Customer Value Proposition:

Fan drive systems are an important part of the protection for any vehicle or piece of machinery’s engine and hydraulic components, assuring improved reliability, productivity and long life. A fan drive system by Parker can save fuel, reduce emissions, and increase productivity by operating the fan at the optimum speed. By matching fan speed to the amount of heat that is generated, hydraulic power is freed up for other functions.

Parker Electronic Controls has the products and system expertise to provide fan drive solutions, from the simplest to the most sophisticated. Parker has the right components and systems for any fan drive application.

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Products and Features:

- Fan speed sensors
- Temperature sensors
- Proportional outputs
- Analog controllers
- CANbus controllers
- Able to communicate directly with engine ECU
- Works with hydraulic or electronic fan motors
- Real time calculations
- Ability to reverse flow
Why use hydraulic fan drives?

Increasing government regulations on Tier III and IV diesel emissions require engine fan drive solutions with significantly higher cooling ability and more precise temperature control.

Engine cooling systems need to be highly efficient to conserve power and fuel for the vehicle. In addition, these systems need to be quiet and reliable.

An integral part of the engine cooling system is the fan drive system, and hydraulic fan drive systems are an excellent solution to meet these demands.

**Flexible installation**

With a fan that isn’t tied to the drivetrain, the cooler can now be located at any place in the vehicle. This can result in better air flow and lower installation costs.

**Reduced Power Consumption**

Traditional direct-drive engine mounted fan systems consume excess power because the fan speed is dependent on the engine speed. As the engine speed changes, the fan is often driven faster than what is required to cool the engine. This inefficiency is very significant especially at high fan speeds. In addition, direct-drive systems have difficulty achieving high cooling levels at low engine speeds.

**Increased Control**

A hydraulic fan drive system allows variable fan speed independent of the engine speed. It provides only the cooling that is required throughout the operating range of the vehicle, including where high cooling may be required at lower than maximum engine speed.

The full cooling control of hydraulic fan drives enables ramping of the fan speed command to avoid shock and to idle the fan during engine startup to preserve power. Hydraulic fan drive systems enable better fan control, yielding significant power and fuel savings.

**Efficiency**

Parker hydraulic fan drive systems are efficient throughout the engine and vehicle’s operating range. Traditional on/off clutch solutions operate only at maximum speed and can suddenly drain power to the vehicle. The unnecessary stresses of the on/off cycle can also reduce the life of the cooling system.

Viscous or wet clutch solutions offer variable fan speed, but have limited efficiency when the fan is being commanded to intermediate speeds which occur during the majority of the operating conditions.

Parker hydraulic fan drive systems have a high power to weight ratio to offer maximum power density and efficiency. The fan drive can be optimized whether using a simple stand-alone fan controller, or when the fan control logic is integrated into a complete vehicle controller.
Fan drive control options

Installing a hydraulic fan drive system offers many flexible options.

**Speed control**
A wide spectrum of speed options are available.
- Single speed
- Dual speed (Hi/Lo)
- Proportional speed
- Closed loop (with Fan Speed Feedback)
- Full stop (True Zero Speed)
- Priority flow control

**Reverse options**
With a hydraulically operated fan you can run in reverse in several modes for improved cooling by keeping the radiator clear of debris.
- Auto Reverse
- Manual Reverse
- Reverse Ramp Control

**Safety options**
A Parker fan drive system also adds safety features that keep the operator informed through status alarms.
- Over Temperature Alarm
- Limp Home Mode Alarm

Control types
Examples of fan drive systems

There are many types of fan drive control systems, from simple analog systems to more complex CAN bus systems.

**Simple analog**
A basic fan drive system relies on analog temperature transmitters for engine oil and coolant temperature information. A simple system with analog sensors has the advantage of being easy to design and easy to diagnose. The diagnostic information is limited however, due to its simplicity. The sensors are combined with a basic stand-alone controller with inputs and outputs to monitor temperature readings and drive the valve supplying the fan drive motor.

**CAN Bus**
More complex systems are CAN bus systems. Temperature information is obtained from the engine ECU over CAN using J1939 protocol. Although it is more complex, it may have a lower cost than a basic system since there are no external sensors and additional wiring harnesses. Because the controller is more powerful and connected to the engine ECU, there is more diagnostic information available. Integrating the fan drive into the overall vehicle control system can reduce the installation time and cost, reduce diagnostic time and increase fan drive efficiency by allowing all the vehicle functions that affect fan drive performance to be monitored.

**Hybrid (mixed) system**
A mixed system is the most complex and uses analog sensors in addition to a CAN interface to the engine ECU. The hybrid system offers the most flexibility in design and allows more factors to be monitored and used in fan drive system calculations. Because some of the system is analog, diagnostic information may be limited. Overall, a hybrid fan drive system may provide the best performance.
Fan drive system products from ECD

Parker has a full range of hydraulic components available for Fan Drive Systems.
- **Pumps**
- **Reservoirs and filtration**
- **Valves & integrated manifolds**
- **Fan motors**
- **Hoses and adapters**
- **Controls and sensors**

For the controller and sensor products used in fan drive systems that are offered by the Electronic Controls Division, please consult the table below.

<table>
<thead>
<tr>
<th>Controller options</th>
<th>Basic Analog</th>
<th>CAN bus</th>
<th>Hybrid</th>
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<tbody>
<tr>
<td>IQAN-TOC2</td>
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<tr>
<th>Sensors</th>
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<td>GS60 fan speed sensor</td>
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<tr>
<td>IQAN-ST temperature sensor</td>
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