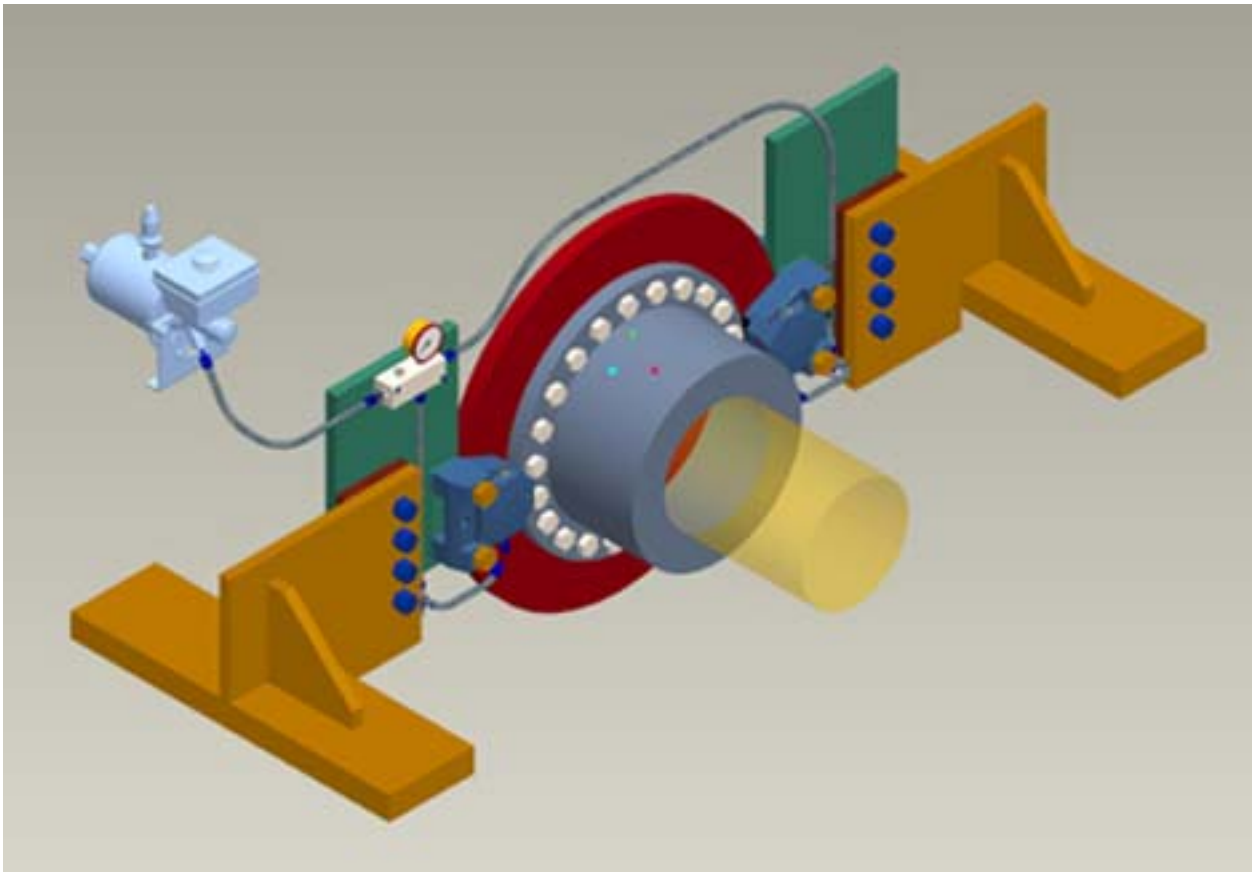
Brakes, Clutches and Filtration Products for the Marine Industry

Hilliard™
MOTION CONTROL DIVISION

Brake Systems for Propulsion

When Twiflex brakes are installed on the main propulsion drive, they provide the fast propeller retardation and shaft locking required for speedy maneuverability when changing from ahead to astern.

Installation Example



Brake Applications

- Suction Dredger
- Main Propulsion
- Bow Thruster
- Diesel Pump
- Fan Drive
- Marine Pump
- Marine Propulsion
- Pump Drive
- Compressor Drive

Features and Benefits

- Eliminates engine stall during high-speed maneuvers and last-minute reversals
- Easy to install and service
- Self-adjusting, spring retracting calipers reduce pad wear
- Stops the propeller shaft from full speed in approximately 2-5 seconds (quickly and efficiently)
- Economical to maintain
- Automatically stops the propeller shaft with every change of direction

Shaft Brake Selection Prodedure

To determine proper caliper/disc size, the following must be known:
1. Type of Vessel (A or B)
2. Maximum Engine Horsepower @ Rated Speed (HP)
3. Rated RPM of Engine (RPM_e)
4. Reduction Ration of Transmission (Ratio)

Note: Maximum air pressure available and maximum expected end float of brake shaft must be considered in final caliper selection.

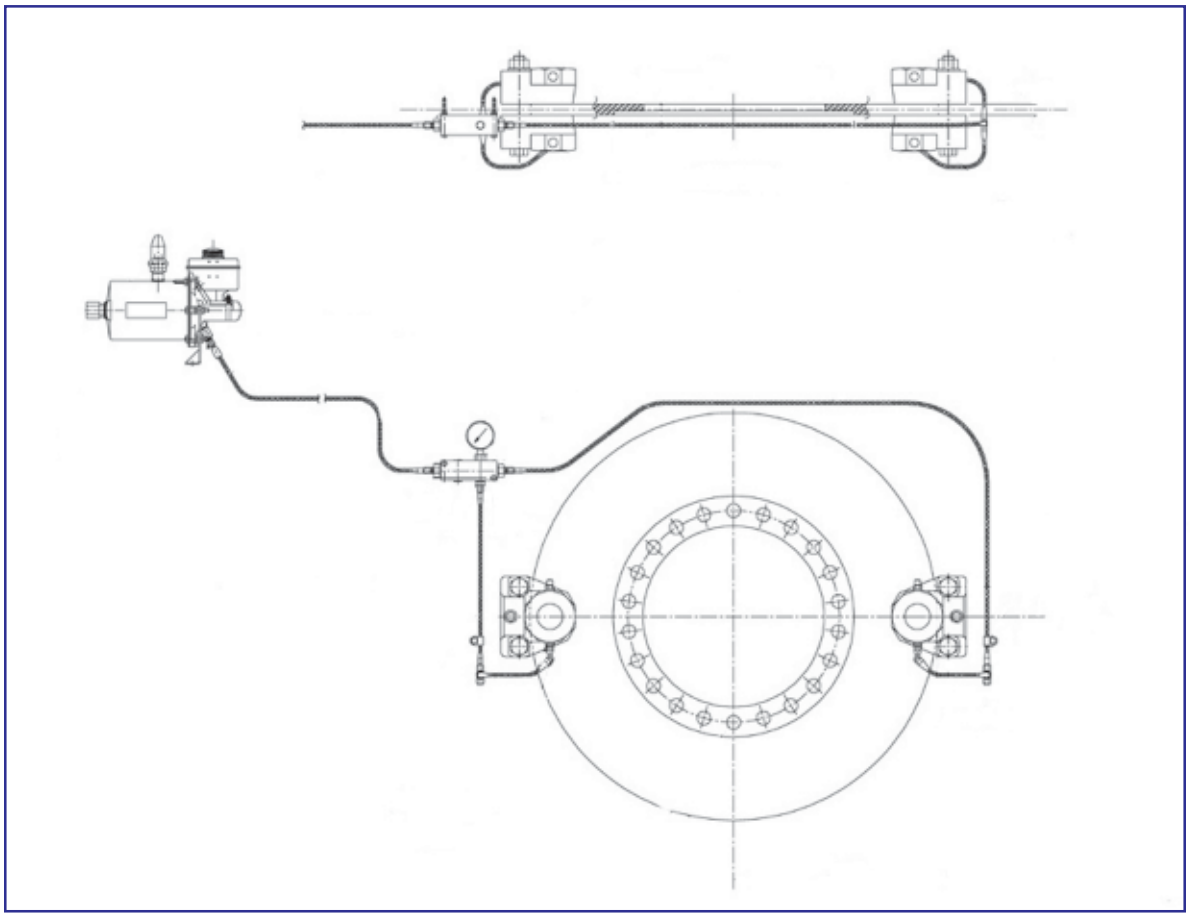
FORMULA A: For Type A Vessels -- Tug boats, tow boats, work boats, push boats, utility/supply boats and bow thruster brakes.

$$\text{BRAKE TORQUE (LB FT): } T = \frac{HP \times RATIO \times 4200}{RPM_e}$$

FORMULA B: For Type B Vessels -- Less than 100,000 gross tons, such as ferry boats, crew boats, dredges, fish boats, steamships, research vessels, fire boats, passenger and cargo ships.

$$\text{BRAKE TORQUE (LB FT): } T = \frac{HP \times RATIO \times 2700}{RPM_e}$$

Typical Installation Schematic



MXB Model

Pneumatic caliper for use with 1” thick discs. Maximum air pressure is 100 PSI. Compressed air requirement is 26 in^3 per each caliper. Maximum allowable disc end float is ± 1/16”. Note: An inclined mounting kit #7901512 is required for the caliper when installing the caliper at a position more than 30° above or below the horizontal centerline of the disc.
Caliper weight = 23 lbs. (10.4 kg)

Pneumatic Caliper @ 100 PSI Pressure (Torque per Caliper):
Torque (lb.ft.) = 225 x (Disc radius in Inches - 1.3”)

See Data Sheet DB3103

GMRP Model

Pneumatic caliper for use with discs 1” thick, 24” minimum diameter. Maximum air pressure is 145 PSI. Compressed air requirement is 110 in^3 per caliper.
Maximum allowable disc end float is ± .118”. Note: An inclined mounting kit #6700458 is required for the caliper when used with a tandem mounting bracket or when caliper is installed at a position more than 30° above or below the horizontal centerline of the disc.
Caliper weight = 90 lbs. (40.8 kg)

Pneumatic Caliper @ 100 PSI Pressure (Torque per Caliper):
Torque (lb.ft.) = 674 x (Disc Radius in Inches - 2.36”)

See Data Sheet DB3606

T40 Model

Hydraulic caliper with self-retraction of pads for approximately .039” maximum retraction at each pad. Split caliper design features simple mounting using two 3/4” diameter (or M20) bolts supplied by user. Caliper is for use with 1” thick disc. Center plate of caliper mounting bracket is the same as disc thickness (1”). Maximum allowable end float is approximately ± 1/32”. Normal working pressure is 1250 PSI and maximum pressure is 1450 PSI. Total oil displacement for .039” retraction is .7 in^3 per caliper.
Caliper weight = 44 lbs. (20 kg)

Hydraulic Caliper @ 1450 PSI (Torque per Caliper):
Torque (lb.ft.) = 843 x (Disc Radius in Inches - 1.77”)

See Data Sheet DB2017

VCH/VKHD Model

Model VCH-FL shown

Hydraulic caliper with spring retraction of pads. Maximum allowable disc end float is approximately ± .157”. Split caliper design features 4-bolt mounting (2 M24 tie rods and 2 M16 bolts) supplied by user or The Hilliard Corporation. Caliper is for use with 20” minimum disc diameter with 1” minimum disc thickness. Center plate of caliper mounting bracket is the same thickness as the disc. Normal working pressure is 1700 PSI and maximum pressure is 2000 PSI. Total oil displacement for 0.080” (2 mm) maximum retraction is 1.6 in^3 per caliper.
Caliper weight = 104 lbs. (47 kg)

Hydraulic Caliper @ 1450 PSI (Torque per Caliper):
Torque (lb.ft.) = 1069 x (Disc Radius in Inches - 2.13”)

See Drawing A01154

Motion Control Products Related to the Marine Industry

Centrifugal Clutch

The Hilliard Centrifugal Clutch provides automatic, gradual, cushioned engagement over a speed range on high-inertia loads. It smoothes out and reduces starting current surge.

Two-Shoe Centrifugal Clutch

Three-Shoe Centrifugal Clutch

Air Start Centrifugal Clutch

This system combines the advantages of a link clutch with the additional features of engagement/disengagement at any speed. It also provides overload protection by disengaging immediately on heavy overload, protecting the clutch and the rest of the transmission equipment.

Electric Brakes

Designed for maximum flexibility and long, dependable service, our electric brake is electromagnetically released when voltage is applied and spring-engaged when current is interrupted.

Couplings

The Marine Couplings can withstand high amounts of continuous and instantaneous misalignment, and are capable of carrying a heavy and unsupported shaft. Maintenance-free and non-magnetic, these couplings also accommodate high levels of shock loading.

Enclosed Overrunning Clutch for Dual Drive (backstop mechanism)

Hilliard's Enclosed Overrunning Clutch incorporates superior clutch design in a totally enclosed package. Designed for power transmission operations, this clutch is totally contained in a stationary housing for constant protection from hostile environments or washdowns.

Brakes (on cranes)

Designed to operate in harsh conditions, Hilliard disc brakes are often used for the main hoist, acting as service brakes mounted on the input shaft and as emergency brakes mounted on the output shaft or directly on the main drum flange.

HILCO Products Related to the Marine Industry

Oil Mist Eliminator

The HILCO mist eliminator removes visible oil vapor from the air stream of vents in lubricating oil systems of large, high-speed rotating equipment such as gas turbines, steam turbines, and reciprocating engines.
The mist eliminator prevents oil mist from contaminating air or soil, helping facilities comply with environmental regulations. It also makes for a cleaner, safer work environment by eliminating oily residue build-up on engine room floors, enclosures and stairwells, while improving indoor/outdoor air quality and reducing fire hazards.

Portable Filters

HILCO's HP4 Off-Line Filtration System is an inexpensive, heavy-duty filtration system for removing water and particulate from oils, fuel, and other fluids. Elements are o-ring sealed and are available to filter to 1 micron absolute. The HILCO Portable Filter offers reliable, convenient-to-use, off-line filtration of synthetic fluids, including the EHC fluids used on steam turbine generators. Both HILCO products can be used on crankcase gearboxes.

Ceramic Membrane System

The HILCO Ceramic Membrane System is well-suited for use in fresh water and bilge water systems allowing compliance with existing regulations to meet up to 15 ppm. It separates oily water, removes solvents, and is particularly useful in microfiltration and ultrafiltration applications.

Filter Cartridges

The HILCO Division of The Hilliard Corporation carries a complete line of filtration elements for every turbine package requirement including lube, fuel, hydraulic, and vapor exhaust.

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