Special control modes of JMC servo motors

The integrated AC servo motors from JMC can be operated in different modes
be. These are:

- Position mode (preset)
- Speed mode = speed control
- Torque mode = torque control

The Position mode is the standard mode that is used for positioning, e.g. in the CNC area. In the following, the other two modes are introduced and it is explained how they can be activated or deactivated.

Control modes:

Position mode (preset):
This mode is the factory preset mode. The behavior of the motor in this mode is comparable to that of a stepper motor when controlling the PUL terminal. Depending on the pulses per revolution set via the DIP switches, the motor moves to the desired position.

Speed mode:
Speed control. The speed can be influenced via a PWM signal applied to the PUL terminal. The controlling PWM signal is evaluated by the driver at a duty cycle of 10% to 90%. The evaluable input frequency at the PUL terminal is between 1 kHz and 20 kHz.

Torque mode:
Torque control. In this mode, the motor continuously delivers the torque set via JMC software. All parameters regarding speed limit and rotational speed build-up are taken into account. The torque is output after the PUL terminal is activated, whereby the frequency has no influence on the torque output or the speed limit. The torque is reduced to zero shortly after the PUL terminal is no longer controlled.

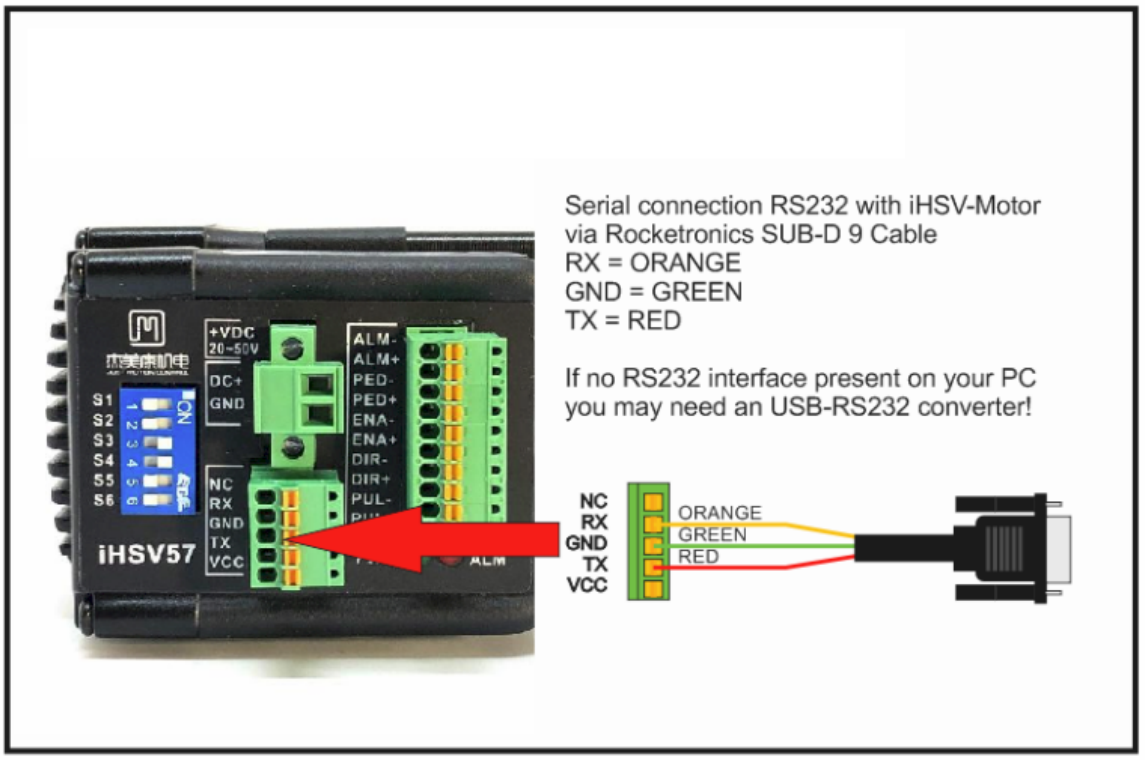
Changing the parameters

The motors have a RS232 interface. Attention: This is not a UART interface but a real RS232 port! For the connection via USB we recommend the RS232-USB converter type HL-340. The interface of the engine does not work with all USB converters, the HL-340 is proven to work.

Connect the terminals to the USB converter via RS232 cable as follows:

- GND to GND
- TX to TXD
- RX to RXD

Attention: Do not connect RXD and TXD crosswise as usual!



Use the latest JMC software version for parameterization: JMC 1.7.6

After you have established the communication with the motor or the driver (pay attention to the correct COMPort, Baud rate and Data bits) call the initially set parameters of the driver. You can also do this manually via the green arrow up (⬆).

We **strongly** recommend **saving** the initial factory parameters of the motor as the very first step. We recommend to enter the serial number and the firmware version in the name of the Parameter files to be integrated. (for example HSV57-30-18-36-21-38_V604.xml).

Fundamental:

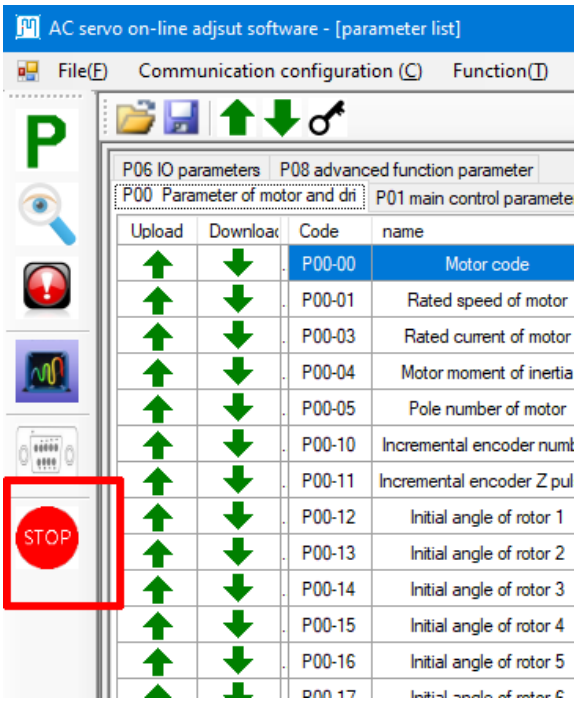
UP arrow ⬆ uploads the data from the motor to the PC (UPload to PC)

Prefil to DOWN ⬇ loads the data from the PC down to the motor (DOWNload to the motor)

Change of the control mode

Control mode setting P01-01 is the parameter that determines the control modes.

ATTENTION VERY IMPORTANT:
So that you can change this parameter P01-01, the driver must be **disabled**! This parameter cannot be adjusted if the driver or motor is enabled. Click on the STOP button in the software beforehand:



After successfully changing the parameter and confirming with Enter, this individual parameter (or all parameters) must be transferred to the motor driver via the green down arrow ( ). The power supply must not be interrupted during transfer. At the start of the data transfer, a pop-up window appears with a status bar for the transfer. After successful transfer, this is displayed under the status bar.

The motor must now be disconnected from the power supply once. After reconnecting the motor to the power supply, it is ready for use with the new parameters.

Speed Operation mode with JMC iHSV servo motors

SPEED OPERATION MODE allows the servo motor to be operated as a speed-controlled drive for shafts, spindles, conveyor belts, grinding plates, tools, etc.

The speed determining signal must be a 5V TTL PWM signal at PUL+.
The controlling PWM signal is evaluated by the driver at a duty cycle of 10% to 90%. The evaluable input frequency at the PUL terminal is between 1 kHz and 20 kHz.

Important:

- For speeds above 1000 rpm, parameter P06-40 must be set to 300. See page 6 for instructions.

The speed can then be set from 0-100%, the speed limits are set with parameters P04-06 and P04-07. The driver controls the speed.

Connection:

- Connect Pul/Dir/En with "Common cathode", i.e. ground on PUL-, DIR- and ENA-

- PUL+ serves as analog input for a PWM signal with 5V voltage

- DIR+ sets the direction of rotation

- EN+ allows the motor to be deactivated, HIGH switches the motor to freewheel.

Parameter :

- PO1-01 set to **1**
- Set P04-00 to **3**
- P04-06 e.g. to **3000** (max rpm cw) for 3000 rpm maximum speed
- P04-07 e.g. to **-3000** (max rpm ccw) for 3000 rpm maximum speed ccw
- P04-14 and P04-15 Set time in milliseconds for acceleration or deceleration.

Torque mode with JMC iHSV servo motors

In this mode, the motor continuously outputs the torque set via JMC software. All parameters regarding speed limit and rotational speed build-up are taken into account. The torque output takes place after controlling the PUL terminal, whereby the frequency has no influence on the output torque or the speed limit. A HIGH signal at PUL+ switches the operation on. The torque is reduced to zero shortly after no signal is applied to PUL+.

Important:

- For speeds above 1000 rpm, parameter P06-40 must be set to 300. See page 6 for instructions.

The speed limits are set with parameters P04-06 and P04-07. The driver controls the speed.

Connection:

- Connect Pul/Dir/En with "Common cathode", i.e. ground on PUL-, DIR- and ENA-

- PUL+ serves as a switch-on signal, a HIGH switches the motor on.

- DIR+ sets the direction of rotation

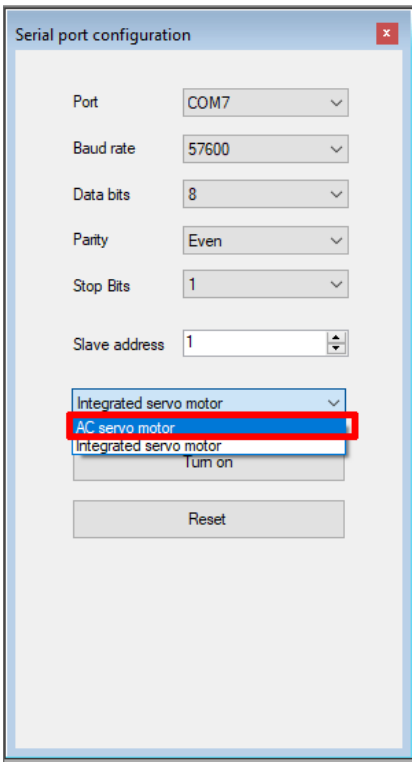
- EN+ allows the motor to be deactivated, HIGH switches the motor to freewheel.

Parameter :

- PO1-01 set to **2**
- Set P04-00 to **3**
- P04-06 e.g. to **3000** (max rpm cw) for 3000 rpm maximum speed cw
- P04-07 e.g. to **-3000** (max rpm ccw) for 3000 rpm maximum speed ccw
- P04-14 and P04-15 Set time in milliseconds for acceleration or deceleration.
- P05-10 e.g. to **100** = % of the nominal torque to be maintained cw
- P05-11 e.g. to **-100** = % of the nominal torque to be held ccw

Tip: Setting P05-10 or P05-11 to "10" results in a low torque at which you can just about stop the motor shaft by hand, this is a good way to test how the mode works.

Setting the parameter 06-40

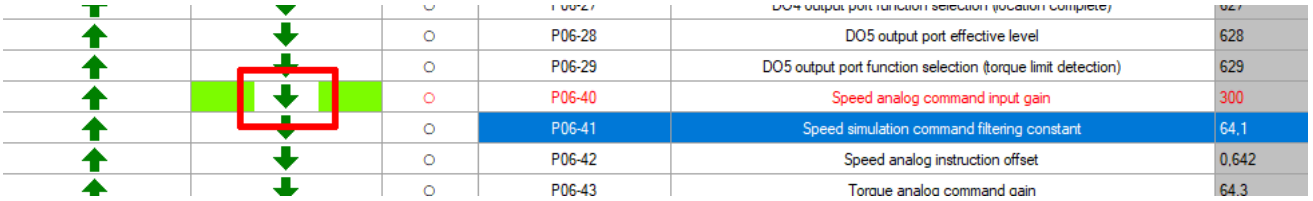


For speeds above 1000 rpm, parameter P06-40 must be set to **300:**

This is only possible if you do not select the "*Integrated servo motor*" but the *"AC servo motor*" when starting the software! Sounds wrong, but is correct in this case, a bug in the software makes it necessary unfortunately

Proceed as follows:

- Restart the software
- In the "Serial port Configuration" window, do not select the "*Integrated servo motor*" but the *"AC servo motor*"!
- Then connect by clicking on "TURN ON".
- Click on P to open the parameter window
- Find the parameter P06-40 and set it to 300
- Then save only this parameter by clicking on the green arrow:



- Close the parameter window again
- Stop the connection by clicking on "TURN OFF".
- In the "Serial port Configuration" window, select the "*Integrated servo motor".*
- Start the connection by clicking on "TURN ON" and call up the parameter list again.
- Now you can change and save the parameters of the servo motor again as usual.

Description of the relevant parameters:

P01-01
Control mode setting Setting
0: Position control mode (default)
1: Speed Operation mode = speed control
2: Torque mode = torque control

P04-00
Source of the speed command
0: external analog command
1: digital instruction (parameter setting)
2: digital command (communication)
3: "Internal multiple instruction sets" = PWM

P04-06
Limit value for forward speed
Set range: 0-6000 in rpm Limitation of motor speed during forward travel

P04-0 7
Speed limit when reversing
Set range: 0-6000 in rpm Limitation of the reverse speed of the motor.

P04-14
Acceleration time
Setting range: 0-10000, unit: 1ms/1000 rpm
Setting the acceleration for speed control

P04-15
Deceleration time, braking time
Setting range: 0-10000, unit: 1ms/1000 rpm
Setting the deceleration time for braking for speed control

P06-40
Amplification of the analog speed setpoint
Set range: 10-2000, unit 1rpm/V
The factory setting is 100. But should be 300.