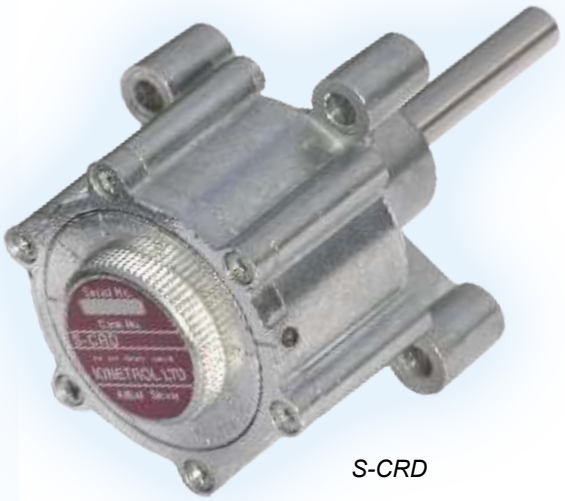
KINETROL

Dashpots

Rotary Dampers

Catalogue Index

Precision Rotary Dampers for Smooth Motion Control



S-CRD

- vibration damping
- speed control
- shock absorption
- slipping drives
- mechanical delays

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The policy of Kinetrol is one of continuous improvement and the company reserves the right to alter the product as described and illustrated without notice. Whilst every effort is made to ensure that information presented is correct, Kinetrol will not be responsible for incorrect application of Kinetrol dashpots following the use of data given in this brochure.

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

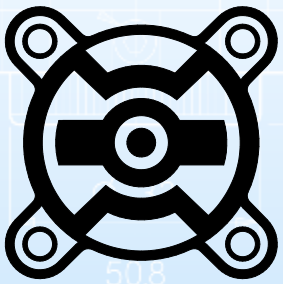
Angle of travel:
60° (model KD)
215° (model LA)
240° (model LB)

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

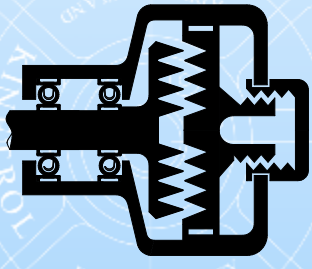
Unlimited travel

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.



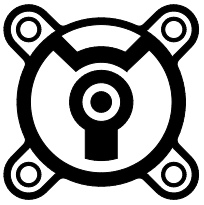
General Notes

- 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

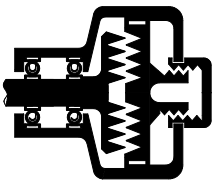
- To select a suitable dashpot for an application, the suggested procedure is to first establish the RATE required. Most applications can be reduced to one of the cases shown opposite. The formula concerned will give the RATE.
- Having established the rate required, the type of dashpot (vane or continuous 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 for one of the cases opposite (or otherwise).
- 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.

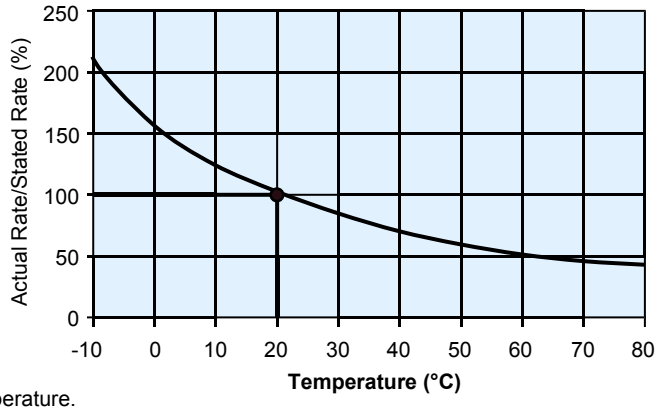
Continuous Rotation Dashpots - (Lower rate, unlimited travel)



- Establish the rate from the formula for one of the cases opposite (or otherwise).
- 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 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.



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 ambient. At temperatures above 20°C these power limits are derated by a factor:

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

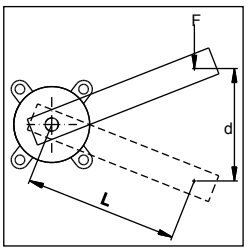
where T_L = Limit Temperature and T_A = Ambient Temperature.

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

Metric Units

Given quantity and unit

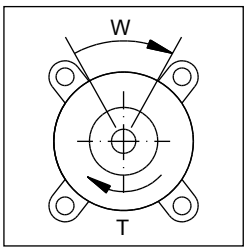
F	N	=	force of weight on end of lever	**t**	s	=	time taken to move this distance	**M**	kg	=	mass
L	m	=	effective length of lever	**w**	rad/s	=	speed of rotation	**V**	m/s	=	velocity of mass
d	m	=	distance moved by end of lever	**T**	Nm	=	torque applied to shaft	**f**	Hz	=	frequency of vibration



1 Steady movement in a straight line.

Required rate:

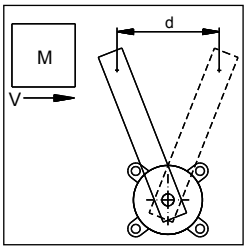
$$= \frac{FL^2t}{d} \text{ Nm/rad/s}$$



2 Steady rotation.

Required rate:

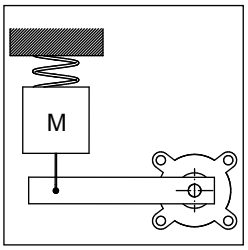
$$= \frac{T}{w} \text{ Nm/rad/s}$$



3 Deceleration of mass moving in a straight line.

Required rate:

$$= \frac{MVL^2}{d} \text{ Nm/rad/s}$$



4 Critical damping of vibrating mass.

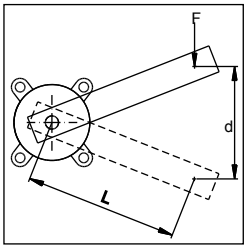
Required rate:

$$= \frac{MfL^2}{0.08} \text{ Nm/rad/s}$$

English Units

Given quantity and unit

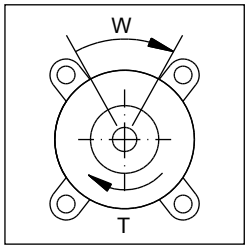
F	lbf	=	force of weight on end of lever	**t**	s	=	time taken to move this distance	**M**	lbf	=	mass
L	in	=	effective length of lever	**w**	rad/s	=	speed of rotation	**V**	in/s	=	velocity of mass
d	in	=	distance moved by end of lever	**T**	lbf.ins	=	torque applied to shaft	**f**	Hz	=	frequency of vibration



1 Steady movement in a straight line.

Required rate:

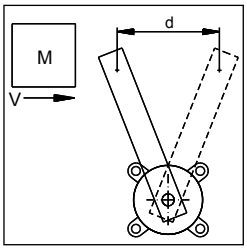
$$= \frac{FL^2t}{d} \text{ lbf.ins/rad/s}$$



2 Steady rotation.

Required rate:

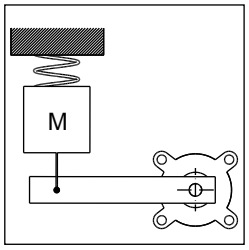
$$= \frac{T}{w} \text{ lbf.ins/rad/s}$$



3 Deceleration of mass moving in a straight line.

Required rate:

$$= \frac{MVL^2}{386d} \text{ lbf.ins/rad/s}$$



4 Critical damping of vibrating mass.

Required rate:

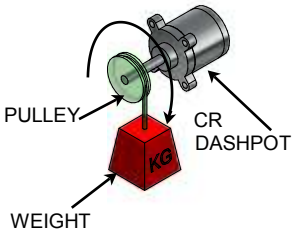
$$= \frac{MfL^2}{30.7} \text{ lbf.ins/rad/s}$$

Conversion factors

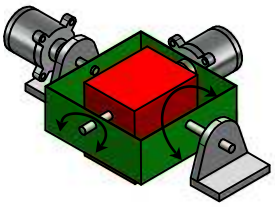
1	rad	=	57.3°	1	RPM	=	0.1047 rad/s	1	lbf.ins	=	0.113 Nm
1	Nm	=	8.85 lbf.ins	1	lbf	=	4.45 N	9.81 N		=	1 kgf = 1 kp

Sketches Showing Some Application Ideas

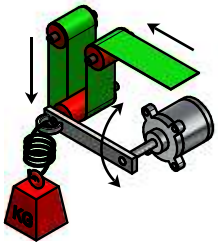
CONTROL OF DESCENT



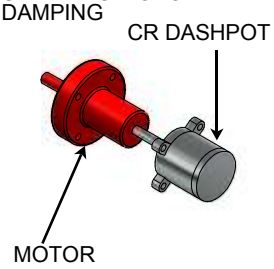
DAMPING GIMBALS



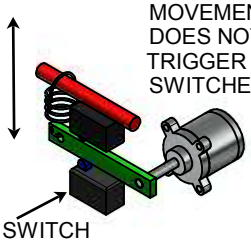
TENSION ROLLER DAMPING



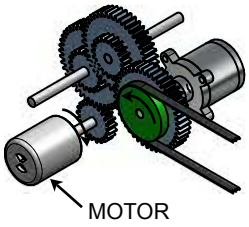
STEPPING MOTOR DAMPING



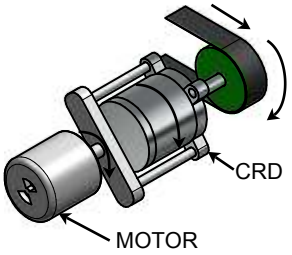
VEHICLE LEVEL SENSOR HIGH FREQ. MOVEMENT DOES NOT TRIGGER SWITCHES



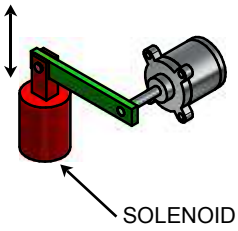
DAMPING GEAR TRAIN VIBRATION



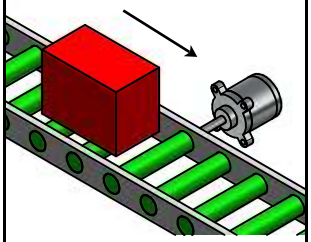
DRIVING TAKE UP REEL



SOLENOID DAMPING

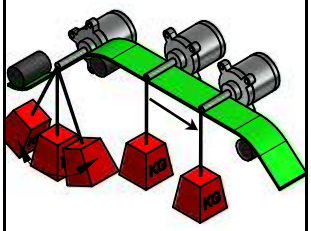


CONVEYOR ROLLER DAMPING

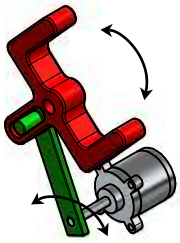


DAMPING SPRING LOADED ARM

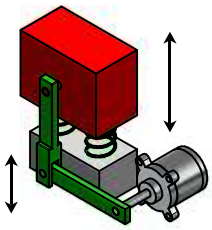
HANGING CONVEYOR DAMPING



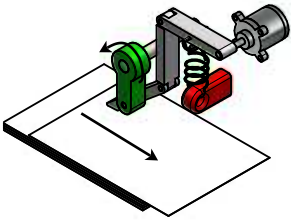
MANUAL CONTROL YOKE DAMPING



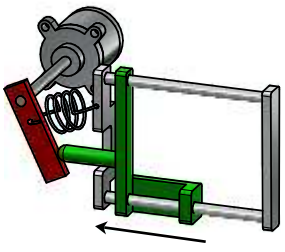
DAMPING ANTI-VIBRATION MOUNTING



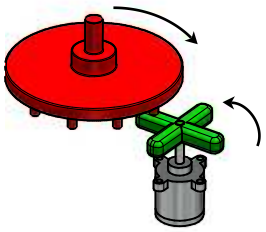
DAMPING HIGH SPEED PAPER FEED



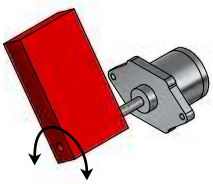
CARRIAGE END STOP DAMPING



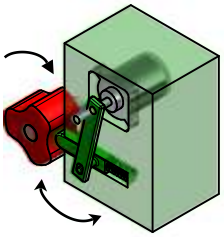
INDEXING TABLE BOUNCE DAMPING



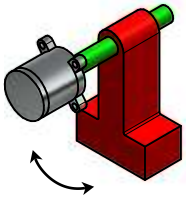
DAMPING UNBALANCED WEIGHTS



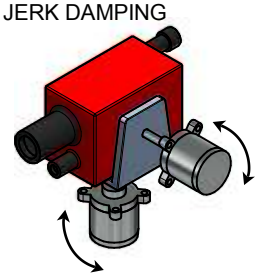
TURNSTILE MOTION CONTROL



PENDULUM SWING DAMPING

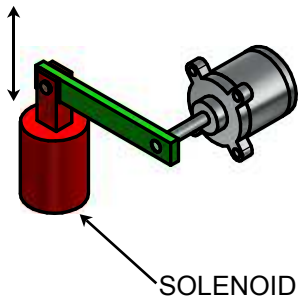


CAMERA PAN & TILT JERK DAMPING



Solenoid Damping

SOLENOID DAMPING



Solenoid force **F** = 10 N
Solenoid travel **d** = 25 mm = 0.025 m
Lever arm length **L** = 75 mm = 0.075 m
Travel time required **t** = 5 s

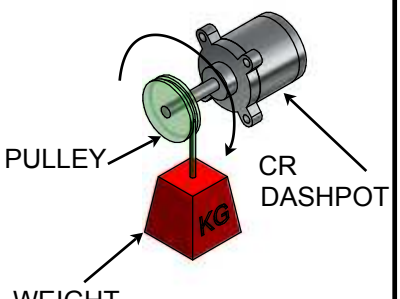
Use Formula 1: Rate = $\frac{FL^2t}{d}$ = $\frac{10 \times 0.075^2 \times 5}{0.025}$

= 11.2 Nm/rad/s (99 lbf.Ins/rad/s)

Conclusion: **Use KD – A2**

Control of Descent

CONTROL OF DESCENT



Weight = 1 kg
Pulley radius = 50 mm = 0.505 m
Speed required **V** = 100 mm/s = 0.1 m/s
Force **F** = 1 x 9.81 = 9.81 N
Torque **T** = 9.81 x 0.05 = 0.49 Nm
Speed of rotation **w** = 0.1 m/s ÷ 0.05 m = 2 rad/s

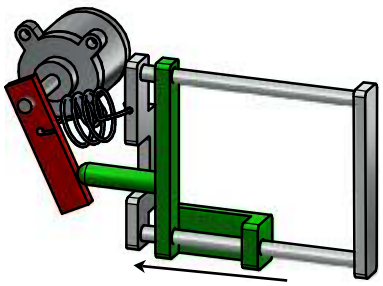
Use Formula 2: Rate = T/w = 0.49/2 = 0.245 Nm/rad/s

This is a CR dashpot application. Find point on the S – CRD graph for torque and speed

Conclusion: **Use S – CRD – 30,000**

Carriage Mechanism End Stop Damping

CARRIAGE END STOP DAMPING



Carriage mass **M** = 10 kg
Velocity **V** = 1 m/s
Deceleration distance **d** = 50 mm = 0.050 m
Lever length **L** = 75 mm = 0.075 m

Use Formula 3: Rate = $\frac{MVL^2}{d}$ = $\frac{10 \times 1 \times 0.075^2}{0.05}$

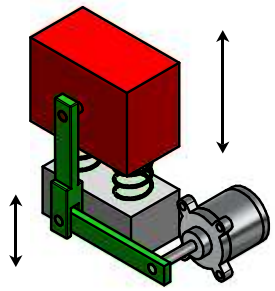
= 1.1 Nm/rad/s (9.7 lbf.Ins/rad/s)

Check max. rotation speed = 1 m/s ÷ 0.075 m = 13.3 rad/s
Hence max. torque = 13.3 x 1.1 = 14.7 Nm (130 lbf.Ins)

Conclusion: **Use KD – A1**

Damping Anti-Vibration Mounting

DAMPING ANTI-VIBRATION MOUNTING



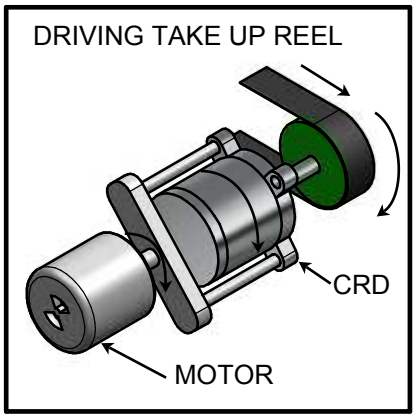
Mass **M** = 10 kg
Natural frequency **f** = 20 Hz
Lever length **L** = 100 mm = 0.10 m

Use Formula 4: Rate = $\frac{MfL^2}{0.08}$ = $\frac{10 \times 20 \times 0.1^2}{0.08}$

= 25 Nm/rad/s (220 lbf.Ins/rad/s)

Conclusion: **Use KD – A3**

Notes on Constant Tension Take Up Reel



A CR dashpot can be used as a slipping drive between a geared motor and a take up reel for winding tape or wire on to a reel. If sized correctly the tension in the tape can be maintained within reasonable limits for a ratio of maximum to minimum reel radius of up to 2.5. Difficulty sometimes arises because it is necessary to select the correct motor speed as well as dashpot rate.

Suggested Procedure

Given:
- Tape linear speed **V** — m/s
- Required tension **f** — N
- Minimum reel radius **a** — m
- Maximum reel radius **b** — m

Required motor speed **n** = $13\ V/a$ rpm

Required damping rate **k** = $\frac{400\ f\ V}{n^2}$ Nm/rad/s

CR dashpot must give torque $\frac{0.4\ k\ V}{a}$

At a speed of $0.4\ V/a$ rad/s.

Check max. Power dissipated = $k(0.1n - V/b)^2$ W

This must be less than 10W for S – CRD and 40W for T – CRD.

SPECIAL DASHPOT QUESTIONNAIRE

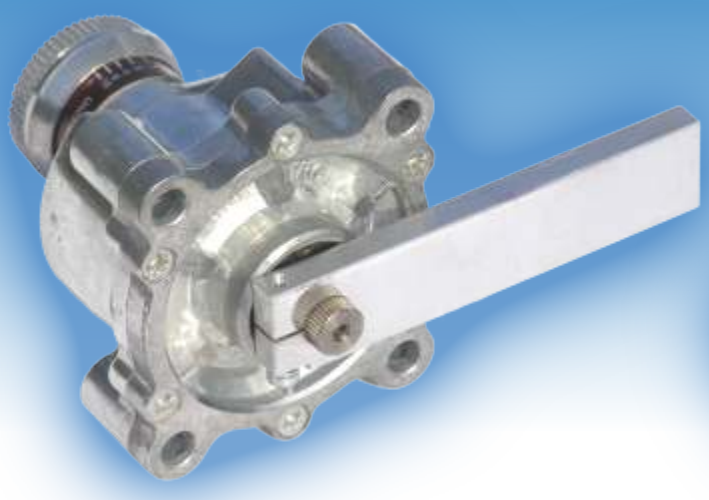
When standard dashpots are not suitable, special dampers (metal or plastic) may be offered for high volume applications. To engineer a special unit the following information is required:

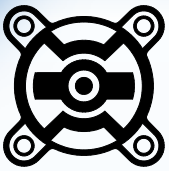
1. *Continuous rotation or reciprocating (state angle of travel) type.
2. *Fixed rate or adjustable rate.
3. *Unidirectional or bi-directional damping.
4. Maximum operating speed.
5. *Maximum operating torque (for strength).
6. *Nominal torque and tolerance at specified speed and at 20°C (for damping rate).
7. Maximum allowable frictional torque in each direction.
8. *Maximum and minimum ambient temperatures.
9. *Energy dissipation (watts).
10. *Typical cycle description and period between cycles/sequences
11. *Maximum acceptable dimensions.
12. Mounting arrangement, eg 2 or 4 lugs, clamped body, central or end flange.
13. Drive arrangement, eg male or female, square or round with splines or keyway.
14. Maximum side load.
15. Maximum end load.
16. Materials, eg zinc alloy, aluminium or acetal polymer.
17. Surface finish, eg natural or painted.
18. *Maximum weight.
19. Any production test requirements.
20. *Volume requirements.
21. *Target unit price.
22. Storage periods and conditions.

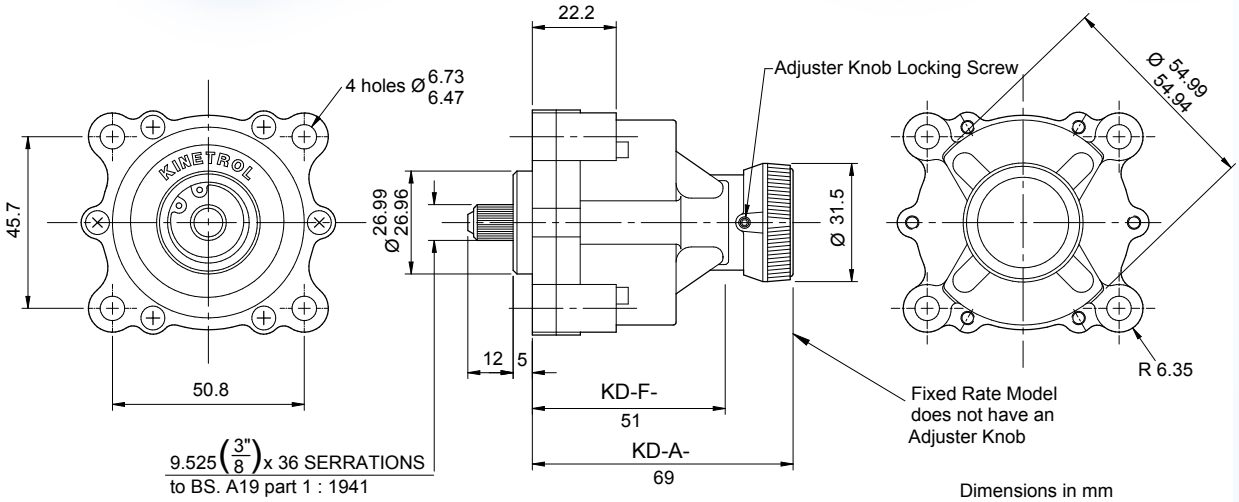
The data marked with an * is essential to initiate any study but all of the above data will be required before a product can be produced.

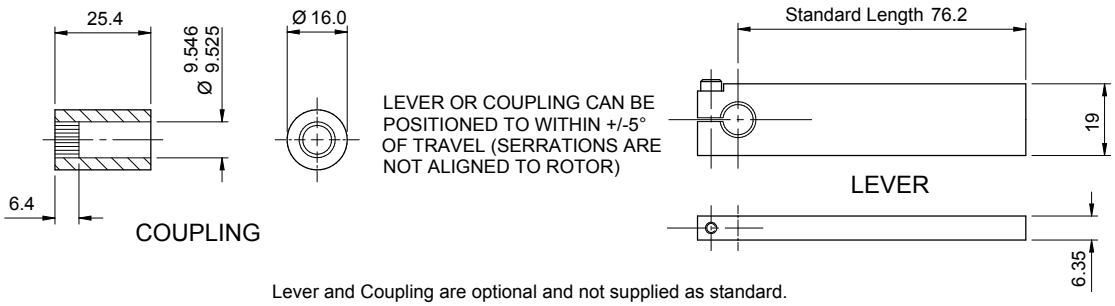
KF-681 3/11

Model KD
60° Vane Dashpot









Lever and Coupling are optional and not supplied as standard.

Adjustable Rate Model KD – A

Has an adjuster which permits any damping rate to be obtained within one of the following ranges. This range must be specified when ordering the dashpot.

- **A1:** 0.8 to 10 lbf.ins/rad/s / 0.09 to 1.13 Nm/rad/s
- **A2:** 10 to 100 lbf.ins/rad/s / 1.13 to 11.3 Nm/rad/s
- **A3:** 100 to 1100 lbf.ins/rad/s / 11.3 to 124 Nm/rad/s
- **A4:** 260 to 2600 lbf.ins/rad/s / 29 to 293 Nm/rad/s

Ordering Codes

Fixed Rate Model	Adjustable Rate Model
KD – F (Rate) – DD	KD – A1, 2, 3 or 4 – DD
KD – F (Rate) – FC or FAC	KD – A1, 2, 3 or 4 – FC or FAC

Options

The following features may be specified for either model:

Differential Rate (FC or FAC)
Gives a large resistance in one direction only and less than 1/10 resistance in the other. Specify free clockwise or free anticlockwise when viewed from shaft end. Internal valves in this type of dashpot give slight backlash. If application demands, very low backlash valve may be fitted - consult Kinetrol.

Double Damping (DD)
Gives equal resistance in either direction. External end stops must be provided.

Levers and Couplings
Splined aluminium or steel levers and steel couplings are available as an option.

Specification

Rate
Fixed rate model KD–F
Any value (± 10%) between:
min: 2.0 lbf.Ins/rad/s
0.22 Nm/rad/s
max: 4000 lbf.Ins/rad/s
450 Nm/rad/s
Adjustable rate model
See opposite

Angle of travel
60° ± ½°
External end stops must be provided

Max. safe torque
250 lbf.ins / 28 Nm
Continuous power dissipation not to exceed 10W at 20°C ambient.

Max. shaft end load
10 lbf / 45 N

Max. shaft side load
40 lbf / 178 N

Ambient temperature range
0°C to 40°C

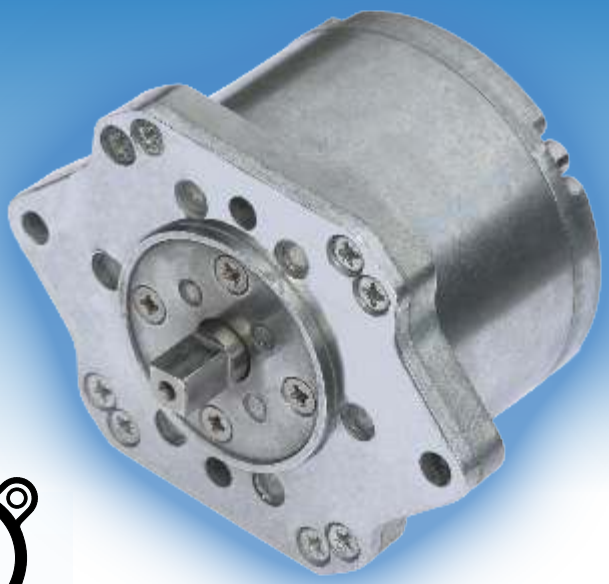
Frictional torque
0.01 lbf.ins / 0.001 Nm typical

Shaft material
Stainless steel 431S29

Body material
Zinc alloy Mazak 3

Weight
KD – F 16.6 ozs / 472 g
KD – A 18.4 ozs / 522 g

Model LA
240° Vane Dashpot



Specification

Rate
Adjustable
Max (LA4): 300 Nm/rad/s
(2700 lbf.ins/rad/s)

Angle of travel
240° ± 5°
External end stops
must be provided

Max. safe torque
350 lbf.ins / 40 Nm
Continuous power
dissipation not to exceed
10W at 20°C ambient

Max. shaft end load
2 lbf / 10 N

Max. shaft side load
100 lbf / 450 N

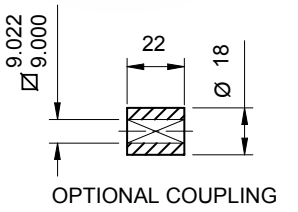
Ambient temperature range
0°C to 60°C

Frictional torque
2 lbf.ins / 0.2 Nm typical

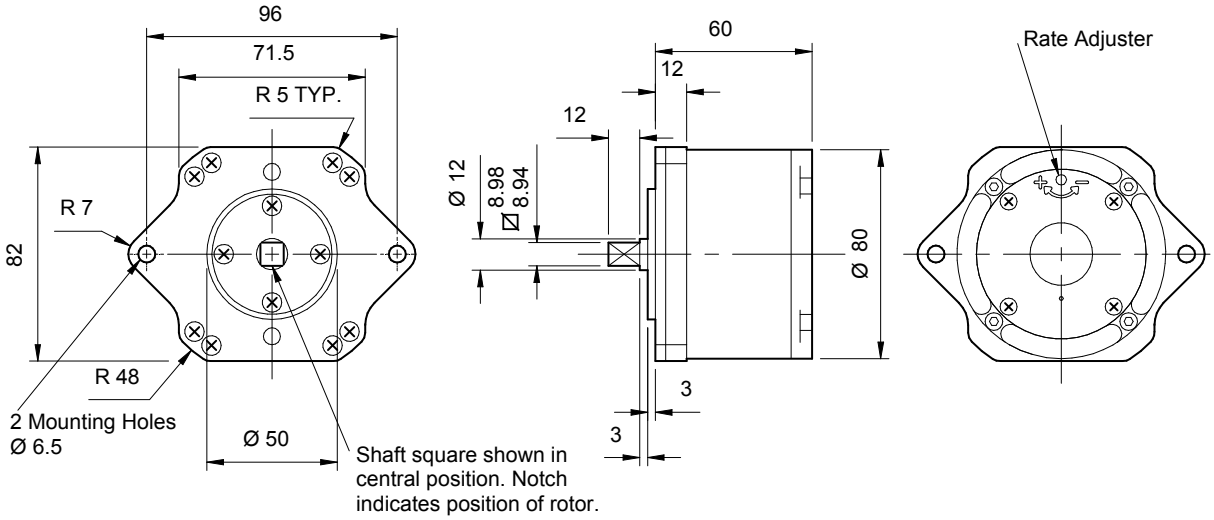
Shaft material
Stainless steel 441S49

Body material
Zinc alloy Ilzro 16

Weight
3.6 lbs / 1.61 kg



Dimensions in mm



Rates

An adjuster permits any damping rate to be obtained within one of the following ranges. The range must be specified when ordering the dashpot.

- **LA1:** 22 to 220 lbf.ins/rad/s / 2.5 to 25 Nm/rad/s
- **LA2:** 53 to 530 lbf.ins/rad/s / 6 to 60 Nm/rad/s
- **LA3:** 106 to 1060 lbf.ins/rad/s / 12 to 120 Nm/rad/s
- **LA4:** 266 to 2660 lbf.ins/rad/s / 30 to 300 Nm/rad/s

With adjuster set to maximum the rate may exceed stated maximum and with adjuster set to minimum the rate may be less than stated minimum.

Options

The following features may be specified for any model:

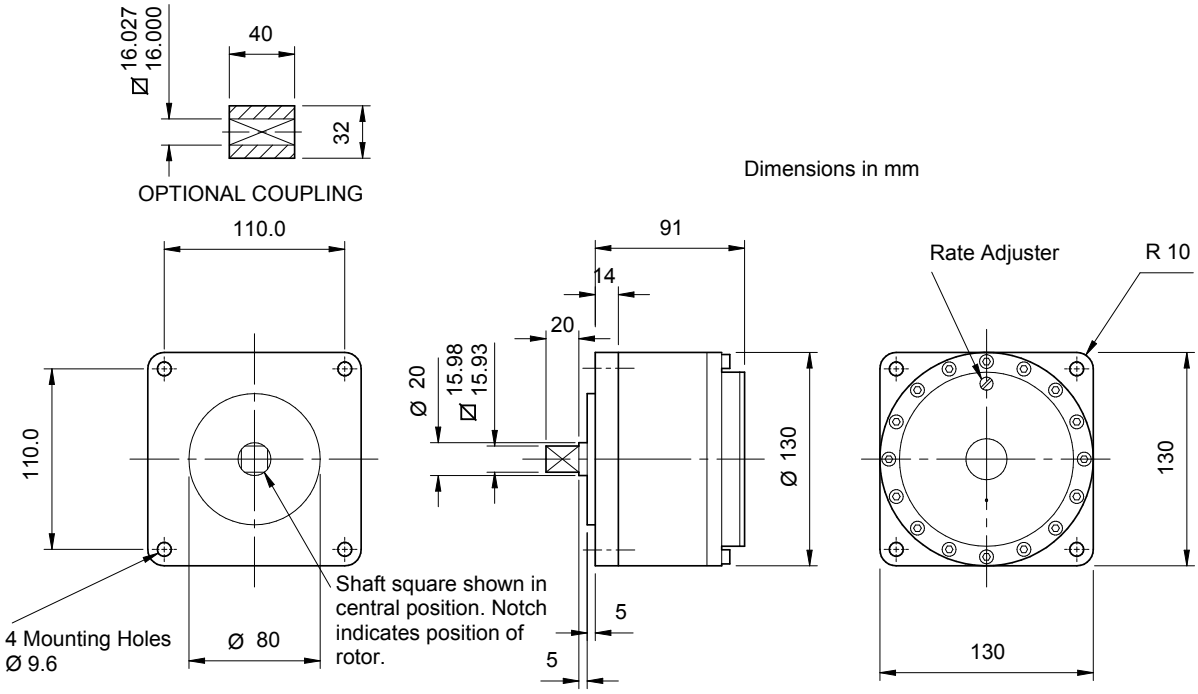
Differential Rate (FC or FAC)
Gives a large resistance in one direction only and less than 1/10 resistance in the other. Specify free clockwise or free anticlockwise when viewed from shaft end.

Double Damping (DD)
Gives equal resistance in either direction.

Couplings
Steel couplings are available as an option.

Ordering Codes

LA1, 2, 3 or 4 – DD
LA1, 2, 3 or 4 – FC or FAC



Rates

An adjuster permits any damping rate to be obtained within one of the following ranges. The range must be specified when ordering the dashpot.

- **LB1:** 35 to 350 lbf.ins/rad/s / 4 to 40 Nm/rad/s
- **LB2:** 71 to 710 lbf.ins/rad/s / 8 to 80 Nm/rad/s
- **LB3:** 150 to 1500 lbf.ins/rad/s / 17 to 170 Nm/rad/s
- **LB4:** 350 to 3500 lbf.ins/rad/s / 40 to 400 Nm/rad/s

With adjuster set to maximum the rate may exceed stated maximum and with adjuster set to minimum the rate may be less than stated minimum.

Options

The following features may be specified for any model:

Differential Rate (FC or FAC)
Gives a large resistance in one direction only and less than 1/10 resistance in the other. Specify free clockwise or free anticlockwise when viewed from shaft end.

Double Damping (DD)
Gives equal resistance in either direction.

Couplings
Steel couplings are available as an option.

Ordering Codes

LB1, 2, 3 or 4 – DD
LB1, 2, 3 or 4 – FC or FAC

Specification

Rate
Adjustable
Max (LB4): 400 Nm/rad/s
(3500 lbf.ins/rad/s)

Angle of travel
240° ± 5°
External end stops must be provided

Max. safe torque
1400 lbf.ins / 160 Nm
Continuous power dissipation not to exceed 80W at 20°C ambient

Max. shaft end load
5 lbf / 22 N

Max. shaft side load
200 lbf / 890 N

Ambient temperature range
0°C to 60°C

Frictional torque
5 lbf.ins / 0.5 Nm typical

Shaft material
Stainless steel 441S49

Body material
Zinc alloy Ilzro 16

Weight
13.5 lbs / 6.14 kg

Model LE
220° Vane Dashpot

Specification

Rate
Adjustable
Max (LE6):
12000 Nm/rad/s
(106200 lbf.ins/rad/s)

Angle of travel
220° ± 1°
External end stops must be provided

Max. safe torque
4820 lbf.ins / 545 Nm
Continuous power dissipation not to exceed 200W at 20°C

Max. shaft end load
224 lbf / 1000 N pushing on shaft
18 lbf / 80 N pulling on shaft

Max. shaft side load
340 lbf / 1500 N

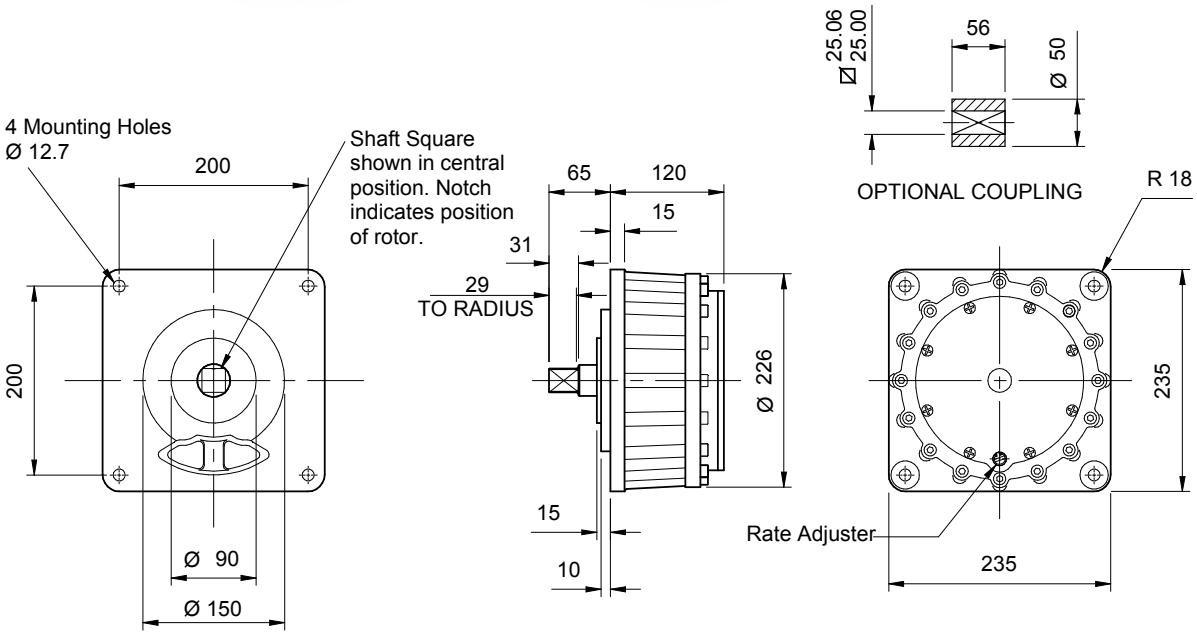
Ambient temperature range
0°C to 60°C

Frictional torque
27 lbf.ins / 3 Nm typical

Shaft material
Stainless steel 431S29

Body material
Aluminium alloy LM25

Weight
26 lbs / 12 kg



Rates

An adjuster permits any damping rate to be obtained within one of the following ranges. The range must be specified when ordering the dashpot.

- **LE1:** 443 to 3100 lbf.ins/rad/s / 50 to 350 Nm/rad/s
- **LE2:** 885 to 6200 lbf.ins/rad/s / 100 to 700 Nm/rad/s
- **LE3:** 1770 to 13275 lbf.ins/rad/s / 200 to 1500 Nm/rad/s
- **LE4:** 3540 to 26550 lbf.ins/rad/s / 400 to 3000 Nm/rad/s
- **LE5:** 7080 to 53100 lbf.ins/rad/s / 800 to 6000 Nm/rad/s
- **LE6:** 14160 to 106200 lbf.ins/rad/s / 1600 to 12000 Nm/rad/s

With adjuster set to maximum the rate may exceed stated maximum and with adjuster set to minimum the rate may be less than stated minimum.

Options

The following features may be specified for any model:

Differential Rate (FC or FAC)
Gives a large resistance in one direction only and less than 1/10 resistance in the other. Specify free clockwise or free anticlockwise when viewed from shaft end.

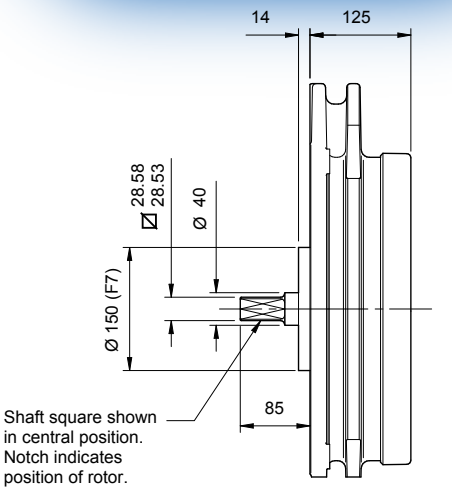
Double Damping (DD)
Gives equal resistance in either direction.

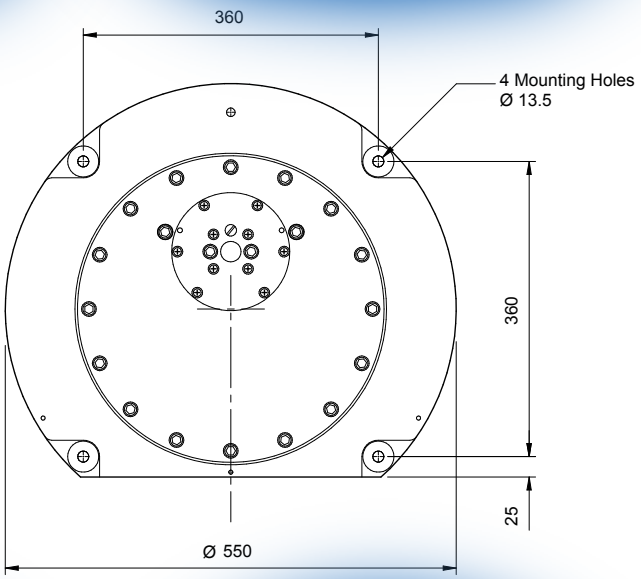
Couplings
Steel couplings are available as an option.

Ordering Codes

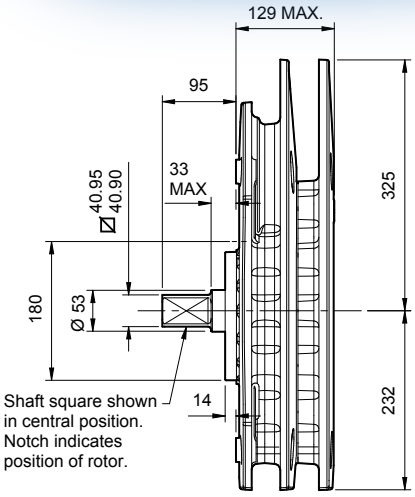
LE1, 2, 3, 4, 5 or 6 – DD
LE1, 2, 3, 4, 5 or 6 – FC or FAC

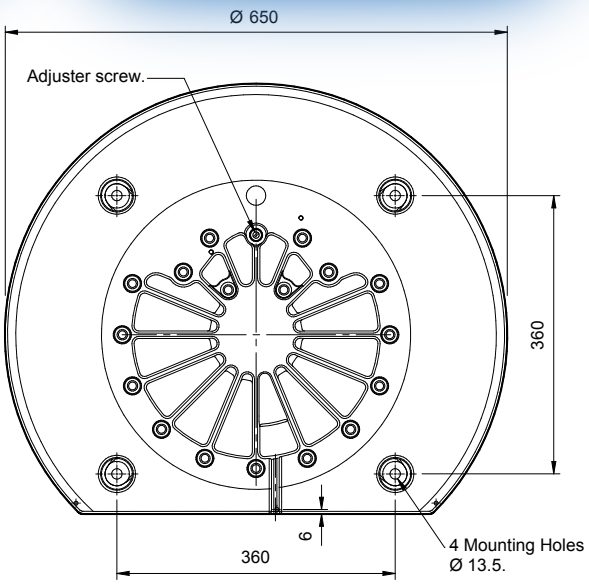
LX





LH





Specification

LX

Rate
Adjustable
Max 18000 Nm/rad/s
(159300 lbf.ins/rad/s)

Angle of travel
220° ± 1°
External end stops
must be provided

Max. safe torque
5660 lbf.ins / 640 Nm

Ambient temperature range
0°C to 60°C

Shaft material
Stainless steel 431S29

Body material
Aluminium alloy LM25

Weight
99 lbs / 45 kg

LH

Rate
Adjustable
Max 18000 Nm/rad/s
(159300 lbf.ins/rad/s)

Angle of travel
220° ± 1°
External end stops
must be provided

Max. safe torque
8500 lbf.ins / 960 Nm

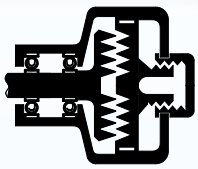
Ambient temperature range
0°C to 60°C

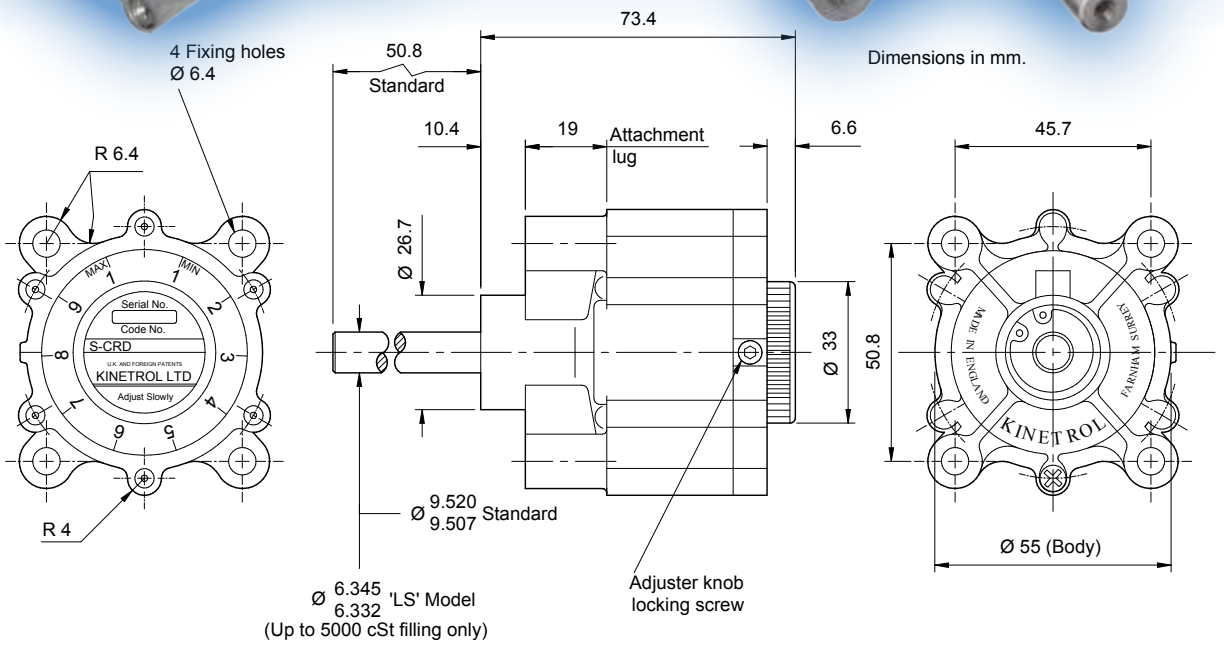
Shaft material
Stainless steel 431S29

Body material
Aluminium alloy LM25

Weight
108 lbs / 49 kg

Model S – CRD
CR Dashpot





Specification

Rate
Adjustable - see curves right (± 10%)

Adjustment allows the rate to be varied down to 1/10 of the maximum values, for any speed of rotation.

The adjuster knob, although marked for reference, is not normally calibrated.

Max. safe torque
61 lbf.ins / 7 Nm

Max. shaft end load
20 lbf / 89 N

Max. shaft side load
26 lbf / 115 N

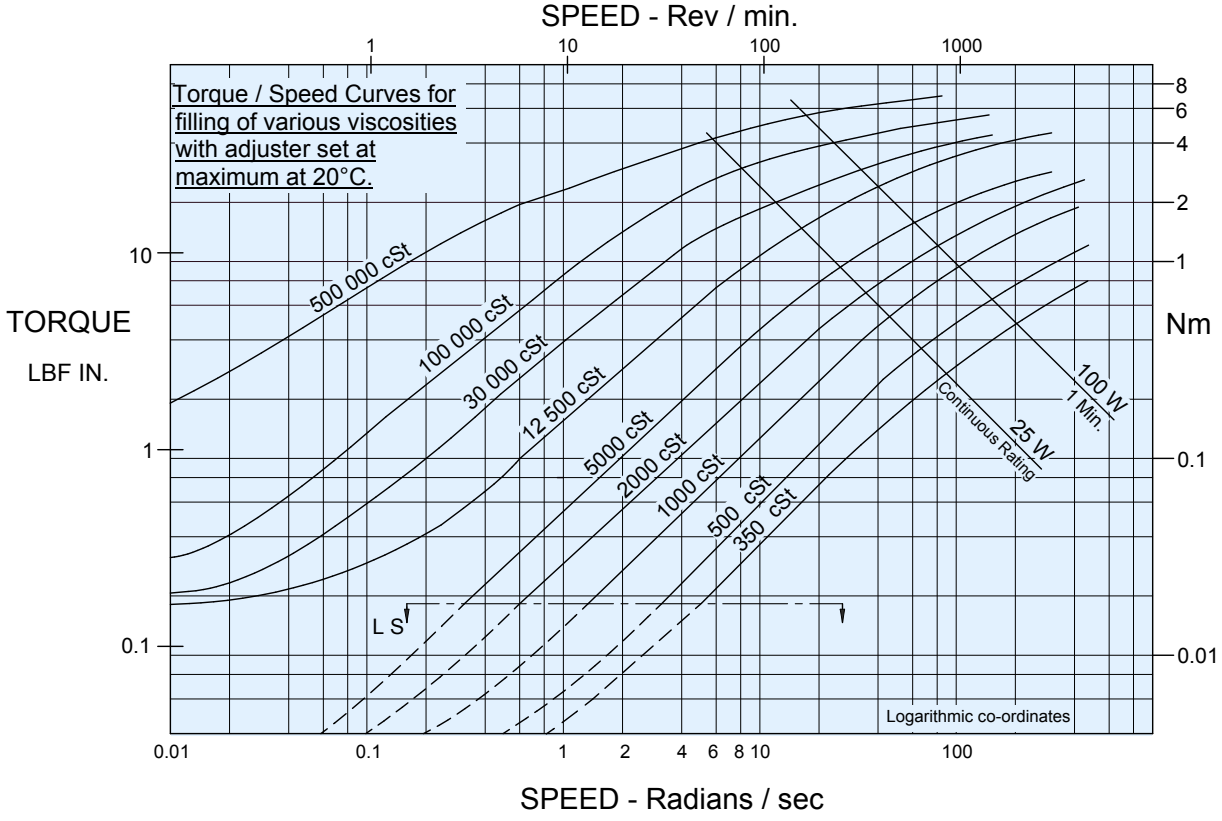
Ambient temperature range
0°C to 60°C

Frictional torque
0.13 lbf.ins / 0.015 Nm typical

Shaft material
Stainless steel 303S31

Body material
Zinc alloy Mazak 3

Weight
1.32 lbs / 619 g



Viscosities Available

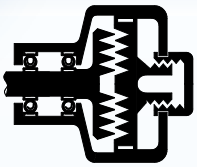
350; 500; 1,000; 2,000; 5,000; 12,500; 30,000; 100,000; 500,000 cSt.

Specification of fluid viscosity provides torque/speed characteristics shown by the curves above.

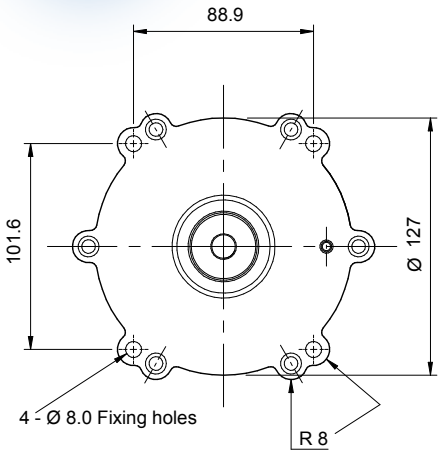
Ordering Codes

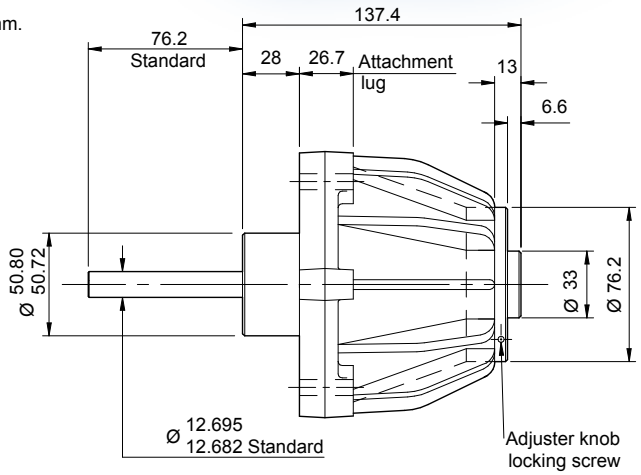
S – CRD – (Filling Viscosity)

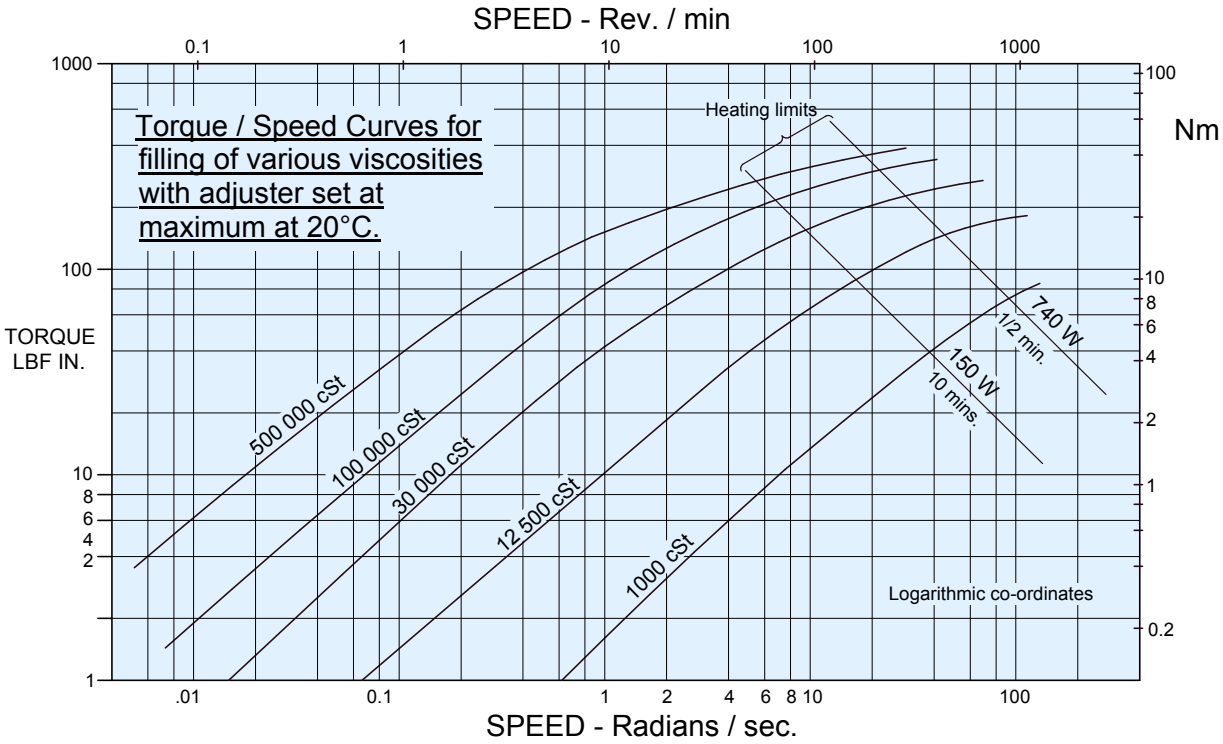
Example:
S – CRD – 30,000 has a 30,000 cSt filling.



Dimensions in mm.







Viscosities Available

1,000; 12,500; 30,000; 100,000; 500,000 cSt.

Specification of fluid viscosity provides torque/speed characteristics shown by the curves above.

Ordering Codes

T – CRD – (Filling Viscosity)

Example:
T – CRD – 100,000 has a 100,000 cSt filling.

Specification

Rate
Adjustable - see curves left (± 10%)

Adjustment allows the rate to be varied down to 1/4 of the maximum values, for any speed of rotation.

The adjuster knob, although marked for reference, is not normally calibrated.

Fixed rate version available - contact Kinetrol

Max. safe torque
398 lbf.ins / 45 Nm

Max. shaft side load
41 lbf / 183 N

Ambient temperature range
0°C to 60°C

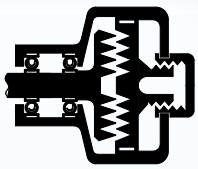
Frictional torque
0.5 lbf.ins / 0.056 Nm typical

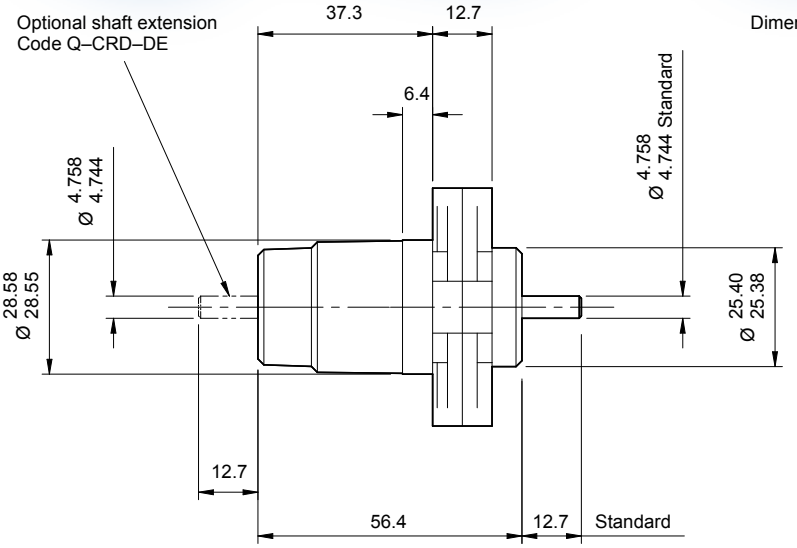
Shaft material
High tensile steel 605M36(T)

Body material
Cast Aluminium LM 4M

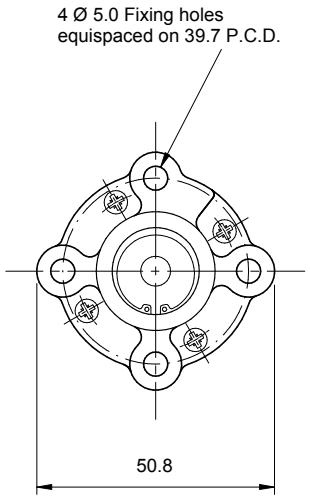
Weight
5.27 lbs / 2.39 kg

Model Q – CRD
CR Dashpot





Dimensions in mm.



Specification

Rate
Fixed - see curves right (± 10%)

Max. safe torque
13 lbf.ins / 1.5 Nm

Max. shaft end load
20 lbf / 89 N

Max. shaft side load
5.2 lbf / 23 N

Ambient temperature range
0°C to 60°C

Frictional torque
0.025 lbf.ins / 0.003 Nm typical

Shaft material
Mild steel 220M07

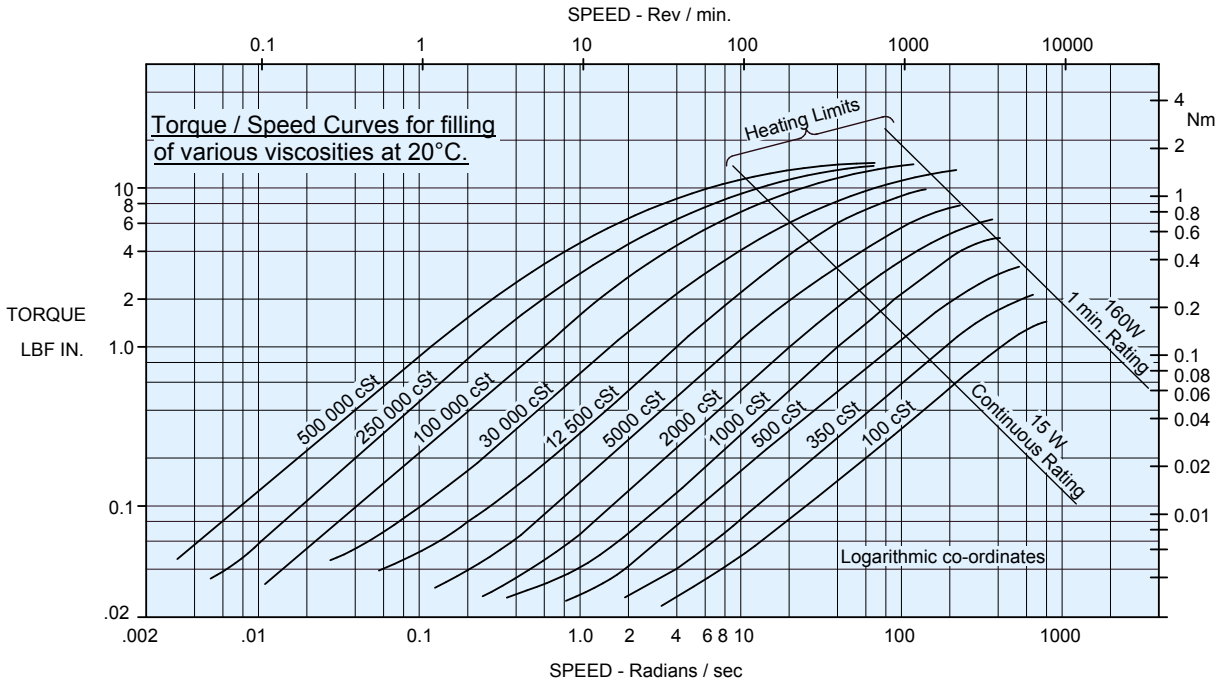
Body material
Zinc alloy Mazak 3

Weight
7.5 ozs / 214 g

Applications
Proves to be economical where use of the larger adjustable rate models may not be justified.

This dashpot is available with double ended shaft (code suffix –DE). In this version, due to the extra shaft seal, there is greater stiction torque (less than 0.025 lbf.ins/seal).

Applications



Viscosities Available

100; 350; 500; 1,000; 2,000; 5,000; 12,500; 30,000; 100,000; 250,000; 500,000 cSt.

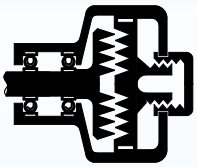
Specification of fluid viscosity provides torque/speed characteristics shown by the curves above.

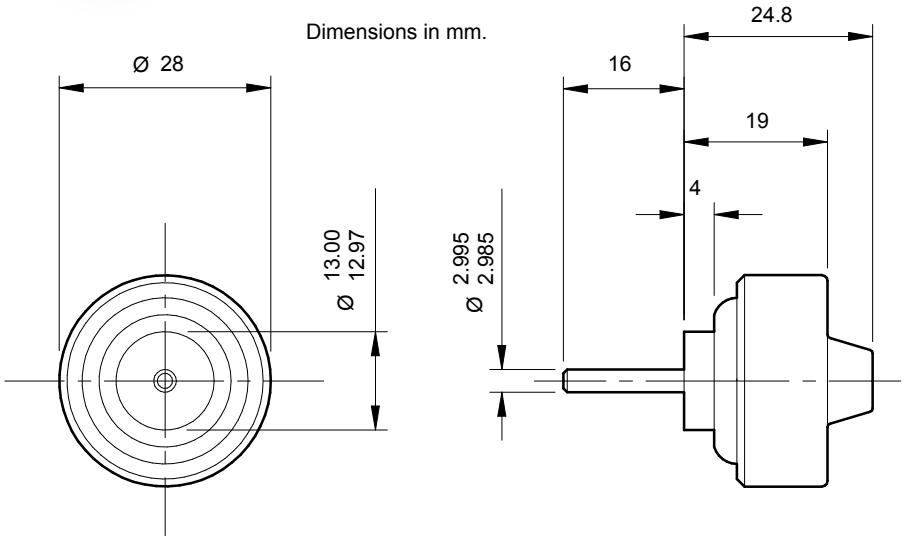
Ordering Codes

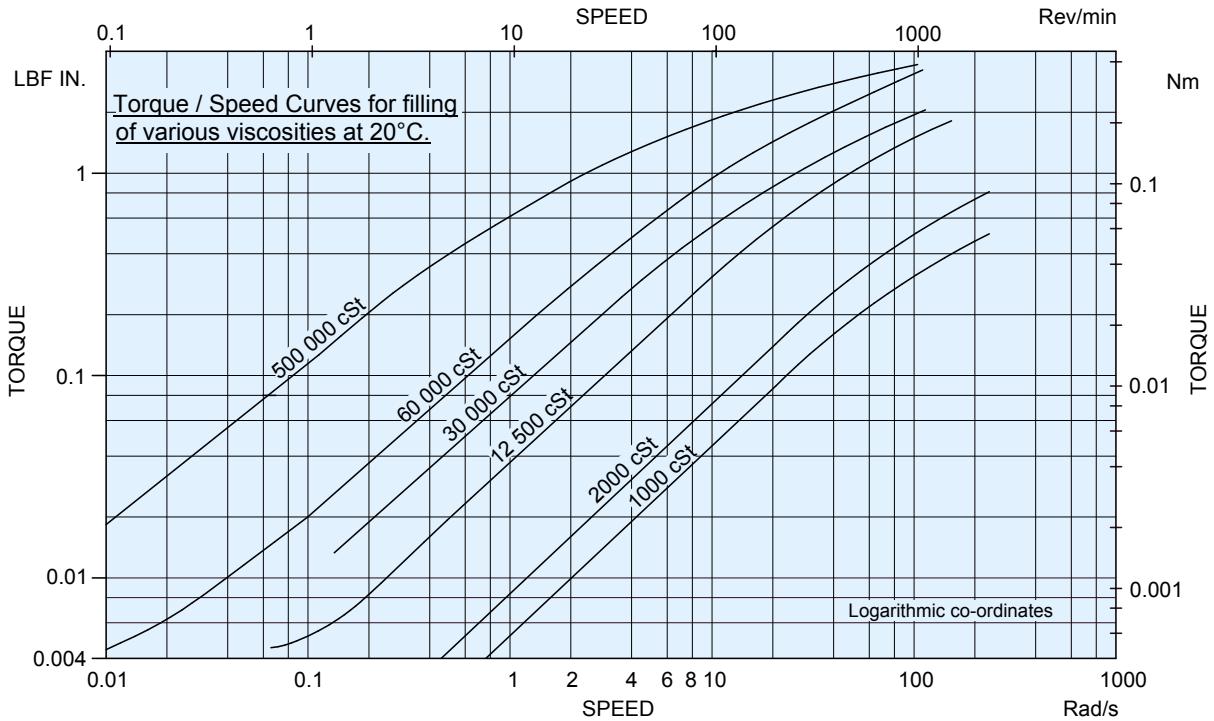
Q – CRD – (Filling Viscosity)

Example:
Q – CRD – DE – 12,500 is double ended and has a 12,500 cSt filling.

Model N – CRD
CR Dashpot







Specification

Rate
Fixed - see curves left (± 10%)

Max. safe torque
3.5 lbf.ins / 0.4 Nm

Max. shaft end load
3 lbf / 13 N

Max. shaft side load
2.2 lbf / 10 N

Ambient temperature range
0°C to 60°C

Low frictional torque
0.015 lbf.ins / 0.002 Nm typical

Shaft material
Stainless steel 431S29

Body material
Zinc alloy Mazak 3

Weight
0.075 lbs / 34 g

Applications
Particularly suited to instrument and small precision machine applications.
Pure viscous damping is produced by shear of a film of silicone fluid.
The drum type rotor is supported at both ends by miniature ball races.
Typical applications include tension control, damping moving parts in small precision machines and detection of shaft rotation.

Viscosities Available

1,000; 2,000; 5,000; 12,500; 30,000; 60,000; 500,000 cSt.

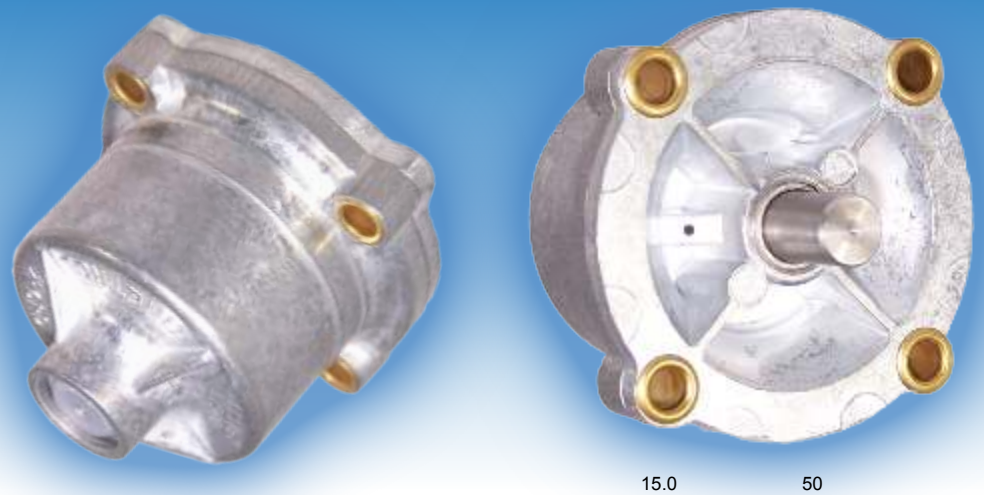
Specification of fluid viscosity provides torque/speed characteristics shown by the curves above.

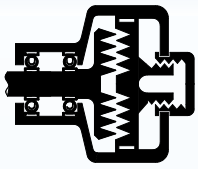
Ordering Codes

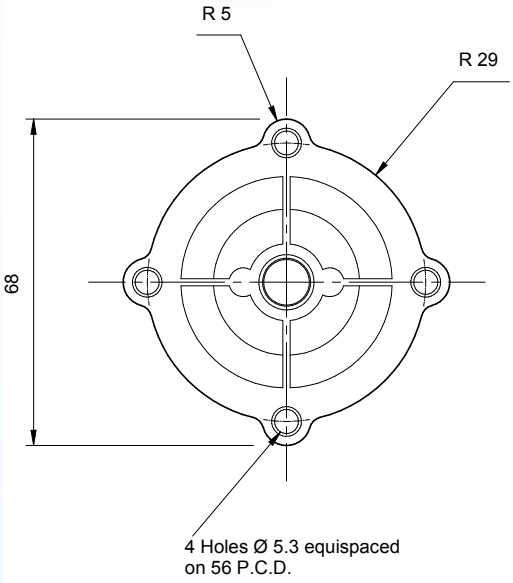
N – CRD – (Filling Viscosity)

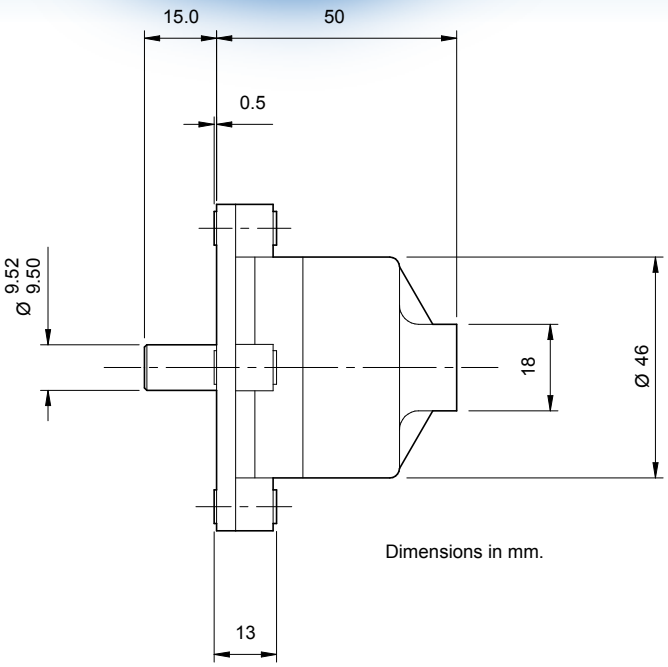
Example:
N – CRD – 60,000 has a 60,000 cSt filling.

Model X – CRD
CR Dashpot









Specification

Rate
Fixed - see curves right (± 10%)

Max. safe torque
53 lbf.ins / 6 Nm

Ambient temperature range
0°C to 60°C

Frictional torque
0.3 lbf.ins / 0.034 Nm typical

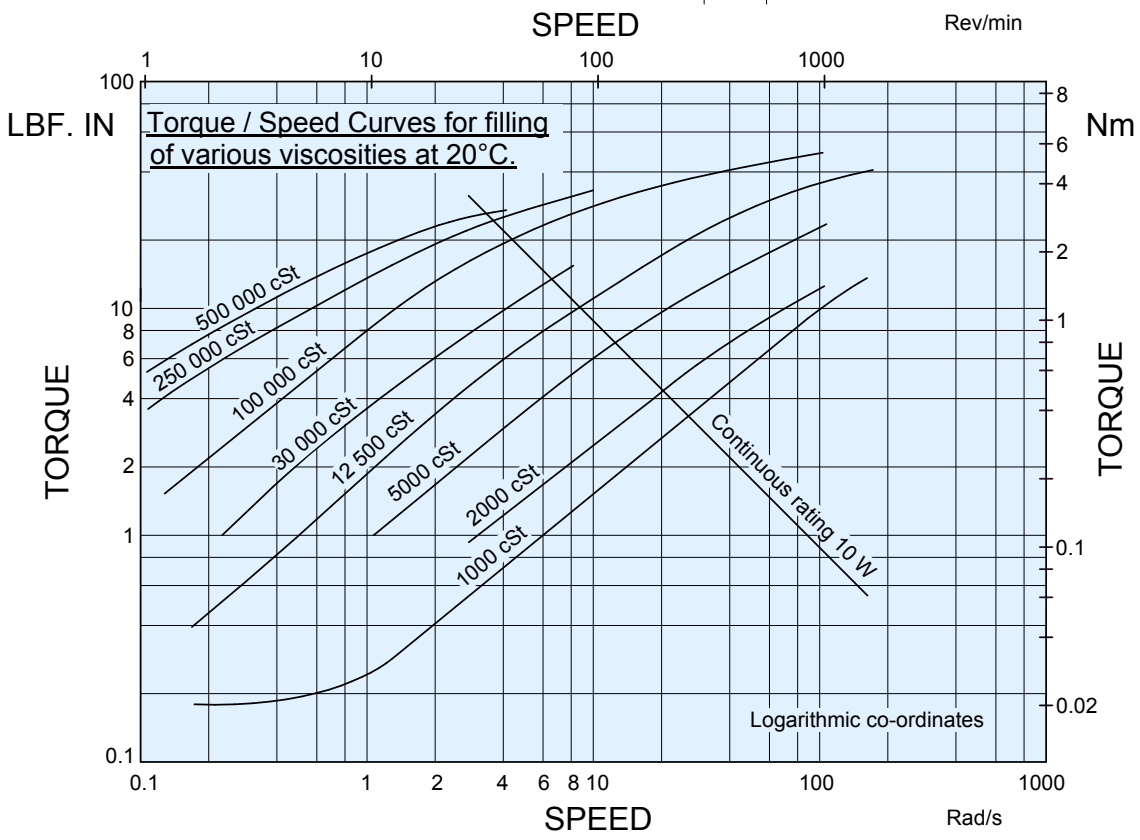
Shaft material
Mild steel 080A15 (case hardened). The shaft can be supplied unhardened.

Body material
Zinc alloy Mazak 3

Weight
0.78 lbs / 355 g

Bearing
Single overhung anti-friction bush

Applications
Value engineered to suit volume applications where unit cost is of paramount importance.
Viscous damping is produced by shear of a film of silicone fluid, using a drum type rotor. Static friction is higher than for other dashpots in the range but is not significant for most applications.
The dashpot is designed to react pure torsion and therefore side or axial loads should be avoided.
Typical applications include damping moving parts in light machinery, e.g. Copying machines, control of coil dereeling, control of descent.



Viscosities Available

1,000; 2,000; 5,000; 12,500; 30,000; 100,000; 25,000; 500,000 cSt.

Specification of fluid viscosity provides torque/speed characteristics shown by the curves above.

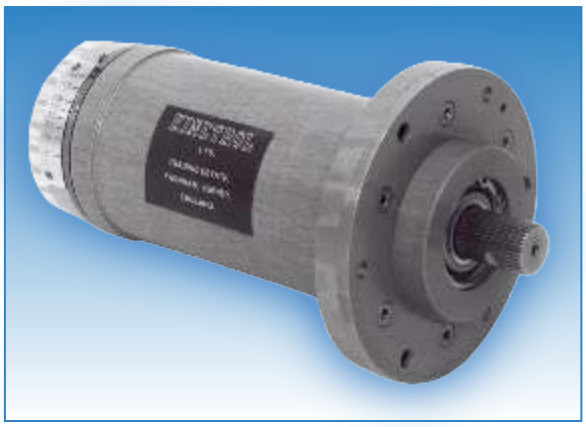
Ordering Codes

X – CRD – (Filling Viscosity)

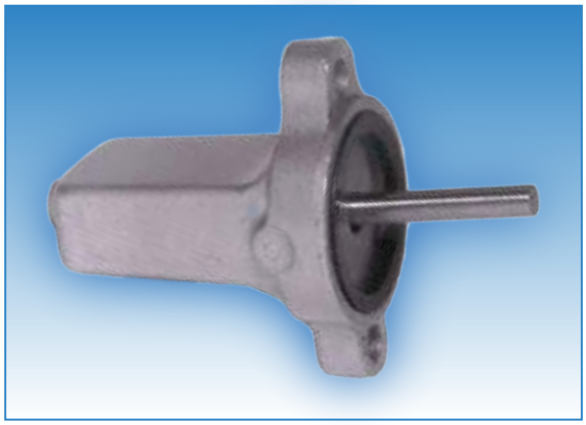
Example:
X – CRD – 12,500 has a 12,500 cSt filling.

Special Dashpots

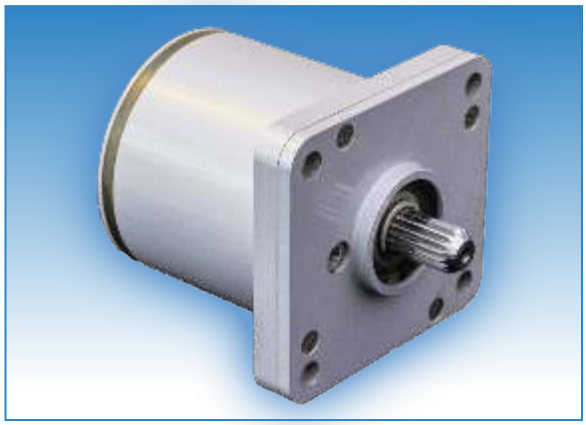
If required Kinetrol will engineer special dampers to your specification. Some examples of dashpots designed to suit customers applications are shown here. See special dashpot questionnaire on page 7.



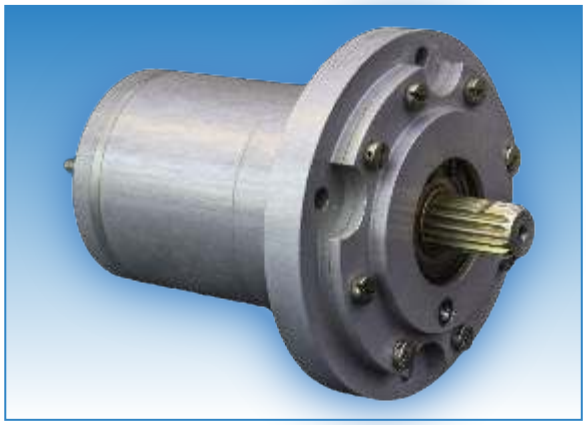
Aerospace flight control dashpot. 120° travel vane type with 200mm long light alloy body.



Automotive level sensor damper. 50mm long diecast small angle vane type.

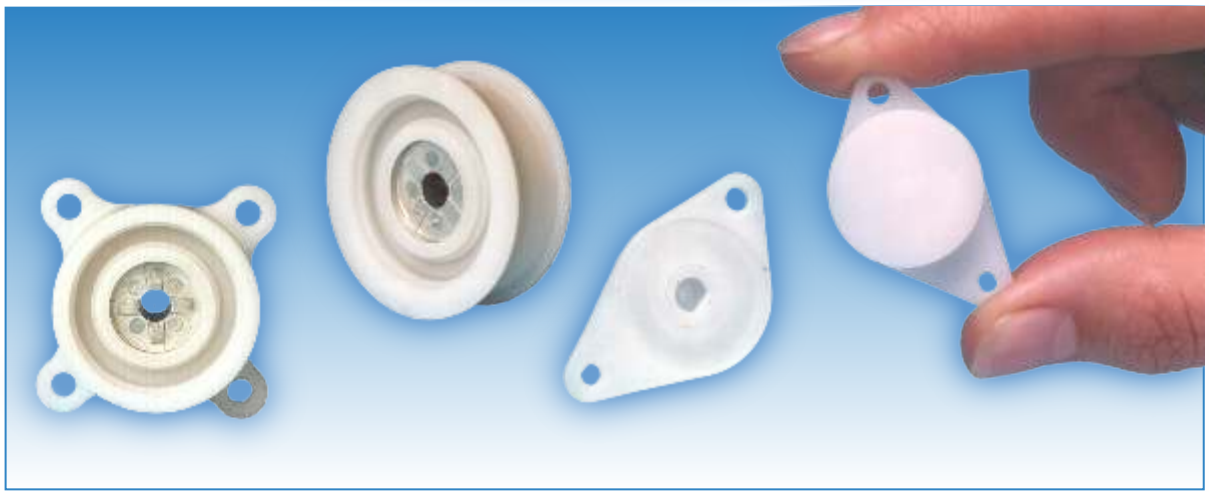


Aerospace aileron trim control dashpot. Continuous rotation type with integral fluid loss indication.



Aerospace elevator G-weight control damper. 120° travel vane type with integral temperature compensation.

Plastic Dashpots



To compliment its range of robust, precision dashpots Kinetrol has also custom-designed plastic dampers for high volume, low cost applications.

Injection moulding in acetal or other materials facilitates a wide range of drive and mounting options.

Hybrid designs, with some metal components, can also be engineered where strength and/or longer life are required.

Example specification:

Continuous rotation type
Uni-directional damping
0.08 ± 20% Nm/rad/sec rate
45mm diameter x 17mm dimensional envelope
25g weight
0 - 40°C ambient temperature range

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