



Adjustable Clutches

Huco Vari-Tork are adjustable clutches which allow controlled slip between input and output whenever the load exceeds the set torque.

Vari-Tork D

An entirely original design based on ball-detent torque limiter principles but using an elastomeric pad to provide a spring force which holds a series of radial mounted ball bearings in detent pockets on a carrier plate. When torque exceeds the adjustable pre-set level, the balls roll out of the detent pockets, causing the clutch to slip and automatically re-set when the torque reduces. This unique design is quieter in operation than competing versions.

- **One size – up to 12Nm torque capacity**
- **3 Interface styles**

Vari-Tork F

The original Vari-Tork friction device with adjustable drag in a simple, robust design comprising a series of steel clutch plates engaging a hub and a series of friction rings engaging the housing. Pressure is applied 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

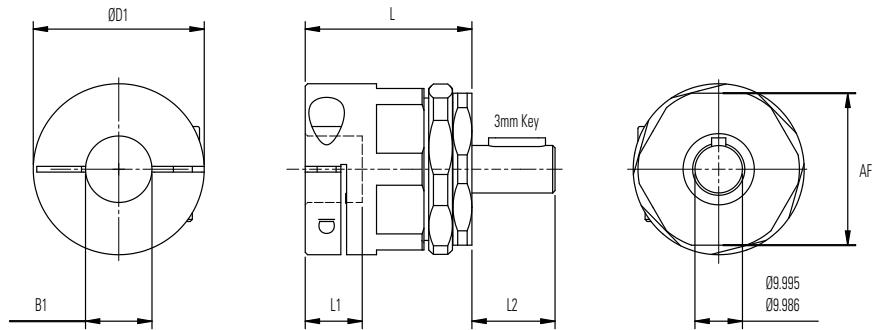
- **Four sizes – up to 3Nm slip torque capacity**
- **4 Interface styles**
- **Set-screw or clamp connection**
- **Compact and economic designs**
- **Alternative functions:**
 - o As a **TORQUE LIMITER** – Vari-Tork D or F interrupts continuity between power source and load when torque reaches a pre-determined level.
 - o As a **TENSIONING DEVICE** – Vari-Tork F typically maintains tension in a filament or tape winding operation by exerting drag on the feed spool.
 - o As an **OVERRUN DEVICE** – Vari-Tork F absorbs residual inertia of a motor when the load is braked or reaches a terminal stop.



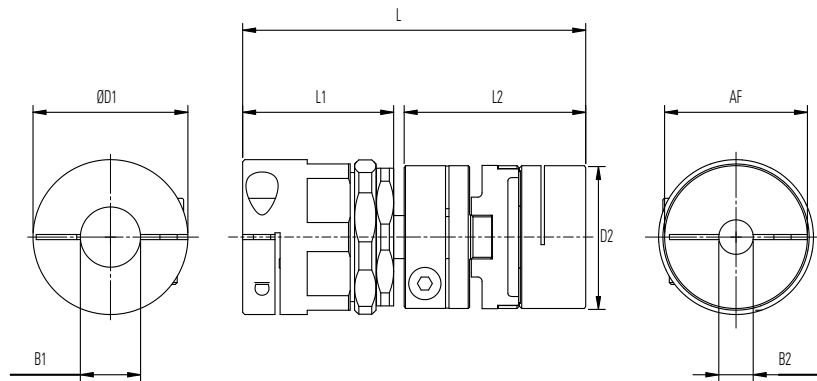
Vari-Tork D

Adjustable Clutches

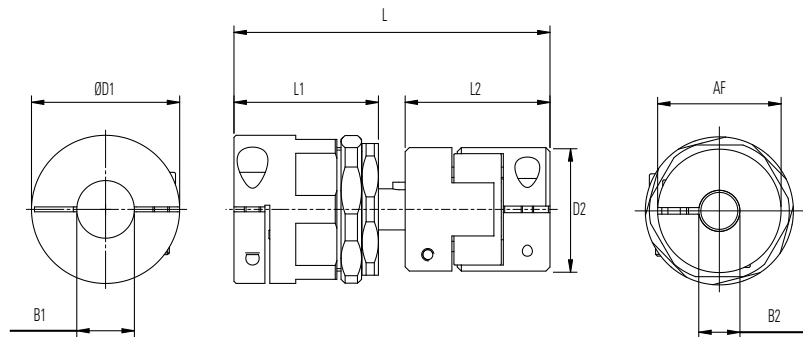
Basic Clutch 650



Clutch & Oldham Coupling 651



Clutch & Flex G Coupling 652



Materials & Finishes

Housing, adjuster ring:	Al. Alloy 2014 T6 or 6026 LF Irridite NCP finish
Hub (male), bearing plate:	Steel, heat treated
Bearing:	Sintered bronze
Fasteners:	Alloy steel, black oiled
Element:	Polyurethane
Locking Ring:	Stainless Steel

STANDARD BORES

		ØB1, ØB2 +0.0012/-0 (+0.03mm/-0mm)							
Type		(8)	3/8"	(10)	(12)	1/2"	(14)	5/8"	(16)
36	650	B1	•	•	•	•	•	•	•
		B2	See diagram						
	651	B1	•	•	•	•	•	•	•
		B2	•	•	•	•	•	•	•
	652	B1	•	•	•	•	•	•	•
		B2	•	•	•	•	•	•	•

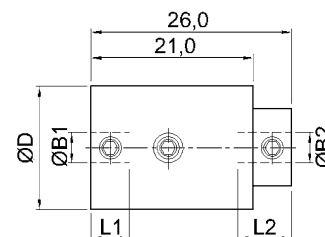
DIMENSIONS & ORDER CODES

Size	Clamp	ØD1 in. (mm)	ØD2 in. (mm)	L +/-0.6 in. (mm)	L1 in. (mm)	L2 in. (mm)	ØB1 max in. (mm)	Fasteners			ØB2 max in. (mm)	AF in. (mm)	Max TQ lb.-in. (Nm)	Moment of inertia kgm ² x 10-8	Mass kg x 10-3
								Screw	Torque lb.-in. (Nm)	Wrench in. (mm)					
36	650	1.4 (36)	n/a	1.4 (35.6)	0.47 (12)	0.67 (17)	0.63 (16)	M4	31 (3.5)	0.12 (3)	0.39 (10)	1.23 (32)	106.2 (12)	1590	0.116
	651	1.4 (36)	1.3 (33.3)	3.15 (80)	1.4 (35.6)	1.66 (42.2)	0.63 (16)	M4	31 (3.5)	0.12 (3)	0.63 (16)	1.23 (32)	79.7 (9)	2735	0.192
	652	1.4 (36)	1.2 (30)	3.03 (77)	1.4 (35.6)	1.38 (35.0)	0.63 (16)	M4	31 (3.5)	0.12 (3)	0.55 (14)	1.23 (32)	106.2 (12)	2680	0.185

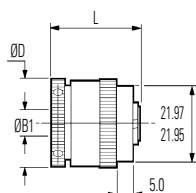
Adjustable Clutches



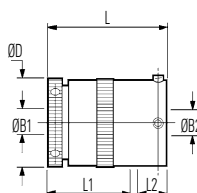
Size 16 Set Screw
Shaft Fixing



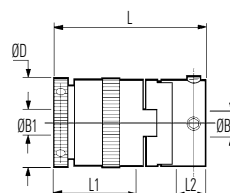
Size 25 Set Screw Shaft Fixing



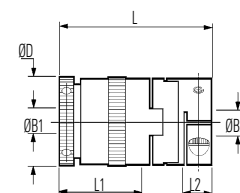
Ref. 271 (2 plate)
279 (6 plate)
Basic clutch (thru bore)



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

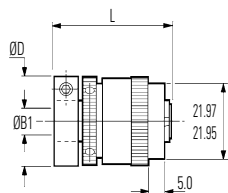


Ref. 277 (2 plate)
285 (6 plate)
Basic clutch + Oldham (set screw) coupling

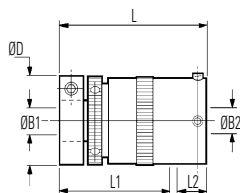


Ref. 267 (2 plate)
269 (6 plate)
Basic clutch + Oldham (clamp) coupling

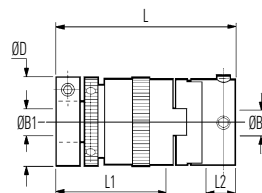
Size 25 Clamp Shaft Fixing



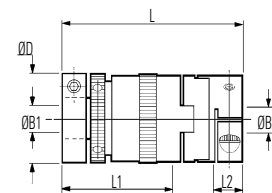
Ref. 401 (2 plate)
409 (6 plate)
Basic clutch (thru bore)



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

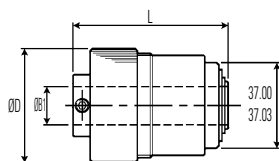


Ref. 407 (2 plate)
415 (6 plate)
Basic clutch + Oldham (set screw) coupling

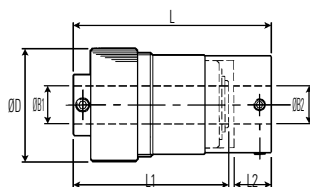


Ref. 397 (2 plate)
399 (6 plate)
Basic clutch + Oldham (clamp) coupling

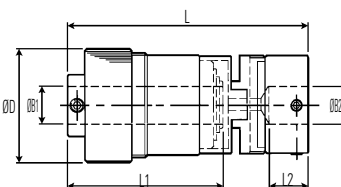
Size 48 Set Screw Shaft Fixing



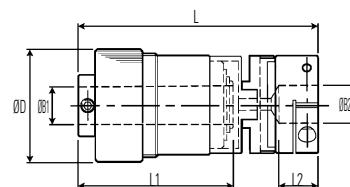
Ref. 279
Basic Clutch (thru bore)



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

Vari-Tork F

Adjustable Clutches

DIMENSIONS & ORDER CODES

Size & Model	Set Screw Hub	Clamp Hub	ØD in. (mm)	L in. (mm)	L1 in. (mm)	L2 in. (mm)	ØB1 max in. (mm)	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
								Screw	Torque lb.-in. (Nm)	Wrench in. (mm)		Screw	Torque lb.-in. (Nm)	Wrench in. (mm)			
	CLUTCH REF				①		②				②						
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
	267.25	-		1.83 (46.5)	0.98 (25.0)	0.34 (8.6)					0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)		416	58
	271.25	-	1.02	1.04 (26.4)	thro'	-	0.31	M3	0.94	0.06 (1.5)	-	-	-	-	4.7	242	37
	273.25	-	(25.8)	1.42 (36.0)	0.98 (25.0)	0.35 (9.0)	(8)				0.47 (12)	M4	20.0 (2.2)	0.08 (2)	(53)	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	1.35 (34.4)	thro'	-	0.31	M3	2.43	0.1 (2.5)	-	-	-	-	4.7	317	47
	-	403.25	(25.8)	1.73 (44.0)	3.27 (33.0)	0.35 (9.0)	(8)				0.47 (12)	M4	20.0 (2.2)	0.08 (2)	(53)	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 2-PLATE	269.25	-		2.1 (53.4)	1.22 (31.0)	0.34 (8.6)		M3	0.94	0.06 (1.5)	0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)		529	68
	279.25	-	1.02	1.28 (32.4)	thro'	-	0.31				-	-	-	-	11.6	312	48
	281.25	-	(25.8)	1.67 (42.5)	1.22 (31.0)	0.35 (9.0)	(8)				0.47 (12)	M4	20.0 (2.2)	0.08 (2)	(132)	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)		M3	2.43	0.1 (2.5)	0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)		617	79
	-	409.25	1.02	1.6 (40.7)	thro'	-	0.31				-	-	-	-	11.6	381	58
	-	411.25	(25.8)	1.98 (50.3)	1.54 (39.0)	0.35 (9.0)	(8)				0.47 (12)	M4	20.0 (2.2)	0.08 (2)	(132)	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
25 6-PLATE	269.25	-		2.1 (53.4)	1.22 (31.0)	0.34 (8.6)		M3	0.94	0.06 (1.5)	0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)		529	68
	279.25	-	1.02	1.28 (32.4)	thro'	-	0.31				-	-	-	-	11.6	312	48
	281.25	-	(25.8)	1.67 (42.5)	1.22 (31.0)	0.35 (9.0)	(8)				0.47 (12)	M4	20.0 (2.2)	0.08 (2)	(132)	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)		M3	2.43	0.1 (2.5)	0.47 (12)	M3	21.5 (2.4)	0.1 (2.5)		617	79
	-	409.25	1.02	1.6 (40.7)	thro'	-	0.31				-	-	-	-	11.6	381	58
	-	411.25	(25.8)	1.98 (50.3)	1.54 (39.0)	0.35 (9.0)	(8)				0.47 (12)	M4	20.0 (2.2)	0.08 (2)	(132)	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	-		4.02 (102.0)	2.56 (65.0)	0.66 (16.7)		M6	7.60	0.12 (3.0)	0.79 (20)	M4	50.1 (5.6)	0.12 (3)		8037	390
	279.48	-	1.89	2.56 (65.0)	thro'	-	0.63				0.79 (20)	-	-	-	26.5	5548	278
	281.48	-	(48.0)	3.27 (83.0)	2.56 (65.0)	0.63 (16.0)	(16)				0.79 (20)	M5	40 (4.6)	0.1 (2.5)	(300)	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 68°F (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	176°F (80° C)	176°F (80° C)	176°F (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 70 for details

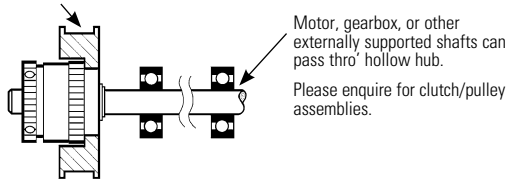
Adjustable Clutches

How to install Vari-Tork

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

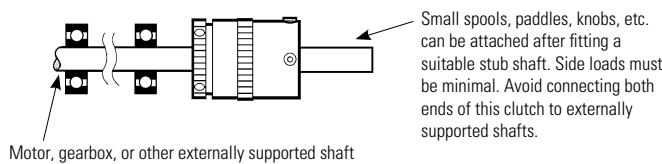
Controlled slip occurs between pulley and shaft.

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



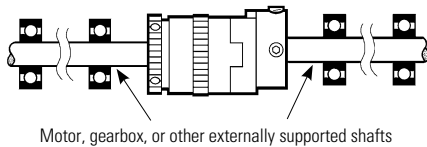
BASIC CLUTCH + SLEEVE ADAPTOR – REFS. 273, 281, 403 & 411

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



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

Controlled slip occurs between LH & RH 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

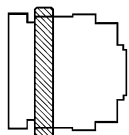
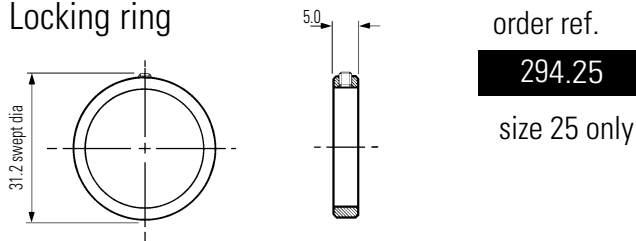
Given the slipping speed in rpm and the drag torque in Nm, the following equation can be used for calculating the power dissipation in watts (W).

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

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



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

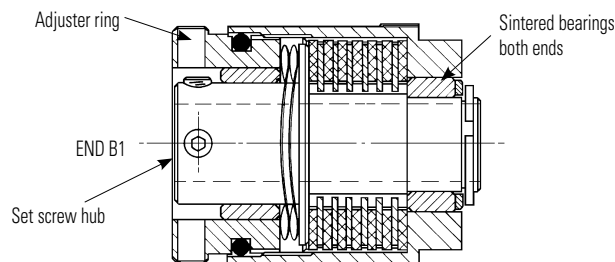
Removing the adjuster ring

- 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. Flattening or dimpling of shafts is recommended and may be necessary with shafts larger than Ø6.35 to avoid the screws fouling the adjuster ring.

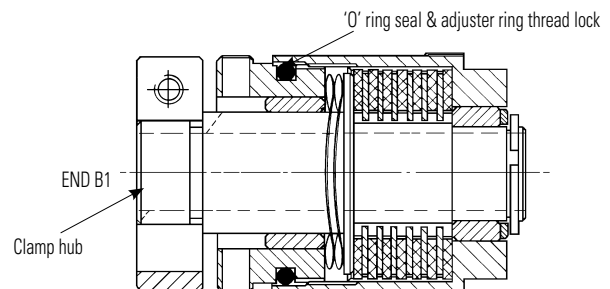
Waved washers

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.

Notes