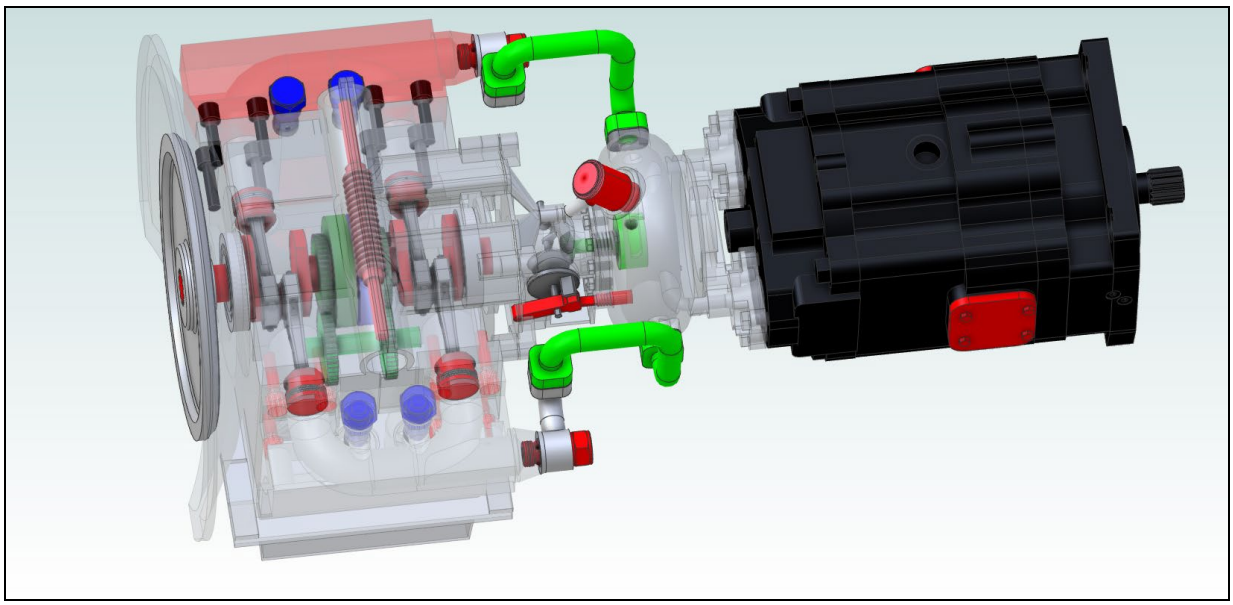
AMT Controlled VDS with Parker Motor

This document describes a Constant Speed, Continuously (Infinite) Variable Semi-tractor transmission utilizing an Angular Motion Translator, (AMT, US 6,547,689) controlled Variable Displacement System (VDS, US 9,890,638) Hydraulic Pump coupled with Parker Model M24FE03N1DFDFF0XXXNXX Hydraulic Motor.



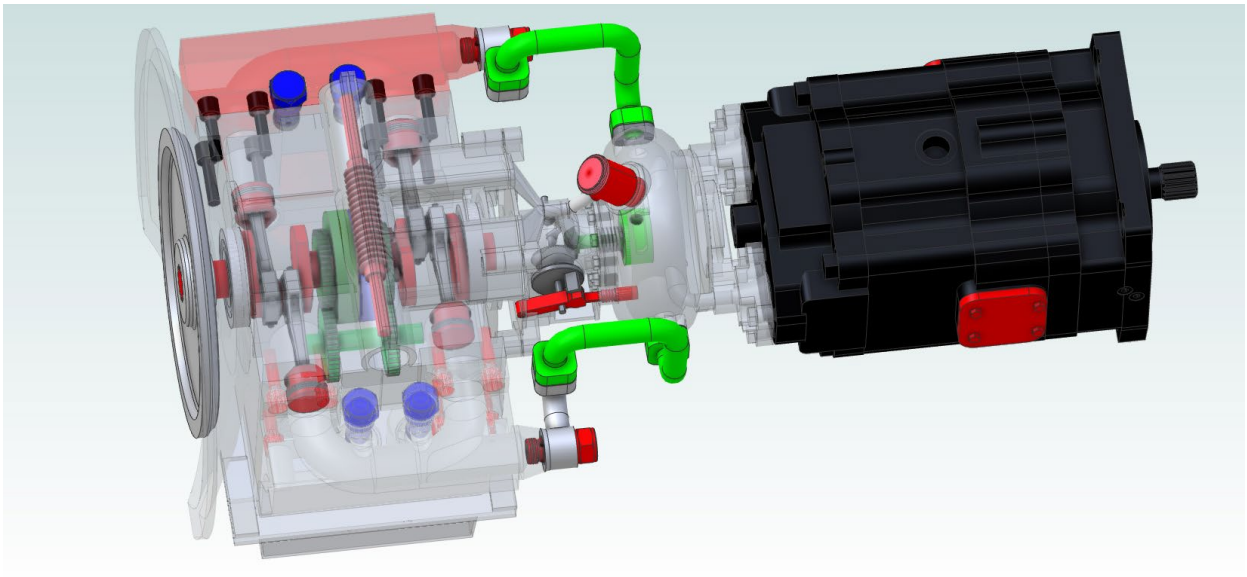
AMT Controlled VDS with paired pistons at 0° in-phase relationship, with maximum displacement

The Variable Displacement System consists of an in-line, co-axial, dual-crankshaft assembly with the fore and aft crankshafts each driving a pair of piston assemblies. The pistons to the left (near) side of the transmission form one pair with a common headspace. The pistons to the right (far) side of the transmission form another pair with their own common headspace.

The Angular Motion Translator resides between the fore and aft crankshafts and permits the power input to the flywheel to be transmitted through the fore crankshaft, and through the AMT, to the aft crankshaft. Additionally, the AMT allows an additional 180° of angle to be added to (or subtracted) from the aft crankshaft while the transmission is under load.

The forward Annulus Gear of the AMT (the green annulus above) is held static (non-rotating) by a force sensor which allows for monitoring the instantaneous torque passing through the transmission. The aft Annulus Gear of the AMT (The light purple annulus above) is driven by the worm-gear break that allows for injecting an additional 180° of rotation into the aft crankshaft. The worm-gear break would be driven by a servo-motor which in turn would be controlled by a computer programmed to adjust the displacement of the system to hold the Internal Combustion Engine at its most efficient speed (RPM).

When the pistons are in-phase, as shown above, the maximum amount of hydraulic fluid will be drawn through a pair of suction check-valve from the reservoir as the pistons move to the bottom of their common headspace/cylinders. Then as the pistons move in sequence toward the top of their common headspace/cylinders, discharging the maximum displacement through their common discharge check-valve.



AMT Controlled VDS with paired pistons at 180° out-of-phase relationship, with zero displacement

As shown in this image, as the AMT has added an additional 180° of motion to the aft crankshaft while under load, the paired pistons are completely out-of-phase. In this state, the fluid within the common headspace/cylinders will simply move back and forth between the common cylinders; no additional fluid will be drawn in from the reservoir, and no fluid will be discharged through the common discharge check-valve.

Between these two limits of the completely in-phase state of the paired pistons, and the completely out-of-phase state, an infinite number of states can be established by adjusting the worm-gear brake. This will therefore perform as a transmission with an infinite number of gear rations.

As fluid is discharged from each common headspace/cylinders through their respective discharge check-valves, it first is routed through a damping chamber before passing through a reversing valve assembly to the port of a Parker Model M24FE03N1DFDFF0XXXNXX Hydraulic Motor.

This configuration will be able to pass 1600 ft-lbs of torque to the driveshaft of a semi-tractor rig, generating 640 horsepower at 2100 RPM, and would accommodate any Detroit Diesel engine currently available.

It is projected that this described arrangement could increase the mileage/fuel efficiency of a typical 18-wheel rig by 5% to 10%, without requiring the driver to have any transmission shifting skills.

For further review, please see the 3-dimensional PDF below. (Once 3-D mode is activated, you will be able to toggle the Model Tree and hide or make transparent the various components, as well as select different views).

AMT Controlled VDS Hydraulic Pump coupled with Parker Model M24FE03N1DFDFF0XXXNXX Hydraulic Motor