



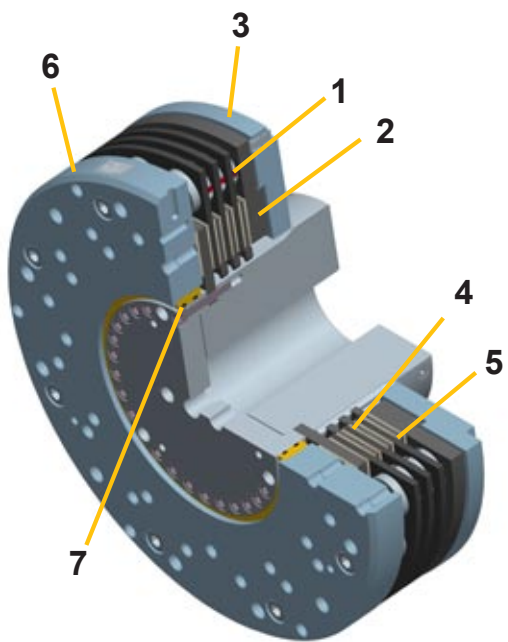
FMD Series

Fixed Multiple Disc Torque Management

PT Tech's FMD series is a friction-type multiple disc torque limiter for high horsepower, high energy and/or limited space applications. They are designed to operate on the high speed side of a drive system.

FMDs feature:

- High Torque capacity
- High Energy capacity
- Consistent, tamper-resistant torque throughput wearlife
- Low Maintenance
- Low Output Inertia
- Designed to fit Renold Hi-Tec PM Couplings or American Vulkan Flexomax-GS Series Couplings or custom designed for your coupling



How the FMD Works

The FMD series friction-type torque limiters require no adjustment at installation or throughout their entire wearlife. They require no lubrication and no resetting after slip has occurred. Wear can be accurately and readily measured without disturbing the unit.

A complement of spring cup assemblies (Item #1) exert a force pushing the pressure plate (Item #2) away from end plate "B" (Item #3). This places a clamping force between the friction plates (Item #4) and the separator plates (Item #5). Torque is transmitted from the input end plate (Item #6) through the separator plates to the friction plates. The friction plates are engaged to the bored output hub through close tolerance splines.

The FMD Series torque setting is preset at the factory. When the drive system torque exceeds the setting, the torque limiter will slip while continuing to transmit torque equal to the setting. This is possible because the static and dynamic coefficient of friction of the disc pack are almost identical due to proprietary design.

The FMD series torque limiter is designed to operate at motor speed. In most drive systems the prime mover represents approximately 90-95% of the total inertia. The FMD series will generally provide excellent inertial shockload protection when located at the prime mover.

For more complete information on inertial shockloads, request PT Tech's "Torque Protection for Electric Motor Driven Equipment" brochure.

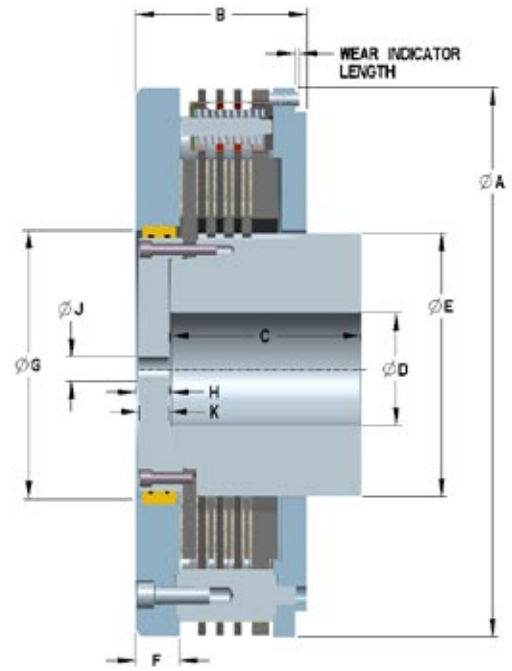
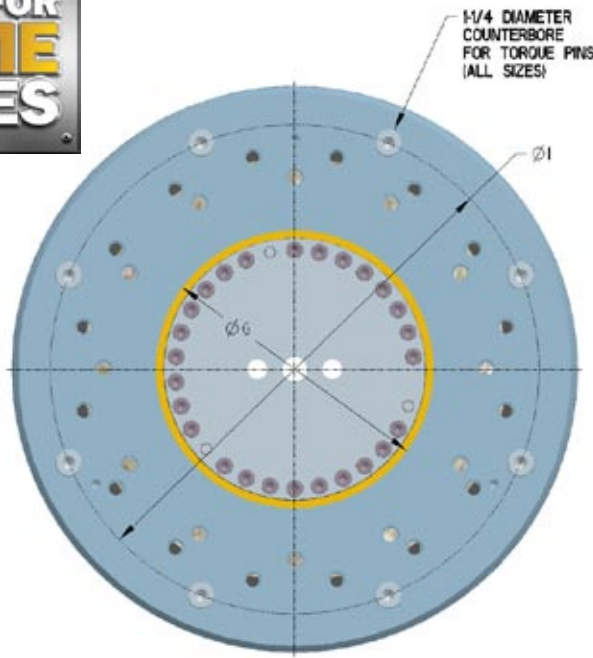


Table #1

PERFORMANCE DATA*				
FMD SERIES		28	36	44
Maximum torque **	lb-ft	7,640	15,168	25,552
	Nm	10,352	20,544	34,640
Max quantity spring-cups		8	12	16
Torque per spring-cup:				
GOLD	lb-ft	156	2,050	2,640
	Nm	2,136	2,779	3,579
BLUE	lb-ft	955	1,264	1,597
	Nm	1,294	1,712	2,172
RED	lb-ft	631	834	1,054
	Nm	855	1,130	1,433
SILVER	lb-ft	430	569	718
	Nm	583	771	976
GREEN	lb-ft	191	253	319
	Nm	258	343	434
Maximum speed	RPM	3,450	2,500	2,050
Inertia - complete torque limiter w/o coupling	lb-ft ²	71	178	365
	kgm ²	2.99	7.49	15.38
Inertia - torque limiter output only	lb-ft ²	5.89	12.37	35.4
	kgm ²	.25	.52	1.49
Torque limiter weight	lbs.	341	456	760
	kg	155	207	345

* All dimensions are subject to change without notice.
 *** Max torque can be greater in certain applications. Consult PT Tech.

Table #2

DIMENSIONAL DATA* <small>See Figures #1 & #2</small>				
FMD SERIES		28	36	44
A Outside Diameter	inches	16.50	20.13	23.75
	mm	419.1	511.3	603.3
B Torque Limiter Length	inches	6.67	7.16	7.16
	mm	169.4	181.9	181.9
C Output Hub Length***	inches	5.65	6.00	8.00
	mm	143.5	152.4	203.2
D Max bore****	inches	3.94	4.72	7.87
	mm	100.0	120.0	200
E Output Hub Diameter	inches	6.03	6.75	10.50
	mm	153.1	171.5	266.7
F Input Flange Thickness	inches	1.52	1.85	1.85
	mm	38.6	47.0	47.0
G Bearing Clearance diameter	inches	6.72	8.50	11.625
	mm	170.7	215.9	295.3
H Min DBSE	inches	1.02	1.16	1.43
	mm	25.9	29.5	36.3
I Torque Pin Bolt Circle	inches	13.33	17.00	20.50
	mm	338.5	431.8	520.7
Number of Torque Pins		4	6	8
KEEPER PLATE**				
J		customer specified per application		
K Thickness	inches	.73	.73	.73
	mm	8.5	18.5	18.5

* All dimensions are subject to change without notice.
 ** Request toleranced dimension for the purpose of machining or modifying keeper plate.
 *** Extended length output hubs are available.
 **** If larger bore is required, consult PT Tech.

FMD With Renold Hi-tec PM Coupling

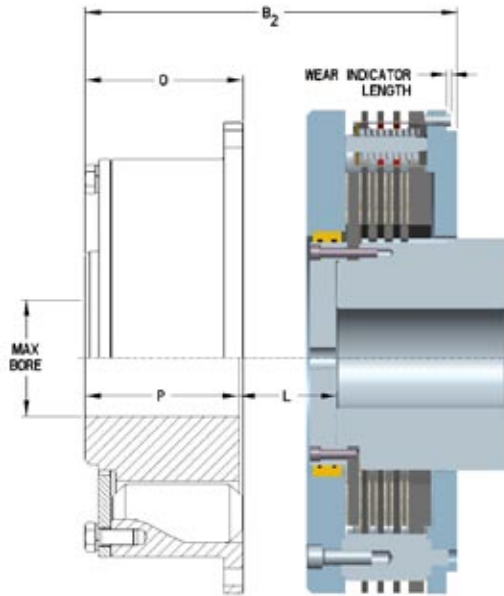


Figure #3

Table #3

FMD TORQUE LIMITER SIZE				
FMD SERIES		28	36	44
B ₂ Overall Length	inches	11.10	12.97	14.70
	mm	281.9	329.4	373.4
L DBSE*	inches	1.16	1.34	1.38
	mm	29.4	34.0	35.0
O Coupling Length	inches	4.43	5.81	7.54
	mm	112.5	147.6	191.5
P Hub Length	inches	4.29	5.63	7.32
	mm	109.0	143.0	185.9
Max Bore	inches	4.29	5.63	7.32
	mm	109.0	143.0	185.9
RENOLD HI-TEC**				
Part number		PM 12 U10368/00	PM 27 U10369/00	PM 60 U10374/00
Renold Hi-Tec Coupling Inertia	lb-ft ²	8.78	34.01	127.1
	kgm ²	.37	1.43	5.36
Renold Hi-Tec Coupling weight	lbs.	74	166	368
	kg	34	75	167

* DBSE - Distance between shaft ends

**Refer to Renold Hi-Tec Coupling flex half for all sizes
Renold Hi-Tec Engineering Co. 1-800-850-8141

FMD with American Vulkan GS Coupling

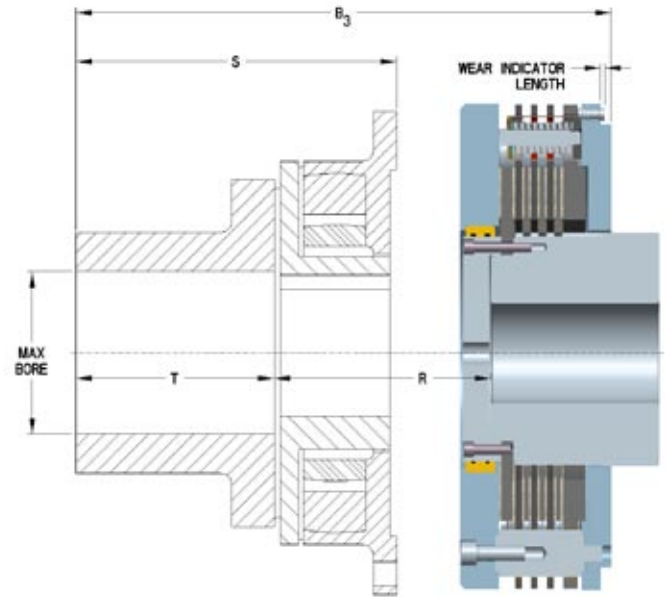


Figure #4

Table #4

FMD TORQUE LIMITER SIZE				
FMD SERIES		28	36	44
B ₂ Overall Length ²	inches	15.15	17.79	18.26
	mm	384.8	451.9	463.8
R DBSE*	inches	4.32	5.02	5.30
	mm	109.7	127.5	134.6
S Coupling Length	inches	8.60	10.75	11.22
	mm	218.4	273.1	285.0
T Hub Length	inches	5.18	6.77	7.22
	mm	131.6	172.0	183.4
Max Bore	inches	5.75	7.50	9.50
	mm	146.1	190.5	241.3
AMERICAN VULKAN COUPLING SIZE**				
		GSNX 300	GSNX 360	GSNX 400
American Vulkan Coupling Inertia	lb-ft ²	16.37	50.85	89.40
	kgm ²	.690	2.143	3.767
American Vulkan Coupling weight	lbs.	130	211	247
	kg	59	96	112

* DBSE - Distance between shaft ends

**Refer to American Vulkan Flexomax-GS for all sizes
American Vulkan Corp. 1-800-993-2424

Important Features

High Energy Capacity

The end plates, separator plates and pressure plate (Items #2, 3, 5 and 6) provide a large mass and surface area to absorb and dissipate heat due to torque limiter slippage. For applications where extensive slippage is anticipated, consult PT Tech for energy capacity data.

No Adjustment at Installation

Torque limiter torque is preset. Problems due to improper adjustment at installation are virtually eliminated.

No Adjustment Throughout Entire Wearlife

Unique spring-cup design provides consistent force on the friction surfaces as they wear. Problems due to improper adjustment by maintenance personnel are eliminated.

Tamper-resistant Torque Setting

Torque can only be varied by disassembling the torque limiter and changing the strength or quantity of spring-cups (Item #1).

Wide Range of Torque Settings

Torque capacity can be precisely set by selecting quantity and strength of spring-cups.

Accommodates a Wide Variety of Couplings

The input endplate (Item #6) can be easily modified to accept a variety of couplings and universal joint drive shafts.

Torque Setting Easily Checked

Color-coded spring-cups allow quick verification of torque setting. Special equipment and testing to check torque setting is eliminated.

No Maintenance

No lubrication and no adjustment feature virtually eliminate periodic maintenance.

Graphited Bronze Bearing

Permanently lubricated for long maintenance-free life (Item #7).

Friction Wear Easily Checked

The external wear indicator allows quick check of remaining wearlife.

Low Output Inertia

Provides excellent control of inertial shockloads.

Insulated Springs

Springs are insulated from torque limiter heat to protect against thermal relaxation of spring force.

Easy Installation

The FMD Torque Limiter is shipped fully assembled. It is as easy to install as a flexible coupling.

Preliminary Selection Procedure*

A friction-type torque limiter is both a torque and an energy device. The following preliminary selection procedure identifies the torque limiter size based strictly on torque requirements. Torque setting should be above the motor's peak torque. This allows the motor to fully draw upon its peak torque capability during heavily loaded situations without slipping the torque limiter. If torque setting needs to be below peak motor torque, contact PT Tech.

1) Determine Running Torque (T_R)

$$T_R = (\text{HP} \times 5,252) / \text{RPM}$$

2) Determine Max Torque

This information can be obtained from motor manufacturer. Typically, NEMA B motors have max torque that is 250% greater than T_R

3) Determine Torque Setting (T_S)

$$T_S = \text{Max Torque} \times 1.50$$

4) Preliminary Selection Based on

- a. torque setting (T_S)
- b. bore requirement
- c. max speed

5) Consult with PT Tech to correctly match application energy requirement and torque limiter energy capacity.

6) For diesel or Turbine applications consult PT Tech.

* This procedure is STRICTLY intended as a general guideline. Consult PT Tech to finalize selection.

For reversing applications consult PT Tech.

Application Engineering Assistance

PT Tech has analyzed hundreds of drive systems in many types of equipment and industries. Our torque control expertise is available to our customers at no charge to help engineer the best possible torque protection.

PT Tech can provide a computerized report that analyzes your drive system and helps determine the need for torque protection. The computer generates a torque analysis graph comparing the maximum torque in the drive system, with and without a TLC torque limiter, under various jam conditions.

Also, PT Tech has developed a unique test stand that can simulate shockloads generated by the inertia of motors up to 2,500 HP.



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* Brochure content subject to change without notice.

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