Kinetrol Dashpot Overview

Rotary Dashpots

Kinetrol rotary dashpots
Kinetrol rotary dashpots are precision fluid damping devices which give a smooth resistance to shaft rotation which increases with angular velocity. Two types of dashpot are available to suit a wide range of applications.

- **Vane dashpots**
  Vane dashpots give a restricted travel and high damping rate suitable for applications with reciprocating motions.

- **Continuous rotation dashpots**
  Continuous rotation dashpots give less damping rate but unlimited travel.

Silicone Fluid (Polydimethyl Siloxane - DC200 or equivalent)
Silicone fluid is used as the damping medium because of its stable viscous properties. Daspots are normally vacuum filled and sealed for life.

Rigorous 100% inspection
Kinetrol's rigorous quality programme, approved to ISO 9001, ensures that each unit is manufactured to high standards. Every dashpot is tested to ensure that it gives the specified rate.

Certificate No. FM22163

Vane Dashpots

Angle of travel:

60°	(model KD)
215°	(model LA)
220°	(model LE)
220°	(model LH)
220°	(model LX)
240°	(model LB)

Maximum torque:

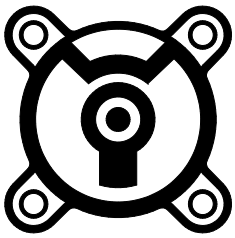
28 Nm	(model KD)
40 Nm	(model LA)
160 Nm	(model LB)
545 Nm	(model LE)
640 Nm	(model LX)
960 Nm	(model LH)

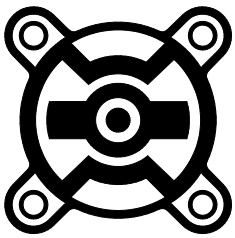
Maximum rate:

450 Nm/rad/s	(model KD)
300 Nm/rad/s	(model LA)
400 Nm/rad/s	(model LB)
12000 Nm/rad/s	(model LE)
18000 Nm/rad/s	(model LX)
18000 Nm/rad/s	(model LH)

Adjustable versions available

The vane dashpot is a displacement damper. As the vane on the shaft rotates between fixed vanes on the body, silicone fluid is displaced through controlled clearances from one side of the vane to the other. Damping can be in both directions or valves can be fitted to give damping in one direction only. On the KD unit, shaft sealing is by a cylindrical rubber seal which is bonded both to the shaft and to the body to give a hermetic seal. All other vane dashpots use a lip seal.





Continuous Rotation Dashpots

Unlimited travel

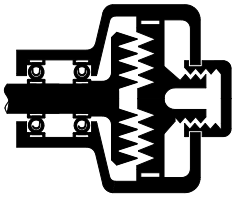
Maximum torque:

0.4 Nm	(model N-CRD)
1.5 Nm	(model Q-CRD)
6 Nm	(model X-CRD)
7 Nm	(model S-CRD)
45 Nm	(model T-CRD)

Effective rate:
up to 20 Nm/rad/s (T–CRD)

Adjustable versions available

Continuous rotation dashpots give viscous damping by shearing thin layers of silicone fluid between the concentric surfaces of a rotor and a fixed stator. Damping is normally in both directions. The shaft is sealed with a lip seal. Damping is adjusted by varying the effective thickness of the sheared layer of fluid by moving the stator relative to the rotor.



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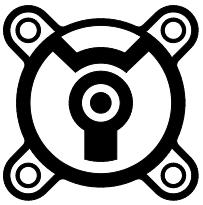
General Notes

- For calculation purposes the rotation speed of the dashpot is given in RADIANS per second (1 radian = 57.3°). The significance of a radian is that if, for example, a 1 metre radius lever rotates through 1 radian, the end of the lever moves 1 metre, a distance equal to the radius.
- Damping RATE is defined here as TORQUE divided by ROTATION SPEED. Note that a dashpot with a high rate may not necessarily be working at a high torque. For example, may have a rate of 100 Nm/rad/s; however, it may be rotated at 1/10 rad/s so that the damping torque produced is 10 Nm which is not numerically equal to the rate.

Dashpot Selection

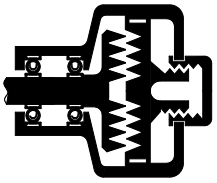
- To select a suitable dashpot for an application, the suggested procedure is to first establish the RATE required. Most applications can be reduced to one of the cases shown. Please see calculations data sheet.
- Having established the rate required, the type of dashpot (vane or continuous rotation) must be selected. This usually depends on the angle of travel required.
- It is recommended that initially an adjustable dashpot is used in an application. This allows the exact damping rate to be established. Subsequent units can then be supplied with fixed rates based on measurement of the adjustable unit as set on the application.

Vane Dashpots - (High rate, restricted travel)



- Establish the rate from the formula. Please see calculations data sheet.
- Check that the maximum shaft torque does not exceed the maximum allowable. Note that max. torque = RATE x max. speed of rotation.
- For a vane dashpot the RATE does not vary much with speed and so can be used to specify the unit.

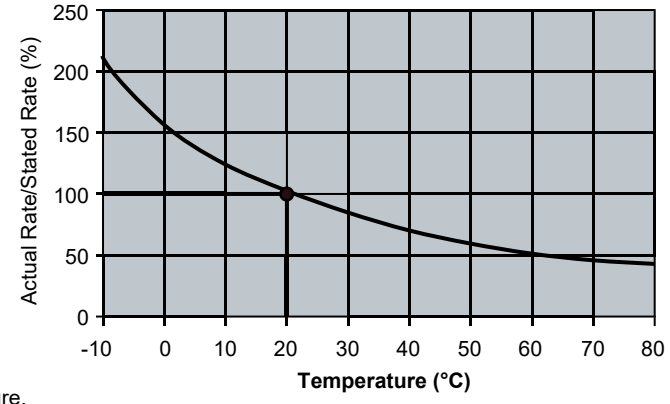
Continuous Rotation Dashpots - (Lower rate, unlimited travel)



- Establish the rate from the formula. Please see calculations data sheet.
- Calculate the working speed w in radians/sec.
- Calculate the working torque (RATE x working speed of rotation).
- The rate of a CR dashpot is not constant. It varies with speed. This is because at the high shear rates used by this method of damping the viscosity of the fluid is not constant (Non-Newtonian). The performance of a CR dashpot is thus not specified by a single rate but is specified by a graph showing torque against speed of rotation.
- To select a CR dashpot plot the required working torque against the speed on the graph given on the data sheet. The nearest curve above the point gives the selected dashpot.

Temperature Effects

Damping rate is reduced by increases in fluid temperature (and increased by reduction in temperature). The graph opposite indicates the percentage change in damping rate with temperature, relative to the rate quoted at 20°C (68°F).



Dashpots compensated for temperature change, to keep damping rate constant, can be supplied to special order.

In addition to the effect of ambient temperature, heating of the dashpot above ambient is caused by the power absorbed by the damping action. Power dissipation limits are given for 20°C (68°F) ambient. At temperatures above 20°C (68°F) these power limits are derated by a factor:

$$(T_L - T_A) / (T_L - 20)$$

where T_L = Limit Temperature and T_A = Ambient Temperature.

Provision is made for temperature expansion of the fluid and no topping up is required during the life of the dashpot.