6.7 Pulse frequency wobbling

Description

The function is available for Motor Modules in chassis format with DRIVE-CLiQ (order numbers: 6SL3xxx-xxxxx-xxx3) available in the vector control mode.

Pulse frequency wobbling damps the spectral components, which can generate unwanted noise in the motor. Wobbling can be activated only for pulse frequencies that are lower than or equal to the current controller frequency (see also p0115[0]).

Wobbling causes the pulse frequency in a modulation interval to deviate from the setpoint frequency. This means that the actual pulse frequency might be higher than the average pulse frequency required.

A noise generator can be used to vary the pulse frequency around an average value. In this case, the average pulse frequency is equal to the setpoint pulse frequency. The pulse frequency can be varied in every current controller cycle if the cycle is constant. Current measurement errors resulting from asynchronous pulse and control intervals are compensated by a correction in the actual current value.

Pulse frequency wobbling can be parameterized with parameter p1810 "Modulator configuration".

Parameters (see SINAMICS S120/S150 List Manual)

p1810 Modulator configuration

- Bit 0: DC link voltage limitation
  Bit 0 = 0:
  Voltage limitation derived from DC link voltage minimum (lower ripple in the output current; reduced output voltage).
  Bit 0 = 1:
  Voltage limitation derived from mean DC link voltage (increased output voltage with increasing ripple in the output current).
  The selection is valid only if the DC link voltage is not compensated in the CU (Bit 1 = 0).

- Bit 1: DC link voltage compensation
  Bit 1 = 0:
  DC link voltage compensation in the modulator.
  Bit 1 = 1:
  DC link voltage compensation in the closed-loop current control (CU)
  This bit can be set only in conjunction with a pulse inhibit and when r0192 bit 14 = 1 (DC link voltage can be compensated in the power unit).

- Bit 2: Activate pulse frequency wobbling
  Pulse frequency wobbling is deactivated in the default setting (p1810.2 = 0). Exception:
  For a parallel connection, pulse frequency wobbulation is only activated after the first
  commissioning (p1810.2 = 1).

  When the sine-wave filter is active (p0230 = 3 or 4), the wobbling function is locked out in
  order to protect the filter.
  Pulse frequency wobbling can be activated (p1810.2 = 1) only if:

  – p1800 (pulse frequency) <= 2* 1000/p0115[0] (in all indices)

  – p1802 (modulator mode) <= 6 (no optimized pulse patterns)

  – A pulse inhibit is applied

  – r0192 bit 16 = 1 gating unit with pulse frequency wobbulation available

p1811[0...n] Pulse frequency wobbling amplitude

Parameter p1811[0...n] "Pulse frequency wobbling amplitude" can be set to adjust the
magnitude of variation in the pulse frequency wobble to between 0 and 20 %. The factory
setting is 0%. For a wobble amplitude of p1811 = 0%, the maximum possible pulse
frequency
p1800 = 2 * 1/current controller cycle (1000/p0115[0]). With a wobble amplitude setting of
p1811 > 0, the maximum possible pulse frequency p1800 = 1/current controller cycle
(1000/p0115[0]). These conditions apply to all indices.

p1811 > 0 is possible under the following conditions:

- p1810.2 (modulator configuration) = 1 (wobbling activated)

- p1800 (pulse frequency) <= 1000/p115[0]

- p0230 (output filter) < 3 (no sine-wave filter)

Note

If pulse frequency wobbling is deactivated, all the indices of parameter p1811 are set to 0.