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Cyclic sync velocity mode

Cyclic sync velocity mode

General information

In the "Cyclic sync velocity mode", a velocity command value is specified for the drive. The velocity command value can be limited by ramps and filters.

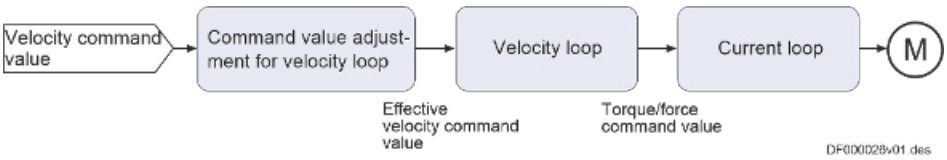

Fig. 66: Block diagram "Cyclic sync velocity mode"

This operation mode is also available in the case of open-loop axis control without actual value feedback (open-loop velocity control).

Commissioning

For commissioning the Cyclic sync velocity mode, the following dialog is available in ctrlX DRIVE Engineering, depending on the selected configuration:

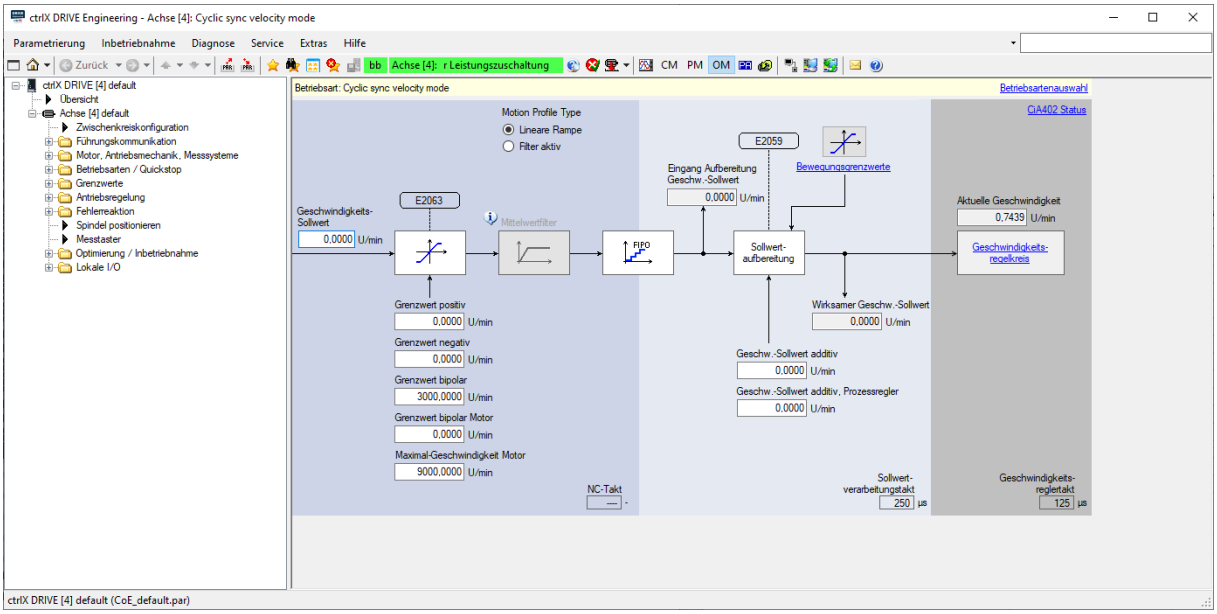

Fig. 67: Parameterization of the "Cyclic sync velocity mode"

Additional information and details

Overview

Fig. 68: Command value preprocessing in Cyclic sync velocity mode

In Cyclic sync velocity mode, the velocity command value is specified via parameter 0x60FF:00.

In case of a cyclic command value input (0x2834:02, bits 1/0 = 00), the command value is transmitted to the interpolation unit only in jerk-filtered form. If the velocity is to increase in a ramp-like way, the value already has to be preset in a ramp-like way in 0x60FF:00.

The value of "0x60B1:00, Velocity command value adjustment: Velocity offset" and "0x220D:03, Velocity command value preprocessing: Add. value, process control" can also be added to "0x60FF:00, Target velocity" directly at the input of the velocity controller.

The activated "Cyclic sync velocity mode" is displayed by the following diagnostics:

- A0101 Velocity (open-loop/closed-loop control)

Features of the operation mode

- Presetting an external velocity command value ("0x60FF:00, Target velocity") that is processed in different ways, depending on the selected command value processing mode.
- Command value processing mode:
  - Cyclic command value input with average value filter
  - via motion profile type 0x6086:00, the filter can be deactivated:
    0 = Linear ramp profile (filter deactivated)
    -1 = Filter active
- Default additive velocity command values ("0x60B1:00, Velocity command value adjustment: Velocity offset" and "0x220D:03, Preprocessing of velocity command value: Add. value, process control"), which become effective cyclically in the position controller clock.
- Using a drive-internal command value generator for generating command values is possible (easy startup mode)
- Limitation of target velocity and monitoring of actual velocity
- Linear fine interpolation of the velocity command values from the NC clock to the position controller clock; these command values are transmitted in the position controller clock
- Velocity control loop monitoring (cannot be parameterized) to prevent the drive from running away; monitoring can be switched on or off ("0x2200:01, Axis configuration: Word", bit 1)

- Velocity controller internally generates the torque/force command value to which the value of the parameter "0x60B2:00, Torque/force feedforward: Torque offset" can be added as an additive component
- Control and status word specifically for "Cyclic sync velocity mode" ("0x2834:01, Velocity control mode: Control word 1" and "0x2836:06, Velocity profile: Status word")

Jerk limitation

The command value specified via "0x60FF:00, Target velocity" is jerk-limited according to the settings in "0x2836:07, Velocity profile: Filter time constant".

The filtering is carried out as average value filtering.

Set point limitation

The command value specified via "0x60FF:00, Target velocity" is limited to the velocity limit values. When the limitation takes effect, the drive generates the warning E2063.

The effective "0x2220:09, Velocity controller: Command value" is limited to the velocity limit values. When the limitation takes effect, the drive generates the message "E2059 Velocity command value limit active".

See also chapter "Velocity limitation"

Monitoring functions

Monitoring functions specific to the operation mode:

Velocity command value > limit value

- The value of the parameter "0x60FF:00, Target velocity" is limited to "0x607F:00, Velocity limitation: Max profile velocity", "0x2304:02, Velocity limitation: Limit value, positive" and "0x2304:03, Velocity limitation: Limit value, negative". If the value in 0x60FF:00 is greater than the value in 0x607F:00, the warning "E2063 Velocity command value > limit value" is generated.

Parameters and diagnostics involved

Parameters involved

- 0x60FF:00, Target velocity
- 0x60B1:00, Velocity command value adjustment: Velocity offset
- 0x2304:02, Velocity limitation: Limit value, positive
- 0x2304:03, Velocity limitation: Limit value, negative
- 0x60B2:00, Torque/force feed forward: Torque offset
- 0x607F:00, Velocity limitation: Max profile velocity
- 0x6080:00, Motor basic data: Max. motor speed
- 0x2220:09, Velocity controller: Command value
- 0x2204:03, Axis mechanical data: Velocity limit, bipolar
- 0x2200:01, Axis configuration: Word
- 0x220D:03, Velocity command value preprocessing: Add. value, process control

- 0x2834:01, Velocity control mode: Control word 1
- 0x2836:01, Velocity profile: Acceleration 1
- 0x2836:03, Velocity profile: Final speed 1
- 0x6083:00, Profile acceleration
- 0x2836:06, Velocity profile: Status word
- 0x2836:04, Velocity profile: Deceleration 1
- 0x6084:00, Profile deceleration
- 0x2834:02, Velocity control mode: Configuration
- 0x2836:07, Velocity profile: Filter time constant

Diagnostics involved

- A0101 Velocity (open-loop/closed-loop control)
- E2059 Velocity command value limitation active
- E2063 Velocity command value > limit value
- F8078 Speed loop error
- F8079 Velocity limit value exceeded