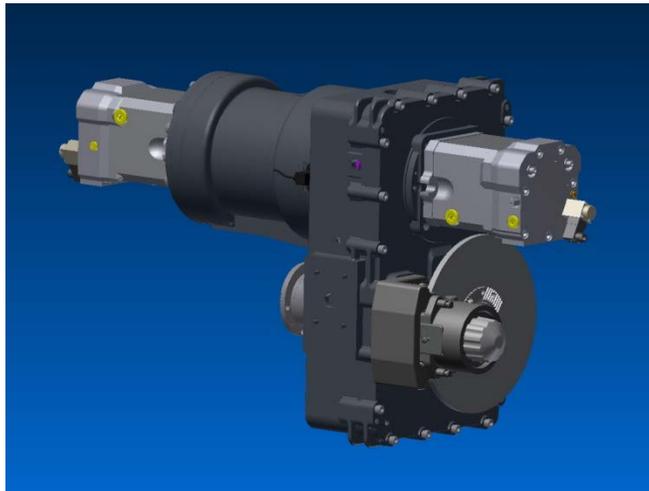


Driveline system for mobile working machinery

Two fully hydrostatic version and one power split version

fully hydrostatic version

hydraulic motors „in line“



Power: 120 - 200 kW

Two **LINDE** hydraulic motors:
as required from 75cc to 105cc

gear ratio 1: 4.73 - 6.51

gear ratio 2: 1.26 - 1.74

Maximum output torque:

Md = 8.100 Nm, effectiv

Maximum output speed:

n = 3.600 rpm

fully hydrostatic version

hydraulic motors „side by side“



Hydrostatic-mechanical driveline system for wheel loaders, grader,
mining machines, forest machines and other high-performance applications

System description

- The HYDROTRANSMATIC Plus technology uses a planetary gearbox which is driven by two hydraulic motors. In the 1. gear operation both hydraulic motors are coupled to the sun wheel of the planetary gear and therefore add the torques in order to realise high force at the vehicle wheel.
- In the 2. gear operation one of the hydraulic motors is taken off the sun wheel and coupled to the ring wheel of the planetary gearbox and causes therefore the addition of the revolution of both hydraulic motors taking into account the need of high vehicle speed.
- Within **ECO-DRIVE** operation the planetary gear is blocked and therefore switched to shaft function with the result of higher mechanical efficiencies and optimal low revolution of diesel engine. Also the hydraulic motors are driven with lowest possible revolution.

1. gear:

clutch K1 **open**; clutch K2 **closed**; clutch K3 **closed**

Both torques of hydraulic motors HM1 and HM2 are **added** at the sun wheel of the planetary gear.

2. gear:

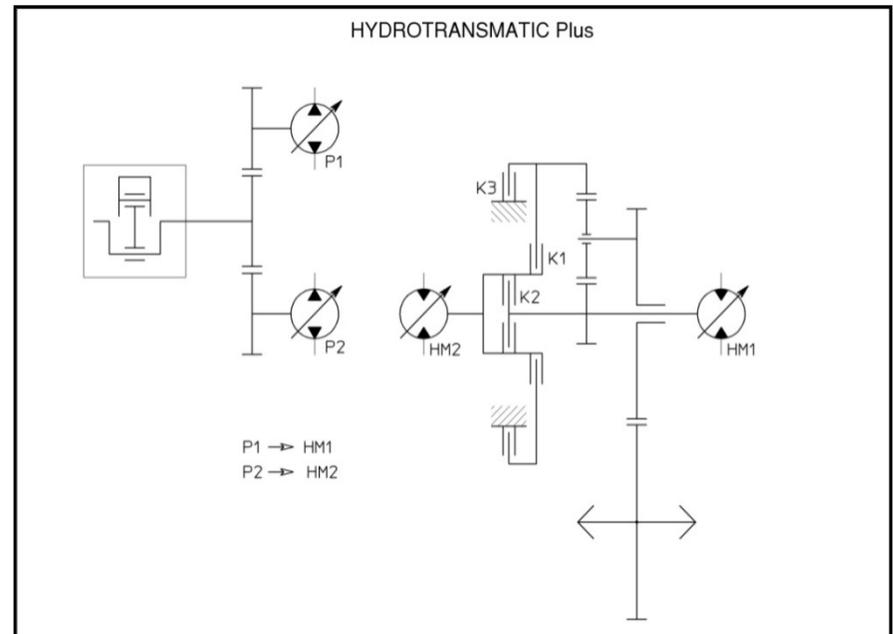
clutch K1 **closed**; clutch K2 **open**; clutch K3 **open**

Both revolutions of hydraulic motors HM1 and HM2 are **added** by the planetary gear.

ECO-Drive:

clutch K1 **closed**; clutch K2 **closed**; clutch K3 **open**

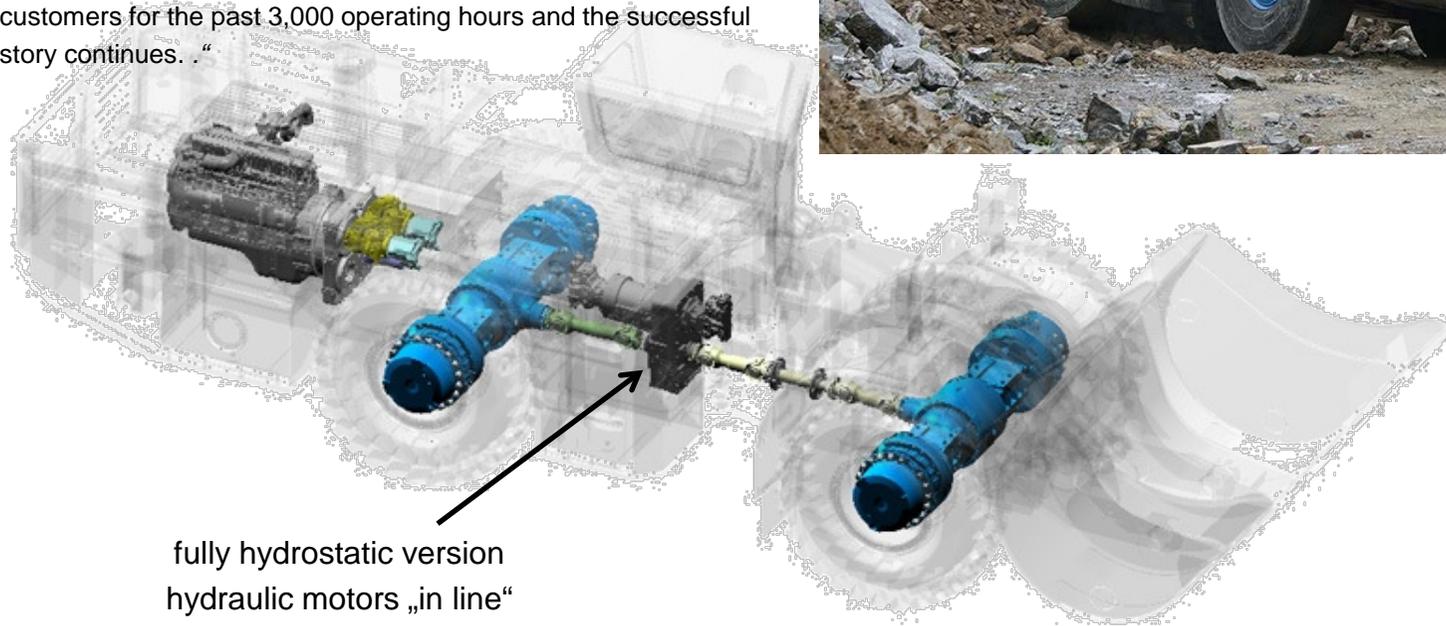
Planetary gear is blocked between ring wheel and sun wheel and therefore functioning as a shaft without any power losses. Diesel engine and HM1 and HM2 drive with lowest rpm.



Application example

Customers statement:

„This new generation of GHH Loaders combines all advantages from both drive systems, hydraulic and mechanic, in one new system, the so called "Efficient Drive System". This proven concept, developed and in operation on the lowest LHD in the 12t class (SLP12, overall height 1650mm) gives our customers magnificent savings in fuel consumption, maintenance and has satisfied in its field operation with its extremely high breakout force (LF-9.3E/LF-17E/LF-10/11). The successful introduction of the **EDS** in underground mining conditions has convinced our customers for the past 3,000 operating hours and the successful story continues. “



fully hydrostatic version
hydraulic motors „in line“

Reconstruction the „fully hydrostatic” version to “power split gear”

Replace one hydraulic motor
by a mechanical path unit

Established technology

Fully hydrostatic driveline including 2 hydraulic motors



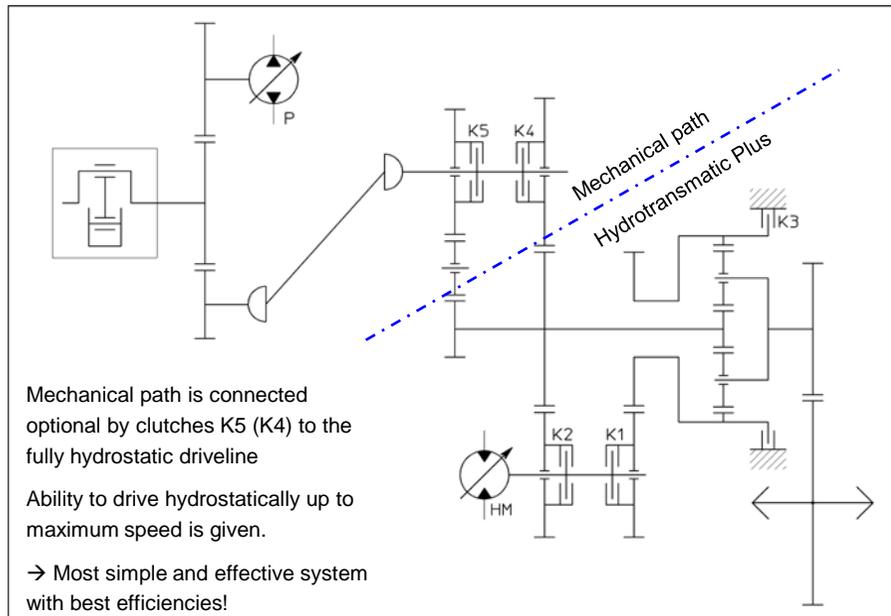
Power split gear



Mechanical path unit

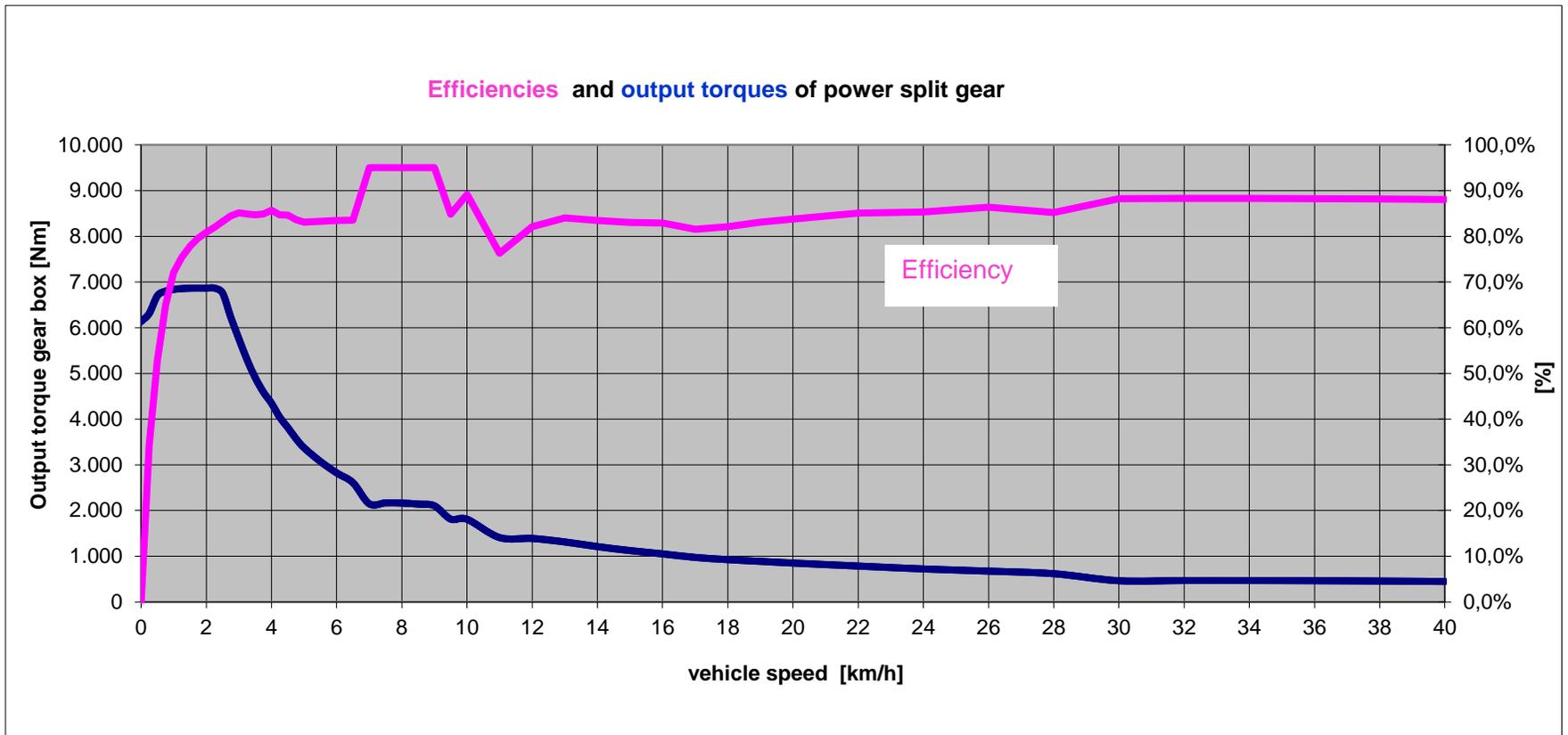
Description of the functionality of the power split gear

Fully hydrostatic version + Mechanic path = Power split gear



clutch	hydrostatic drive mode		Power split mode (without idle power)		mechanical drive mode			
	gear 1 -10 km/h to +10 km/h	gear ECO -40 km/h to +40 km/h	part load -5 to -40 km/h and +5 to +40 km/h	full load -6 to -40 km/h and +6 to +40 km/h	part load -5 to -11 km/h and +5 to +11 km/h	full load -7 to -11 km/h and +7 to +11 km/h	part load -26 to -40 km/h and +26 to +40 km/h	full load -32 to -40 km/h and +32 to +40 km/h
K1 ring gear clutch		✓	✓	✓			✓	✓
K2 sun wheel clutch	✓	✓	power-adaptiv	speed-adaptiv			power-adaptiv	✓
K3 ring gear clutch	✓				✓	✓		
K4 or K5 backward/forward clutch			✓	✓	✓	✓	✓	✓

Efficiencies of the power split gear



Advantages:

- up to 30% fuel savings and 10% more power available
- CVT shifting mode without any interrupt of traction force
- most simple hydrostatics components without zero degree operation
- outstanding low speed of hydraulic motors
- high amount of the controlled displacements from the hydraulic motors over the whole speed range
- easy structured software is adequate for best machine operation
- fully functioning electronic hard- and software available
- hydrostatic system support available