

# CMD SERIES

## COMPACT MULTIPLE DISC FRICTION TORQUE LIMITERS

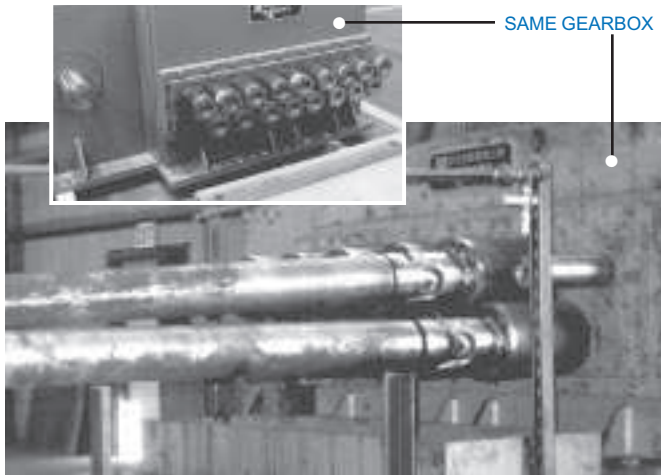
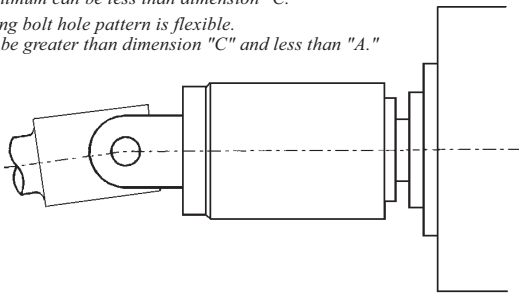
- **High Torque**
- **Radially Limited Applications**
- **Custom Design**

| OUTPUT SHAFT MOUNTED          |             |       |       |
|-------------------------------|-------------|-------|-------|
|                               | 120         | 180   | 210   |
| A1. HOUSING DIAMETER          | 4.75        | 7.12  | 8.25  |
| A2. ENDPLATE/PILOT DIAMETER** | AS REQUIRED |       |       |
| B. HOUSING LENGTH             | 7.38        | 9.72  | 11.0  |
| C. BEARING CLEARANCE          | 3.0         | 4.5   | 5.25  |
| D. MAX SHAFT DIAMETER*        | 2.125       | 3.125 | 3.5   |
| E. SHAFT ENGAGEMENT           | 6.38        | 8.66  | 9.875 |
| Max Torque (lb-ft)            | 550         | 3630  | 5450  |

\* Without Inner Hub.

\*\* Pilot diameter can be machined to customer's requirement. The minimum can be less than dimension "C."

\*\*\* Mounting bolt hole pattern is flexible. It must be greater than dimension "C" and less than "A."



A leveler's distribution gearbox has one input shaft and up to 19 output shafts. The output shafts are geared together to distribute the motor's horsepower.

In a leveler, the strip is worked back and forth as it passes over the rolls. The rolls are configured to work the strip more on the entry side than on the exit side. This puts an uneven torque demand on the gearbox output shafts and creates a tension differential within the strip. If the

torque demand and tension differential is too uneven, several problems can arise.

**FIRST:** The torque demand can exceed component design limits. This contributes to premature failure of gearboxes and spindles. In some cases when a spindle fails, its whipping motion will break other spindles before the leveler can be brought to a stop.

**SECOND:** The uneven loading on the rolls can result in one or more rolls

slipping on the strip. This leaves a blemished surface that affects the quality of the finished product.

CMD Series Torque Limiters slip just enough to absorb damaging torque loads. Typically, the slip speed or difference between the input and output speeds of the CMD is quite small. Also, the CMD will slip instead of the rolls slipping on the strip.

PT Tech's CMD series are friction-type compact multiple disc torque limiters for levelers and flatteners on steel processing lines and other high torque, limited radial space applications. They perform best on the slow speed side of a gearbox. The most typical application is a leveler/flattener on a steel processing line.

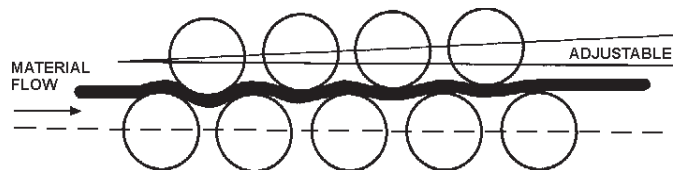
The torque setting is set at the factory and does not require adjusting throughout its wear life. Wear life indicators are available on most designs.

CMD units protect drive components from damaging torque overloads. Also, when significant tension differential exists between the entry and exit rolls, the CMD's will slip just enough to evenly distribute the load.

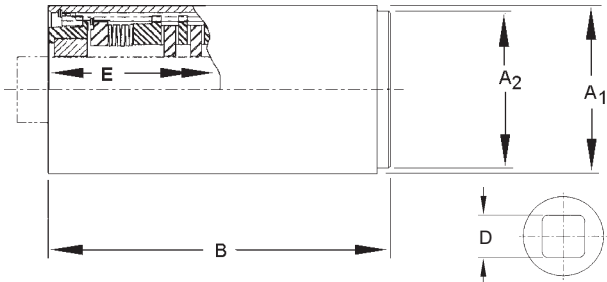
Typically, CMD units are custom designed. There are two different design configurations, output shaft mounted (front page) and mid-spindle mounted (back page). Examples of each configuration are shown. Maximum torque is affected by the available shaft engagement length (DIMENSION E), distance between centerlines of the output shafts, and the strength of available springs.

**SHAFT MOUNTED:** This design mounts on all of the distribution gearbox's output shafts. The endplate can be machined to accept an industrial universal joint or gear coupling spindles. In some cases, the inner hub is removed to accommodate a large shaft diameter and high torque setting. In this design the friction plates are in direct contact with the shaft's key.

**MID-SPINDLE MOUNTED:** This design is used in extremely limited space applications. The torque limiters mount within the spindles and are staggered to maximize radial space (see sketch on back page).



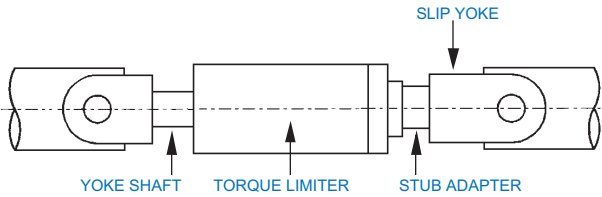
### MID-SPINDLE MOUNTED



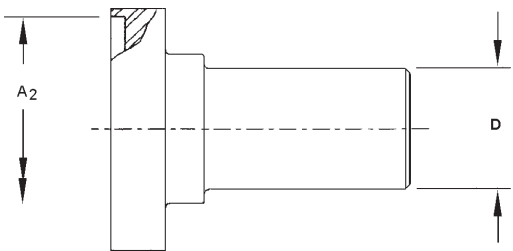
|                                    | 70   | 83   |
|------------------------------------|------|------|
| A <sub>1</sub> . HOUSING DIAMETER  | 2.75 | 3.25 |
| A <sub>2</sub> . ENDPLATE DIAMETER | 2.5  | 3.0  |
| B. HOUSING LENGTH                  | 7.6  | 6.58 |
| D. SHAFT                           | .875 | 1.31 |
| E. SHAFT ENGAGEMENT                | 6.96 | 6.96 |
| Max Torque (lb-ft)                 | 490  | 600  |

### MID SPINDLE MOUNTING

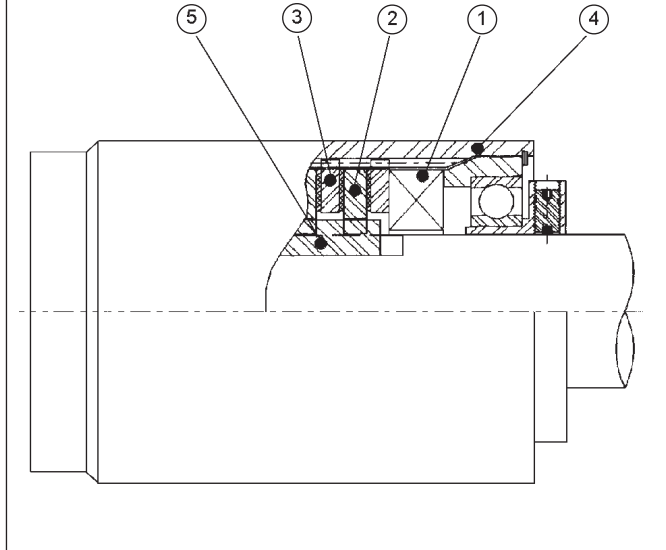
CMD's that are mounted within the spindles are long and slender. They are staggered in order to maximize the radial envelop. See sketch below.



Typically, the yoke shaft is square (DIMENSION D) and slides into the torque limiter. It is secured to the torque limiter with a keeperplate. The stub adapter bolts onto the other end of the torque limiter. The stub slides within the slip yoke allowing for axial length compensation during roll positioning.



### HOW CMD WORKS



A complement of springs (#1) exert a force on the disc pack. The disc pack includes friction plates (#2) and separators (#3).

When the drive system torque exceeds the setting, the friction plates will slip relative to the separators, while continuing to transmit torque equal to the setting. The separator plates are splined to the housing (#4). Friction plates are laser-cut to accept the shaft key (#5).

**WARRANTY:** PT Tech guarantees all its products will leave the factory in good condition. PT Tech warrants its products against defects in workmanship and material for a period of 365 days (one year) after shipment. Adjustments under this warranty will be made only after completion of inspection of the part or product in PT Tech's factory. PT Tech's liability under the warranty shall extend only to the replacement or correction of any defective part or product determined by PT Tech's inspection as not conforming to this warranty. Under no circumstances shall PT Tech be liable for consequential or incidental damages. This warranty shall not apply to any product which shall have been repaired or altered without PT Tech's knowledge and consent or operated or installed contrary to PT Tech's instruction or subjected to misuse, improper maintenance, or damaged by accident or negligence.

**PERFORMANCE ASSURANCE:** Rated torque and speeds are provided by PT Tech to assist the buyer in selecting the proper product. In addition, engineering assistance is offered by PT Tech for design and application of custom designed drives. Since the actual performance characteristics of the buyer's equipment cannot be completely analyzed nor duplicated in laboratory tests, performance assurance of all PT Tech products in the buyer's applications is the responsibility of the buyer. Performance assurance is usually accomplished through manufacture of a prototype by PT Tech and a test or qualification program on the part of the buyer.

*Rotating equipment is potentially dangerous and should be properly guarded. The user should check all applicable safety codes in his area and provide suitable guards.*



1441 Wolf Creek Trail • P.O. Box 305  
Sharon Center, OH 44274-0305 USA  
TEL (330) 239-4933 FAX (330) 239-2012

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