

## Logan Direct Drive PTO Clutches Enhance Bow Thruster

Steering a commercial boat or large yacht can be similar to driving a heavy car with bad brakes. It's difficult to stop, and response to the rudder is slow. This poses no problem in the open sea, but it can be real challenge to maneuver the vessel in a congested marina or when docking. This is where a bow thruster comes in.

A bow thruster consists of an open-ended tube that runs through the underwater sections of the hull near the bow and perpendicular to the keel. A propeller mounted at some point inside this tube can rotate in either direction. The helmsman selects the rotational direction and actuates the propeller. As a result, the bow thruster sucks a solid stream of water in one end of the tube and forces it out of the other, pushing the bow sideways and augmenting the rudder to make steering more responsive.





The hydraulic system for the bow thruster is powered through a Logan PTO clutch, which disengages the hydraulic system from the power train when not in use.

## Two Props are better than one

Traditional single propeller systems generate thrust by accelerating water in the axis of the propeller shaft. However, the water discharged by the propeller also rotates. This is due, in part, to the friction between the surface of the propeller and the water. This rotational component does not produce thrust, but it does consume energy. That's why Fred Knowles of Hansen Marine, Marblehead, Mass., like the ABT-TRAC thruster from American Bow Thruster, Rohnert Park, Cal. The ABT-TRAC thruster is designed with two counter-rotating propellers. By turning the propellers in opposite directions, the efficiency of the ABT-TRAC thruster becomes 10 to 15% greater than that of single propeller systems.

Single propeller thrusters have no way to prevent losing energy to the rotational forces imparted into the water. Because this loss increases with speed, there is a practical limit to the amount of input horsepower that can be applied to single propeller systems. ABT-TRAC's counter-rotating propellers cancel out rotational losses so greater horsepower can be input into a given tunnel diameter. As a result, ABT-TRAC thrusters generate up to 50% more thrust than competing thrusters of the same diameter.



This air or fluid-actuated PTO clutch from Logan saves energy by transmitting power to the hydraulic pump only when needed, which also reduces wear and tear on the pump, and reduces emissions.

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## **Logan Fluid-Operated Clutch Enhances Bow Thruster**



Logan Direct Drive, Power Take-Off (PTO) Clutches are used in a variety of Industrial, On-Highway, Marine, Construction, Agriculture, Mining, Oil Field, and Rail applications. They are designed to mount between the power take-off of the engine and auxiliary attachment, ie. single or multi-station pump drives.

## **Hydraulics provides power**

Because the bow thruster propellers are underwater, a hydraulic motor is a practical means of power transmission. For even higher over-all efficiency, ABT-TRAC hydraulic thrusters are fitted with piston-type motors. These motors are 10 to 18% more efficient than the vane or gear motors used in most other thrusters. As a result, overall efficiency of the ABT-TRAC (in terms of thrust per input horsepower) could be 20 to 33% greater than competing products.

The vessel's engine drives the hydraulic system's pump through a power takeoff (PTO). And because the bow thruster is only used for relatively short periods of time, it's logical to disengage the bow thruster power train with a clutch during idle periods. This minimizes wear and tear on pump and auxiliary drive, and saves fuel by eliminating energy consumption by the thruster when not in use.



Hydraulic Pump

View of a typical marine transmission equipped with a Logan SBB-2000 clutch mounted between the live PTO and a 30 gallon per minute pump.

Hansen specifies Logan 300 or 600 series Direct Drive PTO's based on application requirements. The heavy-duty PTO 300's compact, in-line configuration suits the power train well, as does its high torque rating. Because the clutch is hydraulically-actuated, mechanical linkages are eliminated, and the bow thruster can be rapidly engaged or disengaged remotely from the vessel's control station.

Logan's PTO 300 clutches incorporate a multiple disc pack design, enabling them to transmit high torque within a compact housing they are corrosion resistant, require no external lubrication, and are self-adjusting. The cylinder-piston travel compensates for disc wear to provide consistent performance.



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