

Kawasaki K3VL and K3VLS series pumps with Power Shift control

With today's ever changing demands on hydraulics and the advent of new Tier 4 engine, the need to vary the input torque of hydraulic pumps becomes evident. When the engine is operating at low idle, available torque is low and can be stalled. Using the Power Shift regulator, input torque to the pump can be limited to prevent engine overload and stalling at varying engine speeds and output power. Optimizing the horsepower input demands of the pump can result in significant savings in fuel consumption and emission output.

Kawasaki Power Shift is a low-cost alternative that maximizes machine versatility and can be retrofit into existing machine design platforms. Reduces fuel consumption, emissions and noise. Being able to operate at lower RPM with maximum efficiency, significant reduction in cooling demands and overall machine wear will be realized.

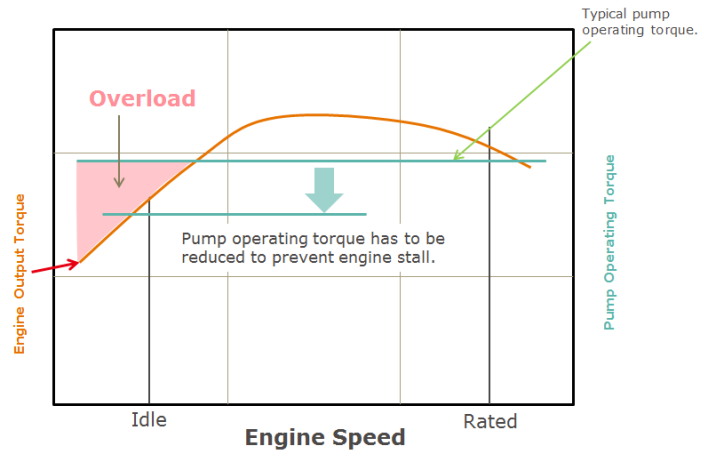
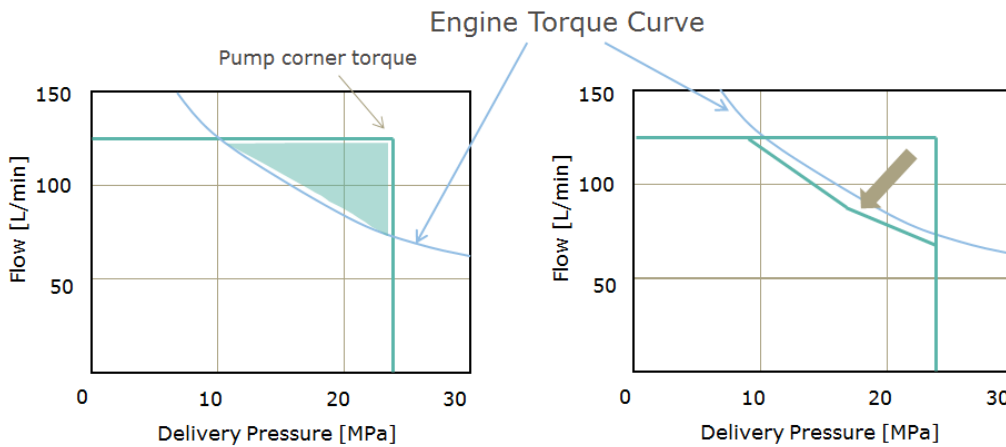


Figure 1

From Figure 1 we can see that as engine speed varies available output torque varies as well. To prevent engine stall the input torque requirement of the pump must change accordingly.



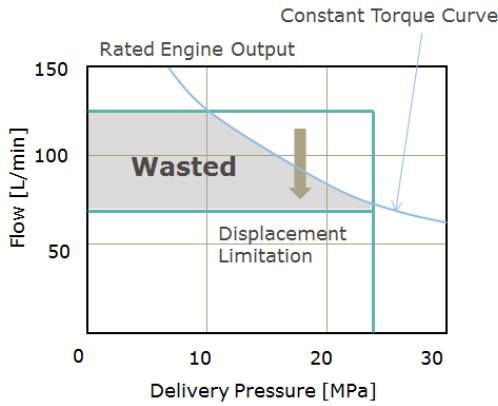
Displacement Limit

To prevent engine stalling, pump displacement must be reduced. With only a displacement control, much of the pump potential and machine performance is wasted.

Torque Limiter

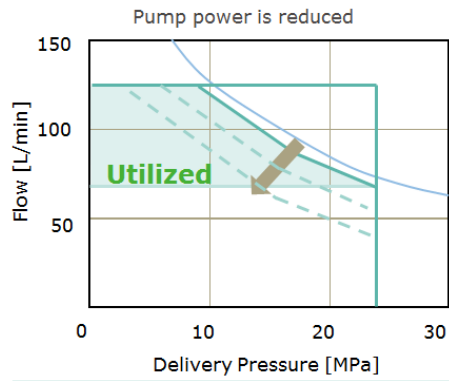
A torque limiter incrementally reduces displacement as pressure increases to limit the pump input torque to a constant level. The torque limiter is preset to match the max engine torque.

A torque limiter with Power Shift allows the pump to always operate at the maximum available torque. The pump can be set for various power levels for improved fuel economy or maximum performance. The pump can be used with an engine speed sensing control (ESS) with the controller monitoring engine droop. Pump input power is reduced to allow the engine to quickly recover preventing overload, at any speed.



Displacement Limit

One method of limiting input torque is to reduce pump maximum displacement. Unless the displacement is constantly changed to match pressure, machine performance will be wasted.



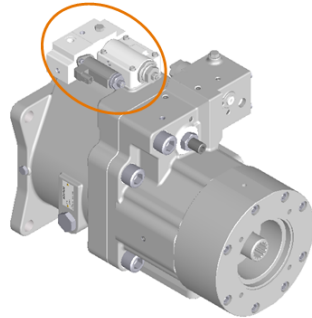
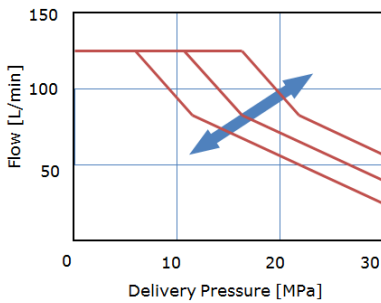
Torque Limiter with Power Shift

A torque limiter with Power Shift allows the pump to always operate at the maximum available torque level. The pump could be set for various power levels for improved fuel economy or maximum performance. The pump could be used with an engine speed sensing control (ESS) with the controller monitoring engine droop. Pump input power is reduced to allow the engine to quickly recover when overloaded, at any speed.

There are currently two versions of Power Shift available to meet system design requirements, Electric proportional or hydraulic pilot control.

Features

- Variable Torque Limit control (Power Shift)
- Two types of Power Shift operation
 - Electric Proportional (shown)
 - External Pilot Pressure



Key benefits of Kawasaki Power Shift:

- Reduction in emissions
- Reduction in fuel consumption
- Reduction in noise emission
- Reduction in cooling demands
- Increased machine versatility
- Longer machine life
- Can be retrofit to existing platforms
- Lower implementation cost

Please contact Kawasaki KPM for more information on the Power Shift control options.