chilling the seat ring may be required to loosen an extremely tight seat.

i) Remove and discard the lower cage/seat gasket (18).

When the valve is fully dismantled all the components must be cleaned and inspected for wear or damage, if any is noted then dependant on severity refurbish or replace. Remove all cleaned components to a clean area

Plug Assembly

BEFORE ATTEMPTING ASSEMBLY ENSURE THAT ALL COMPONENTS HAVE BEEN INSPECTED AND ARE THOROUGHLY CLEAN

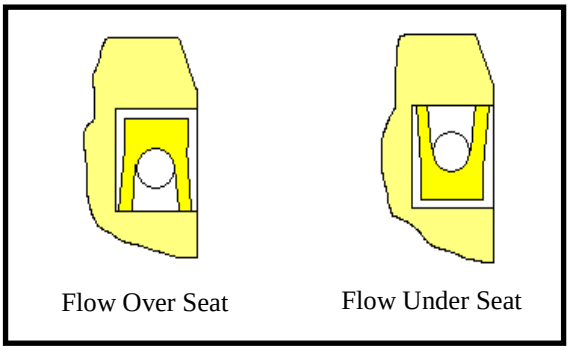
1. Assembly of valve plug and valve stem

a) If the valve plug and valve stem have been separated they must be fitted together before fitting the plug seal rings.

b) Screw the valve stem into the valve plug ensuring that it is screwed fully down and tight. Drill a new hole of a diameter to suit the plug stem pin through the plug boss and valve stem. If a solid pin is to be used then countersink the hole, push the pin through and peen over each end. Polish off the excess material. If a spirol pin is bing used then only a small countersink is required as a lead, then tap in the pin

Assembly of the Plug Seal Rings

Note: Always use new seals and wear strips



1. Fitting a Carbon Graphite Ring

a) Carbon graphite rings are supplied in segmental sections. Insert each ring segment into the groove, ensuring they are fully located when the plug is assembled into the guide.

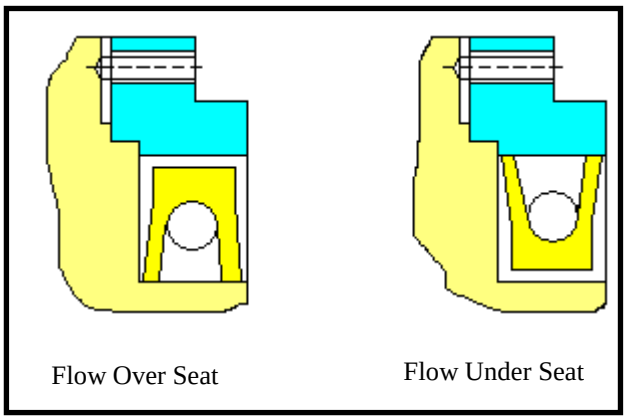
2. Fitting the Slide Over Resilient Seal

a) Resilient seals are installed by sliding the seal over the taper at the top of the plug.

b) Heat the resilient seal to approx 100°C and noting the orientation, carefully slide the seal over the plug head to fit in the seal ring groove. Wait for the seal to re-size before fitting the plug into the guide. A clamp can be fitted around the seal to assist in the re-sizing.

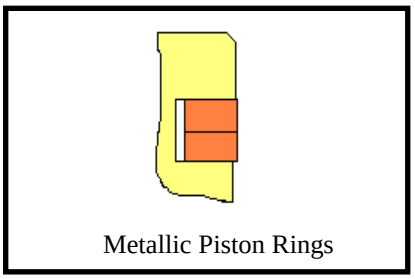
3. Fitting the Resilient Seal with Shroud

a) Some resilient seals cannot be stretched over the plug head and are located in position with a shroud
b) Fit the seal onto the plug head in the correct orientation.
c) Dependant on plug size, either screw the seal retainer fully down and lock in position with the 'kel f' pellets and grub screws or on larger plugs fit the retainer, locate and fully tighten all the cap head screws, upsetting the counter bored holes to make sure the cap head screws are locked in position.



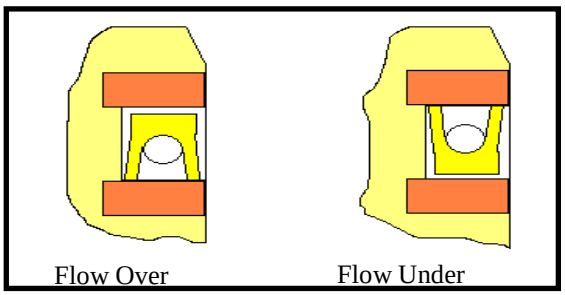
4. Fitting Metallic Piston Rings

a) Metallic seals are supplied and fitted in sets of two fitting in a common groove.
b) Carefully slide each ring over the plug and into the groove ensuring that the joints are at 90° to each other.



5. Fitting Resilient Seal with Metallic Scraper or Back Up rings

a) Slide the lower metallic ring over the plug and locate into position in the bottom ring groove.



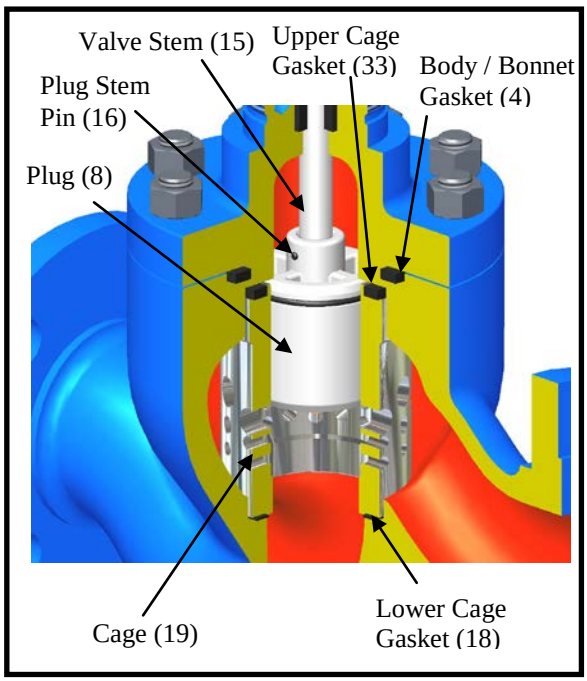
b) Heat the resilient seal to approx 100°C and noting the orientation carefully slide it over the plug head to its position in the resilient seal ring groove.
c) Slide the upper metallic ring over the plug and locate into position in the upper ring groove
d) Wait for the seal to re-size before fitting the plug into the guide. A clamp can be fitted around the seal to assist in the re-sizing.

Valve Assembly

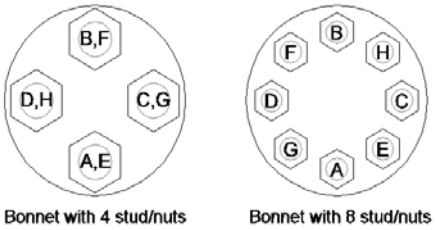
a) Ensure that all parts are thoroughly clean, especially the gasket faces, and the packing box.
b) If the body / bonnet studs have been removed the replacement studs must be screwed into the body radius end first.
c) Place the lower cage gasket (18) into the recess in the valve body bridge.
d) If fitted with a separate seat ring, lower the seat ring (17) into the body and locate over the lower cage gasket (18).
e) Lower the cage (19) into the valve body (1) and locate on the seat ring (17), if integral seat then locate cage (19) directly on the lower cage gasket (18).
f) Place the upper cage gasket (33) onto the cage location diameter.
g) Place the body / bonnet gasket (4) into position in the body recess.

Completing the Body Assembly

a) Taking care not to damage the plug seals lower the fully assembled plug into the cage (19) and ensure that the plug sits squarely on the seat angle.
b) Lower the bonnet (5) carefully over the valve stem and body / bonnet studs (2) so that it sits square on the body / bonnet gasket (4).



c) Re-fit the body / bonnet stud nuts (3). If the nuts were removed by heat then new nuts should be fitted. Tighten the nuts evenly in a diagonal sequence as illustrated using a suitable torque wrench to the torque figures specified. (See Table)

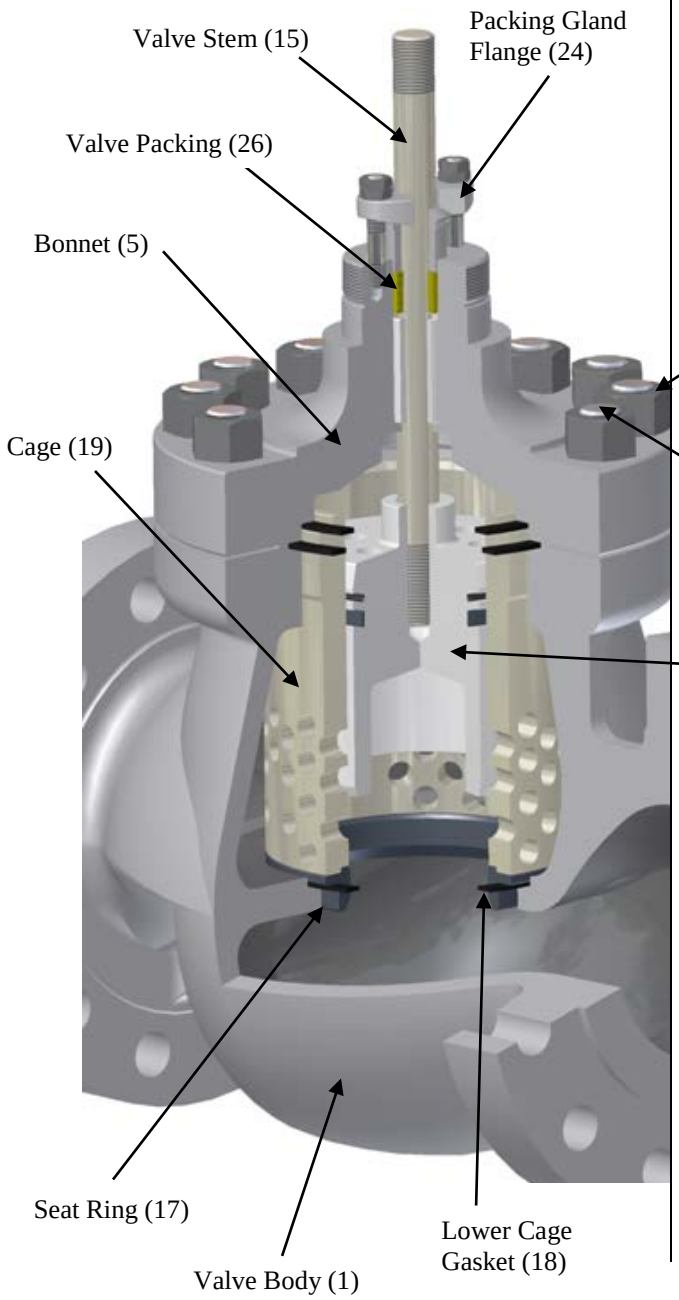


d) Install the valve packings as described in separate packing instructions.

Mounting the Actuator

a) Assemble and adjust the actuator as described in the actuator instruction manual.
b) Carefully lower the actuator over the valve stem (15) and packing gland flange (24) to squarely seat on the bonnet shoulder.
c) Rotate the actuator to the position noted on dis-assembly, then screw the locking ring (25) onto the valve bonnet threads and using a drift tighten securely.
d) Ensure that the valve plug remains on its seat and that the actuator is at its lowest point of travel while connecting the stem coupling. (apply air if necessary)
e) Locate half of the coupling which is threaded for the coupling screw against the valve and actuator stem threads (it might be necessary to lift the plug slightly to mesh the threads) so that:
   i. The ends of the valve and actuator stems are equidistant in the coupling.
   ii. The tapped coupling screw hole is on the same side of the actuator as the positioner or other accessories which may require attachment to the coupling.
f) Apply the other half of the coupling, carefully engaging the threads. Insert the coupling bolts and tighten by hand

g) Maintain the actuator stem at its lowest position of travel whilst preventing the stem coupling from rotating, unscrew the valve plug stem out of the coupling until the valve is firmly seated.
h) Move the plug off the seat by either applying or venting air from the actuator. Unscrew the stem an additional turn out of the coupling to ensure positive seating.
i) Tighten the coupling securely.
j) Seat the plug firmly by means of the actuator.
k) Adjust the travel scale so that the 'shut' mark is opposite the travel indicator ring.
l) Disconnect the air supply and refit any instrumentation



BODY/BONNET BOLT TORQUE

BOLT DIA	MAX TORQUE
1/2"	40 Nm
5/8"	78 Nm
3/4"	138 Nm
7/8"	222 Nm
1"	330 Nm
1.1/8"	483 Nm
1.1/4"	675 Nm
1.3/8"	912 Nm
1.1/2"	1200 Nm
1.5/8"	1580 Nm
1.3/4"	1940 Nm
1.7/8"	2405 Nm
2"	2906 Nm
2.1/4"	4226 Nm

Torque figures are for lubricated studs & nuts