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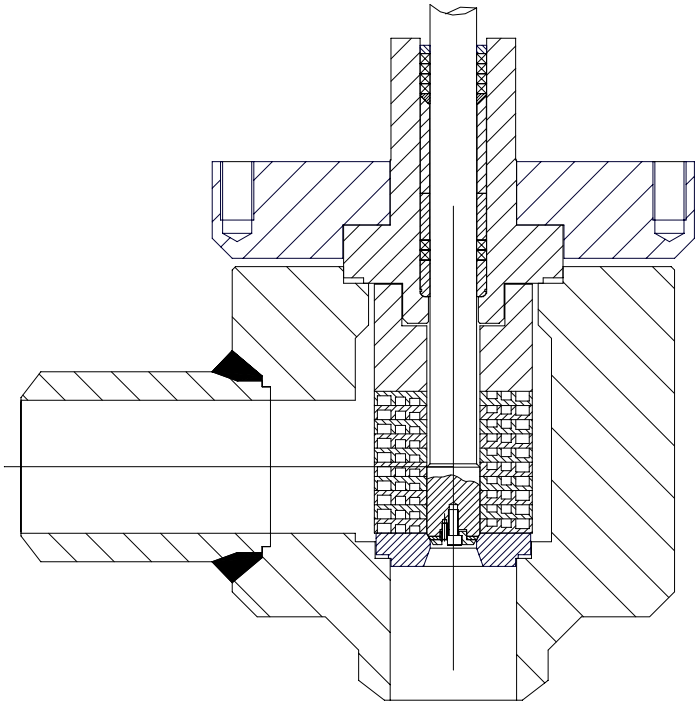
## 1. General

The ED disk stack trim is fitted to Mitech globe control valves to enable the valve to handle high pressure drop conditions.

- In liquid applications cavitation would otherwise cause vibration and damage to the internals leading to premature failure.
- In gas and vapour applications high pressure drop leads to excessive fluid velocities and high noise levels being generated.

The disk stack works by converting pressure directly into heat energy – preventing the occurrence of high velocities and low pressure regions.

The disk stack fits inside the gallery of the valve on top of the seat ring and is clamped into position by the process of tightening down the bonnet bolting.



**Drawing 1:** Disk Stack fitted within Control Valve Body

## 2. Installation

***Refer to the MITECH Globe Control Valve installation and maintenance bulletin for recommendations concerning the installation of the standard control valve.***

## 3. Flow Direction

The fluid flow direction is always from under the plug for gas and vapour applications. For liquid duties the disks can be designed such that the flow can be in either direction – please note that it is important that the flow must be in the same direction for which the design was done.
A flow arrow is attached to the body to indicate the correct flow direction.

## 4. Cleanliness

The clearances between the plug head and the bore of the disk stack vary with the application but generally are small and dirt in the process lines can cause damage and possible seizure.

Should the flow be under the plug particular care must be taken to ensure that the process is clean and that no particles such as welding slag are introduced during installation. With flow over liquid applications large particles will be trapped on the outside of the stack and will limit the flow through the valve, but will not cause damage to the valve.

If the chance of particles cannot be eliminated the valve internals (disk stack and seat ring) must be removed during installation and only replaced after the lines have been flushed. The plug can be left in place to maintain the seal of the process line to the atmosphere.

## 5. Commissioning

The only special action required for ED disk stack valves during commissioning is to ensure that the movement is smooth during stroking – to check that the plug is free in the stack.

## 6. Disassembly of Disk Stack Valve

Should it become necessary to take the valve apart the following steps should be followed: -

6.1 Preferably remove the actuator from the valve before unscrewing the bonnet nuts. If this cannot be done move the plug to the fully open position and ensure that the top works assembly is lifted as close to vertical as possible.
6.2 Do not attempt to strip an ED disk stack valve in line if it has not been installed in any other position than upright – the valve must first be removed from the line.
6.3 Remove all bonnet nuts.
6.4 Lift bonnet flange and bonnet assembly off body. Remove the plug. If plug is removed with bonnet assembly take care to let the plug slide through the disk stack. Ensure the plug does not fall.
6.5 Should the bonnet be lifted ensure that the plug cannot fall once the bonnet assembly is clear of the valve.
6.6 Should some or all of the disks come out attached to the plug take care that these do not come loose and fall.
6.7 Remove the disk stack through the bonnet bore – each disk is numbered and should be identified so that the sequence and orientation can be maintained on assembly.
6.8 Remove seat ring and both the bonnet and seat gasket.

## Inspection of Trim

Study the plug, seat ring and disk stack for wear or damage.

| | |
|---|---|
| Scoring on plug head and stack bore | • indicates presence of foreign material or misalignment |
| Cutting of seating faces on plug and seat | • result of failure of valve to maintain tight shut off |
| Clogging of disk passageways with debris | • build up of magnetite or particles |
| Damage to passageways of disks | • excessive velocities or cavitation |

Contact local MITECH agent or factory for advise on preventing ongoing problems.

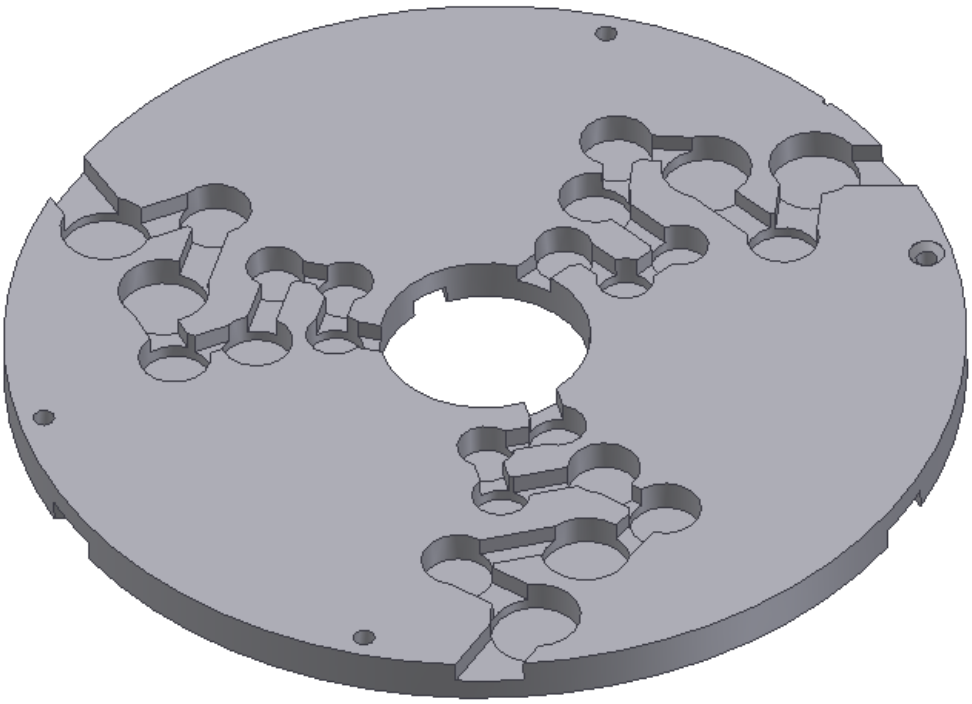
## 7. Re–assembly of valve

Do not attempt to rebuild the valve unless the body is in a vertical position.
Clean all components and carefully remove all burrs on disks, seat and plug.

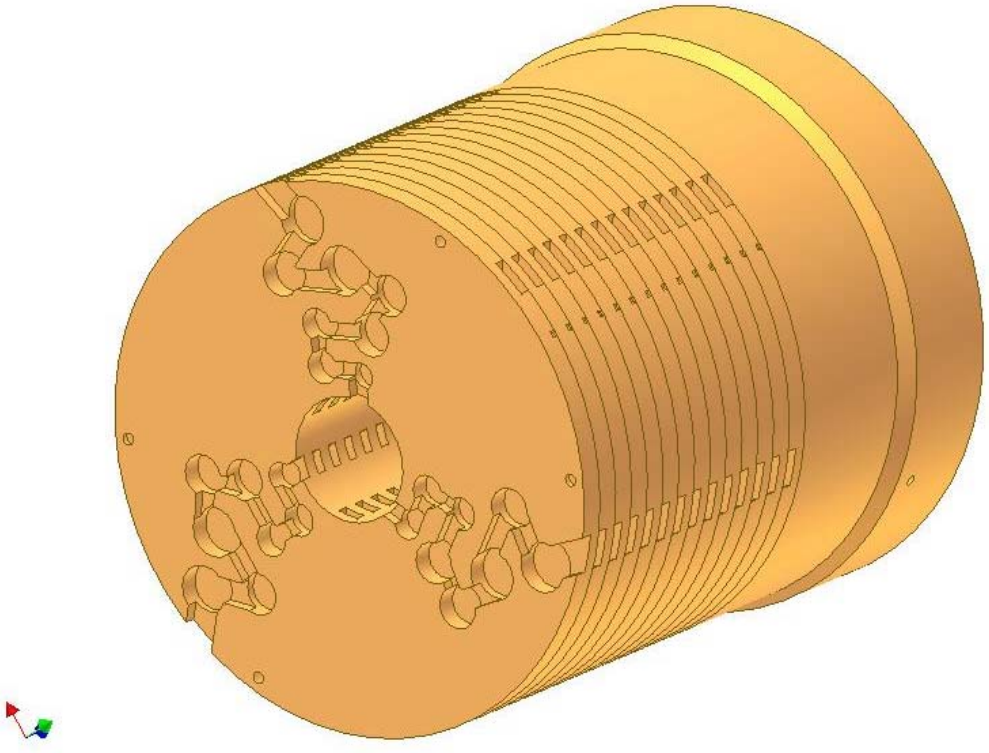
8.1 Insert new seat gasket on the seat ring recess in the body.
8.2 Position seat ring in body
8.3 Place disk stack on seat ring – this can be done as an assembly for small stacks or one disk at a time on the larger sized ones. The disks are marked with a number and the original sequence and orientation must be kept. Once the stack is assembled, the slots in each disk should all line up with those in the other disks. Two pins in each disk are used to assist with the alignment.
8.4 Position a new bonnet gasket into the body recess.
8.5 Insert the plug through the stack – lower the bonnet assembly over the plug stem and hand tighten the bonnet nuts.
8.6 With high temperature applications the clearance between the disk bore and the plug is significant and pins are used to align the bottom disk with the bore of the seat ring. On low temperature applications the plug is used to ensure that the stack is correctly aligned.
8.7 When building these valves the plug must be carefully moved (preferably by hand) throughout its stroke to align the disk stack initially with the plug and then with the seat ring. The seat ring is free for radial movement but the weight of the disk stack sitting on top will restrict this. Take care during initial assembly to align the components as accurately as possible.
8.8 Gradually and uniformly tighten the bonnet studs – checking regularly for parallelism of the bonnet flange to the body. A set of hexagonal socket wrenches can be used for gauges. Move the plug up and down regularly to ensure freedom of movement.
8.9 Once the bonnet is fully tightened into the body fit the actuator. Stroke valve checking that the plug movement is smooth and no contact between the plug head and disk bores can be detected.
8.10 Check for seat leakage. Many disk stack valves operate in the closed position for much of their life, with a high pressure drop across the seat. A small leakage will cause damage to take place which then increases the leakage rate and

consequently the rate of damage will increase exponentially. The only way to prevent this is to ensure that the valve when rebuilt, shuts off tight.

## 8. ENERGY DISSIPATING DISK STACK DRAWINGS



**Drawing 2**: Energy Dissipating Disk – showing expansion paths



**Drawing 3**: Energy Dissipating Disk Stack