Adjustable Friction Clutches

Huco Vari-Tork are rotary friction devices with adjustable drag or slip torque. Controlled slip takes place between the hub and housing whenever the load exceeds the set torque.

- **Three sizes - up to 3Nm torque capacity**
- **4 interface styles**
- **Set screw or clamp connection**
- **Compact proportions**
- **Use as a torque limiter, tensioning, or overrun device**

The construction is simple and robust and comprises a series of steel clutch plates engaging a hub and a series of friction rings engaging a housing. Pressure is brought to bear on the plates and friction rings by an adjuster acting through a spring and pressure plate. The load can be connected to either the steel inner hub or the aluminium alloy housing.

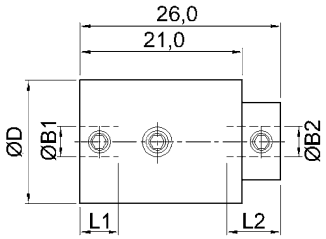
As a torque limiter, Vari-Tork interrupts continuity between power source and load when this reaches a pre-determined level.

As a tensioning device, Vari-Tork typically maintains tension in a filament or tape winding operation by exerting drag on the feed spool.

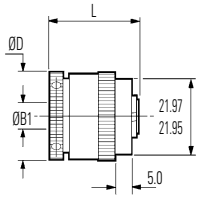
As an overrun device, Vari-Tork absorbs residual inertia of a motor when the load is braked or reaches a terminal stop.

Adjustable Friction Clutches

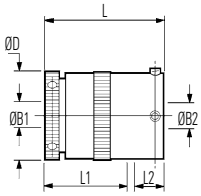
Size 16 Set Screw Shaft Fixing



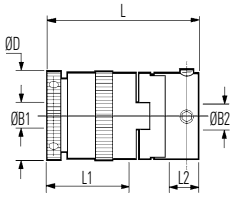
Size 25 Set Screw Shaft Fixing



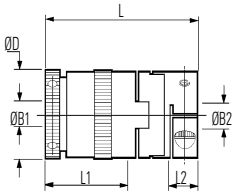
Ref. 271 (2 plate)
279 (6 plate)
Basic clutch (thro' bore)



Ref. 273 (2 plate)
281 (6 plate)
Basic clutch + sleeve adaptor

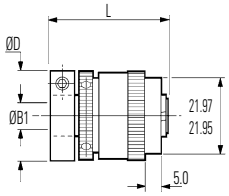


Ref. 277 (2 plate)
285 (6 plate)
Basic clutch + Oldham (set screw) coupling

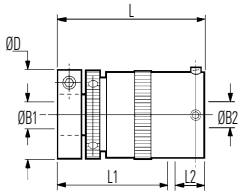


Ref. 267 (2 plate)
269 (6 plate)
Basic clutch + Oldham (clamp) coupling

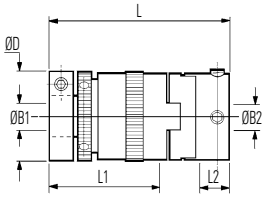
Size 25 Clamp Shaft Fixing



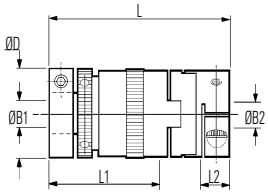
Ref. 401 (2 plate)
409 (6 plate)
Basic clutch (thro' bore)



Ref. 403 (2 plate)
411 (6 plate)
Basic clutch + sleeve adaptor

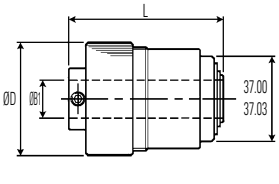


Ref. 407 (2 plate)
415 (6 plate)
Basic clutch + Oldham (set screw) coupling

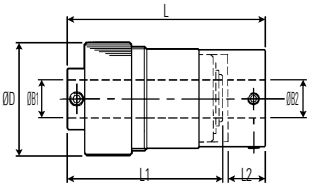


Ref. 397 (2 plate)
399 (6 plate)
Basic clutch + Oldham (clamp) coupling

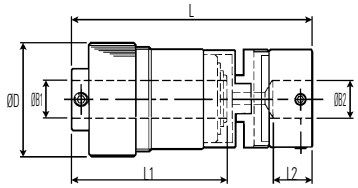
Size 48 Set Screw Shaft Fixing



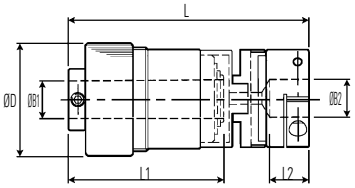
Ref. 279
Basic Clutch (thro' bore)



Ref. 281
Basic Clutch + sleeve adaptor



Ref. 285
Basic Clutch + Oldham (set screw) coupling



Ref. 269
Basic Clutch + Oldham (clamp) coupling

Materials & Finishes

Housing, adjuster ring, adaptors:	Al. Alloy 2014 T6 or 6026 LF Irridite NCP finish
Hub:	Steel, heat treated
Clutch plates:	Size 25 Steel, heat treated Size 48 Brass
Bearings:	Sintered bronze
Fasteners:	Alloy steel, black oiled

DIMENSIONS & ORDER CODES

Size & Model	Set Screw Hub	Clamp Hub	ØD in. (mm)	L in. (mm)	L1 in. (mm) ①	L2 in. (mm)	ØB1 max in. (mm) ②	Fasteners at B1 end			ØB2 max in. (mm)	Fasteners at B2 end			Max drag torque lb.-in (Ncm)	Moment of inertia kgm2 x 10-8 ③	Mass kg x 10-3 ③
	CLUTCH REF							Screw	Torque lb.-in. (Nm)	Wrench in. (mm)		Screw	Torque lb.-in. (Nm) ②	Wrench in. (mm)			
16	311.16	-	0.63 (16.0)	1.89 (26.0)	0.2 (5.0)	0.28 (7.0)	0.16 (4)	M3	0.94	0.06 (1.5)	0.16 (4)	M3	8.3 (0.9)	0.06 (1.5)	0.04 (0.5)	30	14
25 2-PLATE	267.25	-	1.02 (25.8)	1.83 (46.5)	0.98 (25.0)	0.34 (8.6)	0.31 (8)	M3	0.94	0.06 (1.5)	0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)	4.7 (53)	416	58
	271.25	-		1.04 (26.4)	thro'	-					-	-	-	-		242	37
	273.25	-		1.42 (36.0)	0.98 (25.0)	0.35 (9.0)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		382	50
	277.25	-		1.83 (46.5)	0.98 (25.0)	0.34 (8.6)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		425	58
	-	397.25		2.15 (54.5)	3.27 (33.0)	0.34 (8.6)					0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)		508	68
	-	401.25	1.02 (25.8)	1.35 (34.4)	thro'	-	0.31 (8)	M3	2.43	0.1 (2.5)	-	-	-	-	4.7 (53)	317	47
	-	403.25		1.73 (44.0)	3.27 (33.0)	0.35 (9.0)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		441	60
	-	407.25		2.15 (54.5)	3.27 (33.0)	0.34 (8.6)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		511	69
25 6-PLATE	269.25	-	1.02 (25.8)	2.1 (53.4)	1.22 (31.0)	0.34 (8.6)	0.31 (8)	M3	0.94	0.06 (1.5)	0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)	11.6 (132)	529	68
	279.25	-		1.28 (32.4)	thro'	-					-	-	-	-		312	48
	281.25	-		1.67 (42.5)	1.22 (31.0)	0.35 (9.0)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		451	60
	285.25	-		2.1 (53.4)	1.22 (31.0)	0.34 (8.6)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		516	69
	-	399.25		2.39 (60.8)	1.22 (31.0)	0.34 (8.6)					0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)		617	79
	-	409.25	1.02 (25.8)	1.6 (40.7)	thro'	-	0.31 (8)	M3	2.43	0.1 (2.5)	-	-	-	-	11.6 (132)	381	58
	-	411.25		1.98 (50.3)	1.54 (39.0)	0.35 (9.0)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		530	71
	-	415.25		2.39 (60.8)	1.54 (39.0)	0.34 (8.6)					0.47 (12)	M4	20.0 (2.2)	0.08 (2)		590	80
48 6-PLATE	269.48	-	1.89 (48.0)	4.02 (102.0)	2.56 (65.0)	0.66 (16.7)	0.63 (16)	M6	7.60	0.12 (3.0)	0.79 (20)	M4	50.1 (5.6)	0.12 (3)	26.5 (300)	8037	390
	279.48	-		2.56 (65.0)	thro'	-					0.79 (20)	-	-	-		5548	278
	281.48	-		3.27 (33.0)	2.56 (65.0)	0.63 (16.0)					0.79 (20)	M5	40 (4.6)	0.1 (2.5)		7135	350
	285.48	-		4.02 (102.0)	2.56 (65.0)	0.66 (16.7)					0.79 (20)	M5	40 (4.6)	0.1 (2.5)		8037	390

PERFORMANCE DATA

Size	Size 16	Size 25	Size 48
Power dissipation at 20°C 2-PLATE 6-PLATE	0.5 watt	 7 watts 8.6 watts	 18 watts
Backlash	0° max	2° max	zero
Max surface temperature	80° C	80° C	80° C
Max speed continuous slip	1000 rpm	1000 rpm	600 rpm

STANDARD BORES

Sizes indicated in parenthesis are metric (mm).

		ØB1, ØB2 +0.0012/ -0 (+0.03mm/-0mm)															
		(4)	(6)	1/4"	5/16"	(8)	3/8"	(10)	(12)	1/2"	(14)	5/8"	(16)	(18)	(19)	3/4"	(20)
Size 16	At B1 end	●															
	At B2 end	●															
Size 25	At B1 end		●	●	●	●											
	At B2 end		●	●	●	●	●	●	●								
Size 48	At B1 end					●	●	●	●	●	●	●	●				
	At B2 end						●	●	●	●	●	●	●	●	●	●	●
Bore ref.		18	22	24	27	28	31	32	35	36	38	41	42	45	46	47	48
Corresponding bore adaptor				253		255		257		259			260				261

Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes. *See page 58* for details

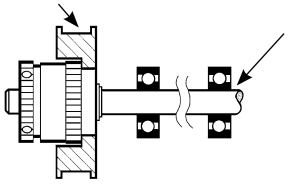
Adjustable Friction Clutches

How to install Vari-Tork

BASIC CLUTCH – REFS. 271, 279, 401 & 409

Controlled slip occurs between pulley and shaft.

Pulley (or gear, etc.) bonded to register. Press fits not permissible.

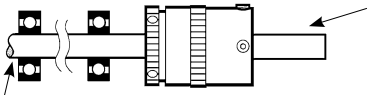


Motor, gearbox, or other externally supported shafts can pass thro' hollow hub.

Please enquire for clutch/pulley assemblies.

BASIC CLUTCH + SLEEVE ADAPTOR – REFS. 273, 281, 403 & 411

Controlled slip occurs between LH & RH shafts. Clutch orientation not important, supported shaft may be entered either end.

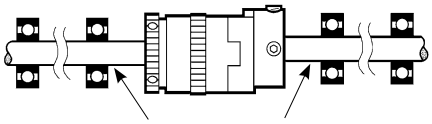


Small spools, paddles, knobs, etc. can be attached after fitting a suitable stub shaft. Side loads must be minimal. Avoid connecting both ends of this clutch to externally supported shafts.

Motor, gearbox, or other externally supported shaft

BASIC CLUTCH + FLEXIBLE COUPLING - REFS. 267, 269, 277, 285, 397, 399, 407 & 415

Controlled slip occurs between LH & RH shafts.



Motor, gearbox, or other externally supported shafts

Vari-Tork characteristics

The characteristics of dry plate clutches favour those applications which can tolerate relatively imprecise drag torques. Three tendencies should be noted:

BREAKAWAY TORQUE

After a period during which no slipping has taken place, the breakaway torque can be up to $2^{1}/_{2}$ times the set value.

TORQUE DECAY

There is an inverse relationship between clutch temperature and slipping torque. The slipping torque reduces from the set value as the power being dissipated causes the clutch temperature to rise. When slipping continuously, torque settles at approximately 70% of the value set on a new clutch and at approximately 80% of the value set on a used clutch. This characteristic is not speed-dependent.

SPEED RELATED TORQUE FLUCTUATIONS

Variations in slipping speed cause a momentary increase in the prevailing output torque. The clutches behave more consistently at high speed/low torque than at low speed/high torque. High speed in this instance starts at approximately 500 rpm.

Where applications call for sustained slipping, the housing temperature should be maintained below 80°C. Clutches mounted concentrically within pulleys, gear wheels, etc. will be more effective at dissipating heat generated during slipping.

CALCULATING FOR POWER DISSIPATION

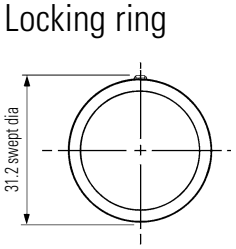
Given the slipping speed in rpm and the drag torque in Nm, the following equation can be used for calculating the power dissipation in watts (W).

$$W = \frac{Nm \bullet rpm}{9.55}$$

Locking ring

In some circumstances it is possible for the adjuster ring to unscrew during operation. The adjuster ring can be secured by fitting locking ring ref. **294.25**.

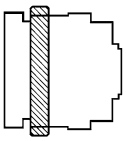
Locking ring



order ref.

294.25

size 25 only



Fit locking ring flush with end of housing as shown. Lightly tension locking screw to secure the adjuster.
Wrench size 1.5

Removing the adjuster ring

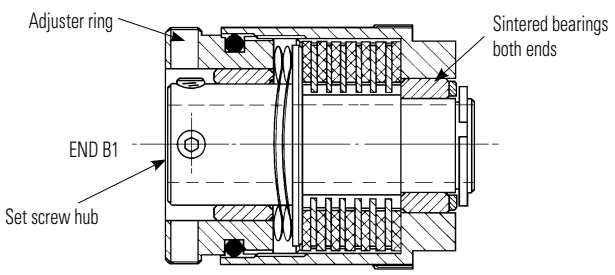
1) If this should be necessary, be sure to replace the pressure plate first, then the spring washers. Ensure that the topmost friction ring is fully engaged with the splines. *A disengaged friction ring will cause the clutch to malfunction.*

2) To remove the adjuster ring, first remove the clamp. With set screw hubs the adjuster ring cannot be removed if the set screws protrude above the hub diameter. Flatting or dimpling of shafts is recommended and may be necessary with shafts larger than Ø6.35 to avoid the screws fouling the adjuster ring.

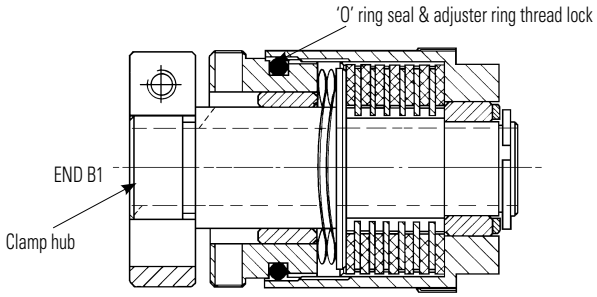
Waved washers

Two waved washers are fitted to these clutches. In some instances, better torque control may result from removing one of them, particularly when working in the lower torque ranges.

Construction - Size 25 Vari-Tork



Sectional view of 6-plate Vari-Tork Ref. 279.25 Shafts are secured by set screws accessed through radial holes in the adjuster ring.



Sectional view of 6-plate Vari-Tork Ref. 409.25 Shafts are secured by a split hub and ring clamp method which does not score the shafts.