

Application Note

AN-ODP-39

Using the Speed Droop Function for load sharing

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- **General:**

The speed droop function is intended for applications where two or more drives are used in parallel to control the speed of two different but mechanically linked motors with the same speed reference. The key requirement in this kind of application is to synchronize the speed of two different motors and to share the load equally.

Optidrive Plus provides a special droop parameter which allows the load to be shared between the two motors equally by adjusting the motor speed of each motor automatically depending on the motor load condition. This document details how to use this speed droop control function.

- **Parameters:**

The droop parameter forms part of the special parameters located in group 6. To access group 6, enter the value 702 in P1-14.

P6- 09 Speed droop control

Note that this parameter only works when drive is in vector speed control mode. (P4-01=0)

When set to zero, this speed droop control function is disabled.

If P6-09 > 0, then this parameter effectively defines a slip speed at motor rated output torque. The droop speed is expressed as a percentage value of P1-09. Depending on the motor load condition, the motor speed will be reduced by a “droop value” according to the following equation :

$$MotorSpeed = Speedreference - \frac{DroopSpeed \times MotorOutputTorque}{MotorRatedTorque}$$

where, $DroopSpeed = P6-09 * P1-09$

When the motor load increases, the actual motor speed will automatically reduce in proportion to the applied load. Conversely, a reduction in load will result in the speed increasing. The resulting effect is that the load in each motor is shared automatically.

- **Example:**

P1-09 = 50 Hz, P6-09 = 10.0%.

Drive has a speed reference speed of 40Hz with a motor output torque equal to 80% of the rated torque value.

Resulting motor speed = $40\text{Hz} - ((10\% * 50\text{Hz}) * 80\%) = 36\text{Hz}$.

The speed reduction is mirrored for negative speeds (ie -40Hz results in -36Hz actual)

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