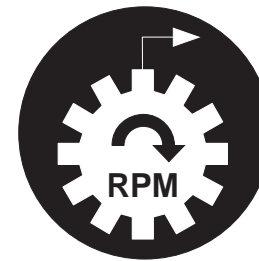
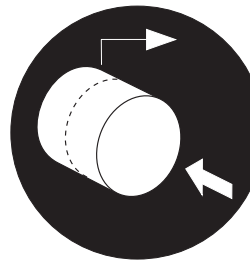
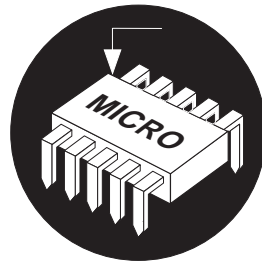
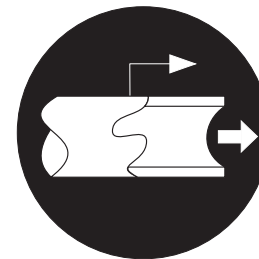
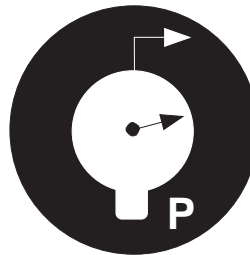
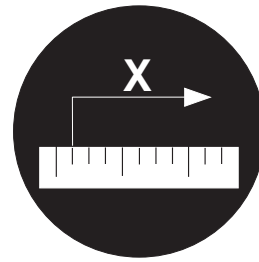


Your Guide to the Electronic Control of Fluid Power



The members of the National Fluid Power Association (NFPA) have prepared this application as an introduction to the electronic control of fluid power. The application and components described here are representative — electrohydraulics and electropneumatics can be effectively utilized in countless processes, and components are available in many different sizes and configurations.

NFPA's manufacturers invite you to contact them for additional information.

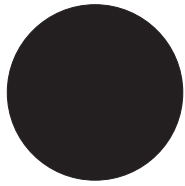
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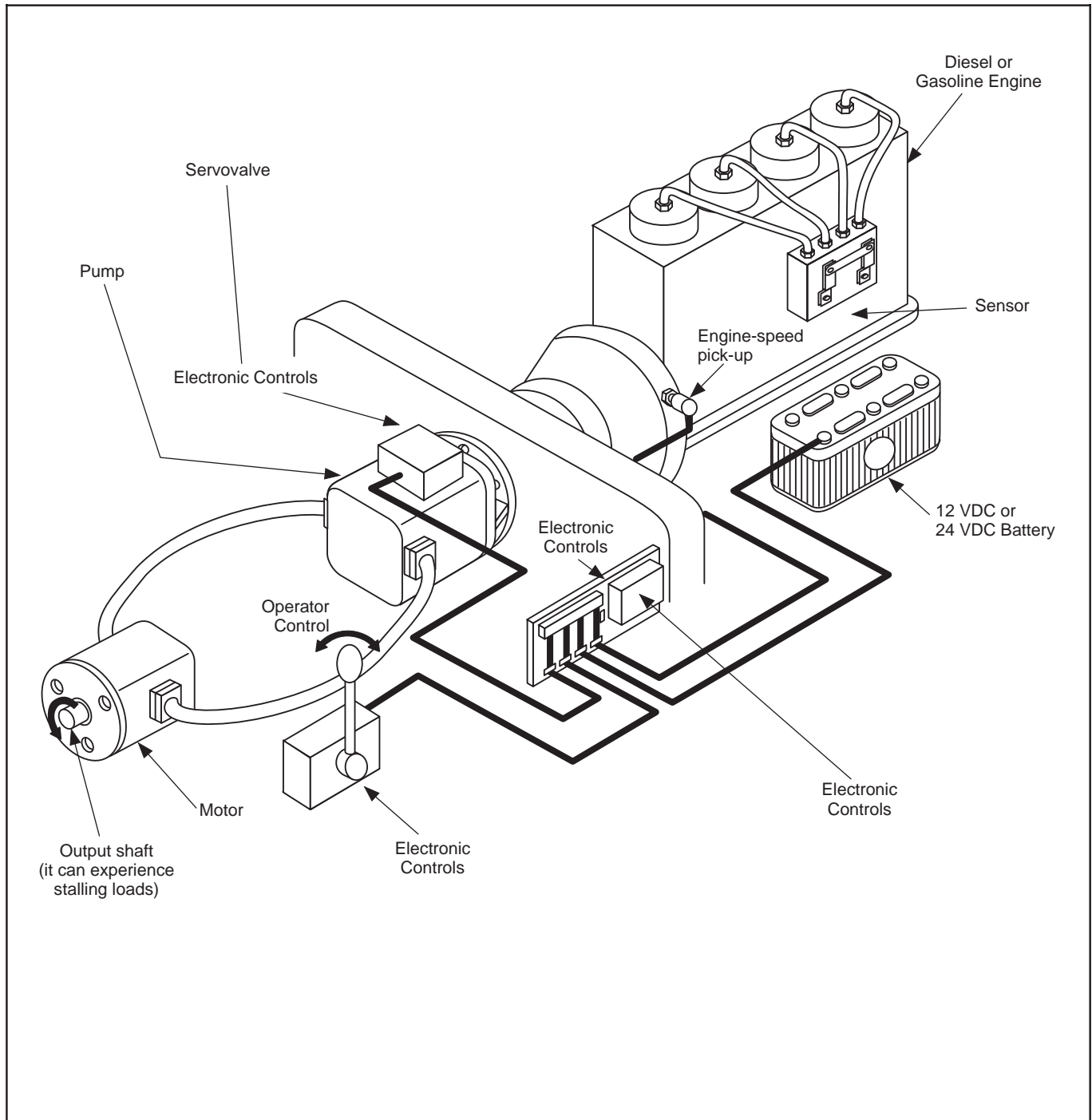
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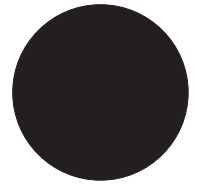
ISBN 0-942220-28-5



Electrohydraulics at Work

Anti-stall Control for Hydrostatic Drive





The Problem

Mobile equipment is one of the most common applications for hydrostatic drives. However, the drives are so powerful that unless automatic torque and speed control are included in the system design, the diesel or gasoline engine prime mover will stall out long before the drive runs out of capacity.

Take as an example a variable-displacement hydrostatic pump (see the illustration) that supplies pressure and flow to a fixed-displacement hydrostatic motor. Let's say the motor is one of several that power the wheels of a heavy hauler vehicle. Imagine then that the operator decides to climb a steep grade with a full load. Unless he/she is a skilled driver, the engine might quickly stall or, at best, run in an inefficient manner.

Its Solution

The answer in this application was to incorporate an automatic electronic control that senses loss in engine speed, overrides the operator's manual control, and quickly decreases the swashplate angle of the pump.

Pump displacement and flow are substantially reduced, thus unloading the hydrostatic motor and preventing engine stall. The vehicle, of course, slows down, but the operator has not lost control and can adjust engine performance to meet the need.

The amount the engine is allowed to drop in speed before the automatic control takes over is called *speed droop*, and is carefully calculated for optimum performance. The operator need not be aware of it happening.

Engine speed is sensed with a magnetic pickup that counts gear teeth on the engine flywheel. Microprocessors convert teeth per second into engine speed, and send an electronic signal to the controller mounted on top of the hydrostatic pump.

All of the electronic controls are energized from a 12 vdc or 24 vdc storage battery. The electronic connectors and other hardware are readily available from suppliers.

Related Applications

This electronic control technique of monitoring engine speed, and modifying load accordingly, can improve performance and safety for tree harvesters, trenchers, cable plows, skid-steer loaders, bulldozers and many other mobile work vehicles.

How Electronics Improved This Application

- Protection against engine stall
- Automatic control
- More efficient use of power
- Smoother transitions

Components Used in Industrial Hydraulic Systems*

Accumulators	Motors
Controls (electronic) and Software	Power Units
Cylinders	Pumps
Filters	Pump Drives
Fittings	Reservoirs
Flanges	Rotary Actuators
Fluids	Seals
Gauges	Shaft Couplings
Heat Exchangers	Shock Absorbers
Hose	Switches
Hydrostatic Drives	Tubing
Manifolds	Valves

*Click [here](#) to access the NFPA Fluid Power Product Locator, which includes information about and links to NFPA member companies.