H5 Servo Motion System

---Higher performance servo solutions

meet the High-Dynamic Response of industry applications!

H5

Comfort Drive

The new generation of motion control AC servo systems, including the **HR5** rotary servo system and the **HD5** direct drive servo system, can achieve sub-micron level position control accuracy, significantly enhancing the precision, speed, efficiency and stability of industrial automation equipment.

They also feature **high performance, high response and greater safety**, and support multiple industrial Ethernet protocols such as EtherCAT,PROFINET and so on.

They can meet the application scenarios of high dynamic response in industries such as semiconductors, 3C and printing!

Various Control Modes!

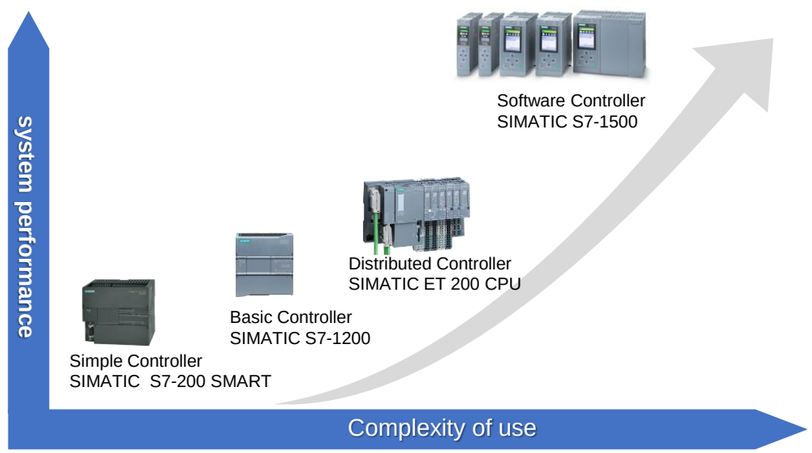
The **H5** series servo system adopts core self-developed technology. Besides the traditional pulse and analog control (H5-P) methods, it also supports **EtherCAT** (H5-E) and **PROFINET** (H5-F) communication, allowing for flexible matching with various bus control systems!

Pulse

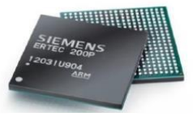
EtherCAT®

EtherCAT® is owned by Beckhoff Automation GMBH. PROFINET is developed by Siemens and the PROFIBUS Users Association. Other products, product names and trademarks or registered trademarks of products listed in this manual belong to each company and are not products of the Company.

H5-F with Profinet

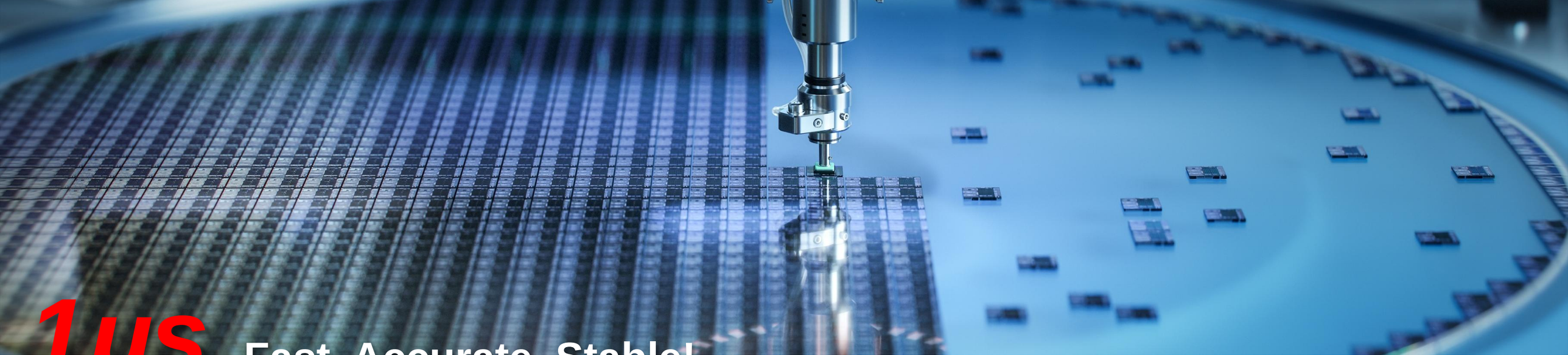


- The **H5-F** series PN bus servo adopts the dedicated ERTEC200P chip solution from Siemens and can be perfectly adapted to Siemens PN bus PLCs such as S7-200 Smart, S7-1200, and S7-1500.



- It follows the standard PROFIDRIVE profile, **supports RT real-time communication and IRT isochronous communication,** and offers multiple message options including 3, 102, 111, and 750. Whether it's simple single-axis control or complex multi-axis synchronous motion control, it can handle them with ease!

- The **H5-F** series PN bus servo comes with a standard pulse generator frequency division output function across the entire series, which can provide real-time feedback on motor position and is suitable for high-speed camera shooting applications (PCOM).



1μs Fast Accurate Stable!

H5 Series Servo adopts New 16bit digital hardware current loop design, sampling period up to **1μs!**

Its velocity loop response frequency is **3.5Khz**. Low-power like 400w servo with 360%~**390%** overload capacity, can maximize the performance of mechanical equipment, which can meet the requirements of high performances in semiconductor, LED, electronic manufacturing and other high dynamic response industry applications!

This system comes standard with 17bit magnetic and 23bit optical encoder, meanwhile the driver can support a maximum **27bit** high-precision encoder, which can achieve absolute positioning accuracy of ±15arcsec

数字量

full close-loop

HR5 series rotary servo system can optionally equip full closed-loop function, which can effectively eliminate the position deviation caused by mechanical clearance, and improve the positioning accuracy of the equipment.

Besides standard digital quantity A/B/Z linear encoder, it can also be customized to develop bus-absolute encoders such as BISS-C, SSI, Tamagawa, etc.

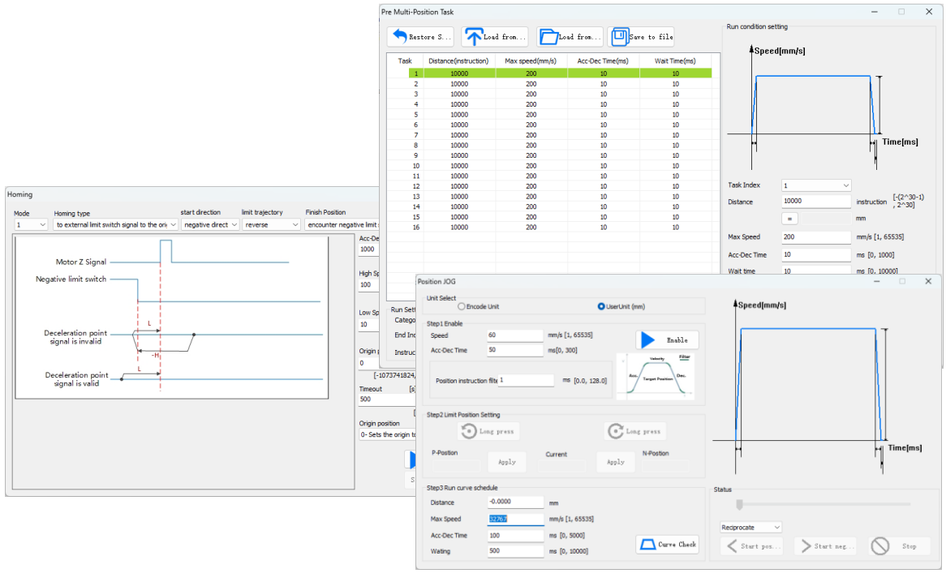
Semiconductor application

Taking dual-head LED die bonder as an example, the production efficiency of this equipment is only 50-60K/h when equipped with other brand products, while it can reach to **65K/h** with Huatron servo systems.

Besides the production efficiency increased by **30%**, the positioning accuracy and stability are better than others.

ALL in one

- Whether it is AC servo, direct drive servo or low voltage servo, all types of drive products of Huatron adopt a **unified technology development platform**, and can use the same servo tuning software tool DriverStart, which can effectively reduce the learning cost.

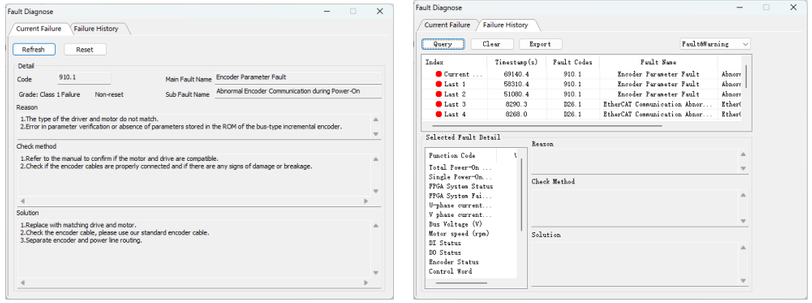


Easy Tuning

- Support offline project construction;
- Function groups are divided from the user's perspective to facilitate technical debugging and terminal maintenance;
- Built-in brake resistance selection guide function;
- Support position JOG function, 16-section preseting position tasks, 35 kinds of homing methods and other test-run functions;

Fast Diagnosis

- Provide real-time fault query and troubleshooting guidance, convenient for users to troubleshoot;
- The system supports 10 historical fault records to facilitate fault location;
- Fault dictionary can view all fault details, fault causes, detection methods, solutions, which is quite intuitive and practical;



Frequency Respond Analysis

- Its function of frequency domain analysis can support three modes of speed closed loop, speed open loop and mechanical characteristic, in which the mechanical characteristic mode can automatically identify the resonance point and the anti-resonance point. It can help users design the optimal servo control gain and filtering parameters.

Gantry Synchronous Control Algorithm

-Higher precision, higher response

- **Gantry synchronization** function is optional in **pulse /EC-bus type of H5** servo series, including rigid gantry or flexible gantry control.
- 15M high-speed communication rate between the two axes can realize the real-time exchange of three-loop control data.
- The fast cross-decouple gantry synchronization algorithm can achieve dual drive real-time synchronization. Its unique position synchronization decoupling control function can constantly detect mechanical motion deviation and compensate with dynamic decoupling algorithm, which can meet the requirment of higher precision and high response in gantry control!
- Support return to zero mode with dual photoelectric sensor.

- When HD5 direct drive series with linear motor, the acceleration of the gantry mechanism is up to ***4G***, and running speed can break ***4m/S***.

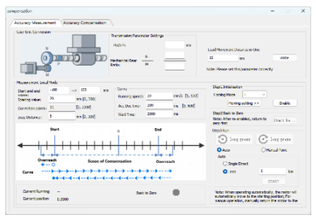
PCOM

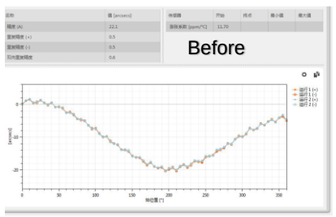
The built-in "position comparison function" uses the instantaneous position data feedback from the servo to compare with the value stored in the target position array in advance. When the comparison condition is correct, it will immediately output a digital output pulse signal for subsequent motion control use, meeting the application of visual inspection, laser, printing and other industries!

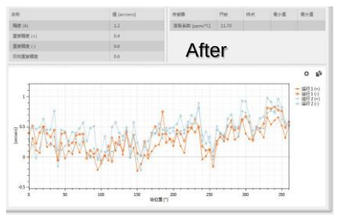
- Support A/B/Z 5V Emulated Encoder Output, with 4M output frequency
- The comparison output supports all encoder feedback channels, including full closed loop encoder
- Support two 24V voltage DO high-speed output, with only 0.1ms response delay
- The output supports pulse mode and trigger mode;
- Support list mode and equal spacing mode;
- The list mode supports 8 point comparison output, and can be customized to expand up to 256 points.

Positioning Error Compensation

- H5 servo system, with built-in positioning error compensation function, can achieve compensation motion control through the servo debugging software, free from the dependence on the upper order system. Besides, H5 supports multiple laser interferometer file import, and the maximum compensation is up to 2000 points.
- This function can also eliminate the deviation between the actual position of the motor and the position message from grating ruler, thus improve the positioning accuracy of the equipment.
- In addition to the application in direct-drive servo motor, this function also supports the screw lead compensation and the synchronous belt gap compensation.

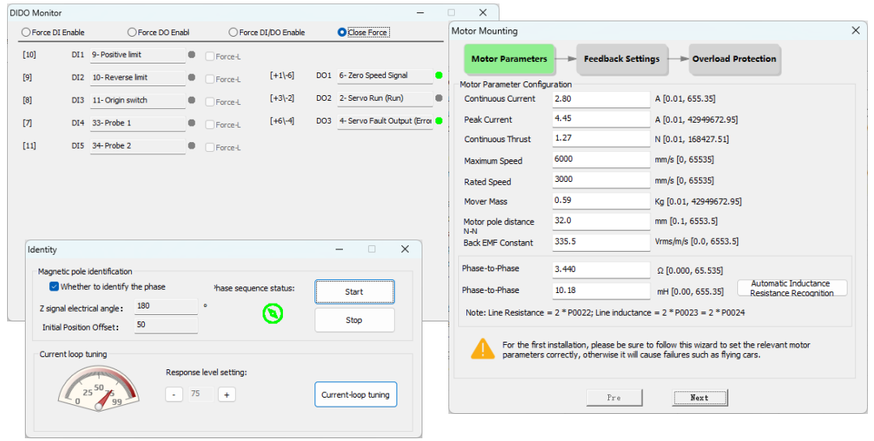






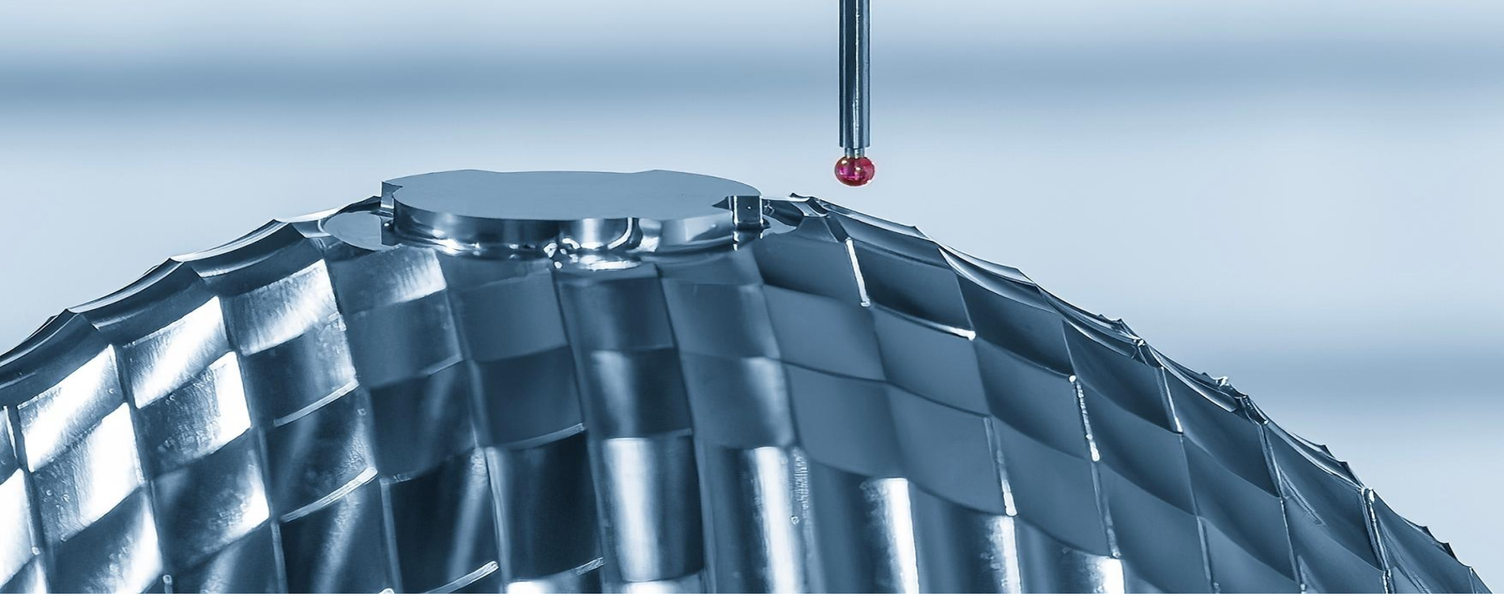
User-friendly Software

- DriverStart is a software of servo tuning for the all Huatron servo series. This guided, visual software assistant, coupled with excellent servo self-tuning technology, can easily help the customer's technicians reach the level of tuning technology with **3 years of experience**.



- H5 supports a variety of magnetic pole identification methods, applying to different complex working conditions. It can be flexibly configured according to the needs of the identification parameters, and significantly improve the success rate and accuracy of phase finding. The minimum movement distance of magnetic pole identification is only a few encoder pulses, with identification accuracy error < 2% electrical angle.

- All commissioning of **HD5** direct drive servo can be completed in just ***10min***.



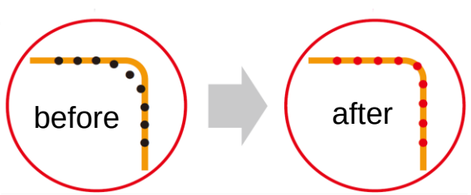
How to improve machining Accuracy?

Stable Speed

- H5 series' built-in high-precision torque fluctuation learning and correction algorithm makes the minimum torque fluctuation reach **± 1%** and the minimum speed fluctuation reach **±0.001%**, so that high-speed and low-speed operation machining have higher stability!

Trajectory Tracking

- H5 series' built-in high-precision trajectory tracking algorithm includes non-deviation control function, model tracking function, zero phase control function and iterative learning function. This algorithm can help achieve high dynamic response, in order to reduce the trajectory error in reciprocating operation, and greatly improve the trajectory accuracy. Therefore, H5 is suitable for the occasions of high processing accuracy requirement such as CNC, laser...



Friction Compensation

- H5 series' built-in friction compensation function, which improves the accuracy of arc trajectory in the trajectory control of X/Y slide table. This function can also suppress the Quadrant Mark caused by speed distortion when the rotation direction of servo motor is reversed.

CNC and laser applications

- **Taking CNC metal circle machining as an example, if you run the friction compensation and trajectory tracking functions, the machining accuracy of the circle will be increased to 1μm!**
- **Taking laser processing as an example, if you run the trajectory tracking function, the two-element measurement accuracy can reach 20 μm and the actual laser cutting accuracy can be increased to 50μm!**

Be Reliable, Be Safe!

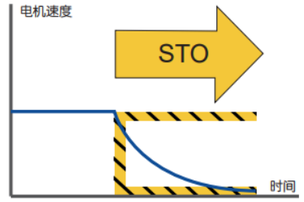
Reliable Structure

- Independent cooling duct design can not only help improve heat dissipation efficiency, but also avoid dust, high humidity and other intrusion into the driver body, which can effectively improve product reliability.
- The enhanced tri-proof coating ensures the resistance of moisture, dust and light corrosion.
- 750W and above H5 servo models have built-in brake resistance, which can consume the regenerative energy generated when the motor decelerates, ensuring that the servo motor can be stopped quickly and run reliably.

STO Safe Torque Off

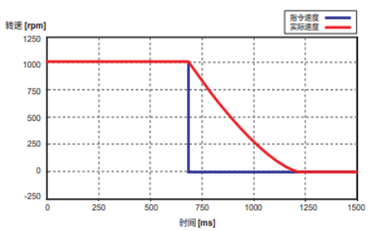
The STO design of H5 series servo adopts dual-channel redundancy hardware design and software verification mechanism.

In case of emergency, after the STO is activated, the hardware protection circuit of the driver will trigger, quickly cut off the motor power supply current, and prevent the motor from running, so as to protect the safety of people and equipment.

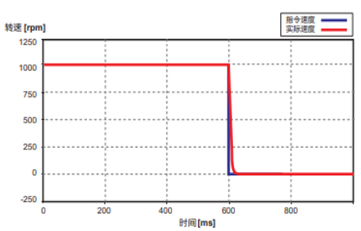


DB Dynamic Brake

The H5 series servo system is equipped with dynamic braking function, which can short-circuit the motor three-phase in the case of an emergency, so that the motor can stop rotating quickly, so as to protect the safety of people and equipment.



DB OFF



DB ON

HR5 AC Servo Drive

Naming Rule

HR5	-	E	R	5R5	S2	S	C
①		②	③	④	⑤	⑥	⑦

1	Product Series
HR5	Series

2	Command Type
P	Pulse
E	EtherCAT
F	PROFINET

3	Motor Type
R	PMSM Servo Motor

4	Rated Output Current	
S2/AC 220V		
1R6	1.6A	200W
2R8	2.8A	400W
5R5	5.5A	750W
7R6	7.6A	1KW
012	11.6A	1.5KW
014	14.0A	2KW
T3/AC 380V		
5R4	5.4A	1.5KW
8R4	8.4A	2KW
012	11.9A	3KW
017	16.5A	5KW
021	20.8A	6KW
026	26.0A	7.5KW
030	30.0A	11KW

5	Voltage Specifications
S2	Single-phase /Three-phase 220V
T3	Three-phase 380V

6	Safety Function
S	STO

7	Optional Function
C	Full-closed Loop
G	Gantry Note1

- **AC220V**
- **AC380V**

The power of HR5 AC servo drive ranges from 200W to 11KW.

Note1 PROFINET model does not support the gantry function

Specification configuration

HR5 Functional Configuration	Pulse/Analog	EtherCAT	PROFINET
	HR5-P	HR5-E	HR5-F
I/O	9DI/5DO	6DI/3DO	6DI/3DO
Analog	2AI/2AO	-	-
High-precision Analog Input	16bit customizable	-	-
Emulated Encoder Output	√	√	√
Full-closed Loop	Optional	Optional	Optional
Gantry Synchronization	Optional	Optional	-
PCOM	in development	in development	in development
STO	Optional	Optional	Optional
DB	√	√	√

AC 220V General Specifications

Structure Size	Size-A		Size-B	Size-C		
Driver Type: HR5*******	1R6S2	2R8S2	5R5S2	7R6S2	012S2	014S2
Rated Power	200W	400W	750W	1KW	1.5KW	2KW
Rated Output Current (Arms)	1.6	2.8	5.5	7.6	11.6	14.0
Maximum Output Current (Arms)	5.8	10.1	16.9	23.0	32.0	42.0
Rated Input Current (Arms)	Single-phase 2.3	Single-phase 4.0	Single-phase 7.9	Single-phase 9.6	Single-phase 12.8	Single-phase 16.0
	Three-phase 1.4	Three-phase 2.6	Three-phase 4.4	Three-phase 5.6	Three-phase 8.0	Three-phase 10.2
Built-in Regenerative Resistance	none		50Ω/50W	25Ω/80W		
Control Power Specification	Single-phase AC200V-240V，-10%-+10%，50/60Hz					
Main Power Supply	Single-phase /Three-phase AC200V-240V，-10%-+10%，50/60Hz					

AC 380V General Specifications

Structure Size	Size-C			Size-D			
Driver Type: HR5*******	5R4T3	8R4T3	012T3	017T3	021T3	026T3	030T3
Rated Power	1.5KW	2KW	3KW	5KW	6KW	7.5KW	11KW
Rated Output Current (Arms)	5.4	8.4	11.9	16.5	20.8	26.0	30.0
Maximum Output Current (Arms)	14.0	20.0	29.8	41.3	52.1	65.0	90.0
Rated Input Current (Arms)	3.6	6.6	8.0	12.0	16.0	21.0	30.0
Built-in Regenerative Resistance	100Ω/80W	50Ω/80W		35Ω/100W			
Control Power Specification	Single-phase AC380V-440V，-10%-+10%，50/60Hz						
Main Power Supply	Three-phase AC380V-440V，-10%-+10%，50/60Hz						

Items			Specifications
Basic Specifications	Control Mode		IGBT PWM control, sine wave current drive mode
			220 V, 380 V: Single-phase/Three-phase full-wave rectification
	Conditions of Usage	Usage/Storage Temperature[注1]	0～+40℃ / -20～+70℃
		Usage/Storage Humidity	below 90%RH (non-freezing)
		Vibration resistance/Shock resistance	4.9m/s^2 / 19.6m/s^2
		IP rating	IP20
		Pollution degree	PD2
		Altitude	The maximum altitude is 5000 m. ● For altitudes not higher than 1000 m, derating is not required. ● For altitudes above 1000 m, derate 1% for every additional 100m. ● For altitudes above 2000 m, contact Huarton.
Position Control Mode	Performance	Feedforward compensation	0.0% to 100.0% (resolution: 0.1%)
		Command shaping	Position instruction low-pass filtering, average filtering.
	Emulated Encoder Output	Output form	Pulse Type: Phase A/Phase B: differential output Phase Z: differential output or open collector output Bus Type: Phase A/Phase B: differential output
		Frequency division range	The motor rotates one circle, and the frequency can be divided into any pulse in the range of 140 to 1048576.
Speed/ Torque control mode	Performance	Dynamic characteristics of current loop	Step response: 187.5μs (0-100%); Sin/cos response: -3dB amplitude attenuation bandwidth, 2000Hz (command signal: ±25%); -90° phase shift bandwidth, 3500Hz (command signal: ±25%);
		Speed control range	The speed ranges from 0 to 12000rpm. If the speed exceeds 6000rpm, contact Huatron.
		Dynamic characteristics of velocity loop	Step response: 562.5μs (0~1000rpm) Sin/cos response: -3dB amplitude attenuation bandwidth, 1000Hz (command signal: ±500rpm); -90° phase shift bandwidth, 630Hz (command signal: ±500rpm);
		Torque control precision	±2%
Input/ Output signal	Digital input (DI) signal		Functions can be configured: forward overrange switch, reverse overrange switch, origin switch, etc.
	Digital output (DO) signal		Functions can be configured: servo ready, zero speed signal, speed arrival, position arrival, positioning approach signal, torque limit, warning, servo fault, etc.
Built-in functions	Electronic gear ratio		Built-in two sets of electronic gear ratio, support gear ratio switching function.
	Overtravel (OT) prevention		The drive stops immediately when P-OT or N-OT signal is activated.
	Protective functions		Including protections against overcurrent, overvoltage, undervoltage, overload, main circuit detection error, heatsink overtemperature, overspeed, encoder error, CPU error, and parameter error
	LED display		Main circuit CHARGE indicator, 5-bit LED display
	Vibration suppression		Four notches (including two adaptive notches) available, 50Hz~5000Hz. Each of the four traps can be set adaptively.
	Usability functions		Adaptive parameter tuning, speed observer, and model tracking
	Others		Status display, fault log, jog
	Connection device		USB

Model selection

HR5-PR Pulse Type					
Power	Current	SIZE	Power Supply Voltage	SC full close-loop+STO	SG gantry+STO
200W	1.6A	A	220V	HR5-PR1R6S2SC	HR5-PR1R6S2SG
400W	2.8A	A	220V	HR5-PR2R8S2SC	HR5-PR2R8S2SG
750W	5.5A	B	220V	HR5-PR5R5S2SC	HR5-PR5R5S2SG
1000W	7.6A	C	220V	HR5-PR7R6S2SC	HR5-PR7R6S2SG
1500W	11.6A	C	220V	HR5-PR012S2SC	HR5-PR012S2SG
2000W	14A	C	220V	HR5-PR014S2SC	HR5-PR014S2SG
1500W	5.4A	C	380V	HR5-PR5R4T3SC	HR5-PR5R4T3SG
2000W	8.4A	C	380V	HR5-PR8R4T3SC	HR5-PR8R4T3SG
3000W	11.9A	C	380V	HR5-PR012T3SC	HR5-PR012T3SG
5000W	16.5A	D	380V	HR5-PR017T3SC	HR5-PR017T3SG
6000W	20.8A	D	380V	HR5-PR021T3SC	HR5-PR021T3SG
7500W	26A	D	380V	HR5-PR026T3SC	HR5-PR026T3SG
11000W	30A	D	380V	HR5-PR030T3SC	HR5-PR030T3SG

HR5-ER EtherCAT Type					
Power	Current	SIZE	Power Supply Voltage	SC full close-loop+STO	SG gantry+STO
200W	1.6A	A	220V	HR5-ER1R6S2SC	HR5-ER1R6S2SG
400W	2.8A	A	220V	HR5-ER2R8S2SC	HR5-ER2R8S2SG
750W	5.5A	B	220V	HR5-ER5R5S2SC	HR5-ER5R5S2SG
1000W	7.6A	C	220V	HR5-ER7R6S2SC	HR5-ER7R6S2SG
1500W	11.6A	C	220V	HR5-ER012S2SC	HR5-ER012S2SG
2000W	14A	C	220V	HR5-ER014S2SC	HR5-ER014S2SG
1500W	5.4A	C	380V	HR5-ER5R4T3SC	HR5-ER5R4T3SG
2000W	8.4A	C	380V	HR5-ER8R4T3SC	HR5-ER8R4T3SG
3000W	11.9A	C	380V	HR5-ER012T3SC	HR5-ER012T3SG
5000W	16.5A	D	380V	HR5-ER017T3SC	HR5-ER017T3SG
6000W	20.8A	D	380V	HR5-ER021T3SC	HR5-ER021T3SG
7500W	26A	D	380V	HR5-ER026T3SC	HR5-ER026T3SG
11000W	30A	D	380V	HR5-ER030T3SC	HR5-ER030T3SG

HR5-FR PROFINET Type				PROFINET model does not support the gantry function
Power	Current	SIZE	Power Supply Voltage	SC full close-loop+STO
200W	1.6A	A	220V	HR5-FR1R6S2SC
400W	2.8A	A	220V	HR5-FR2R8S2SC
750W	5.5A	B	220V	HR5-FR5R5S2SC
1000W	7.6A	C	220V	HR5-FR7R6S2SC
1500W	11.6A	C	220V	HR5-FR012S2SC
2000W	14A	C	220V	HR5-FR014S2SC
1500W	5.4A	C	380V	HR5-FR5R4T3SC
2000W	8.4A	C	380V	HR5-FR8R4T3SC
3000W	11.9A	C	380V	HR5-FR012T3SC
5000W	16.5A	D	380V	HR5-FR017T3SC
6000W	20.8A	D	380V	HR5-FR021T3SC
7500W	26A	D	380V	HR5-FR026T3SC
11000W	30A	D	380V	HR5-FR030T3SC

HD5 Linear Servo Drive

Naming Rule

HD5	-	E	L	006	S2	S	G
①		②	③	④	⑤	⑥	⑦

1 Product Series	
HD5	Series

2 Command Type	
P	Pulse
E	EtherCAT
F	PROFINET

3 Motor Type	
L	linear motor/ torque motor

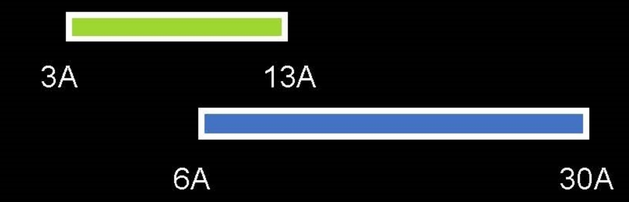
4 Rated Output Current	
S2 /AC 220V	
003	3.0A
006	6.0A
010	10.0A
013	13.0A
T3 /AC 380V	
006	6.0A
012	12.0A
024	24.0A
030	30.0A

5 Voltage Specifications	
S2	Single-phase /Three-phase 220V
T3	Three-phase 380V

6 Safety Function	
S	STO

7 Optional Function	
G	Gantry/Hall/ Temperature Detection
C	Hall/Temperature Detection note1

- **AC220V**
- **AC380V**



The rated output current of **HD5 linear** servo drive ranges from 3A to 30A.

Note1 PROFINET model does not support the gantry function.

Specification configuration

HD5 Functional Configuration	Pulse/Analog	EtherCAT	PROFINET
	HD5-P	HD5-E	HD5-F
I/O	9DI/5DO	6DI/3DO	6DI/3DO
Analog	2AI/2AO	-	-
High-precision Analog Input	16bit customizable	-	-
Frequency Dividing Output	√	√	√
Gantry Synchronization	√	√	-
PCOM	in development	√	in development
STO	√	√	√
DB	√	√	√
A/B/Z grating scale	√	√	√
BISS-C grating scale	√	√	√
Hall Test	√	√	√
Motor Temperature	√	√	√

AC 220V General Specifications

Structure Size	Size-A	Size-B	Size-C	
Driver Type: HD5********	003S2	006S2	010S2	013S2
Rated Output Current (Arms)	3.0	6.0	10.0	13.0
Maximum Output Current (Arms)	9.0	18.0	28.0	28.0
Rated Input Current (Arms)	Single-phase 5.0	Single-phase 10.0	Single-phase 17.2	Single-phase 22.4
	Three-phase 2.4	Three-phase 5.8	Three-phase 10.0	Three-phase 13.0
Built-in Regenerative Resistance	none	50Ω/50W	25Ω/80W	
Control Power Specification	Single-phase AC200V-240V，-10%-+10%，50/60Hz			
Main Power Supply	Single-phase /Three-phase AC200V-240V，-10%-+10%，50/60Hz			

AC 380V General Specifications

Structure Size	Size-C		Size-D	
Driver Type: HD5********	006T3	012T3	024T3	030T3
Rated Output Current (Arms)	6.0	12.0	24.0	30.0
Maximum Output Current (Arms)	18.0	24.0	72.0	90.0
Rated Input Current (Arms)	5.7	11.0	24.0	30.0
Built-in Regenerative Resistance	50Ω/80W		35Ω/100W	
Control Power Specification	Single-phase AC380V-440V，-10%-+10%，50/60Hz			
Main Power Supply	Three-phase AC380V-440V，-10%-+10%，50/60Hz			

Items				Specifications
Basic Specifications	Control Mode			IGBT PWM control, sine wave current drive mode
				220 V, 380 V: Single-phase/Three-phase full-wave rectification
	Conditions of Usage	Usage/Storage Temperature注1		0～+40℃ / -20～+70℃
		Usage/Storage Humidity		below 90%RH (non-freezing)
		Vibration resistance/Shock resistance		4.9m/s2 / 19.6m/s2
		IP rating		IP20
		Pollution degree		PD2
		Altitude		The maximum altitude is 5000 m. ● For altitudes not higher than 1000 m, derating is not required. ● For altitudes above 1000 m, derate 1% for every additional 100m. ● For altitudes above 2000 m, contact Huarton.
Position Control Mode	Performance	Feedforward compensation		0.0% to 100.0% (resolution: 0.1%)
		Command shaping		Position instruction low-pass filtering, average filtering.
	Frequency Dividing Output	Output form		Pulse Type: Phase A/Phase B: differential output Phase Z: differential output or open collector output Bus Type: Phase A/Phase B: differential output
		Frequency division range	DDL type	The motor runs at a pole distance, which can be divided into any pulse in the range of 140 to P0105 [Pole distance pulse number (N-N)].
			DDR type	The motor rotates one circle, and the frequency can be divided into any pulse in the range of 140 to 1048576.
Speed/Torque control mode	Performance	Dynamic characteristics of current loop	DDL type	Step response: 125μs (0-100%); Frequency response: -3dB amplitude attenuation bandwidth, 4000Hz (command signal: ±15%); -90° phase shift bandwidth, 8000Hz (command signal: ±15%);
			DDR type	Step response: 187.5μs (0-100%); Frequency response: -3dB amplitude attenuation bandwidth, 2000Hz (command signal: ±25%); -90° phase shift bandwidth, 3500Hz (command signal: ±25%);
		Dynamic characteristics of velocity loop	DDL type	Step response: 10ms (0-1000mm/s); Frequency response: -3dB amplitude attenuation bandwidth, 1500Hz (command signal: ±50mm/s); -90° phase shift bandwidth, 8000Hz (command signal: ±50mm/s);
			DDR type	Step response: 562.5μs （0~1000rpm）; Frequency response: -3dB amplitude attenuation bandwidth, 2000Hz (command signal: ±500rpm); -90° phase shift bandwidth, 630Hz (command signal: ±500rpm);
		Torque control precision		±2%
Input/Output signal	Digital input (DI) signal			Functions can be configured: forward overrange switch, reverse overrange switch, origin switch, etc.
	Digital output (DO) signal			Functions can be configured: servo ready, zero speed signal, speed arrival, position arrival, positioning approach signal, torque limit, warning, servo fault, etc.
Built-in functions	Electronic gear ratio			Built-in two sets of electronic gear ratio, support gear ratio switching function.
	Overtravel (OT) prevention			The drive stops immediately when P-OT or N-OT signal is activated.
	Protective functions			Including protections against overcurrent, overvoltage, undervoltage, overload, main circuit detection error, heatsink overtemperature, overspeed, encoder error, CPU error, and parameter error
	LED display			Main circuit CHARGE indicator, 5-bit LED display
	Vibration suppression			Four notches (including two adaptive notches) available, 50Hz~5000Hz. Each of the four traps can be set adaptively.
	Usability functions			Adaptive parameter tuning, speed observer, and model tracking
	Others			Status display, fault log, jog
	Connection device			USB

Model selection

HD5 Linear Servo Drive

HD5-PL Pulse Type			
Current	SIZE	Power Supply Voltage	SG STO+Hall+ gantry+tempreture detection
3A	A	220V	HD5-PL003S2SG
6A	B	220V	HD5-PL006S2SG
10A	C	220V	HD5-PL010S2SG
13A	C	220V	HD5-PL013S2SG
6A	C	380V	HD5-PL006T3SG
12A	C	380V	HD5-PL012T3SG
24A	D	380V	HD5-PL024T3SG
30A	D	380V	HD5-PL030T3SG

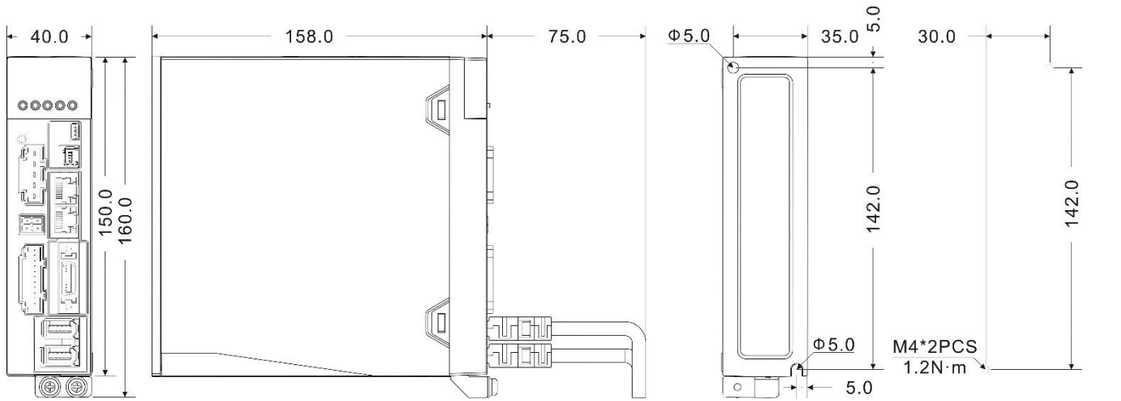
HD5-EL EtherCAT Type			EtherCAT
Current	SIZE	Power Supply Voltage	SG STO+Hall+ gantry+tempreture detection
3A	A	220V	HD5-EL003S2SG
6A	B	220V	HD5-EL006S2SG
10A	C	220V	HD5-EL010S2SG
13A	C	220V	HD5-EL013S2SG
6A	C	380V	HD5-EL006T3SG
12A	C	380V	HD5-EL012T3SG
24A	D	380V	HD5-EL024T3SG
30A	D	380V	HD5-EL030T3SG

HD5-FL PROFINET Type			PROFINET model does not support the gantry function
Current	SIZE	Power Supply Voltage	SC STO+Hall+tempreture detection
3A	A	220V	HD5-FL003S2SC
6A	B	220V	HD5-FL006S2SC
10A	C	220V	HD5-FL010S2SC
13A	C	220V	HD5-FL013S2SC
6A	C	380V	HD5-FL006T3SC
12A	C	380V	HD5-FL012T3SC
24A	D	380V	HD5-FL024T3SC
30A	D	380V	HD5-FL030T3SC

External Dimensions & Connector definition

Size-A

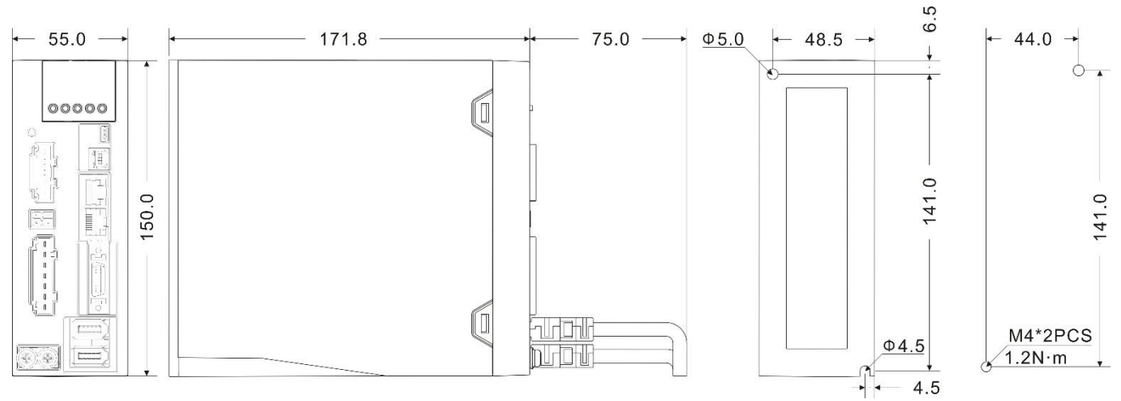
Weight 0.77 KG



Main View | Left View | Back View | Mounting HoleDiagram

Size-B

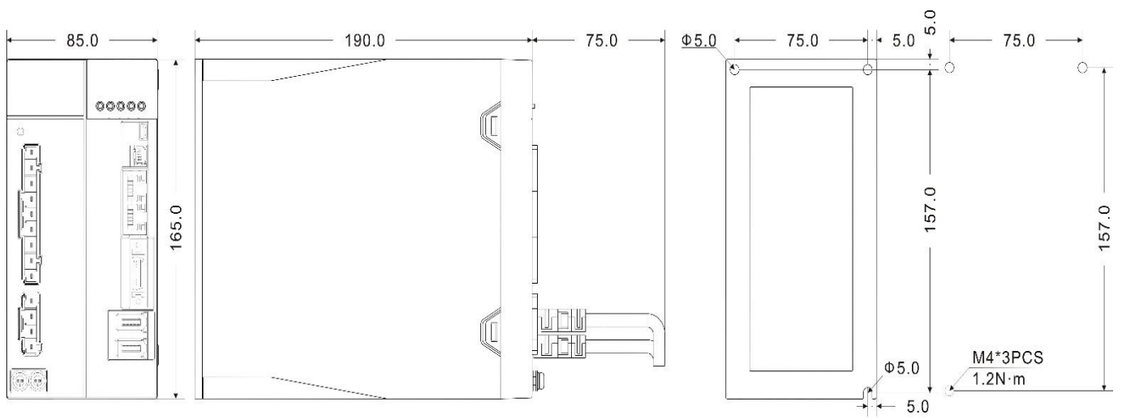
Weight 1.75KG



Main View | Left View | Back View | Mounting HoleDiagram

Size-C

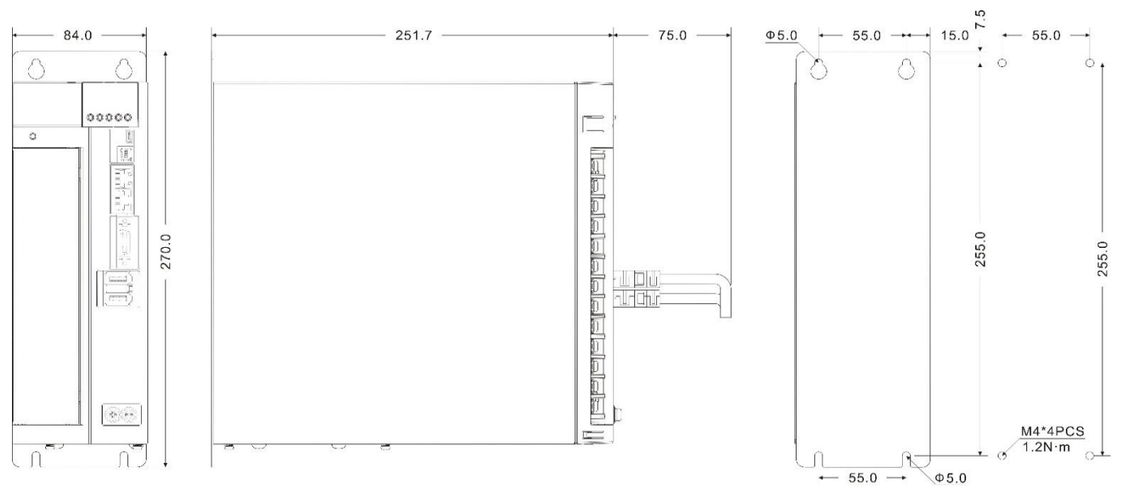
Weight 1.10KG



Main View | Left View | Back View | Mounting HoleDiagram

Size-D

Weight 2.58KG

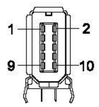


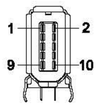
Main View | Left View | Back View | Mounting HoleDiagram

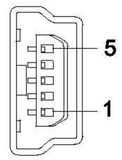
Connector Definition

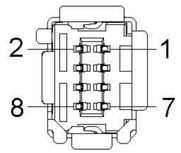
Pulse-type Pulse

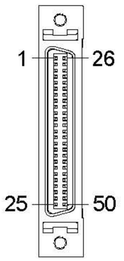
Connector	Function	HR5-PR Rotary Servo			HD5-PL Direct Servo
		Standard Type	SCfull close-loop+STO	SG gantry+STO	SG gantry+STO
CN1	Setting/Debugging	√	√	√	√
CN2	STO	X	√	√	√
CN3	I/O	√	√	√	√
CN4	First encoder	√	√	√	√
CN5	Second encoder	X	√	√	√
CN6	Brake	X	X	X	X

First Encoder Connector (CN4)	No.	HR5 Rotary Servo	HD5 Direct Servo	
		Standard	Standard	BISS
	1	5V	5V	5V
	2	GND	GND	GND
	3	-	A+	-
	4	-	A-	-
	5	-	B+	-
	6	-	B-	-
	7	-	Z+	CLK+
	8	-	Z-	CLK-
	9	SD+	-	DATA+
	10	SD-	-	DATA-

Second Encoder Connector (CN5)	No.	HR5 Rotary Servo		HD5 Direct Servo
		SCfull close-loop	SG gantry	SG gantry
	1	5V	-	5V
	2	GND	GND	GND
	3	SEC_A+	RS485A+	RS485A+
	4	SEC_A-	RS485A-	RS485A-
	5	SEC_B+	RS485B+	RS485B+
	6	SEC_B-	RS485B-	RS485B-
	7	SEC_Z+	-	HALL_U
	8	SEC_Z-	-	HALL_V
	9	-	-	HALL_W
	10	-	-	MTR_TEMP

MINI USB (CN1)	No.	Signal
	1	VBUS
	2	D-
	3	D+
	4	-
	5	GND

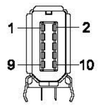
STO connector (CN2)	No.	Signal
	1	Internal power-
	2	Internal power+
	3	STO1-
	4	STO1+
	5	STO2-
	6	STO2+
	7	STO_OUT-
	8	STO_OUT+

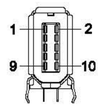
IO Connector (CN3)	No.	Signal	No.	Signal
	1	DI1	26	PZO-
	2	DI2	27	PZO+
	3	DI3	28	PBO-
	4	DI_COM	29	PBO+
	5	DI4	30	PAO-
	6	DI5	31	PAO+
	7	DI6	32	OCZ
	8	DI7	33	GND
	9	HDI1	34	PULSE+
	10	HDI2	35	PULSE-
	11	DO1-	36	SIGN+
	12	DO1+	37	SIGN-
	13	DO2-	38	PULLHI
	14	DO2+	39	GND
	15	DO3-	40	HPULSE+
	16	DO3+	41	HPULSE-
	17	DO4-	42	HSIGN+
	18	DO4+	43	HSIGN-
	19	DO5-	44	GND
	20	DO5+	45	AI1
	21	-	46	AI2
	22	-	47	AO2
	23	-	48	AO1
	24	-	49	GND
	25	-	50	-

Connector Definition

EtherCAT-type

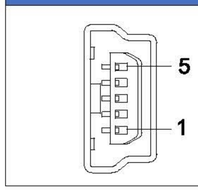
Connector	Function	HR5-ER Rotary Servo			HD5-EL Direct Servo
		Standard Type	SCfull close-loop+STO	SG gantry+STO	SG gantry+STO
CN1	Setting/Debugging	√	√	√	√
CN2	STO	X	√	√	√
CN3	IN	√	√	√	√
CN4	OUT	√	√	√	√
CN5	I/O	√	√	√	√
CN6	First encoder	√	√	√	√
CN7	Second encoder	X	√	√	√
CN8	Brake	X	X	X	X

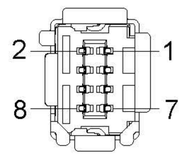
First Encoder Connector (CN6)	No.	HR5 Rotary Servo	HD5 Direct Servo	
		Standard	Standard	BISS
	1	5V	5V	5V
	2	GND	GND	GND
	3	-	A+	-
	4	-	A-	-
	5	-	B+	-
	6	-	B-	-
	7	-	Z+	CLK+
	8	-	Z-	CLK-
	9	SD+	-	DATA+
	10	SD-	-	DATA-

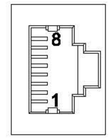
Second Encoder Connector (CN7)	No.	HR5 Rotary Servo		HD5 Direct Servo
		SCfull close-loop	SG gantry	SG gantry
	1	5V	-	5V
	2	GND	GND	GND
	3	SEC_A+	RS485A+	RS485A+
	4	SEC_A-	RS485A-	RS485A-
	5	SEC_B+	RS485B+	RS485B+
	6	SEC_B-	RS485B-	RS485B-
	7	SEC_Z+	-	HALL_U
	8	SEC_Z-	-	HALL_V
	9	-	-	HALL_W
	10	-	-	MTR_TEMP

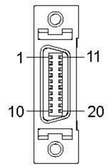
PROFINET-type

Connector	Function	HR5-FR Rotary Servo	HD5-FL Direct Servo
		SC full close-loop+STO	SC STO+Hall+tempreture detection
CN1	Setting/Debugging	√	√
CN2	STO	√	√
CN3	IN	√	√
CN4	OUT	√	√
CN5	I/O	√	√
CN6	First encoder	√	√
CN7	Second encoder	√	√
CN8	Brake	X	X

MINI USB (CN1)	No.	Signal
	1	VBUS
	2	D-
	3	D+
	4	-
	5	GND

STO Connector (CN2)	No.	Signal
	1	Internal power-
	2	Internal power+
	3	STO1-
	4	STO1+
	5	STO2-
	6	STO2+
	7	STO_OUT-
	8	STO_OUT+

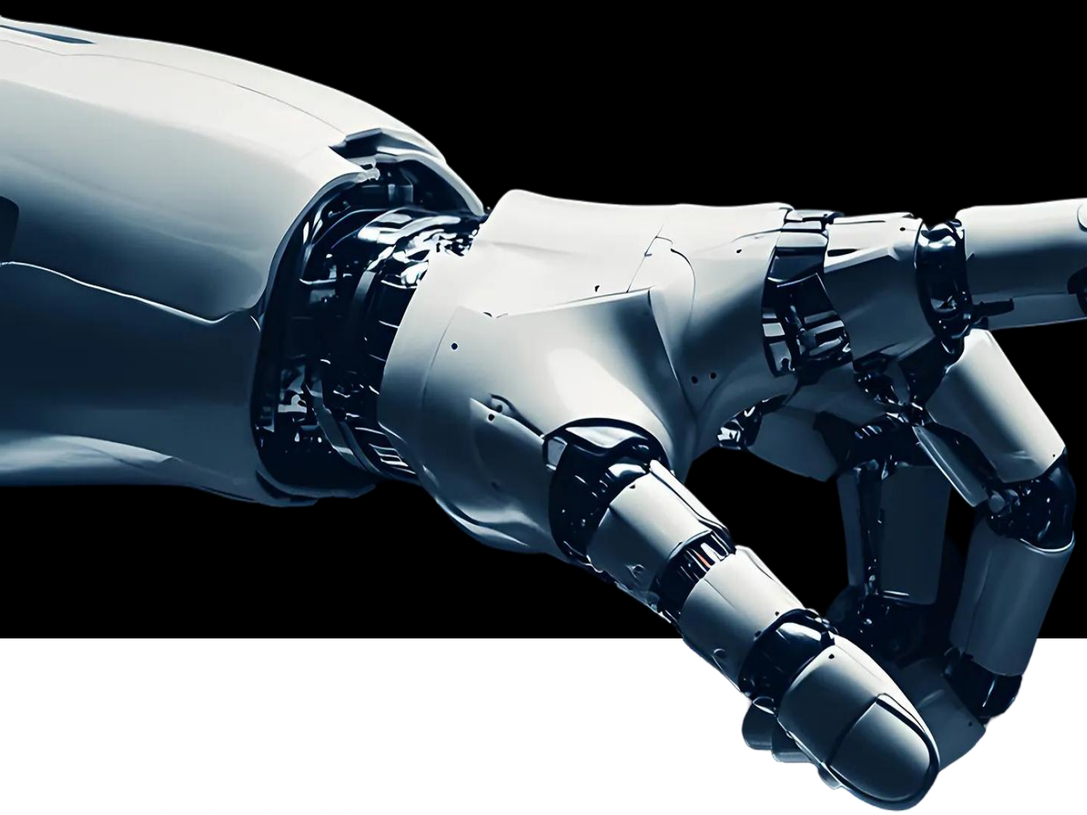
EtherCAT /PROFINET Communication connector	No.	Signal	No.	Signal
	CN3 (IN)		CN4(OUT)	
	1	TX+	1	TX+
	2	TX-	2	TX-
	3	RX+	3	RX+
	4	-	4	-
	5	-	5	-
	6	RX-	6	RX-
	7	-	7	-
	8	-	8	-

IO Connector (CN5)	No.	Signal	No.	Signal
	1	DO1+	11	DI6
	2	DO1-	12	HDI1
	3	DO3+	13	HDI2
	4	DO3-	14	DO2+
	5	DI1	15	DO2-
	6	DI_COM	16	GND
	7	DI2	17	PAO+
	8	DI3	18	PAO-
	9	DI4	19	PBO+
	10	DI5	20	PBO-

Product Accessories

Order Type	Specification
ST-ENC-10P	encoder connector|1394-10P
	for H5 series 
ST-IO50-H5	IOconnector|SCSI-50P
	H*5-P **only for Pulse type** 
ST-IO20-H5	IOconnector|SCSI-20P
	H*5-E/F **only for Bus type** 
ST-STO-H5	STO connector
	only for the type with STO function 

精彩系列



HX Drive

Future

Create more possibilities with you

- Smaller size, higher Power density
- Supports EtherCAT, CANopen and other mainstream communication methods
- Support A/B/Z increment encoder, resolver, Tamagawa absolute encoder, BISS-C encoder and other protocols type encoder.
- Applicable to robotics, AGV, medical, semiconductor industries

HX-25A

DC14-60V/25A

HX-100A

DC400V/100A

DC100V/130A