

Application Note

AN-ODP-33

Motor Parameter Auto-tune

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· General:

Optidrive Plus is designed to achieve the best control performance in the standard AC inductance motor applications. In order to obtain this performance, it is necessary that the motor parameters used by the control algorithms are as close as possible as their actual values.

Measuring these values is difficult and impractical, so it is necessary that the drive can determine the values automatically.

The Auto-tune function is an automatic measurement process that determines all necessary parameters for best possible motor control.

The Auto-tune is static – ie the motor shaft does not need to rotate, which means the mechanical brake can be applied on the motor shaft when auto-tune function is carried out.

This file describes how to enable the motor parameter auto-tune function.

· Procedure:

Connect the drive to the motor as is required for the application. This must be done before the auto tune function is enabled.

IMPORTANT

Motor rated current, rated voltage and rated frequency must be entered correctly in Parameters P1-07, P1-08 and P1-09 before starting the auto-tune.

For drive version 2.20 and later, the motor power factor should also be entered in parameter P4-05 before carrying out the auto-tune.

These values can usually be found on the motor nameplate. If these parameters are entered incorrectly, the auto-tune will fail to give correct results.

See AN-ODP-01 for more information on setting up motor nameplate parameters.

Set P4-01 to 0 or 1 if vector control mode is required, or set P4-01 = 2 if V/F control mode if required.

If P4-01 = 2, a reduced auto-tune will be carried out. If the user therefore plans to use the vector control function, P4-01 must be set to 0 or 1 (vector mode) before starting the parameter auto measurement function.

The correct access code must be set in parameter P1-14 in order to gain access to parameter group 4. (Default value for the access code is 101)

As soon as the Auto-tune enable parameter (P4-02) is set to a 1, the auto-tune process will begin automatically. A hardware enable signal is *not* needed for Auto-tune to run.

During the measurement, the special message 'Auto-t' will be displayed on the drive window, indicating that Auto-tune is running.

Important : During the measurement, the motor shaft may rotate slightly if on light load. If a heavy load or brake is applied, the shaft will not rotate. It is not necessary for the shaft to rotate for the Auto-tune to work correctly.

The auto-tune function will take about two or three minutes to complete, depending on the type of motor (It may take more than 10mins if the motor has a large time constant).

If the motor parameter auto-tune function has been carried out correctly, the drive will display 'StoP' automatically when the function completes and the measured motor parameter values will be saved automatically inside the drive.

If, however, there are some errors that occur during the measurement, the error message 'At-FXX' will be displayed on the drive display, where XX gives extra information. In this case, the initial settings for P1-07, P1-08 and P1-09 should be checked to ensure that they match the motor. Please see the user guide for more information on auto-tune failure code and trouble shooting.

Irrespective of whether or not the measurement function completes correctly or not, the value of parameter P4-02 will be always reset to zero after the measurement. This terminates the Auto-tune process.

The drive is now ready for normal operation.

- Automatic Auto-tune in V/F mode :

Whenever the default parameters are loaded into the drive (by pressing 'STOP', 'UP' and 'DOWN' buttons together for about 2 seconds), V/F mode will be selected (P4-01 = 2).

Provided V/F mode remains selected, the drive will automatically carry out a reduced Auto-tune the first time that the drive is enabled after having loaded the default parameters. This ensures that for simple applications, optimum performance is obtained without needing to access the extended parameter sets.

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