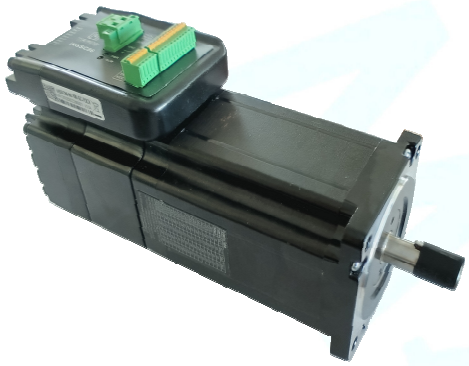
iHSS(C)86-SC Integrated Steppermotors CL with Brake



1. Features

- Cost-effective closed-loop stepper motor solution
- High positioning accuracy
- No step loss
- Smooth and uniform motor operation at low speeds
- Compact size
- Input signal: pulse/direction (PUL/DIR)
- Variable current control technology, resulting in high efficiency
- Parameters can be transferred to a PC via RS232.
- Settings via DIP switch or software.
- Overcurrent protection, overvoltage protection, position deviation protection

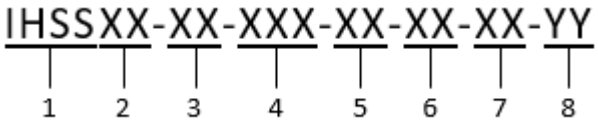
2. Description

The iHSSXX drives are a perfect combination of stepper motor driver and stepper motor. This motor system perfectly integrates stepper motor control technology into the digital stepper drive. In addition, this product uses an optical encoder with high-speed position feedback of 50µs. As soon as a position deviation is registered, it is immediately corrected. This product combines the advantages of stepper motor drives with those of servo drives, such as lower heat generation, less vibration, fast acceleration, and more.

3. Applications

The iHSSXX can be used in various applications, such as laser cutting machines, laser markers, high-precision XY tables, labelling machines, CNC milling machines, etc. Due to their unique characteristics, the iHSSXX are the ideal choice for applications that require smooth motor operation at low speeds and small installation spaces.

4. Naming Rules



1. Integrated closed-loop stepper motor (iHSSC ≙ integrated closed-loop stepper motor with reverse polarity protection)
2. Motor frame size: 86 ≙ 86 mm
3. Nominal voltage: 60 ≙ 60 V / 80 ≙ 80 V
4. Holding torque: 45 ≙ 4.5 Nm / 100 ≙ 9.6 Nm
5. Shaft length: no number ≙ 38 mm
6. Centering diameter: no number ≙ 73 mm
7. Hole spacing: no number ≙ 69.58 mm
8. Special equipment: SC ≙ with brake
   RC ≙ with MOD/CAN bus
   POCA ≙ Resetting alarms requires disconnecting the supply voltage

5. Electrical Specification

Parameter:	Min	Typical	Max	Unit
Input voltage	24	60 (80 *)	80 (100 *)	VDC
Output current:		6		A
Pulses per revolution	4	-	51.200	-
Input frequency		-	200	kHz
Pulse voltage	-	5	24	V
Control signal current	5	10	20	mA
Insulation resistance	100 / 500	-	-	MΩ / V DC
Insulation class		B		
Brake				
Input Voltage:		24		VDC
Current:		0,125		A

*) iHSS(C)86-80-100; iHSS86-80-120

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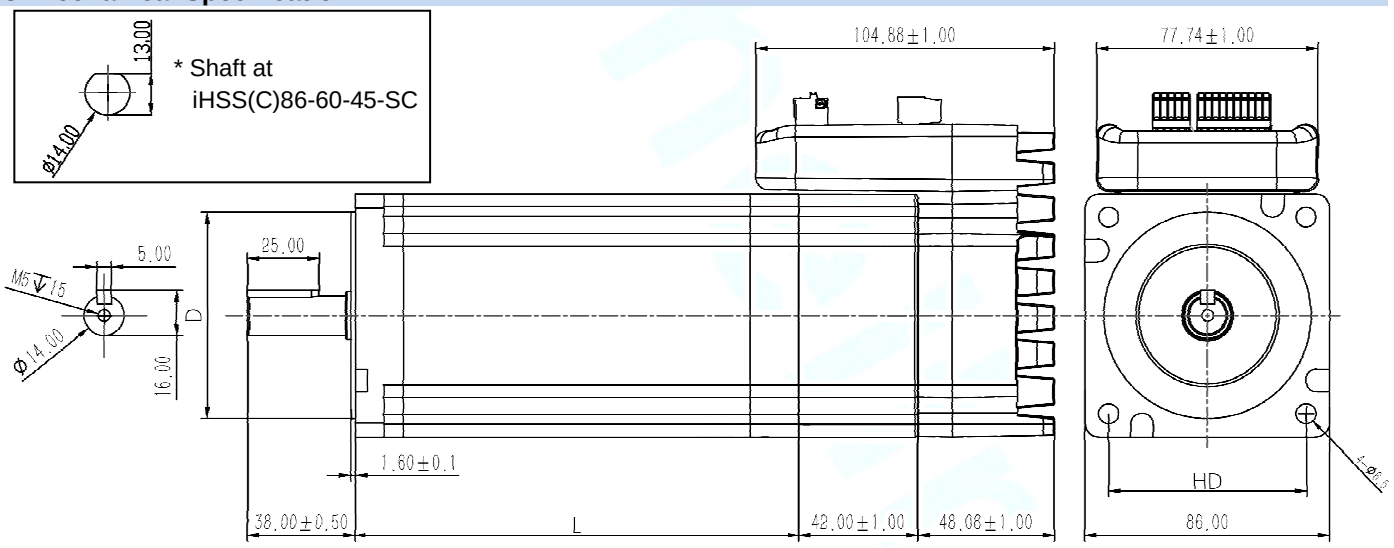
6. Motor Specification

Name:	iHSS(C)86-60-45	iHSS(C)86-80-100	iHSS(C)86-80-120			Unit
Current per phase	6,0	6,0	6,0			A
Number of phases	2	2	2			-
Holding torque	4.5	9.8	12.2			Nm
Inductance per phase	4,0	3,7	8,4			mH ± 20%
Resistance per phase	0,29	0,57	0,76			Ω ± 10 %
Moment of inertia	1.400	3.100	4.000			$g*cm^2$
Weight	2,8	4,8	5,9			kg

7. Environment

Cooling	Natural cooling or forced cooling	
Working environment	Environment	Avoid oil, dust and corrosive gases
	Ambient temperature	0 ℃ - 40 ℃
	Humidity	40 % RH bis 90 %RH
	Operating temperature (motor housing)	max. 90 ℃
Storage temperature	-20 ℃ bis 65 ℃	

8. Mechanical Specification



Name	Length Motor L	Shaft Length SL	Pilot Diameter D	Bore Distance HD
iHSS(C)86-60-45-SC	80 ± 1 mm	38 ± 1 mm	73 mm	69,58 mm
iHSS(C)86-80-100-SC	128 ± 1 mm	38 ± 1 mm	73 mm	69,58 mm
iHSS(C)86-80-120-SC	156 ± 1mm	38 ± 1 mm	73 mm	69,58 mm

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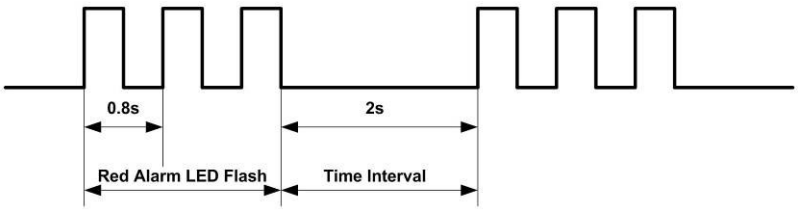
9. Protection Indicator



LED flashes	Description
1 time	Error occurs when the motor coil current exceeds the current limit of the driver.
2 times	Voltage reference error in the driver
3 times	Parameter upload error in the driver
4 times	Input voltage exceeded
5 times	Position sequence error has exceeded the limit value

10.Connector and Pin Assignment

The iHSSXX has three connections: one for power supply, one for control connections and a third for the RS232 communication connection.

Power Connector +VDC			
Pin	**Name**	**I/O**	**Description**
1	**DC+**	I	Input voltage + (positive) 24 – 60 (80 *) VDC recommended to allow for voltage fluctuations and back-EMF during motor deceleration. *)iHSS86-80-100
2	**GND**	GND	Input voltage - (negative)

Control Signal Connector			
Pin	**Name**	**I/O**	**Description**
1	**ALM-**	O	Alarm signal: OC output signal active when one of the following error messages is activated: overvoltage, overcurrent, short-circuit protection and position error. This port can switch a maximum of 8 mA at 24V or max. 200 mW. The resistance between ALM + and ALM- is high in normal operation and becomes low when an error message is received.
2	**ALM+**	O	
3	**PED-**	O	In-position signal: OC output signal, active when the current motor position has reached the target position. This port can switch a maximum of 8 mA at 24 V or max. 200 mW. The resistance between PED + and PED- is high during normal operation and becomes low when the end position is reached.
4	**PED+**	O	
5	**ENA-**	I	Enable signal: This signal is used to enable/disable the controller. By default, a high level means enable and a low level means disable (when using NPN logic). Normally not connected (=controller enabled). Please note that when using PNP logic and a differential output signal, the signal works in reverse, i.e. low level means 'activated'.
6	**ENA+**	I	
7	**DIR-**	I	Direction signal: In pulse direction mode, this input is for the low/high voltage levels, the two directions of the motor. For a reliable response, the DIR signal should be applied at least 5 µs before the PUL signal. Voltages: 3.5 to 24 V for DIR-HIGH, 0 to 0.5 V for DIR-LOW. The direction of rotation of the motor can also be switched using DIP switch S6 (optional: SW5 ON direction of rotation CW/CCW).
8	**DIR+**	I	
9	**PUL-**	I	Pulse signal: In pulse direction mode, this input is active for the input pulse signal, either rising or falling edge (configurable via software); Voltages: 3.5 to 24 V when PUL-HIGH, 0 to 0.5 V when PUL-LOW. For reliable operation, the pulse width should be longer than 2.5 µs at 200 kHz (optional: SW5 ON rotation direction CW/CCW).
10	**PUL+**	I	
11	**GND**	I	Power supply for the brake: This connection must be supplied with 24 V for the motor to operate. The brake is only released if the following conditions are met: 24 V is connected; no alarm is active; ENA is enabled (see ENA description); no power failure to the motor. The brake holds the motor in place when one of the following events occurs: Alarm has been triggered; ENA is not enabled; power failure to the motor.
12	**24V**	I	

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RS232 communication port				
Pin	**Name**	**Colours for the beige round cable**	**Colours for the grey flat cable**	**Description**
1	**NC**	-	-	Not connected
2	**RX**	Brown-White	Yellow	RS232 Data Input
3	**GND**	Blue	Green	Ground
4	**TX**	Blue-White	Red	RS232 Data Output
5	**VCC**	-	-	+3.3 V output (Caution: Do not connect when connected to a PC serial port!)

Note 1: The RS232 communication port is not isolated. Please use a galvanically isolated power supply for the iHSS(C)86 if the serial port of the PC is not isolated.

Note 2: Do not plug or unplug the connector while the device is switched on.

11. DIP switch settings

Pulses per revolution (SW1-SW4)

The pulses per revolution can be configured using DIP switches SW1 - SW4 or the software. If all SW1 - SW4 are in the 'ON' position, the driver adopts the setting specified by the software. In this case, a user can reconfigure the software to a value divisible by 50 between 200 and 50,000 pulses. If any switch from SW1 to SW4 is in the 'OFF' position, the setting is determined by the DIP switches. Use the following table for the setting:

Pulse / Revolution	SW 1	SW 2	SW 3	SW 4
Software dependent	On	On	On	On
800	Off	On	On	On
1600	On	Off	On	On
3200	Off	Off	On	On
6400	On	On	Off	On
12800	Off	On	Off	On
25600	On	Off	Off	On
51200	Off	Off	Off	On
1000	On	On	On	Off
2000	Off	On	On	Off
4000	On	Off	On	Off
5000	Off	Off	On	Off
8000	On	On	Off	Off
10000	Off	On	Off	Off
20000	On	Off	Off	Off
40000	Off	Off	Off	Off

SW 5: S5 can be used to configure the pulse mode. OFF stands for PUL/DIR mode. ON stands for double pulse mode; CW/CCW.

SW 6: Used to set the direction of rotation. 'Off' means CCW, while 'On' means CW.

SW 7: Used to set the PUL filter. 'Off' means max. PUL frequency is 200 kHz, 'On' means max. PUL frequency is 100 kHz.
Note: If the P22 parameter is 0, the value of the pulse filter setting is determined by SW 7. If the value is above 0, SW 7 has no function.

SW 8: is used for the PUL smoothing setting, 'Off' means PUL smoothing is switched off, 'On' means PUL smoothing is active.

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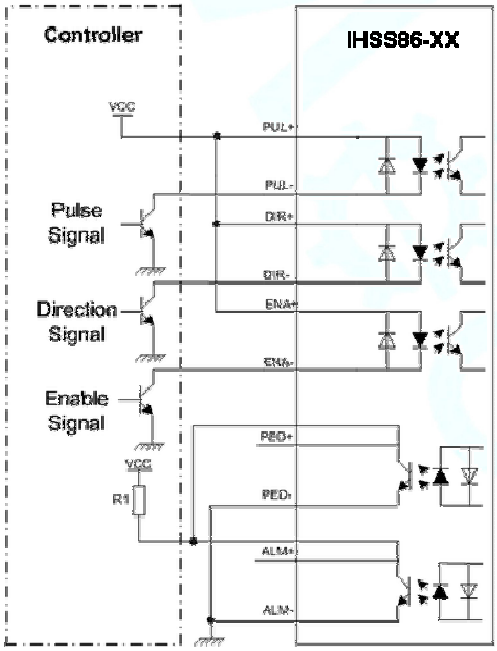
12. Fine Tuning

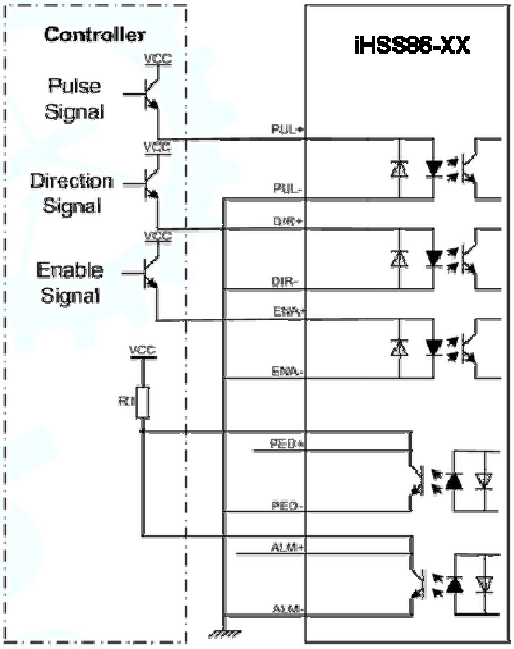
Standard parameters are set at the factory. These standard parameter values are optimised and suitable for most industrial applications. In most cases, it is not necessary to change them. However, if you want to optimise performance for your application, you can use the software to adjust these parameters.

13. Typical Connections

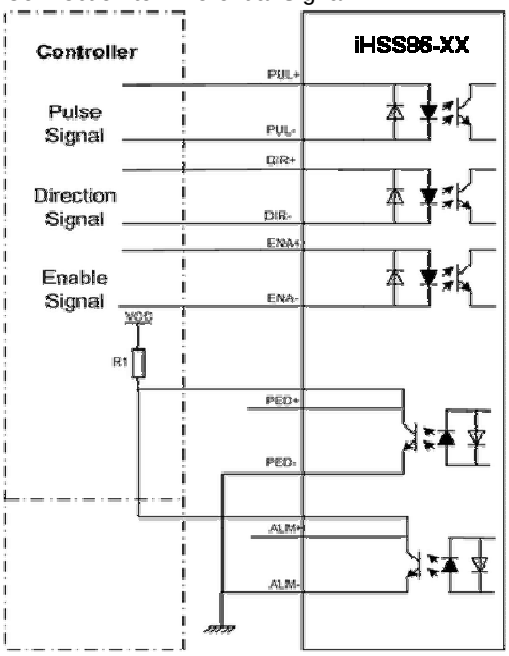
Connection to Common Anode



Connection to Common Cathode



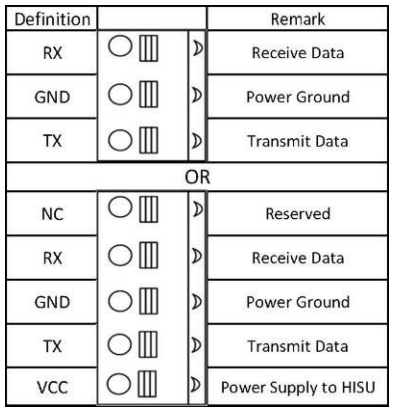
Connection to Differential Signal



14. RS232 Communication Cable Connections

Note 1: The RS232 communication port is not isolated. Please use a galvanic isolated power supply for the iHSSXX when the PC's serial port is not isolated.

Note 2: Do not plug or unplug the connector when power is on.



Definition		Remark
RX		Receive Data
GND		Power Ground
TX		Transmit Data
OR		
NC		Reserved
RX		Receive Data
GND		Power Ground
TX		Transmit Data
VCC		Power Supply to HISU

R1: to be selected depending on VCC; recommendation between 3 - 5 kΩ, since the OC ports switch max. 200 mW.

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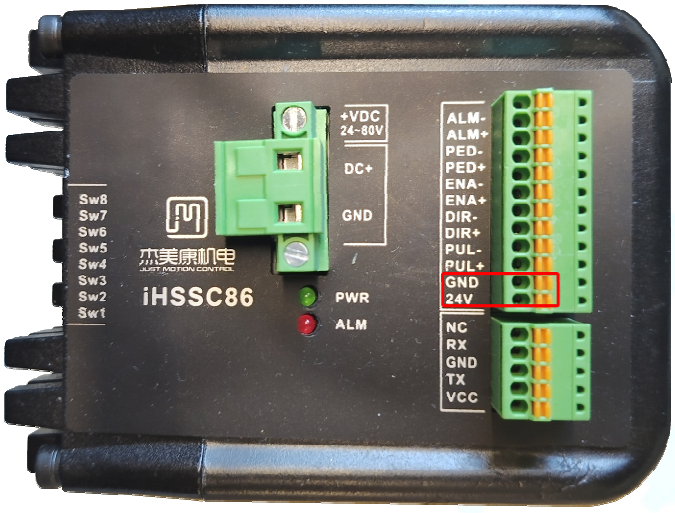
15. Connection of the Brake



To operate the motor, the brake must be supplied with 24V. If the brake is not supplied with the correct voltage (24V) and sufficient current (150mA), it is fixed. It is strongly recommended not to operate the motor with the brake fixed, as the increased current consumption can damage the electronics.

Attention! Reverse polarity protection only for iHSS**C** models!

Brake is fixed at:

- Alarm Signal active
- Enable Signal inactive
- Error in the power connection of the motor
- Error in the power connection of the brake

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Technische Änderungen vorbehalten

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