

VOIGHT VARIABLE SPEED DRIVE

Joseph Tompkin

Salem, Oregon

The variable speed drive transmission is mounted within the gondola and connected with the wind turbine blades and the hub. This unit is designed for the production of ac power. The turbine turns by means of the variable speed drive and a set of synchronous three-phase generators. This motion is controlled automatically by two wind rosettes in such a way that the wind turbine always opposes the wind direction.

Adjustable speed is frequently a problem. For the majority of machine applications, mechanical speed changers are eminently suited and often provide the simplest and most economical answer. Efficiency of power transmissions employing mechanical principles runs to over 90 percent. Through the elimination of complex hydraulic, pneumatic, and electrical elements, mechanical speed changers are simple in design, manufacture, operation, maintenance, and exchange of all structural parts.

The Voight variable speed drive is a mechanical variable positive drive gear transmission. It has an unlimited power and torque transmission, a constant ratio with high degree of accuracy, a speed variation over a wide range, and a nonslip drive. The following are some specific advantages:

- (1) Any desired speed range is available from 1 to infinity.
- (2) Smooth acceleration is possible from zero to maximum speed and deceleration is possible from maximum speed to zero for any character of load.
- (3) Any practical number of positive drive stable speeds are available for any chosen speed variation, and they are accurate to a split rpm even with varying loads.
- (4) Variable speed drive model 58100 (enclosed) covers three speed ranges from 0 to 120, 120 to 360, and 360 to 840 rpm and reverse speeds from 1220 to 2320 rpm. There are 320 nonslip fixed speeds hand adjustable under load while operating the drive.
- (5) Jogging or preset speed is controlled by automatic acceleration or deceleration.
- (6) Dynamic braking exists for quick automatic stopping or where

controlled deceleration of load is required.

(7) There are multiple driving units with related speeds paralleling applications controlled from a single control (for applications where two or more machines must be "link" synchronized).

(8) Operation is by remote control.

(9) There is visual speed indication of operating rate in rpm or as desired.

(10) The Voigt variable speed drive meets the demands of all three general types of power transmission: Constant torque, constant horsepower or variable horsepower, and variable torque except in the very low speed range where the horsepower is somewhat limited because the torque tends to infinity, which is impractical.

(11) Ball bearings are used to reduce friction.

(12) All operating parts are splash lubricated.

(13) Applications are possible for powers from 5 to 10,000 horsepower.

(14) Load shocks are relieved by resiliency of the chaindrive incorporated in the unit and its autotant tension.

(15) Voight variable speed drive provides a means of controlling the speed of one or more standard ac induction motors by simply controlling the frequency of the power applied, thus making them variable speed drives.

If wind power were to be used primarily for pumping water, instead of generating electrical power, it is most practical to produce compressed air by means of a radial type compressor built into the wind turbine hub (see enclosed data sheet and schematic diagram).

DISCUSSION

Q: Have any of these units ever been built or are these just designs?

A: The first prototypes have been built, the first one in Los Angeles. What you just saw was simply patent descriptions. We would like to get involved in building this variable speed transmission, because it will control the fluctuation of the wind velocities in our turbines. This is perhaps a key to the controls so that we can maintain or have a constant voltage on alternating current generators.