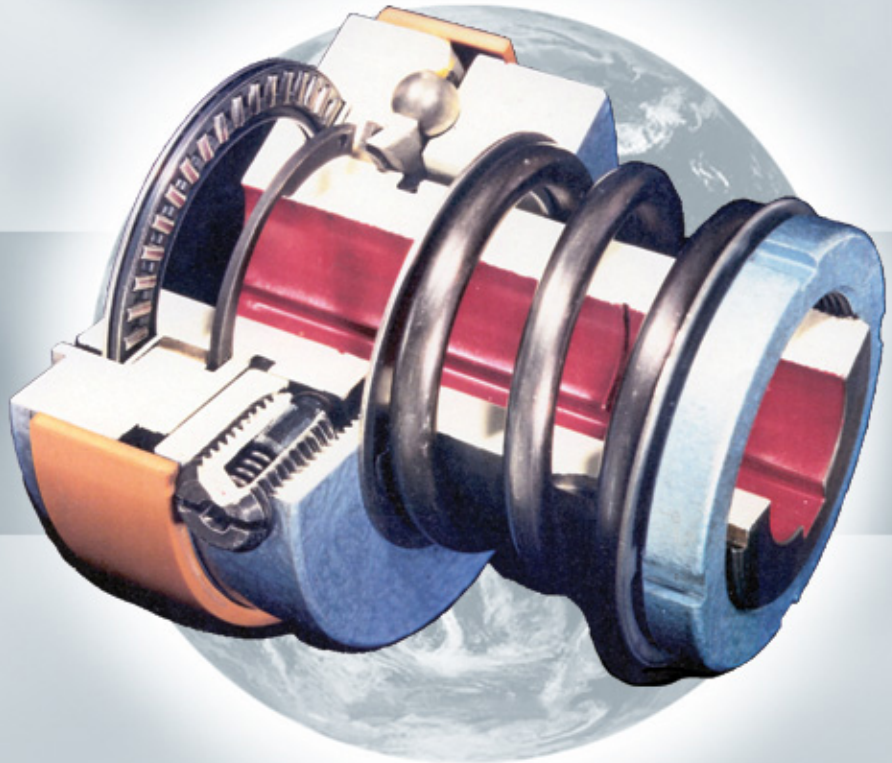
Sadiguard Torque Limiter

DAVID BROWN

CAT.TL01



David Brown Sadiguard Torque Limiting Couplings

Simply the best positive protection against overloads and jamming. David Brown Sadiguard torque limiters positive action eliminates the inaccuracies of shearing and friction devices.

The unique patented designs can accommodate speeds up to 2000 rpm, torques up to 12000 Nm and bore / shaft sizes up to 250 mm.

SERIES TL

- Manual or automatic resetting after tripping.
- Pulley, sprocket, rigid and flexible coupling options.
- Non standard accessories can be easily fitted.
- Can be supplied with housing for fitting between motor and gearbox or other driven machinery.
- Can be mounted in any position.
- Bi-direction operation.
- Special versions to provide single direction of rotation and / or single position of re-engagement.

SERIES AS

- Can be mounted in any position.
- Direct coupling (Mounting 1) or sprocket drive (Mounting 2).
- Economical option for low speed applications.
- Drive torque maintained during tripping action.
- Robust, close-grained cast iron construction.
- Bi-direction operation with automatic resetting.
- Special versions to provide single direction of rotation and / or single position of re-engagement.

Torque (lbf.ins) = $\frac{\text{HP x 63025}}{\text{RPM}}$ (Nm) = $\frac{\text{kW x 9550}}{\text{RPM}}$

TL SELECTION GUIDE

Size	Max Bore		Min Torque		Max Torque	
	mm	Inches	Nm	lb.in	Nm	lb.in
TL 1	42	1.65	1	9	45	398
TL 2	51	2.01	2	18	200	1770
TL 3	75	2.95	10	89	750	6637
TL 4	90	3.54	50	443	1500	13274
TL 5	115	4.53	150	1329	3000	26549
TL 6	145	5.71	500	4429	6000	53097
TL 7	175	6.89	1000	8858	12000	106195

AS SELECTION GUIDE

Size	Max Bore		Max Speed	Min Torque		Max Torque	
	mm	Inches	rev/min	Nm	lb.in	Nm	lb.in
AS 4.5	34	1.34	1000	11.5	102	68	602
AS 9	40	1.57	800	22.5	199	135	1195
AS 18	55	2.17	800	45	398	270	2389
AS 37.5	73	2.87	750	95	841	500	4425
AS 75	90	3.54	600	190	1681	1130	10000
AS 150	125	4.92	500	375	3319	2250	19912
AS 300	145	5.71	400	750	6637	4500	39823
AS 600	185	7.28	300	1500	13274	9000	79646

For larger bore sizes please consult David Brown

Sadiguard Torque Limiters

Introduction

David Brown "Sadiguard" torque limiters (sometimes referred to as "safety couplings") are essential components for all types of modern drive systems and rotating machine, providing ***dependable and accurate protection*** to both driving and driven equipment. The range of David Brown "Sadiguard" torque limiters has been designed with the knowledge gained by more than thirty years experience in this specific field, to provide effective and automatic protection of machinery regardless of rotational speed and to give a complete and economical answer to the problems of machinery overloads and jamming.

The wide variety of industrial needs for the protection of different types of machine are met by the comprehensive range of units available. This comprises two different ranges, series TL and series AS. Both series of "Sadiguard" torque limiters have ***positive mechanical action*** giving accurate tripping indefinitely with virtually ***no maintenance***. "Sadiguard" torque limiters overcome the delay, friction / heat generation and torque variation associated with slipping clutches and belts. The cyclic loading fatigue, maintenance and resetting problems associated with shear pin devices are also eliminated.

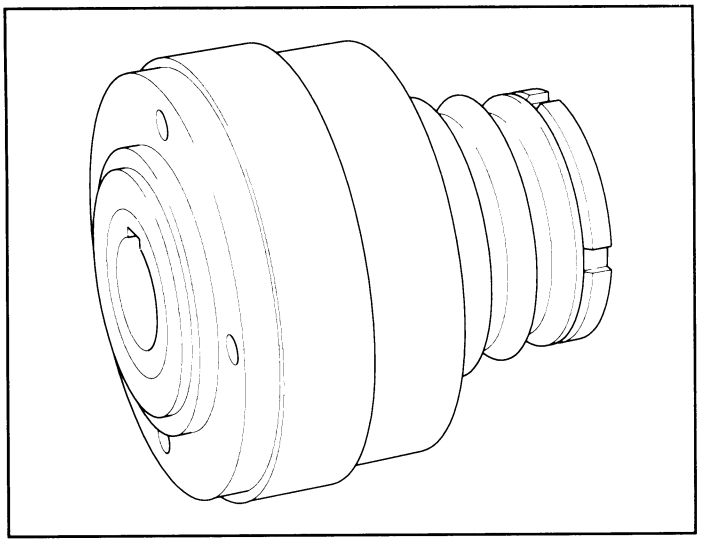
This catalogue illustrates the standard range of David Brown "Sadiguard" torque limiters. For applications and configurations outside the range illustrated please consult David Brown.

"SADIGUARD" SERIES TL.

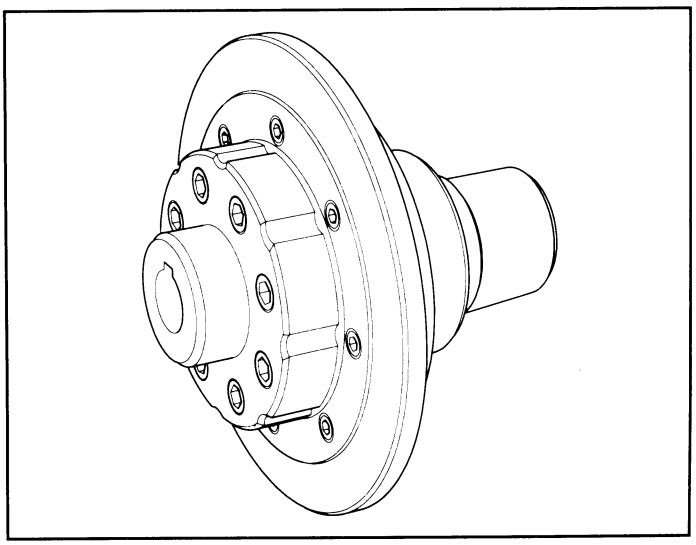
"TL" series torque limiters are available in 7 sizes covering a range of torques from 1 to 12,000 Nm, and are suitable for operation at speeds of up to 2,000 RPM. The basic unit can be fitted with a wide range of accessories allowing various ***shaft-to-shaft coupling options.*** Torque limiters are also available fitted with ***vee-belt pulleys and sprockets.*** The TLM version is equipped with its own housing for ***direct fitting between a flange mounted motor and reducer or driven machine*** and may be retrofitted without modification into many applications. The range offers a very compact design and the maximum amount of flexibility in installation.

"SADIGUARD" SERIES AS.

"AS" series torque limiters are available in 8 sizes covering a range of torques from 12 to 9,000 Nm, and are suitable for operation at speeds of up to 1,000 RPM dependant on size. "AS" series torque limiters are available in either shaft-to-shaft coupling configuration or as a sprocket, pulley or pinion drive. "AS" series torque limiters offer the most economical method of protection for lower speed drives where space is not limited.



Series 'TL'



Series 'AS'

Sadiguard Torque Limiters

Application

WHY SADIGUARD?

The installation of a "Sadiguard" torque limiter acts as a form of insurance against overload of drive motor or jamming of machinery. The problems of jamming or overload can be as minimal as the "burn out" of electric motors driving machinery, whereas more severe problems can cause extensive damage to all parts of the drive system. In addition to damage to machinery, jamming or overloads in process line equipment can cause extensive loss of product due to process damage. In all the above cases, loss of production while damaged components are replaced or repaired can cause losses far greater than the cost of the initial mechanical damage. The fitting of a "Sadiguard" torque limiter acts as a quickly re-settable link in the drive system, thus protecting the whole system at a very low capital cost, with virtually no running costs.

WHAT DOES IT DO?

The "Sadiguard" torque limiter is a device which acts as a rigid coupling until a preset torque value is reached. At this point the torque limiter disengages and the drive is no longer transmitted, effectively limiting the amount of torque which can be present at the driven side of the torque limiter. Dependant on the type of torque limiter selected the drive is either re-engaged automatically or can be reset manually. If the "synchro" option is chosen, re-engagement can only occur with the two coupling halves in the same relative angular position, thus ensuring synchronisation of driving and driven sides. Since the "Sadiguard" range of torque limiters do not rely on friction elements to prevent overloads, the torque limiter will provide reliable tripping at the same torque figure for many thousands of tripping cycles.

In addition to disengaging the drive, the tripping action of both the "TL" and "AS" series torque limiters causes a positive axial movement in one of the components. This axial movement can be used to trip a limit switch which can be used to serve two functions:-

- To disconnect power to the drive.
- To trigger a remote alarm indicating that an overload has occurred.

All "Sadiguard" torque limiters can be provided with a specially designed limit switch which is configured to provide the electrical contacts for the above functions. This limit switch can be easily incorporated into sophisticated control equipment.

WHERE DOES IT FIT?

The wide range of options in the "Sadiguard" torque limiter range means that they can be incorporated virtually anywhere in a drive system. A few basic points should be considered when incorporating "Sadiguard" torque limiters into the system design:-

- For maximum protection, the torque limiter should be positioned as near as possible to the likely cause of any overload.
- The motor is likely to be the furthest point from the overload.
- The use of the "start-lock" option in the TL series torque limiters means there is no need to compensate for high torques generated at start-up on electric motors. (However, care must be taken when using the "start-lock" option where torque overloads may be encountered during the starting cycle).
- Where torque limiters are fitted at the low torque, input side of a gearbox, the level of protection decreases as the gearbox reduction ratio increases.
- Great care should be used when fitting torque limiters into drives which incorporate brakes, especially brake motors, since high braking torques will "trip" a torque limiter in the same way as high driving torques.
- Where manual resetting torque limiters are incorporated accessibility for resetting of the mechanism should be taken into account.

Please consult David Brown for advice on incorporation of torque limiters into a drive mechanism.

Sadiguard Torque Limiters

Selection Example

Having decided on the design of the drive system, a suitable torque limiter can be selected from the "Sadiguard" range.

The selection of a suitable type of torque limiter is illustrated by the following example:-

A drive system has been designed whereby a flange mounted, 4 pole, 1450 RPM, 2.2 kw electric motor drives through a 70/1 reduction gearbox (efficiency 60%) to a conveyor drive. There is a possibility of a small amount of radial and angular misalignment between the drive and the conveyor, and there is also a space constraint between the drive and the conveyor which limits the maximum diameter to 200mm . The output shaft of the gearbox is 48mm and the conveyor drive shaft is 42mm diameter.

OPTION 1 - FITTING THE TORQUE LIMITER BETWEEN THE GEARBOX AND THE CONVEYOR DRIVE SHAFT.

The full load motor torque is calculated by the formula:-

$$\text{Torque (Nm)} = \frac{\text{Power (kw)} \times 9550}{\text{RPM}}$$

Therefore:-

$$\text{Motor torque} = \frac{2.2 \times 9550}{1450} = 14.49 \text{ Nm}$$

As the drive ratio is 70/1, the output speed of the gearbox (operating speed of the coupling) is calculated by:-

$$\text{Output speed} = \frac{\text{Input speed}}{\text{Ratio}}$$

Therefore:-

$$\text{Coupling speed} = \frac{1450}{70} = 20.71 \text{ RPM.}$$

The full load output torque of the gearbox is calculated by the formula:-

$$\text{Output torque} = \text{Input torque} \times \text{Ratio} \times \text{Efficiency}$$

Therefore:-

$$\text{Coupling torque} = 14.49 \times 70 \times 0.6 = 608 \text{ Nm.}$$

The key information for the selection has therefore been determined to be:

- Speed = 20.71 RPM.
- Tripping torque = 608 Nm.
- Shaft diameters 48mm and 42mm.

To help you decide on the type of torque limiter required, a "decision tree" is provided in this catalogue. If we use our above example we can follow the decision process:-

(1). DECISION - High or low speed.
CHOOSE - Low speed

(2). DECISION - Mounting position.
CHOOSE - Between shafts.

(3). DECISION - Alignment.
CHOOSE - Semi-flexible.

(4). DECISION - Resetting.
CHOOSE - Automatic.

(5). DECISION - Space available.
CHOOSE - Limited space
(note that this decision can be re-checked later on when the size of torque limiter has been selected).

Therefore the decision tree indicates a selection of Series "TL" type "N".

Each type of torque limiter has its own data sheet. From the data sheet for the "TL" type "N", we can now check the availability of a torque limiter to suit the shaft sizes to be connected. The data sheet indicates that a TLN size 3 would accommodate the required shaft sizes (note that the driving and driven sides of the torque limiter can be interchanged). Checking the torque ranges available indicates that the heavy duty option would provide a suitable torque range (250 to 750 Nm).

The maximum diameter of a TLN size 3 is indicated from the diagram on the data sheet to be 141 mm which is within the space constraints of the application. In order to verify our decision on space availability we will check whether or not a series "AS" type 1 torque limiter could have been used.

Sadiguard Torque Limiters

Selection Example

From the data sheet for series "AS" type 1 torque limiters it can be seen that to accommodate the required shaft sizes an AS37.5 torque limiter would be required. Checking the torque ranges available indicates that the torque range available only extends to 563 Nm, therefore the next largest size (AS75) would need to be selected (torque range for heavy duty version AS75 is 380 to 1130 Nm). From the data sheet it can be seen that the maximum diameter of an AS75 is 260mm, too large for the space constraint presented by the application. This verifies the initial decision to select the TLN torque limiter.

OPTION 2 - FITTING A TORQUE LIMITER BETWEEN THE FLANGE MOUNTED MOTOR AND GEARBOX.

Full load motor torque can be calculated as in option 1 to be 14.49 Nm.

The key information for the selection has therefore been determined to be:-

- Speed = 1450 RPM.
- Tripping torque = 14.49 Nm.
- Motor shaft diameter 28mm
- Motor flange size F215.

As in option 1 we can determine the type of torque limiter required using the "decision tree". Again, following the decision process:-

(1). DECISION - High or low speed.
CHOOSE - High speed

(2). DECISION - Mounting position.
CHOOSE - Between motor flange and gearbox.

Therefore the decision tree indicates a selection of Series "TL" type "M".

From the data sheet for the "TL" type "M" we can now check the availability of a torque limiter to suit the motor shaft and flange sizes to be connected (28mm shaft and F215 flange). The data sheet indicates that a TLM size 2 would accommodate the required flange and shaft sizes. Checking the torque ranges available indicates that the medium duty option would provide a suitable torque range (10 to 60 Nm).

In the above example option 1 would prove to give the greatest degree of protection, since the torque limiter is positioned as close as possible to the likely source of the overload (the conveyor drive). Option 2, although providing a lower degree of protection, has the advantage of being easier to fit into an existing drive system.

Please note that in both the above examples the tripping torque has been selected for 100% motor torque. Dependant on the application it may be required to set the tripping torque above or below this figure.

Sadiguard Torque Limiters Series T.L.

Features

The Sadiguard series "TL" provides dependable protection for driving and driven machinery, accurately tripping whenever the preset torque is exceeded, regardless of rotational speed.

Series "TL" torque limiters are available in 7 sizes covering a torque range from 1 to 12,000 Nm, with bore diameters up to 175mm. Tripping occurs immediately the resisting torque exceeds the preset figure. Having tripped, the torque limiter will automatically disengage the drive, and when fitted with the recommended limit switch can de-energise the motor and trigger a remote alarm. Resetting of the mechanism after tripping can be either automatic or manual.

	TORQUE SETTING RANGE (Nm)					
SIZE	**LIGHT DUTY**		**MEDIUM DUTY**		**HEAVY DUTY**	
	MIN	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**
TL1	1	7.5	2	15	15	45
TL2	2	15	10	60	60	200
TL3	10	60	50	250	250	750
TL4	50	250	150	500	500	1500
TL5	150	500	500	1500	1500	3000
TL6	500	1000	1000	3000	3000	6000
TL7	1000	2000	2000	6000	6000	12000

$$\text{Torque (Nm)} = \frac{\text{Power (kw)} \times 9550}{\text{RPM}}$$

SERIES "TL" TORQUE LIMITERS - SPECIAL FEATURES.

- ***No slip drive*** below tripping torque, regardless of number of operations.
- Operates at ***speeds up to 2000 RPM*** in either direction.
- Can be mounted in any position.
- Driving and driven sides can be reversed for flexibility of mounting.
- Standard bore sizes for direct mounting onto standard electric motor shafts. Special bores and keyways available for fitting onto gearbox shafts and other driving and driven machinery. Torque limiters can also be supplied pilot bored for the customer to machine to requirements.
- Patented "Start-Lock" pin available for motor speed applications which automatically locks the torque limiter during the starting cycle and permits the release torque to be set as low as 10% above the effective running torque.
- Wear resistant, with tripping components in heat treated chromium alloy steel. Designed for an operating life of ***50,000 tripping cycles with negligible wear.***
- Fully enclosed, ***lubricated for life*** unit. May be used in machines fully immersed in oil if required. Special waterproof versions available on request.
- The tripping torque may be preset before despatch and positively locked at this setting, or can be adjusted simply on site ***without the need for special tools.*** Test certificates can be provided where verified tripping torques are required.
- Resetting after tripping can be manual or automatic, with the "synchro" option ensuring the re-engagement of the drive in the same angular position every time.
- ***Positive axial movement on tripping*** to operate a limit switch. All "Sadiguard" torque limiters can be supplied with a specially designed limit switch capable of disconnecting the electrical supply to the motor and triggering a remote alarm.
- ***Infinitely variable torque adjustment*** means precise torque setting.
- The "Monogyr" version offers torque protection in one direction only. The torque limiter acts as a rigid coupling in the opposite direction. Simple but effective design means that the sense of rotation can be easily reversed with either sense of rotation available on despatch.
- "TL" series torque limiters are available in a wide variety of different configurations as shown in the attached data sheets.

Sadiguard Torque Limiters Series T.L.

How It Works

Operation of the Torque Limiting Mechanism.

The drive is transmitted from the torque limiter body (A) to the hardened driving plate (B) via rectangular keys and via the hardened steel balls to the hardened driven plate (C). On overload the separating force between the driving plate (B) and the driven plate (C) exceeds the pressure from the calibrated spring (D) and the balls roll out of their seats moving the driving plate axially, during this action the balls are retained by the ball cage (K). The torque at which the spring pressure is overcome depends on the compression of the main spring (D). The compression of this spring can be infinitely varied by adjusting the locknut (H), once the desired torque setting has been achieved this locknut can be positively fixed in position by the lockwasher (J). Once the balls have moved out of engagement, the body (A) rotates freely on the self-lubricating bearing (F) and the thrust bearing (G), whilst the driven plate (C) remains stationary. Once the overload has been removed the balls can re-engage with the seats in the driving and driven plates by slight angular rotation from the continuation of the drive. In "Synchro" versions the spacing of the balls means that re-engagement can only occur in one angular position, therefore two complete revolutions are required before re-engagement. (See following section for manual resetting). The axial movement of the driving plate (B) can be used to operate a limit switch (not shown).

Please note that the torque limiting mechanism will work equally well with the drive being transmitted in the reverse direction (i.e. the terms "driving" and "driven" can be interchanged).

Operation of the "Lock-Out" Mechanism (for manual resetting).

When the driving plate (B) moves axially on tripping, the spring loaded "lock-out" pin (E) moves into a hardened steel pocket located in the body (A). The pocket is located in the hub in the same angular position as the "lock-out" pin but is axially offset from the normal position of the pin. Once the lock out pin has been displaced to the position of the pocket due to the axial movement of the driving plate, the spring load causes it to slide into the pocket, thus holding the driving and driven plates apart, even though the torque overload may have been removed. In this "locked-out" position, torque can no longer be transmitted between the driving and driven plates and the coupling assembly is therefore held in the disengaged state until reset. To reset the mechanism, the lock out pin is turned anticlockwise (unscrewed) by 5 turns, the screw thread pulling the plunger out of engagement with the pocket. The main spring (D) then pushes the two plates back together and a click is heard. Once this operation has been carried out, re-engagement of the balls in their seats is by the same means as for automatic resetting. The pin is then turned clockwise (screwed in) until the spring in the plunger is fully compressed.

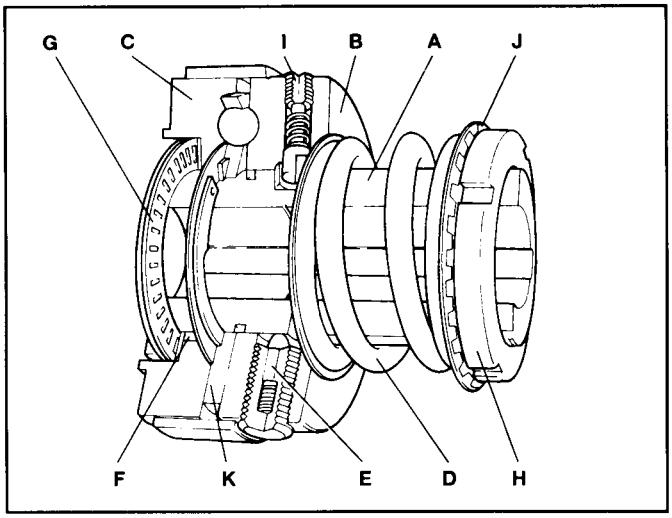
Operation of the "Start-Lock" Mechanism (for high speed operation).

For high speed drives where the starting torque exceeds the desired torque limit under normal running conditions (drives using direct-on-line wired squirrel cage motors for example) the "start-lock" pin (I) can be used.

At start the roller of the "start-lock" pin mechanism (I) is engaged in a pocket in the body (A). This roller is held in engagement with the pocket by a small spring and prevents the driving plate from moving axially, therefore preventing the coupling from disengaging at low speeds. As the speed increases the centrifugal force acting on the roller overcomes the resistance of the spring and the roller moves out of engagement with the pocket in the body (A) and is thrown into its seating in the driving plate (B). At this point, with the coupling rotating at speed, the "start-lock" pin has no effect and the tripping mechanism is free to operate if the torque exceeds the preset value. If the mechanism trips in a torque limiter with the manual reset option ("lock-out" pin fitted), the "start-lock" pin automatically re-engages when the "lock-out" pin is reset.

The use of the "start-lock" option means that the torque setting may be set to as little as 10% above the normal running torque even where start-up torques may be far higher.

Care must be taken where selecting torque limiters for applications where a drive may be started up under an overload. In such circumstances the torque may not fall below the preset torque during the start-up cycle and therefore the "start-lock" pin may not be able to disengage. This would prevent the coupling from disengaging under a torque overload.



Sadiguard Torque Limiters Series A.S.

Features

Series "AS" torque limiters provide dependable protection for driving and driven machinery since torque overloads cause automatic tripping regardless of speed. They give effective and economical protection to machinery against overloads and jamming. Improved materials in the current "AS" series have resulted in higher torque carrying capacity over previous series while retaining dimensional interchangeability with earlier models.

Series "AS" torque limiters are available in sizes covering a range of torques from 12 to 9,000 Nm, with bore diameters up to 185mm. Tripping occurs immediately the resisting torque exceeds the preset figure. Having tripped, the torque limiter will automatically disengage the drive, and when fitted with the recommended limit switch can de-energise the motor and trigger a remote alarm. The torque limiter re-engages the drive automatically once the overload has passed.

	TORQUE SETTING RANGE (Nm)				
SIZE	**LIGHT DUTY**		**HEAVY DUTY**		**MAX SPEEDS RPM**
	MIN	**MAX**	**MIN**	**MAX**	
AS4.5	11.5	34	23	68	1000
AS9	22.5	67.5	45	135	800
AS18	45	135	90	270	800
AS37.5	95	250	190	500	750
AS75	190	565	380	1130	600
AS150	375	1125	750	2250	500
AS300	750	2250	1500	4500	400
AS600	1500	4500	3000	9000	300

$$\text{Torque (Nm)} = \frac{\text{Power (kw)} \times 9550}{\text{RPM}}$$

SERIES "AS" TORQUE LIMITERS - SPECIAL FEATURES

- ***No slip drive*** below preset tripping torque.
- Operation at speeds of up to 1,000 RPM dependant on size in either direction of operation.
- Driving and driven sides can be reversed for flexibility of mounting.
- ***Immediate mechanical action*** gives accurate tripping indefinitely with virtually no maintenance.
- Can be mounted in any position.
- The tripping torque may be preset before despatch, or can be adjusted simply on site ***without the need for special tools.*** Test certificates can be provided where verified tripping torques are required.
- ***Positive axial movement on tripping*** to operate a limit switch. All "Sadiguard" torque limiters can be supplied with a specially designed limit switch capable of disconnecting the electrical supply to the motor and triggering a remote alarm.
- ***Infinitely variable torque adjustment*** means precise torque setting.
- Series "AS" torque limiters can be supplied bored and keywayed to the customer's specification or supplied pilot bored for the customer to machine.
- Versions are available with single position re-engagement and single direction action.
- The preset ***drive torque is maintained*** during the tripping action.
- Drive automatically re-engages ***within a fraction of a revolution*** (except "synchro" versions).

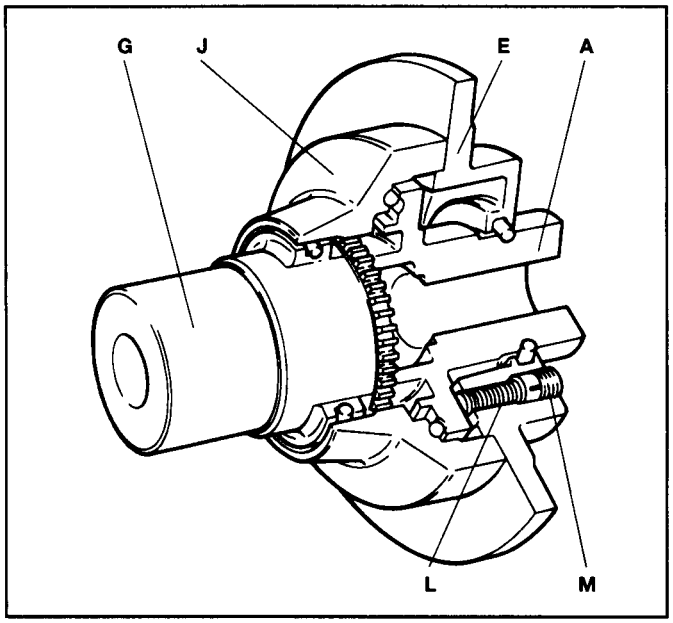
How It Works

Operation of the Torque Limiting Mechanism.

The drive is transmitted from the input hub (A) to the output housing (J) via the hardened steel balls, from the output housing the drive is transmitted via splines to the output hub (G). On overload the separating force between the input hub (A) and the output housing (J) exceeds the pressure from the calibrated springs (L) and the balls roll out of their seats moving the output housing and spring housing (E) assembly axially, with the output housing sliding on the splines between the output housing (J) and the output hub (G). During this action the balls roll around a specially formed annular groove. The torque at which the spring pressure is overcome depends on the compression of the springs (L). The compression of the springs can be infinitely varied by adjusting the adjusting plugs (M). Once the balls have rolled out of engagement, the input hub (A) continues to rotate freely whilst the spring housing (E), output housing (J) and output hub (G) cease rotation. Once the overload has been removed the balls can re-engage with the seats in the input hub and output housing by slight angular rotation from the continuation of the drive. In "Synchro" versions the addition of special pins in certain positions instead of balls means that re-engagement can only occur in one angular position, therefore one complete revolution is required before re-engagement.

The axial movement of the tripping flange on the spring housing (E) can be used to operate a limit switch.

Please note that the torque limiting mechanism will work equally well with the drive being transmitted in the reverse direction (i.e. the terms "driving" and "driven" or "input" and "output" can be interchanged).

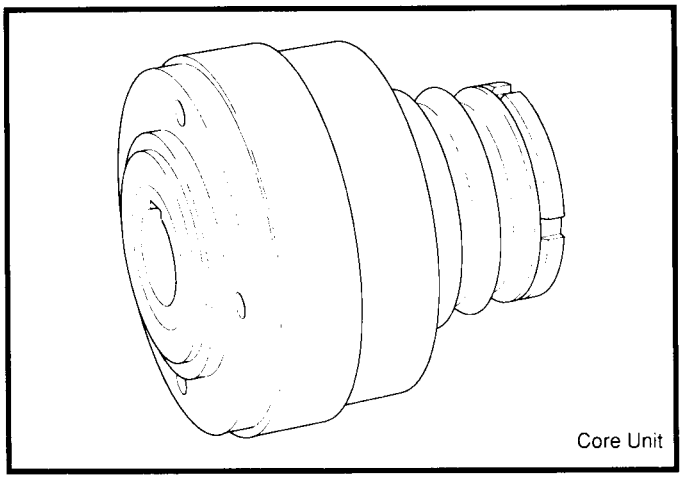


The Type TLS is the core torque limiter unit from which all other versions are derived.

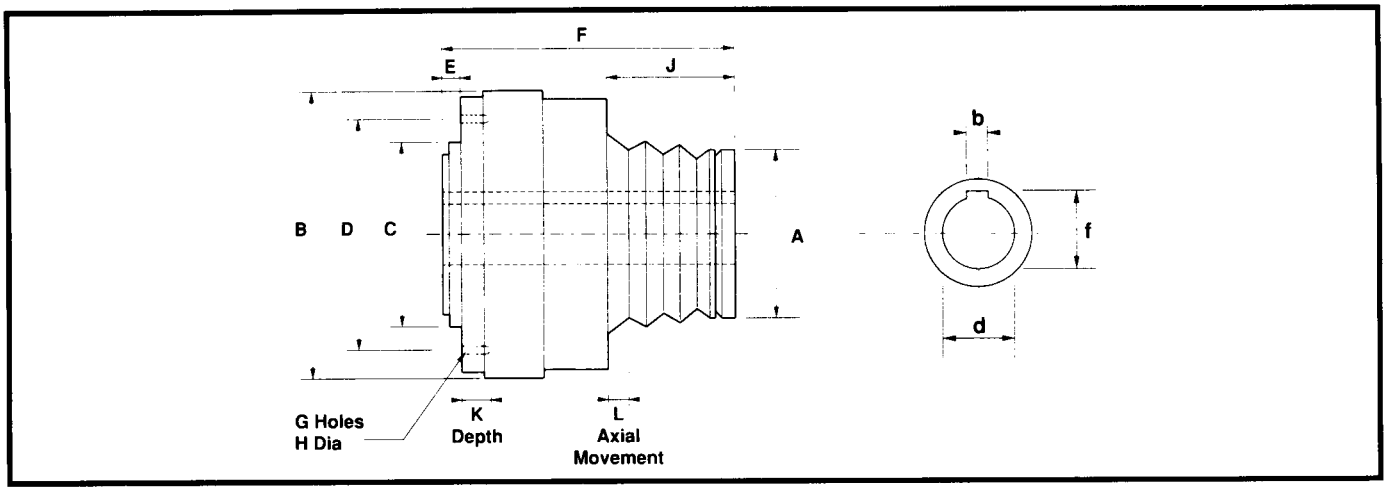
The Type TLS can be supplied separately for customers to incorporate into their own machinery or to fit customised accessories.

Torque limiters are available pilot bored, or with bores and keyways to fit standard motor shafts. Special bores and keyways are available on request.

Keyless shaft/hub connections are also available to allow ease of installation and precise adjustment of shaft position.



Core Unit



Model	A	B	C	D	E	F	G	H	J	K	L	d Max	Preferred Bores b	Preferred Bores d	Preferred Bores f	Torque Nm Light Min	Torque Nm Light Max	Torque Nm Medium Min	Torque Nm Medium Max	Torque Nm Heavy Min	Torque Nm Heavy Max
1	52	90	60	72	5	93	4	M6	45	10	1	22	4 5 6	11 14 19	12.8 16.3 21.8	1	7.5	2	15	15	45
2	70	110	75	90	5	112	4	M6	57	10	2	30	8 8	24 28	27.3 31.3	2	15	10	60	60	200
3	92	141	106	118	13	158	12	M6	84.5	12	2	42	10 12	38 42	41.3 45.3	10	60	50	250	250	750
4	110	180	125	140	19	197	12	M8	106	18	4.5	60	14 16 18	48 55 60	51.8 59.3 64.5	50	250	150	500	500	1500
5	140	225	160	195	24	250	16	M10	130	22	5	75	18 20	60 70	64.5 75	150	500	500	1500	1500	3000
6	180	285	200	245	30	315	20	M12	165	28	6	95	22 22	80 85	85.5 90.5	500	1000	1000	3000	3000	6000
7	225	360	250	305	38	395	24	M16	205	35	7	120	22 28	85 100	90.5 106	1000	2000	2000	6000	6000	12000

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

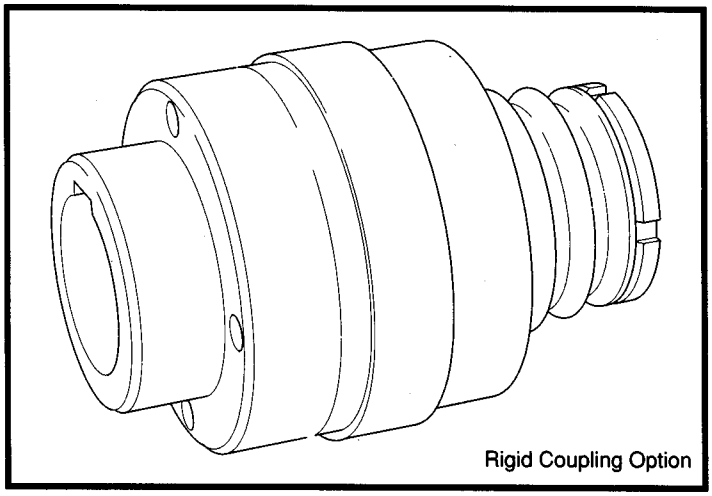
Unless specified otherwise, bore tolerances are H7.

All dimension in mm unless otherwise stated.

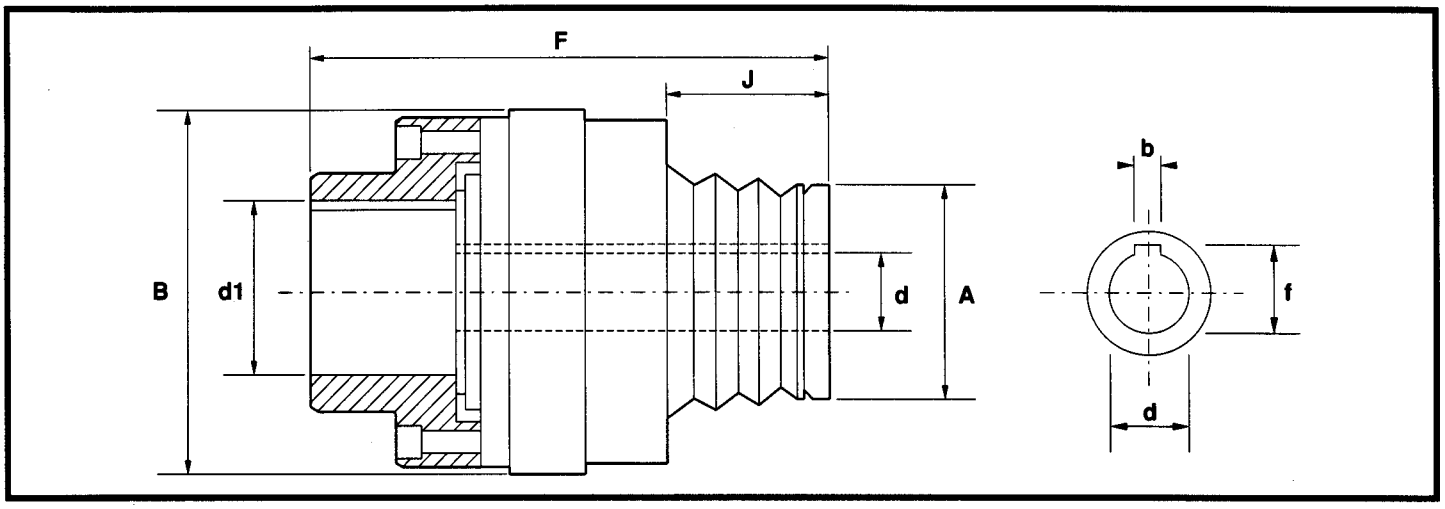
Type TLA torque limiters are combined with a rigid coupling hub for connection between shafts. This version is an economical option where shaft alignment can be guaranteed.

Torque limiters are available pilot bored, or with bores and keyways to fit standard motor shafts. Special bores and keyways are available on request.

Keyless shaft/hub connections are also available to allow ease of installation and precise adjustment of shaft position.



Rigid Coupling Option



Model	A	B	F	J	d Max	Preferred Bores b	Preferred Bores d	Preferred Bores f	d1 Max	Torque Nm Light Min	Torque Nm Light Max	Torque Nm Medium Min	Torque Nm Medium Max	Torque Nm Heavy Min	Torque Nm Heavy Max
1	52	90	123	45	22	4 5 6	11 14 19	12.8 16.3 21.8	42	1	7.5	2	15	15	45
2	70	110	157	57	30	8 8	24 28	27.3 31.3	51	2	15	10	60	60	200
3	92	141	225	84.5	42	10 12	38 42	41.3 45.3	75	10	60	50	250	250	750
4	110	180	278	106	60	14 16 18	48 55 60	51.8 59.3 64.5	90	50	250	150	500	500	1500
5	140	225	350	130	75	18 20	60 70	64.5 75	115	150	500	500	1500	1500	3000
6	180	285	435	165	95	22 22	80 85	85.5 90.5	145	500	1000	1000	3000	3000	6000
7	225	360	540	205	120	22 28	85 100	90.5 106	175	1000	2000	2000	6000	6000	12000

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

Unless specified otherwise, bore tolerances are H7.

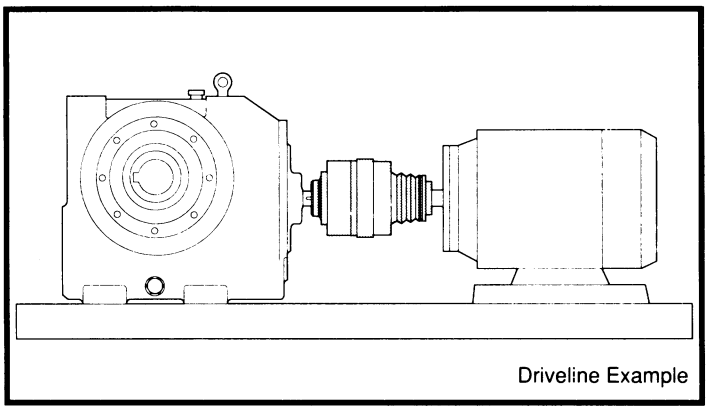
All dimensions in mm unless otherwise stated.

Sadiguard Torque Limiters Series T.L. Type N

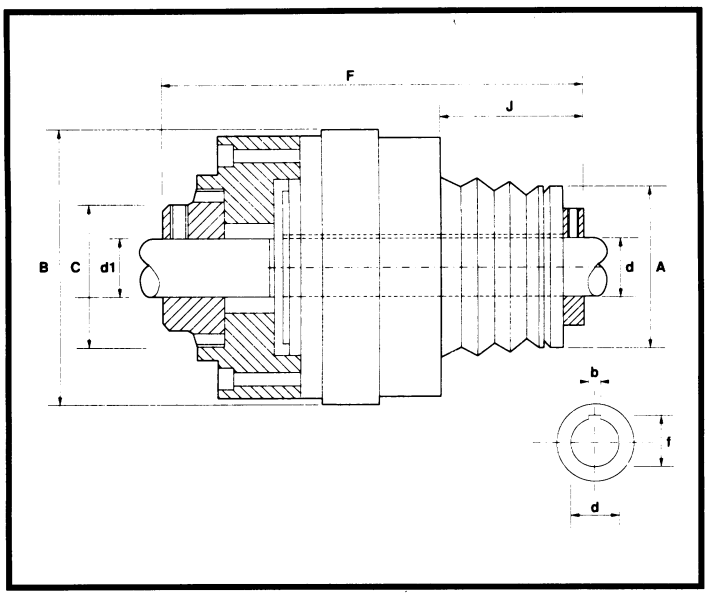
Type TLN torque limiters incorporate a semi-flexible gear type coupling for connection between shafts. This version can be used where moderate shaft mis-alignment may occur.

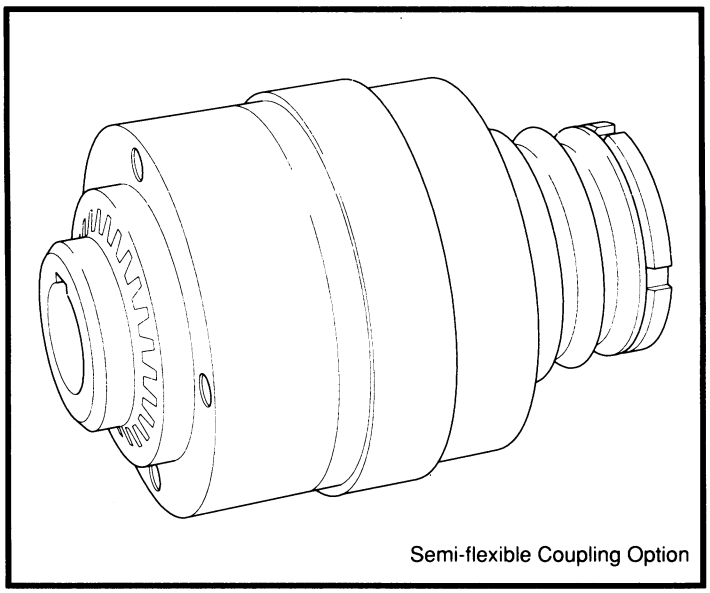
Torque limiters are available pilot bored, or with bores and keyways to fit standard motor shafts. Special bores and keyways are available on request.

Keyless shaft/hub connections are also available to allow ease of installation and precise adjustment of shaft position.



Driveline Example





Semi-flexible Coupling Option

Model	A	B	F	J	d Max	Preferred Bores b	Preferred Bores d	Preferred Bores f	d1 Min	d1 Max	Torque Nm Light Min	Torque Nm Light Max	Torque Nm Medium Min	Torque Nm Medium Max	Torque Nm Heavy Min	Torque Nm Heavy Max	Allowable Radial Misalignment
1	52	90	135	45	22	4 5 6	11 14 19	12.8 16.3 21.8	10	25	1	7.5	2	15	15	45	0.1mm
2	70	110	156	57	30	8 8	24 28	27.3 31.3	18	40	2	15	10	60	60	200	0.15mm
3	92	141	216	84.5	42	10 12	38 42	41.3 45.3	28	60	10	60	50	250	250	750	0.2mm
4	110	180	280	106	60	14 16 18	48 55 60	51.8 59.3 64.5	0	66	50	250	150	500	500	1500	0.25mm
5	140	225	375	130	75	18 20	60 70	64.5 75	0	84	150	500	500	1500	1500	3000	0.3mm
6	180	285	465	165	95	22 22	80 85	85.5 90.5	0	106	500	1000	1000	3000	3000	6000	0.35mm
7	225	360	575	205	120	22 28	85 100	90.5 106	0	128	1000	2000	2000	6000	6000	12000	0.4mm

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

Unless specified otherwise, bore tolerances are H7.

Maximum angular misalignment 0.75 degrees.

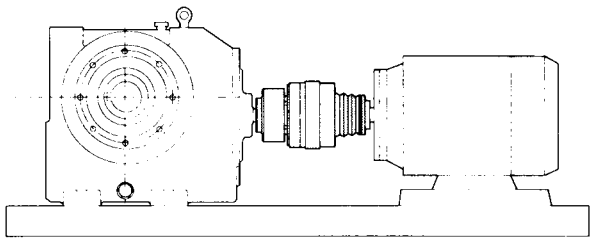
All dimensions in mm unless otherwise stated.

Sadiguard Torque Limiters Series T.L. Type P

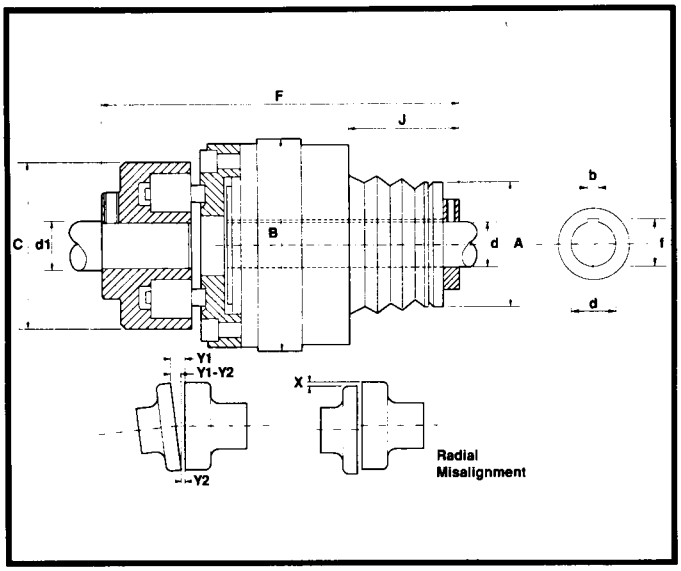
The Type TLP torque limiter incorporates a fully flexible rubber element type coupling for connection between shafts. This version can be used to accommodate greater degrees of shaft mis-alignment and also has the advantage of absorbing shock loads.

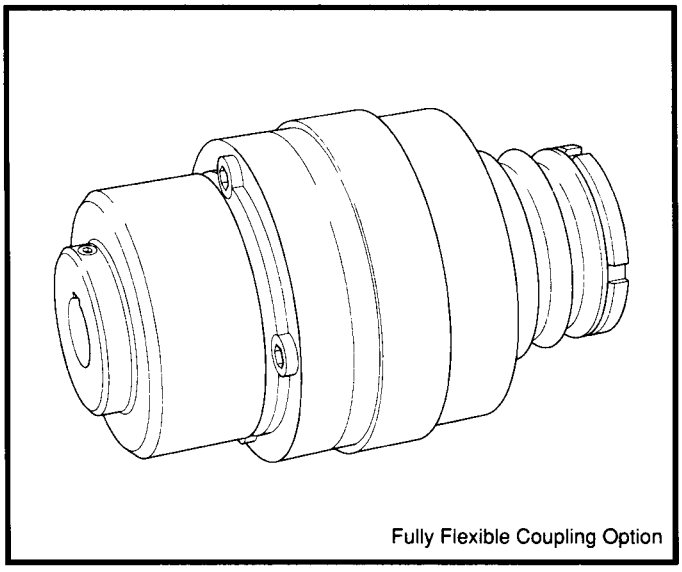
Torque limiters are available pilot bored, or with bores and keyways to fit standard motor shafts. Special bores and keyways are available on request.

Keyless shaft/hub connections are also available to allow ease of installation and precise adjustment of shaft position.



Driveline Example





Fully Flexible Coupling Option

It is recommended that the total combined angular and radial misalignment Z should not exceed the values shown in the table. Where $Z=X+(Y_1-Y_2)$.

Model	A	B	C	F	J	d Max	Preferred Bores b	Preferred Bores d	Preferred Bores f	d1 Min	d1 Max	Torque Nm Light Min	Torque Nm Light Max	Torque Nm Medium Min	Torque Nm Medium Max	Torque Nm Heavy Min	Torque Nm Heavy Max	Allowable Alignment Error Z
1	52	90	70	146	45	22	4 5 6	11 14 19	12.8 16.3 21.8	12	24	1	7.5	2	15	15	45	0.5mm
2	70	110	80	170	57	30	8 8	24 28	27.3 31.3	19	28	2	15	10	60	60	200	0.5mm
3	92	141	115	224	84.5	42	10 12	38 42	41.3 45.3	28	48	10	60	50	250	250	750	0.5mm
4	110	180	157	306	106	60	14 16 18	48 55 60	51.8 59.3 64.5	38	60	50	250	150	500	500	1500	0.7mm
5	140	225	*	*	130	75	18 20	60 70	64.5 75	*	*	150	500	500	1500	1500	3000	*
6	180	285	*	*	165	95	22 22	80 85	85.5 90.5	*	*	500	1000	1000	3000	3000	6000	*
7	225	360	*	*	205	120	22 28	85 100	90.5 106	*	*	1000	2000	2000	6000	6000	12000	*

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

Unless specified otherwise, bore tolerances are H7.

* Consult David Brown.

All dimension in mm unless otherwise stated.

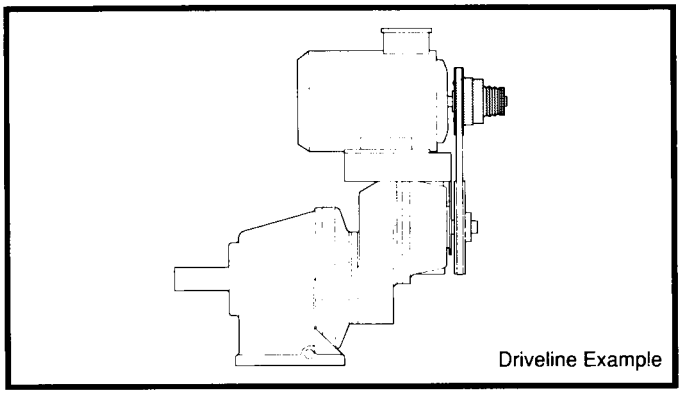
Series T.L. Type P

Sadiguard Torque Limiters Series T.L. Type V

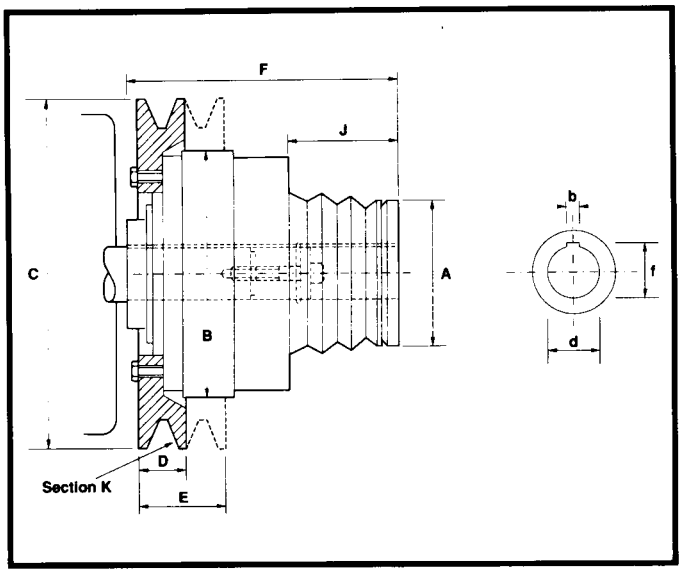
Type TLV torque limiters are fitted with an integral vee-belt pulley for direct fixing on to motor shafts or gearbox output shafts, standardised pulleys are listed but any special configurations can be supplied on request.

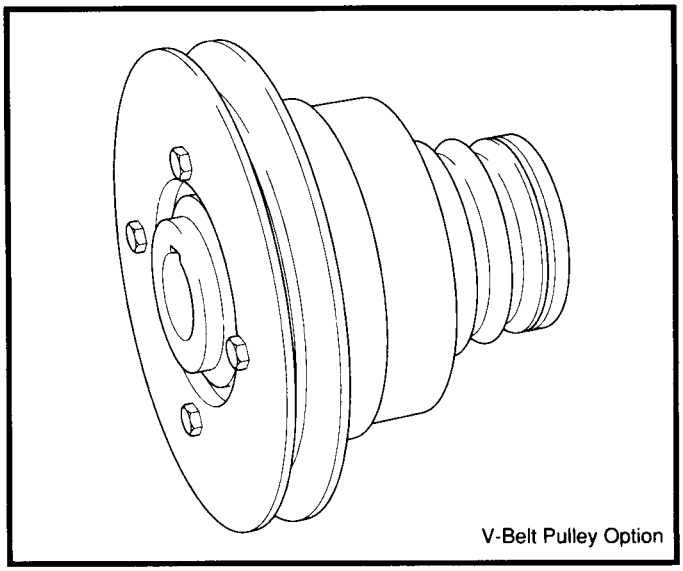
Torque limiters are available pilot bored, or with bores and keyways to fit standard motor shafts. Special bores and keyways are available on request.

Keyless shaft/hub connections are also available to allow ease of installation and precise adjustment of shaft position.



Driveline Example





V-Belt Pulley Option

Model	A	B	C	D	E	F	J	K	d Max	Preferred Bores b	Preferred Bores d	Preferred Bores f	Torque Nm Light Min	Torque Nm Light Max	Torque Nm Medium Min	Torque Nm Medium Max	Torque Nm Heavy Min	Torque Nm Heavy Max
1	52	90	125	16		101.5	45	SPZ	22	4 5 6	11 14 19	12.8 16.3 21.8	1	7.5	2	15	15	45
2	70	110	150	20		121	57	SPA	30	8 8	24 28	27.3 31.3	2	15	10	60	60	200
3	92	141	200	-	43	166	84.5	2xSPB	42	10 12	38 42	41.3 45.3	10	60	50	250	250	750
4	110	180	236 250	-	62 62	210.5 218.5	106	3xSPB 3xSPC	60	14 16 18	48 55 60	51.8 59.3 64.5	50	250	150	500	500	1500
5	140	225	*	*	*	*	130	*	75	18 20	60 70	64.5 75	150	500	500	1500	1500	3000
6	180	285	*	*	*	*	165	*	95	22 22	80 85	85.5 90.5	500	1000	1000	3000	3000	6000
7	225	360	*	*	*	*	205	*	120	22 28	85 100	90.5 106	1000	2000	2000	6000	6000	12000

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

Unless specified otherwise, bore tolerances are H7.

* Consult David Brown.

All dimensions in mm unless otherwise stated.

Series T.L. Type V

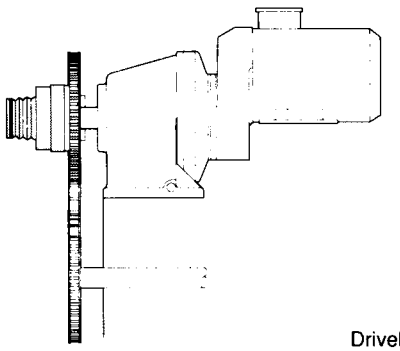
Sadiguard Torque Limiters Series T.L. Type W

Type TLW torque limiters are fitted with an integral chain sprocket for direct fixing on to gearbox output shafts.

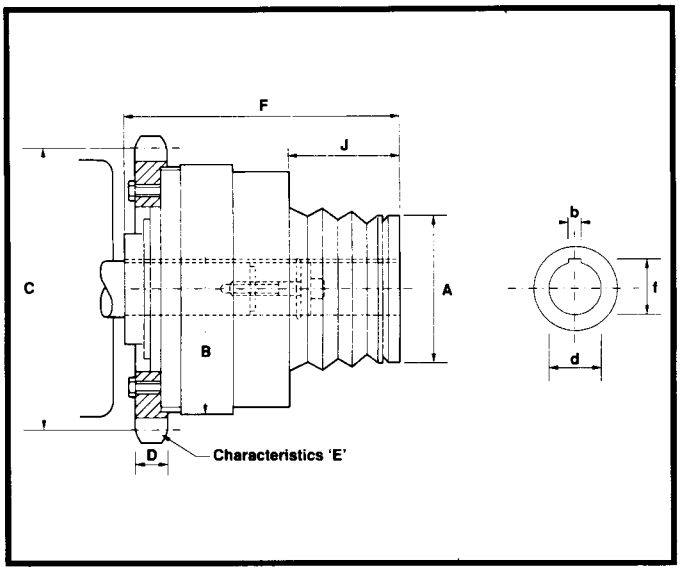
Standardised sprockets are listed but any special configuration of sprocket or gear pinion can be supplied on request.

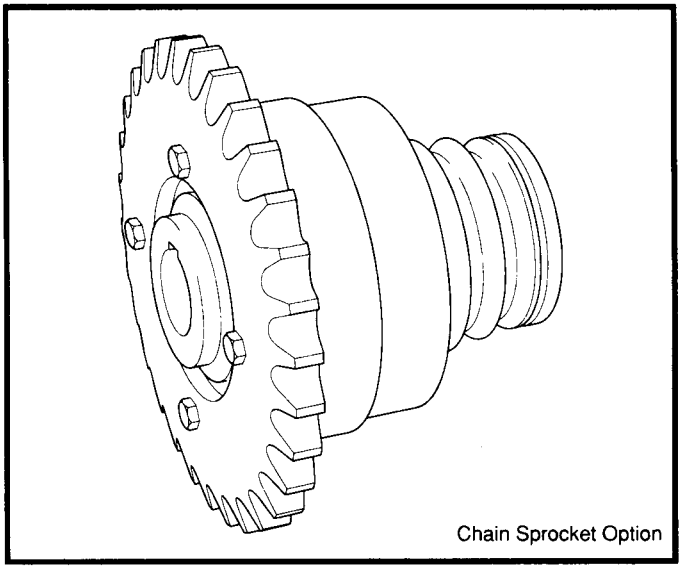
Torque limiters are available pilot bored, or with bores and keyways to fit standard motor shafts. Special bores and keyways are available on request.

Keyless shaft/hub connections are also available to allow ease of installation and precise adjustment of shaft position.



Driveline Example





Chain Sprocket Option

Model	A	B	C	D	E	F	J	d Max	Preferred Bores b	Preferred Bores d	Preferred Bores f	Torque Nm Light Min	Torque Nm Light Max	Torque Nm Medium Min	Torque Nm Medium Max	Torque Nm Heavy Min	Torque Nm Heavy Max
1	52	90	101.3	7	25 Teeth Simplex Pitch ½" DIN 8187	103	45	22	4 5 6	11 14 19	12.8 16.3 21.8	1	7.5	2	15	15	45
2	70	110	133.8	10.5	22 Teeth Simplex Pitch ¾" DIN 8187	123	57	30	8 8	24 28	27.3 31.3	2	15	10	60	60	200
3	92	141	178.5	15.3	22 Teeth Simplex Pitch 1" DIN 8187	169	84.5	42	10 12	38 42	41.3 45.3	10	60	50	250	250	750
4	110	180	202.9	18	20 Teeth Simplex Pitch 1¼" DIN 8187	210	106	60	14 16 18	48 55 60	51.8 59.3 64.5	50	250	150	500	500	1500
	110	180	207.3	23	17 Teeth Simplex Pitch 1½" DIN 8187	213	106										
5	140	225	*	*	*	*	130	75	18 20	60 70	64.5 75	150	500	500	1500	1500	3000
6	180	285	*	*	*	*	165	95	22 22	80 85	85.5 90.5	500	1000	1000	3000	3000	6000
7	225	360	*	*	*	*	205	120	22 28	85 100	90.5 106	1000	2000	2000	6000	6000	12000

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

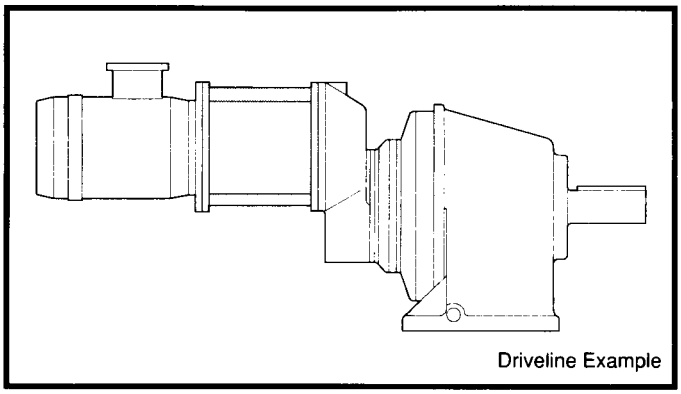
Unless specified otherwise, bore tolerances are H7.

* Consult David Brown.

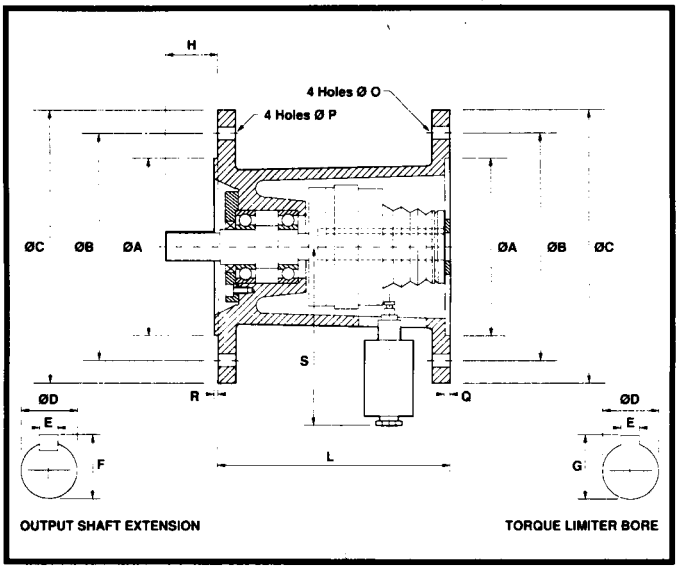
All dimensions in mm unless otherwise stated.

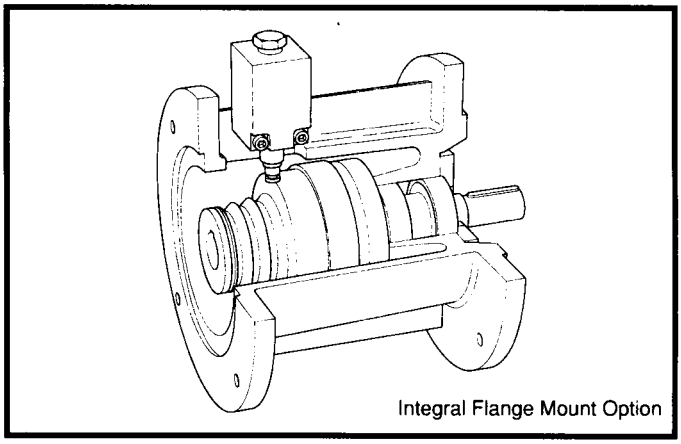
Type TLM torque limiters are supplied complete with a flanged adaptor housing, with output shaft and bearing assembly. The standardised flanges permit the introduction of the torque limiter between an electric motor and gear reducer or other driven machinery without modification, with the coupling itself bored and keywayed to fit the standard motor shaft. This feature is particularly useful for adding to existing installations where unforeseen overloads have occurred resulting in costly breakdowns.

Special versions can be produced on request for fitting to non-standard motor or gearbox interfaces.



Driveline Example





Integral Flange Mount Option

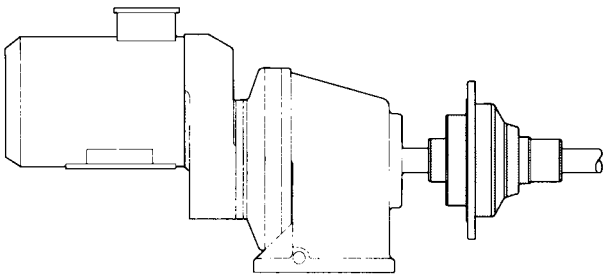
Unless specified otherwise, bore tolerances are H7.
All dimensions in mm unless otherwise stated.
For torque ranges see Type S data sheet.

Model	Motor Frame	Flange	A	B	C	D	E	F	G	H	L	O	P	Q	R	S
1	D63	F115	95	115	140	11	4	12.5	12.8	23	171	M8	8	4	3	144
	D71	F130	110	130	160	14	5	16	16.3	30	171	9	9	4.5	3.5	146
	D80	F165	130	165	200	19	6	21.5	21.8	40	171	11	11	4.5	3.5	146
2	D90	F165	130	165	200	24	8	27	27.3	50	210	11	11	5	3.5	154
	D100\112	F215	180	215	250	28	8	31	31.3	60	210	15	15	5	4	154
3	D132	F265	230	265	300	38	10	41	41.3	80	306	15	15	5	4	169
	D160	F300	250	300	350	42	12	45	45.3	110	306	19	19	6	5	169
4	D180	F300	250	300	350	48	14	51.5	51.8	110	400	19	19	6	5	183
	D200	F350	300	350	400	55	16	59	59.3	110	400	19	19	6	5	183
5	D225	F400	350	400	450	60	18	64.2	64.5	140	505	19	19	6	5	225
	D250	F500	450	500	550	70	20	74.7	75	140	505	19	19	6	5	275
	D280	F500	450	500	550	80	22	85.2	85.5	170	505	19	19	6	5	275
6	D315	F600	550	600	660	85	22	90.2	90.5	170	620	24	24	7.5	6	330
7	D315	F600	550	600	660	85	22	90.2	90.5	170	785	24	24	7.5	6	330
	D355	F740	680	740	800	100	28	105.7	106	210	785	24	24	7.5	6	400

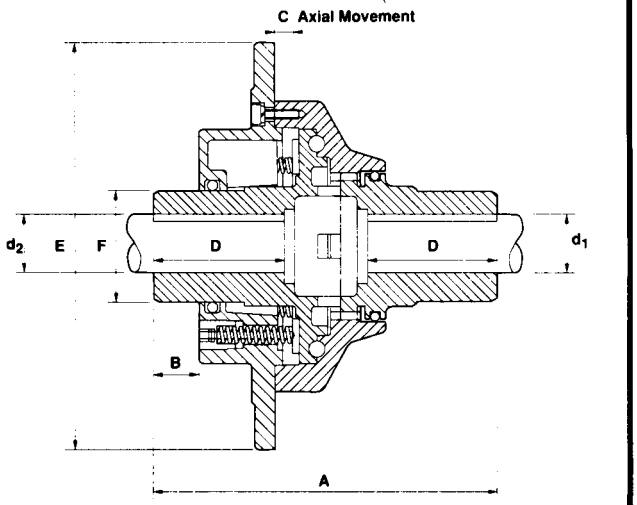
Sadiguard Torque Limiters Series A.S. Type 1

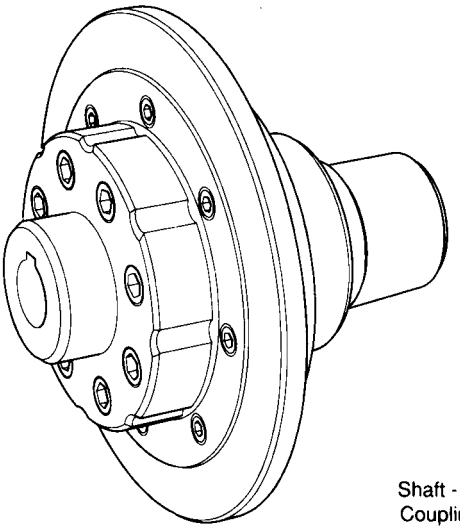
In the type 1 version the AS coupling is designed for shaft to shaft mounting. The torque limiter incorporates a flexible gear type hub which will accommodate shaft misalignment.

Torque limiters are available pilot bored, or with bores and keyways to suit customers requirements.



Driveline Example





Shaft - to - Shaft Coupling Option

Model	A	B	C	D	E	F	Bore Dia			Torque Nm Light Duty		Torque Nm Heavy Duty		Allowable Radial Misalignment
							d1 max	d2 Min	d2 Max	Min	Max	Min	Max	
AS 4.5	150	21	4	50	155	45	30	14	30	11.5	34	23	68	0.2mm
AS 9	160	20	4	60	178	50	40	18	35	22.5	67.5	45	135	0.2mm
AS 18	182	20	4	60	201	55	55	19	36	45	135	90	270	0.2mm
AS 37.5	194	26	5	74.	230	70	73	28	45	95	250	190	500	0.2mm
AS 75	263	35	6	104	260	90	90	38	63	190	565	380	1130	0.3mm
AS 150	316	30	9	104	347	105	125	48	70	375	1125	750	2250	0.3mm
AS 300	400	35	10	134	406	130	145	55	90	750	2250	1500	4500	0.3mm
AS 600	477	69	13	134	480	170	185	75	115	1500	4500	3000	9000	0.3mm

Maximum angular misalignment 0.75 degrees.

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

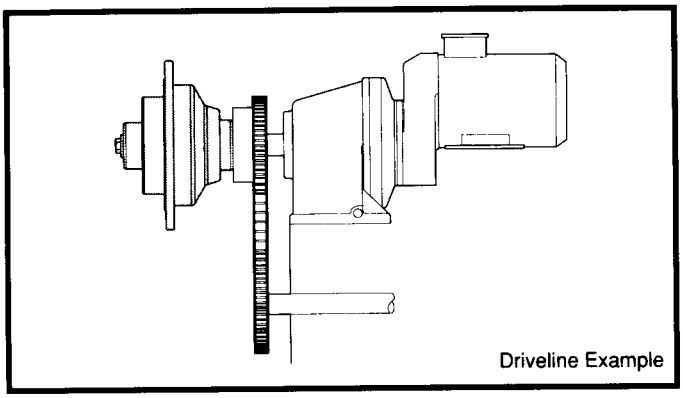
Unless specified otherwise, bore tolerances are H7.

All dimensions in mm unless otherwise stated.

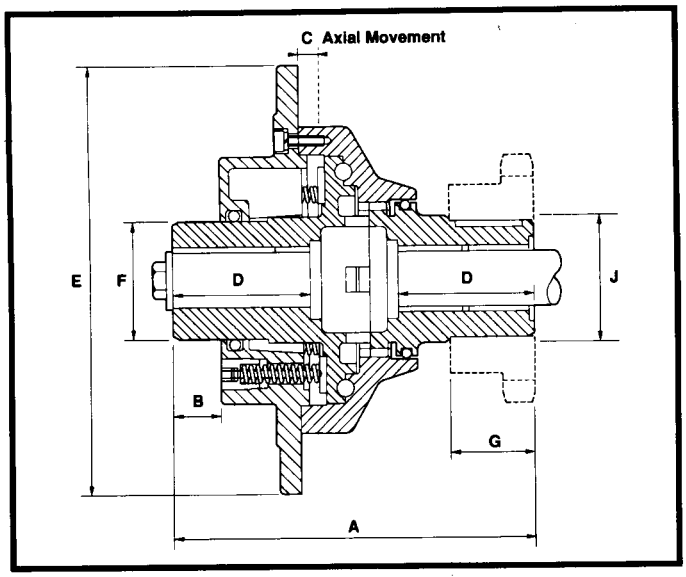
Series A.S. Type 1

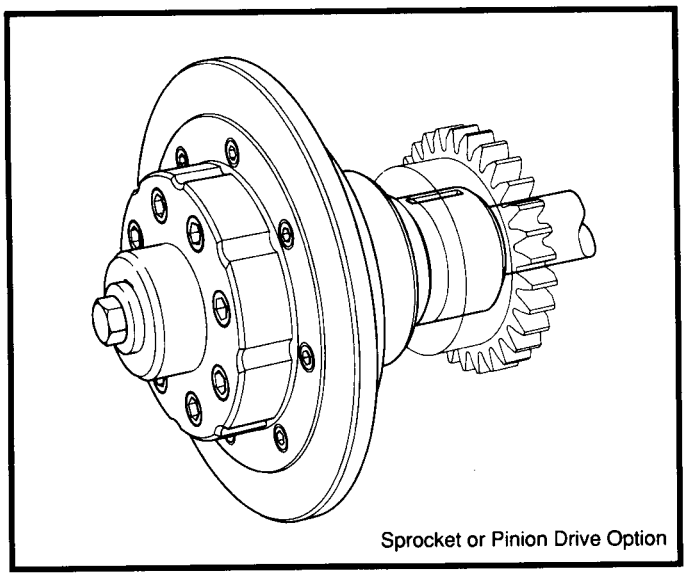
In the type 2 version, the AS coupling is designed for a sprocket or pinion drive. The outside diameter of the driven hub is machined to suit the sprocket or pinion and self lubricating bushes are fitted into the bore. The driving hub is bored and keywayed to fit on to a suitably extended output shaft.

Standard versions are available for David Brown 'Multicell' gearboxes, but special versions can be produced on request.



Driveline Example





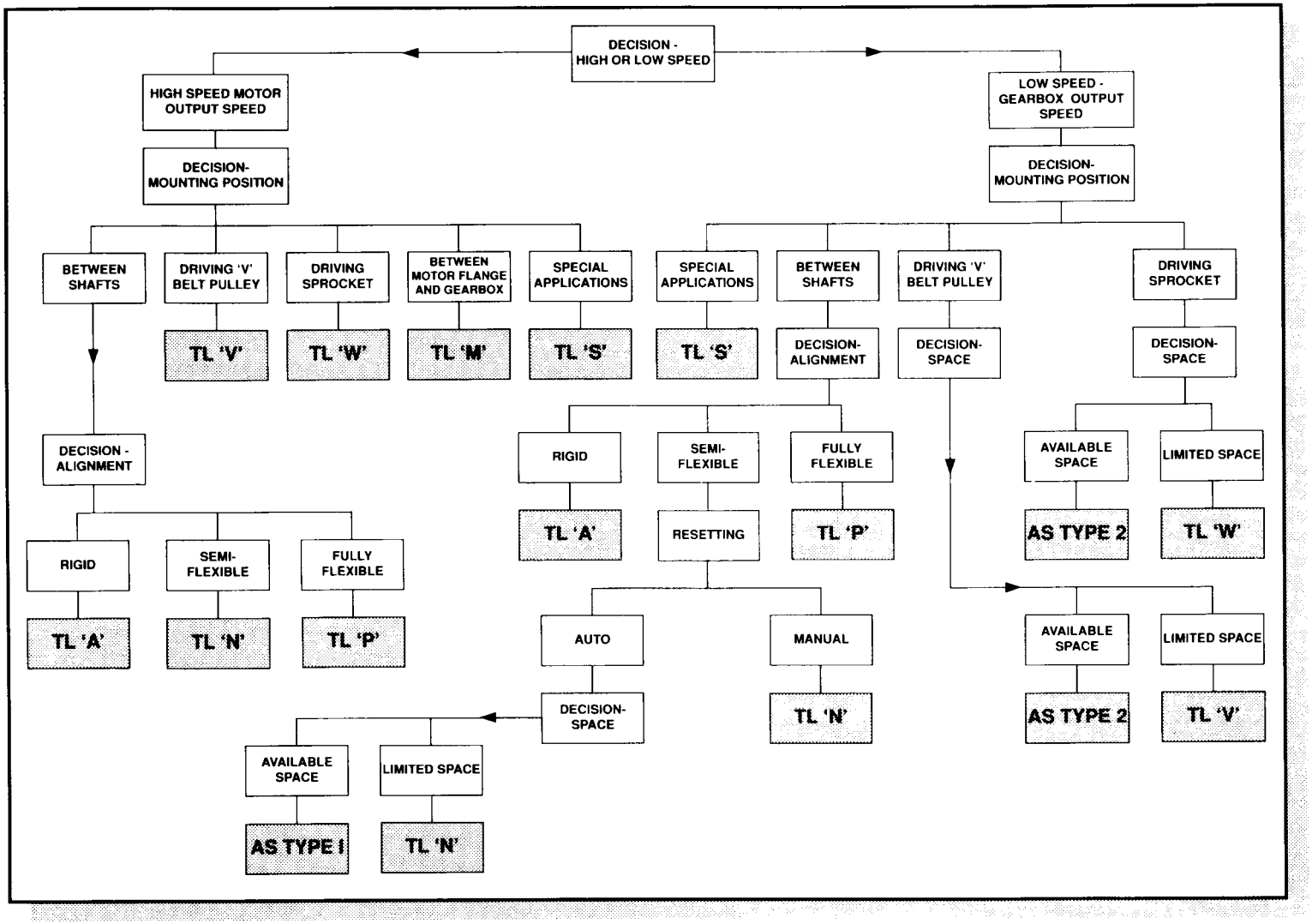
Sprocket or Pinion Drive Option

Model	A	B	C	D	E	F	G	Standard Bore	Max Bore	J	Torque Nm			
											Light Duty		Heavy Duty	
										Max	Min	Max	Min	Max
AS 4.5	150	21	4	50	155	45	28	19	30	50	11.5	34	23	68
AS 9	160	20	4	60	178	50	38	24	35	56	22.5	67.5	45	135
AS 18	182	20	4	60	201	55	55	28	36	75	45	135	90	270
AS 37.5	194	26	5	74	230	70	55	32	45	95	95	250	190	500
AS 75	263	35	6	104	260	90	78	42	63	125	190	565	380	1130
AS 150	316	30	9	104	347	105	85	50	70	160	375	1125	750	2250
AS 300	400	35	10	134	406	130	125	60	90	185	750	2250	1500	4500
AS 600	477	69	13	134	480	170	135	75	115	229	1500	4500	3000	9000

Maximum bore sizes are based on the use of standard keyways. Sizes can be increased slightly by the use of non standard keyways. Please consult David Brown.

Unless specified otherwise, bore tolerances are H7.

Sadiguard Torque Limiters - Selection Decision Tree



TO SELECT SIZE AND DUTY

Using the selection tables, check for bore size.

Check torque required is available.

If necessary try next size up.

TL ONLY - Dependant on torque, specify light, medium or heavy spring.

AS ONLY - Dependant on torque, specify light or heavy duty springs.

TO SELECT OPTIONS

Start lock option for high speed torque limiters

For high speed drives where the starting torque exceeds the desired torque limit under normal running conditions (drives using D-O-L wired squirrel cage motors for example) the starting lock pin can be fitted.

For drives which must re-engage in the same angular position -

Specify synchro version.

For single direction tripping, (ie. acts as a solid coupling in one direction, torque limiter in other direction) -

Specify monogyr version.

Sadiguard Torque Limiters - Series T.L. Configuration Options

TYPE

LIGHT
For Light Torque Applications

MEDIUM
For Medium Torque Applications

HEAVY
For Heavy Torque Applications

RESETTING OPTION

AUTOMATIC
(Coupling re-sets automatically by continuing drive)

MANUAL
(Coupling 'Locks Out' to disengage drive. Simple manual re-setting)

SYNCHRO AUTOMATIC
(Coupling automatically re-engages in same position by continuing drive)

SYNCHRO MANUAL
(Coupling 'Locks Out' to disengage drive and can only be re-engaged manually in same position)

ACCESSORIES

TYPE S

These torque limiters are the basic units without accessories from which all varieties are derived. For special applications specify Type S and indicate adaptions required.

TYPE A

These torque limiters are for attachment between 2 accurately aligned shafts, incorporating a rigid coupling hub.

TYPE N

For torque limiters requiring a semi flexible coupling between shafts incorporating a flexible gear coupling hub.

TYPE P

For torque limiters requiring full flexible coupling between shafts incorporating flexible rubber segment coupling hub.

TYPE V

For torque limiters supplied with a vee belt pulley drive. Available with standard bores to suit standard motor shaft sizes or bored and keywayed to customer's requirements.

TYPE W

For torque limiters supplied with a sprocket drive with standard or non-standard bores as For type V.

TYPE M

These units are supplied with a flanged adaptor housing with output shaft and bearing assembly. The standardised flanges permit the introduction of the Type M between an electric motor and gear reducer or other driven machinery without modification. This feature is particularly useful for adding to existing installations where unforeseen overloads have occurred resulting in costly breakdowns.

START LOCK

START LOCK
Allows coupling to operate on high speed drives (over 500rpm) where starting torque exceeds desired tripping torque under normal running conditions.

NO START LOCK

Contact Details

AUSTRALIA

David Brown Gear Industries Ltd
13-19 Franklin Avenue
Bulli, NSW 2516
Australia
Tel: +61 2 4283 0300
Fax: +61 2 4283 0333

AUSTRIA

Benzler Antriebst Ges mbH
Urnenhainweg 7
AT-4050 Traun
Austria
Tel: +43 7 229 618 91
Fax: +43 7 229 618 84

BELGIUM

SA David Brown Sadi Benzlers NV
Contact the Northern European Service Centre (Netherlands)
Tel: +32 13 66 10 58
Fax: +32 13 66 23 37

CANADA

David Brown Radicon Inc
975 Dillingham Road
Pickering, Ontario
L1W 3B2
Canada
Tel: +01 905 420 4141
Fax: +01 905 420 9513

DENMARK

Benzler Transmission A/S
Hammerholmen 39
DK-2650 Hvidovre
Denmark
Tel: +45 36 34 03 00
Fax: +45 36 77 02 42

FINLAND

Oy Benzler AB
PB 3
FI 02211 Espoo
Finland
Tel: +358 9 8870 630
Fax: +358 9 8870 631

FRANCE

Benzler France
Contact the Northern European Service Centre (Netherlands)
Tel: +33 130 32 79 00
Fax: +33 130 32 80 40

or contact

David Brown Transmissions France SA
42 Avenue du Progrès, BP 149
69686 Chassieu Cedex
France
Tel: +33 4 72 47 61 50
Fax: +33 4 72 47 61 69

DSN
9 rue de la Verrerie, BP 135
ZI Le Fontanil Cedex
38521 El Fontanil
France
Tel: +33 4 76 75 66 83
Fax: +33 4 76 75 57 99

WECO
33 Rue Henri-Lebert, BP 48
68801 Thann Cedex
France
Tel: +33 3 89 37 01 13
Fax: +33 3 89 37 39 36

GERMANY

Benzler Germany
Contact the Northern European Service Centre (Netherlands)
Tel: 0800 350 40 00
Fax: 0800 350 40 01

HUNGARY

Benzler Antriebst Ges mbH
Urnenhainweg 7
AT-4050 Traun
Austria
Tel: +43 7 229 618 91
Fax: +43 7 229 618 84

ITALY

Benzler Ferri SpA
Via F.Ili Rosselli 16
IT 42019 Scandiano (RE)
Italy
Tel: +39 05 22 763314
Fax: +39 05 22 981758

MALAYSIA

Benzler (M) Sdn Bhd
No 24 Jalan TPJ 3
Taman Perindustrian
Jaya Subang
MY 47200 Selangor
Malaysia
Tel: +60 3 745 0668
Fax: +60 3 746 1436

NETHERLANDS

Northern European Service Centre & HQ
Benzlers Netherland
Postbox 3303
NL 5902 Venlo RH
Netherlands
Tel: +31 773 245 900
Fax: +31 773 245 901

NORWAY

Textron Power Transmission (Norge)
Incorporating Benzler A/S & David Brown Hydraulics Norway A/S
PO Box 73 Leirdal
Stromsveien 372
NO- 1008 Oslo
Norway
Tel: +47 22 90 94 30
Fax: +47 22 90 94 11

PHILIPPINES

David Brown John Welsh Custom Build (Pty) Ltd
Unit 1207 One Magnificent Mile
San Miguel Ave, Ortigas Centre
Pasiq City, Philippines
Tel: +63 6 32 910 0316
Fax: +63 6 32 910 0317

SINGAPORE

Benzler (FE) Pte Ltd
1 Clementi Loop
#03-08
Singapore 129808
Tel: +65 469 0777
Fax: +65 469 2083

SOUTH AFRICA

David Brown Gear Industries Ltd
PO Box 540, Benoni 1500
South Africa
Tel: +27 11 748 0000
Fax: +27 11 421 2963

David Brown Gear Industries Ltd
PO Box 36882
Chempet 7442
Cape Town
South Africa
Tel: +27 21 551 2163
Fax: +27 21 551 2164

David Brown Gear Industries Ltd
Natal Sales Office
39 Richmond Road
Pinetown 3600
Natal, South Africa
Tel: +27 31 700 3302
Fax: +27 31 700 1872

SWEDEN

AB Benzlers
PO Box 922
SE-251 09 Helsingborg
Sweden
Tel: +46 42 18 6800
Fax: +46 42 21 8803

THAILAND

David Brown Powauto (Thailand) Ltd
Level 5 Sermsrap Building
169/98 Ratchadapisek Road
Din Daeng, Bangkok 10320
Thailand
Tel: +66 2 276 9504/5/6
Fax: +66 2 276 9503

UNITED KINGDOM

Textron Power Transmission Corporate HQ
Park Road
Lockwood, Huddersfield
West Yorkshire. HD4 5DD
Tel: +44 (0) 1484 465500
Fax: +44 (0) 1484 465501

David Brown Engineering Ltd
Park Road
Lockwood, Huddersfield
West Yorkshire. HD4 5DD
Sales
Tel: 0800 970 4001
Fax: 0800 970 4002
Service & Spare Parts
Tel: 0800 970 4003
Fax: 0800 970 4004

USA

Cone Drive Textron
240 East 12th Street
Traverse City
MI 49684
USA
Tel: +01 231 946 8410
Fax: +01 231 933 8600

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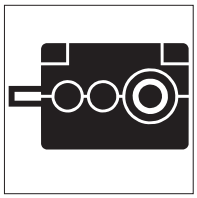
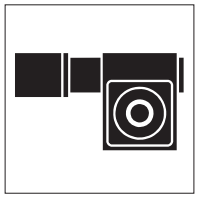
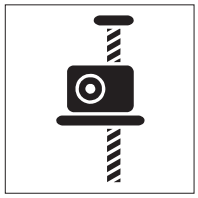
WATER

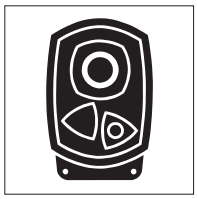

Geared motors

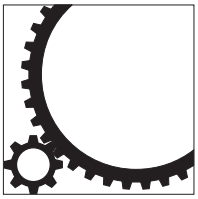

Industrial reducers

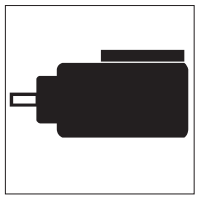

Worm

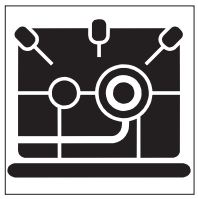

Precision products

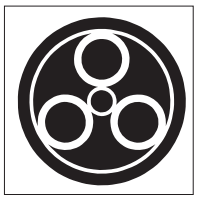

Screwjacks


Shaftmount

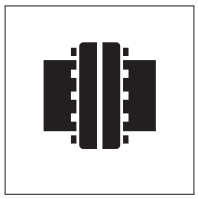

Horizontal mill drives


Vertical mill drives

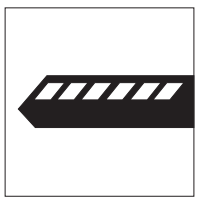

High speed


Planetary units


Specialist drives


Couplings


Defence Systems


Rail

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