

Logan Vs. Electromagnetic Clutches

During a repower of diesel gensets, or in new boat builds, Logan Clutches are increasingly used in place of electromagnetic clutches in most applications since electromagnetic clutches underperform or can no longer manage the cyclic duty, or torque required to power the larger hydraulic pumps now used on yachts or fishing vessels.

Logan hydraulic or pneumatic clutches transmit 35-40% more torque than similar sized electromagnetic clutches. More torque in a smaller envelope enables you to operate larger pumps off the front of your engine for longer periods of time. Stronger pumps means more power on demand and less wear and tear on your equipment.

Air or Hydraulic Vs. Electromagnetic Engagement

Logan clutches are air or hydraulically engaged, and utilize heavy duty, steel backed friction discs and high carbon steel separator discs to provide torque transmission. Logan units are in an enclosed, self-contained oil bath and engage by pressurizing a cylinder-piston cavity with compressed fluid/air. Logan clutch actuation expends little energy – therefore, very little, if any heat is created to operate/engage the clutch. The splash oil bath keeps the disc pack and bearings cool. Static pressure maintains a constant force - no more fluid or air is consumed.

Higher torque, in a smaller package, followed by minimal torque fade - enables Logan hydraulic / pneumatic clutches to outperform electromagnetic clutches.

Electromagnetic Clutches:

Electromagnetically actuated clutches typically utilize a steel-on-steel disc pack and engage by continually passing voltage through an electromagnetic coil. The electrical current elevates the temperature of the clutch, and its disc pack even before any load is applied. The higher the operating temperature of the electromagnetic clutch, the lower the amount of torque is being transmitted, i.e., torque fade occurs, and, over a period of time, the clutch will begin to slip.

Sluggish Disengagement:

Disengagement is another issue since residual magnetism in the disc pack makes it difficult for electromagnetic clutches to engage and disengage in typical on-off, or higher cyclical applications.

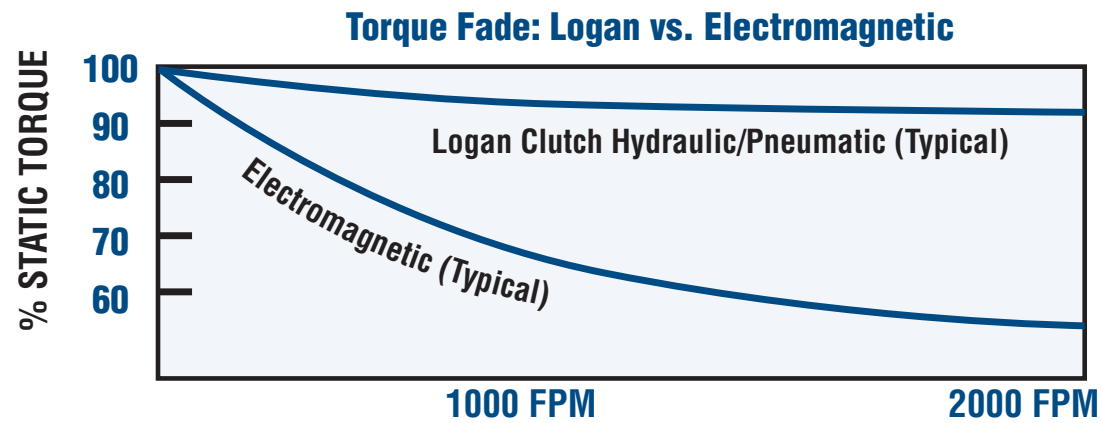
Low Voltage:

Electromagnetic clutches can engage sluggishly if the battery source provides insufficient voltage to the clutch from a loose or pinched connection.

Higher electromagnetic clutch operating temperatures often leads to torque fade and premature failure while in operation.

Why Torque Fade Should be Considered When Specifying a Clutch.

The curves on the graph below represent the percentage of electric, pneumatic, and hydraulic clutch dynamic torque ratings at speeds up to 2000 feet per minute. The graph also shows the dramatic drop in torque of the electromagnetic clutch as speed increases. For example, an electric clutch with an eight-inch diameter friction interface running at 1000 RPM (2000 feet per minute) has only 60% of its rated torque.

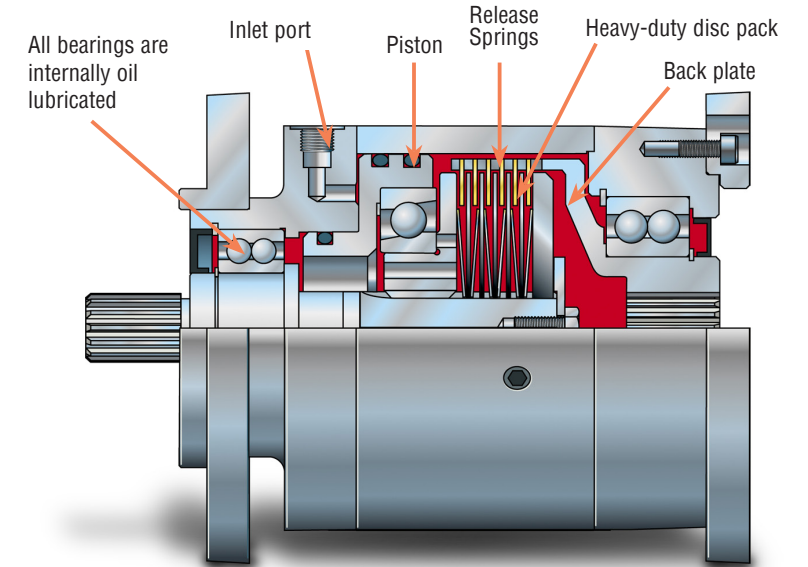


Logan PTO clutches for simple, immediate reduction in fuel consumption, operating costs, and greenhouse gas emissions.

Logan Direct Drive Power Take-off (PTO) clutches are designed to mount between the main or auxiliary live PTO of your engine and attachment, i.e. auxiliary drive, single or multiple pump drive, hydraulic pump or attachment. For example, Logan PTO's are an effective and reliable solution for applications where hydraulic pumps are used on-demand, or in continuous, intermittent duty situations.

How They Work: Logan PTO Clutches are hydraulically or pneumatically actuated, and self-contained within a rugged, light weight corrosion resistant housing, that does not require external shielding. A splash oil bath provides lubrication to the multiple disc, self-adjusting, wet clutch pack. Pressurizing the cylinder, forces the piston to clamp and lock the friction and separator discs. When pressure is removed, release springs separate the separator discs, which provides a running clearance between discs when the clutch is disengaged. In the event of power disruption, (ABS type approved) manual engagement screws are used to mechanically engage the clutch.

Push-button, or Switch Activated: Clutches are remotely controlled with an on-off switch located on a helm, dashboard or control panel – or via a switch on a Logan hydraulic power pack, for machines not equipped with hydraulics.



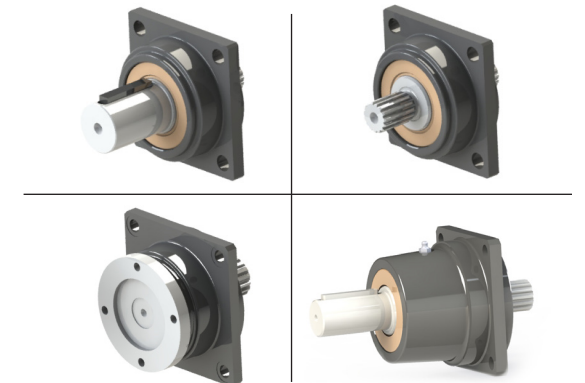
Mounting: Logan clutches utilize SAE and DIN mounted flanges ranging from A-F male/female splines and can also be bored and keyed. Clutches can be directly mounted to the power source via a standard SAE or DIN flange and connect directly to the auxiliary pump using the output flange of the clutch. Standard u-joint / cardan shaft connections can be connected to either or both sides of the Logan PTO clutch utilizing a Logan companion flange and overhung load adapter. Custom overhung load adapters (OHLA) are available for specific design requirements.



Manifolds: Logan offers fluid and air actuated valve manifolds complete with gauge and pressure switch to ensure reliable and accurate engagement of the Logan PTO



Power Packs: Logan Hydraulic Power Packs are available for machines not equipped with a fluid source, and can be operated by a 12 or 24 VDC power supply.

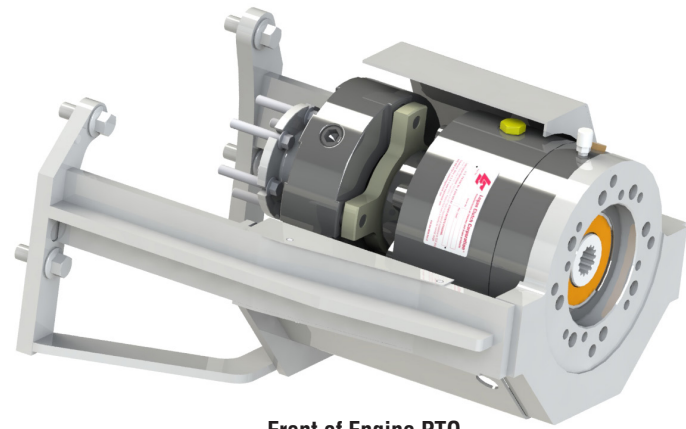


Input and output flanges, and overhung load adapters (OHLA) available

March 2022

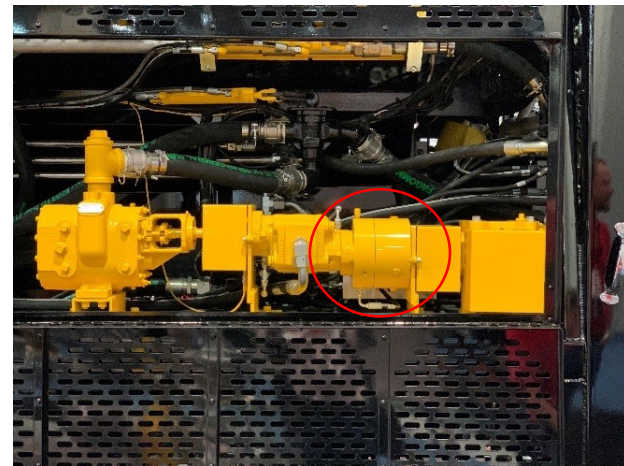


Front of engine mounting is possible using a Logan Universal front of engine PTO kit or a custom front mount bracket designed for specific engine makes and models.



Front of Engine PTO

Where Used: Logan PTO clutches are typically used as a connect-disconnect for power take-off driven pumps, and are suitable for marine, mobile, and stationary equipment, as well as construction, forestry, railroad, utility, mining, and agricultural applications. Other applications include marine transmissions, generator sets, winches, multiple pump drives, fire trucks, and diesel engines with flange mounted hydraulic pumps.



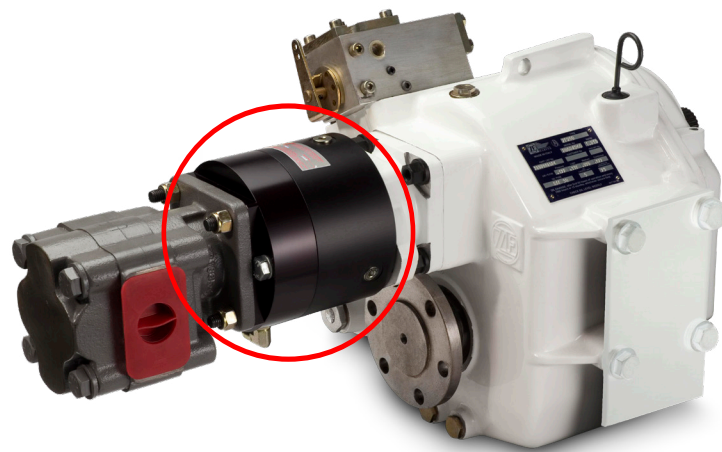
Logan Clutch PTO used as a connect-disconnect for a mobile auxiliary drive

Logan Advantages:

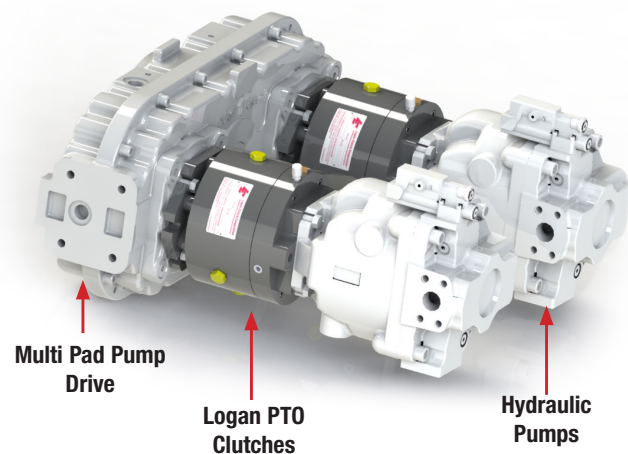
Logan PTO clutches enable you to engage and disengage your main or auxiliary driveline on demand, providing you with several operational, environmental and maintenance benefits.

Operational Benefits:

Ideal for cold start and heavy-duty operating conditions: By disconnecting the hydraulic system from the engine, the Logan PTO lowers horsepower draw and increases cranking power required during engine start-ups, or cold starts. Clutches can also disconnect parasitic pump loads to provide full engine horsepower during heavy-duty operating conditions. Easing the load on your engine prolongs engine life and can extend service intervals.



View of ZF 280 transmission equipped with a Logan SBB-2000 clutch mounted between the live PTO and 30 gallon per minute pump.



Multi Pad Pump Drive

Logan PTO Clutches

Hydraulic Pumps



Cooler Running Hydraulic Systems: Excessive heat is a leading mode of failure in hydraulic systems. Seal compounds and oil viscosity will begin to break down at a faster rate, causing leaks and buildups in the system that will reduce operating life. Disconnecting the hydraulic system from the engine using a Logan PTO clutch, cools the system down and reduces the destructive effects of heat on your hydraulic oil – lowering fluid power maintenance costs and oil replacement.

Double Your Pump Life: When piston or vane pumps are running in bypass mode, the fluid continues to build heat. This heat can cause the packing to melt, and in the case of water pumps, crack or shatter the plungers. The cost of adding a clutch to your system, is a fraction of the cost to shut down your system and replace a worn pump. Engaging your pump on-demand vs. leaving it running all the time could double your pump life.

Reduce Maintenance Costs - Since pumps are driven on demand, and no longer in continuous use, bushings, bearings, lip seals and ring seals in your pump will last longer.

Disconnect Hydraulics for Trouble Shooting: Another key benefit of using a Logan clutch in your fluid power system is the ability to disconnect your hydraulic system from the engine without having to shut the engine down to troubleshoot any leaks or system failures.

Overspeed Protection for Pumps and Motors: Clutches offer an over-speed protection for hydraulic pumps and motors in mobile applications. By disconnecting hydraulic components from the main power source, all moving parts in the pumps and motors are protected from excessive rotation and movement during machine transport.

Logan Clutches Provide Lower Fuel Costs and Emissions:

Even if a hydraulic system is 100% efficient, it still uses fuel to power the unit. Most hydraulic pumps perform an application specific task and may run only 25-50% of the time. By engaging and disengaging your pump with a Logan PTO clutch on-demand, fuel savings and emissions are directly proportional to the fewer operational hours placed on the pumps.

Lower Fuel Consumption:

Typical marine or industrial engines that utilize Logan PTO clutches are in the range of 350-600 kW/HP. A typical unloaded hydraulic pump may draw 5% of the total power – therefore, fuel savings would be around 5% if the pump is de-clutched. Engine Speed, pump load and operating profile are also factors to consider. For example, a 5% savings may save 1-gallon per 8-hr. day, or 365 gallons per shift-year.

Lower Emissions:

Disconnecting your pump with a Logan PTO can save approximately 365 gallons of fuel per shift year (based on 1-gallon per 8-hr. shift savings), and approximately 8,168 lbs. of CO2.

Calculate Your Savings:

Formula: 10,180 grams of CO2/gallon of diesel = 10.180 x 10-3 metric tons CO2/gallon of diesel

One Gallon of Fuel	Pounds (lb) of CO ₂ per Gallon
Marine Diesel	22.38

Data Sources:

Department of Energy (DOE) Alternative Fuels Data Center (AFDC) Properties of fuels.

Contact Logan today www.Loganclutch.com sales@loganclutch.com



Quick Start Guide and Service Manual for After Sales Support