

PRODUCT CATALOG

HUAYAN ROBOTICS

Contact Us:

400-852-9898

Web:

www.huayan-robotics.net

Email:

marketing.oversea@huayan-robotics.com

Address:

6/F, Building 3, Han's Laser Global Intelligent
Manufacturing Industry Base, Bao'an District,
Shenzhen, China.

Factory Address:

Building 9, Haichuang Han's Robot Intelligent
Manufacturing Center, NO.3 Erzhi Industrial
Avenue, Beijiao Town, Foshan City, China.



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COMPANY PROFILE



Guangdong Huayan Robotics Co., Ltd. (Stock Code: 1021.HK) is a "Little Giant" enterprise specializing in professional, high-tech innovation. Since 2005, the company's core team has been dedicated to the R&D and production of core components such as motors and servo drives. In 2014, they established a Robotics Research Institute, and in September 2017, Guangdong Huayan Robotics Co., Ltd. was officially established. The company is committed to the applications and research of collaborative robots in various fields, including intelligent manufacturing, logistics and warehousing, and consumer services. Headquartered in Guangdong, the company has a global intelligent manufacturing base in Foshan, with subsidiaries in United States and Hong Kong, Tianjin, Jiangsu, China. It also has offices and representatives in Germany, Mexico, Japan, South Korea, as well as Shanghai and Chengdu, China.

The company has developed a comprehensive product portfolio with payload range from **3kg to 60kg**, covering a wide range of application scenarios. These include the high-speed, balanced performance Elfin series of collaborative robots, the Elfin-Pro series of collaborative robots with integrated force control and integrated AI vision, the nationally certified waterproof and explosion-proof Elfin-Ex series of collaborative robots, and the S series of collaborative robots suitable for large-load scenarios. Currently, Huayan Robotics boasts joint speeds reaching up to **370°/s**, repeatability up to **±0.015mm**, a maximum rated load of **60kg**, and a reach of up to **2200mm**, enabling it to efficiently meet the complex business needs of a wide range of customers. The company is also actively collaborating with numerous partners to form a healthy and sustainable ecosystem, facilitating the advancement of intelligent manufacturing.

"Huayan" signifies "standing at the forefront of the times, reaching the pinnacle of technology," reflecting Huayan Robotics's ambition to become a world-class robotics company and set a new benchmark for global intelligent manufacturing. To date, Huayan Robotics has successfully served over **40** industries, including 3C electronics, automotive manufacturing, semiconductors, new energy, metal processing, food, and new retail, and over **60** process scenarios, including loading and unloading, palletizing, welding, screw tightening, grinding, spray painting, and inspection. The company achieved industry-leading export volume by 2024.



VISION

To Be The Global Pioneer In The Era Of Intelligent Robots



MISSION

Robotics for Humanity



VALUE

Leadership, Service, Sincerity, Mutual Success

Global Layout

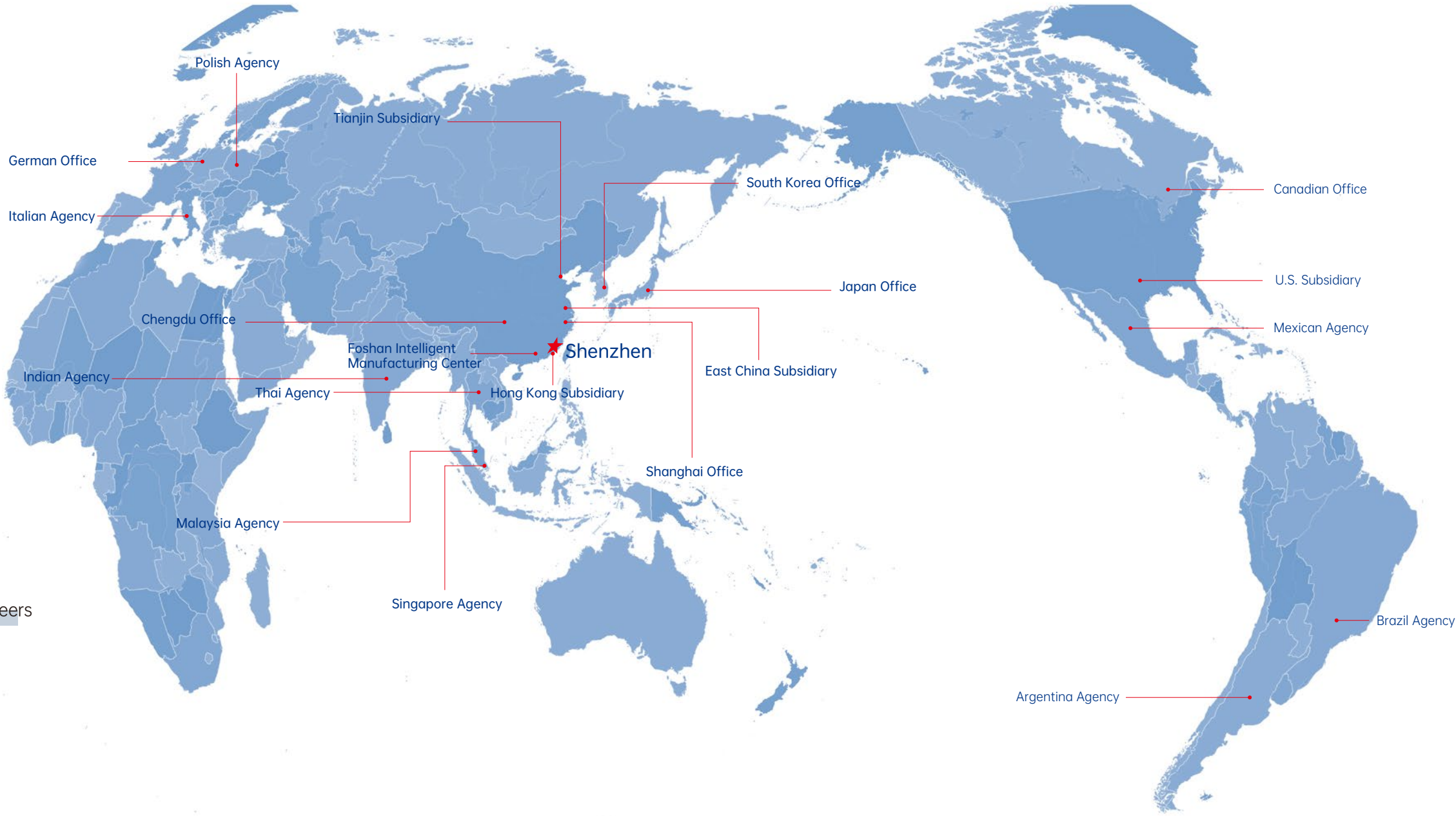
10+ Global Branches

Huayan Robotics is headquartered in Shenzhen, China, with its Global Smart Manufacturing Center located in Foshan City, Guangdong Province, China. The company has established branches in major markets worldwide, including China, the United States, Germany, and South Korea.

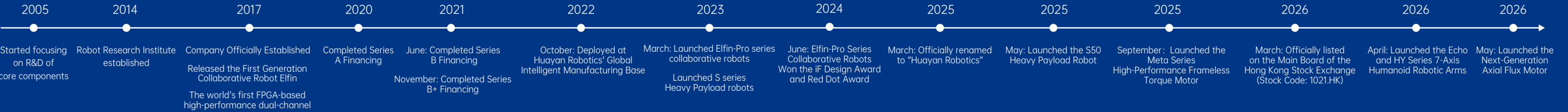
50+ Countries and Regions Customers

Huayan Robotics continues to focus on the iteration, development, and application of robotic technology. With outstanding product performance and high-quality, thoughtful service, it has won customers from over 50 countries and regions, including China, South Korea, Japan, Singapore, Malaysia, Australia, New Zealand, the United States, Canada, Mexico, Brazil, Colombia, Argentina, the United Kingdom, France, Spain, the Netherlands, and Italy.

700+ Team Members 300+ Professional Engineers



Development History



The unique advantages of Huayan Robotics products

Huayan Robotics, based on strong independent research and development capabilities, continuously expands the breadth and depth of intelligent collaborative robot technology to serve humanity. Currently, Huayan Robotics has formed a product system based on the Elfin series of collaborative robots, including the Elfin-Pro series, which integrates end-effector force control and AI vision, the Elfin-Ex series, which has completed national explosion-proof certification, and the Heavy Payload S series, with a rated load covering 60KG, capable of covering different application scenarios and meeting various customer needs.

20 years of core technology accumulation

Motor

- Excellent magnetic circuit and winding design for industry-leading torque density
- In-house electromagnetic/process design and manufacturing to meet customization needs
- 20% performance margin for robotic arms, enabled by higher power density
- Advanced thermal management design with minimal loss

Innovative dual-joint module

- Integrated design, highly integrated
- One motion module contains two joints, providing the robotic arm with more flexible movement
- National invention patent
- 1 drag 2 drive control, more cost-effective

Servo Drive

- Compact Size, High Power, High Efficiency
- High Response Frequency
- Vibration Suppression and Various Compensation Algorithms
- Multi-layer Safety Control

HRC Robot Control System

- Self-developed controller platform with a fully proprietary bus protocol stack
- Open plug-in platform supporting user-defined extensions
- EtherCAT Communication Protocol with 4 kHz Control Frequency
- High-Speed Controller Interface with up to 2 kHz Control Frequency
- Open SDK and Web-Based Frontend
- Visual Programming and Scripting with a Real-Time Script System

Algorithm Advantage

PreciseMove

Achieves precise control of the robot's end position, with an absolute positioning accuracy of $\pm 0.3\text{mm}$.

SafeMove

Utilizes a dual-channel redundant safety controller solution, ensuring safe interaction between the robot and the surrounding environment through real-time collision detection and protection algorithms.

AdaptMove

Force control accuracy reaches within $\pm 1\text{N}$, lowering the teaching threshold and enhancing the flexibility of robot teaching operations in general scenarios.

ToptMove

Achieve precise speed and rhythm control, significantly improving the operational efficiency of robots, meeting the demands for fast, accurate, and efficient industrial applications.

SyncMove

Supports multi-channel and multi-robot synchronous motion planning, effectively solving issues such as poor coordination and low synchronization accuracy among multiple axes and robots during collaboration.

Qualification Advantages



RoHS



SGS



Huayan Robotics products have passed:

Global Market Access:

· CE-EMC · CE-MD · CE-RoHS · CR · KCs · FCC · NRTL · EAC

Industry Certification:

· SEMI S2 · ISO 13849-1 · ISO/TS 15066 · IEC 60601-1 · IPX6 · ISO Class 5
· MTBF 50,000 hours · NEPSI

Structural design advantages

Thermal Management Efficiency

Based on the independently developed thermal management system, it ensures that the robotic arm operates at suitable temperatures under high intensity, high rhythm, and heavy load conditions, enhancing the overall machine efficiency.

Rigid

The structure of the robotic arm is designed using finite element software for mechanical optimization and modal analysis, ensuring high stability and precision during full load and full speed operations.

Obtained international gold award certifications such as IF and Red Dot.



Service Advantages

Process Package

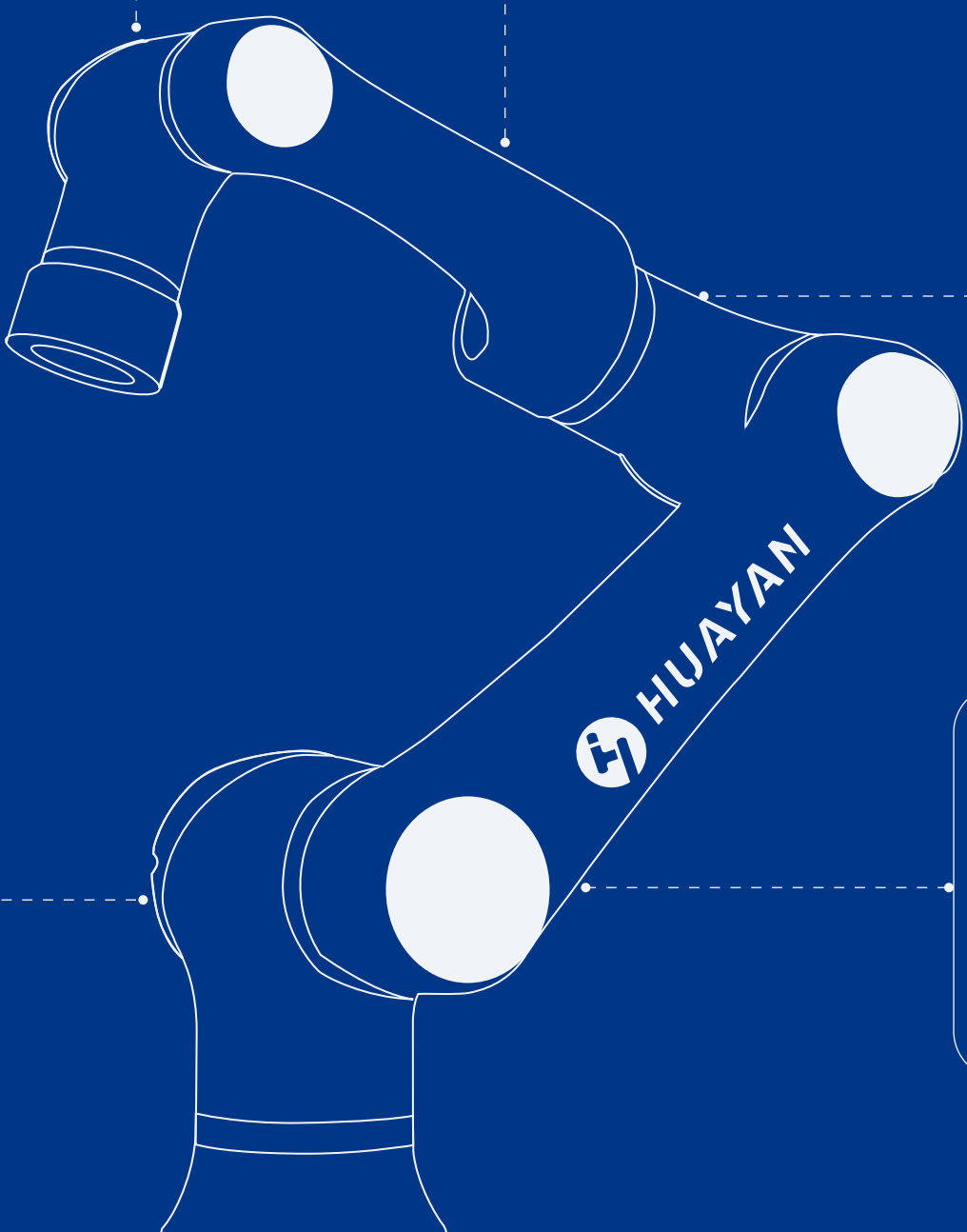
No programming visual operation
Self-developed software process package for high-frequency application scenarios such as stacking and welding, simpler and easier to use

Open Platform

Provides rich software interfaces
Comprehensively supports the ROS system
Meets user integration and development needs

Wide Service Coverage, Fast Response

Branches or offices are located in Tianjin, Wuxi, Shanghai, Chengdu, and other places, with branches in the United States, Germany, Japan, and other countries



Huayan Robotics adheres to the ecosystem concept of "friends all over the world," creating a more complete and open collaborative ecosystem. In product design, it reserves rich I/O and communication interfaces. Through these interfaces, the application range of robots is greatly expanded, supporting the direct use of most accessories in the industrial ecosystem, such as end effectors, vision systems, sensors, etc., meeting the needs of various scenarios such as loading and unloading, assembly, inspection, handling, screw tightening, polishing, and spraying.

Force Sensor >>>

	Link-touch		SRI		Onrobot
	ATI		Robotiq		Hypersen
	KUNWEI		HYchuangan		Xinjingcheng

Mobile Platform System >>>

	Link-touch		Junion		Jazda
	MiR		SEER Robotics		

Grinding and Polishing System >>>

	Saiwider		Ferrobotics		Great Confucian Scholar
	In-Link				

Cameras >>>

	Micromatch		Basler		Cosmosvision
	Mech-Mind		Cognex		Seizet
	Keyence		SHINING 3D		Aimooe
	SOLOMON		Percipio		Welinkirt
	Scape Technology		Vzense Technology		DexForce
	Artificial Intelligence		Full-V Technology		

Grippers >>>

	Robotiq		SMC		RobustMotion
	Onrobot		Schunk		HIWIN
	DH-robotics		SRT		Changing Tek
	Jodell Robotics		Inspire-Robots		E&T Machinery
	Rochu Robotics		Gimatic		zimmer
	Schmalz				

Quick Change System >>>

	Auto		Pilot		Schunk Precision
	Qiaotian		Smartshift robotics		Gimatic

Software system >>>

	Gallop		Rockwell		SIEMENS
	OrBit Systems Inc		Shufu Software		DigiwinSoft

Attachments and Others >>>

	Tutai		Shidian Technology		Anybus
	Yitong Chuanglian		Ewellix		Fuyujin
	Kinco		OMRON		AMSAMOTION
	Siron		SmartLink		Moxa
	Vichnet		Ecoguard		backyard

"POSS" Concept

More reliable bodies,
smarter brains

Huayan Robotics believes that a good collaborative robot can be summarized as **POSS**. We focus on the research and application of cutting-edge robotic technology, developing robots with more reliable bodies and smarter brains.



PRODUCT DETAILS OF HUAYAN ROBOTICS



Embodied Intelligence Products

7-Axis Humanoid Robotic Arm (Echo Series) Coplanar Cross-Axis	7-Axis Humanoid Robotic Arm (HY Series) Spatial Cross-Axis	Elfin Collaborative Robots Higher Cost Performance	Elfin-Pro Collaborative Robots Integrated End Force Control Integrated AI Vision	S Heavy Payload Robots Heavier Load, Longer Reach	Elfin-Ex & Smart-Ex Explosion-proof Collaborative Robots National Explosion-Proof Certification
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Collaborative Robots

Core Components

Motors Highly Customizable Solutions	Joint Modules Patented Dual-Joint Module Design	Servo Drives High Power Density High Performance, and Intelligent Control	Humanoid Joint Modules High Power Density Lightweight Design, and High Reliability
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⚡ Huayan Embodied Intelligence New Product Launch
Ultimate Performance, Comparable to the Human Arm

Huayan Robotics

7-Axis Humanoid Robotic Arm

Echo Series

HY Series

Overview >>>

Backed by over 20 years of expertise in core technologies such as high-performance motors, joint modules, and servo drives, as well as comprehensive capabilities in the high-end collaborative robotics sector, Huayan Robotics has launched a new generation of 7-axis humanoid robotic arms with performance comparable to the human arm. As one of the core execution components for embodied intelligence, Huayan's 7-axis humanoid robotic arms are currently available in two series — Echo and HY — with six models covering payloads from 3 kg to 15 kg, providing highly efficient integration solutions for quadruped, humanoid, and other embodied robotic platforms.



Full-Joint Force Control



Intelligent



Lightweight Design



Large Hollow Design



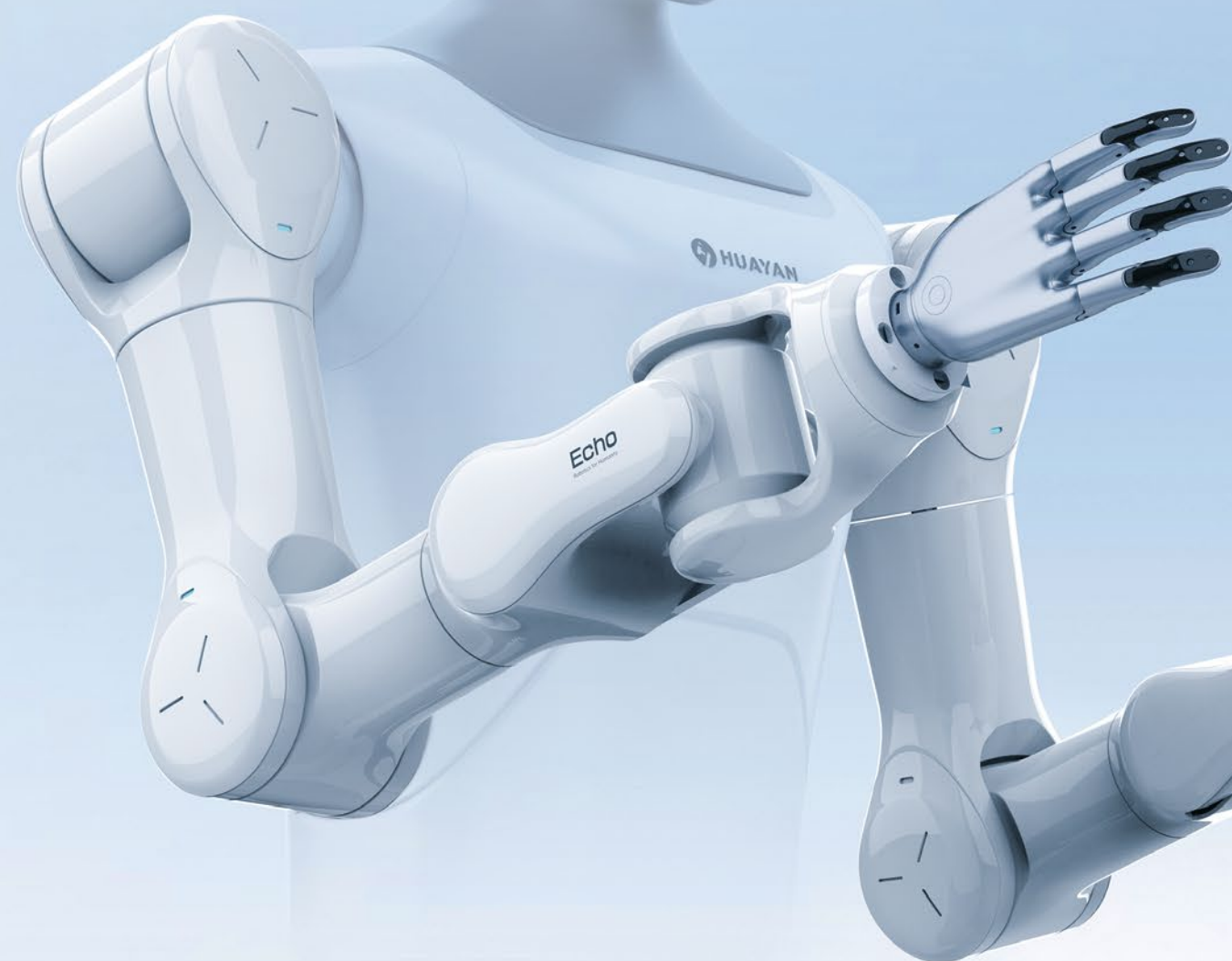
Two Wrist Configurations



Open Ecosystem



Low Noise Performance



HY 3
625mm
3.5KG



HY 7
670mm
7KG



HY 15
850mm
15KG



Echo 3
555mm
3KG



Echo 5
605mm
5KG



Echo 15
850mm
15KG



High-Precision Force Control Across All Joints

Huayan Robotics' self-developed integrated force-control joints and force-control algorithms enable the 7-axis humanoid robotic arm to achieve human-like force perception and interaction capabilities. It can detect extremely subtle external forces — as light as two falling sheets of A4 paper — and deliver compliant responses within milliseconds.

Force Control Performance	Value	Description
Torque Resolution	0.02Nm	Ultra-sensitive sensing
Force Control Bandwidth	>100 Hz	Millisecond-level response
Full-Joint Force Control	0.1 N	End-effector contact force control



Ultra-Lightweight, Built to Perform

The Entire Arm Features a High-Rigidity Aluminum Alloy Hybrid Structure Powered by Self-Developed High Torque Density Motors

Arm weight $\leq 12\text{KG}$

Achieves Extreme Lightweight Design with Greater Power Output in a More Compact Form Ensures Stable Operation on Quadruped, Humanoid, and Other Embodied Robotics Platforms



Echo Series

Coplanar Cross-Axis Configuration

Featuring a 7-degree-of-freedom design with a coplanar crossed-axis configuration, the robotic arm delivers human-like flexibility, enabling smooth obstacle avoidance in confined spaces and excellent performance in precise and complex tasks.



HY Series

Spatial Cross-Axis Configuration

The non-coplanar crossed-axis configuration provides a larger workspace, fewer singularities, and higher structural rigidity.



More Than a Tool — An Intelligent Partner

Integrated Local AI Server
Native ROS 2 Support with Edge Decision-Making Capabilities
Autonomously Detects Deviations, Identifies Abnormalities, and Adjusts Trajectories in Real Time



A Breakthrough in End-Effector Cable Routing Large Hollow Design

Minimum internal routing diameter of **15 mm** — supports simultaneous routing of Gigabit Ethernet/GMSL cables, power cables, and signal cables

This improves wiring integration and transmission stability, while enabling plug-and-play connectivity and fast replacement of end effectors such as dexterous hands and vision modules.



Fully Open Ecosystem for Embodied Intelligence



Faster Integration

Compatible with Various Software, Hardware Systems, and Upstream/Downstream Platforms via SDK, ROS 2, Open Protocols, and Data Acquisition Interfaces



Comprehensive Solutions

20+ Ready-to-Use Applications (Screwdriving, Handling, Vision Poistioning, and More)



Lower Latency

EtherCAT Communication with Ultra-Low Latency (Control Cycle as Low as 1 ms) and High Throughput

7-Axis Humanoid Robotic Arm Parameters ⚡

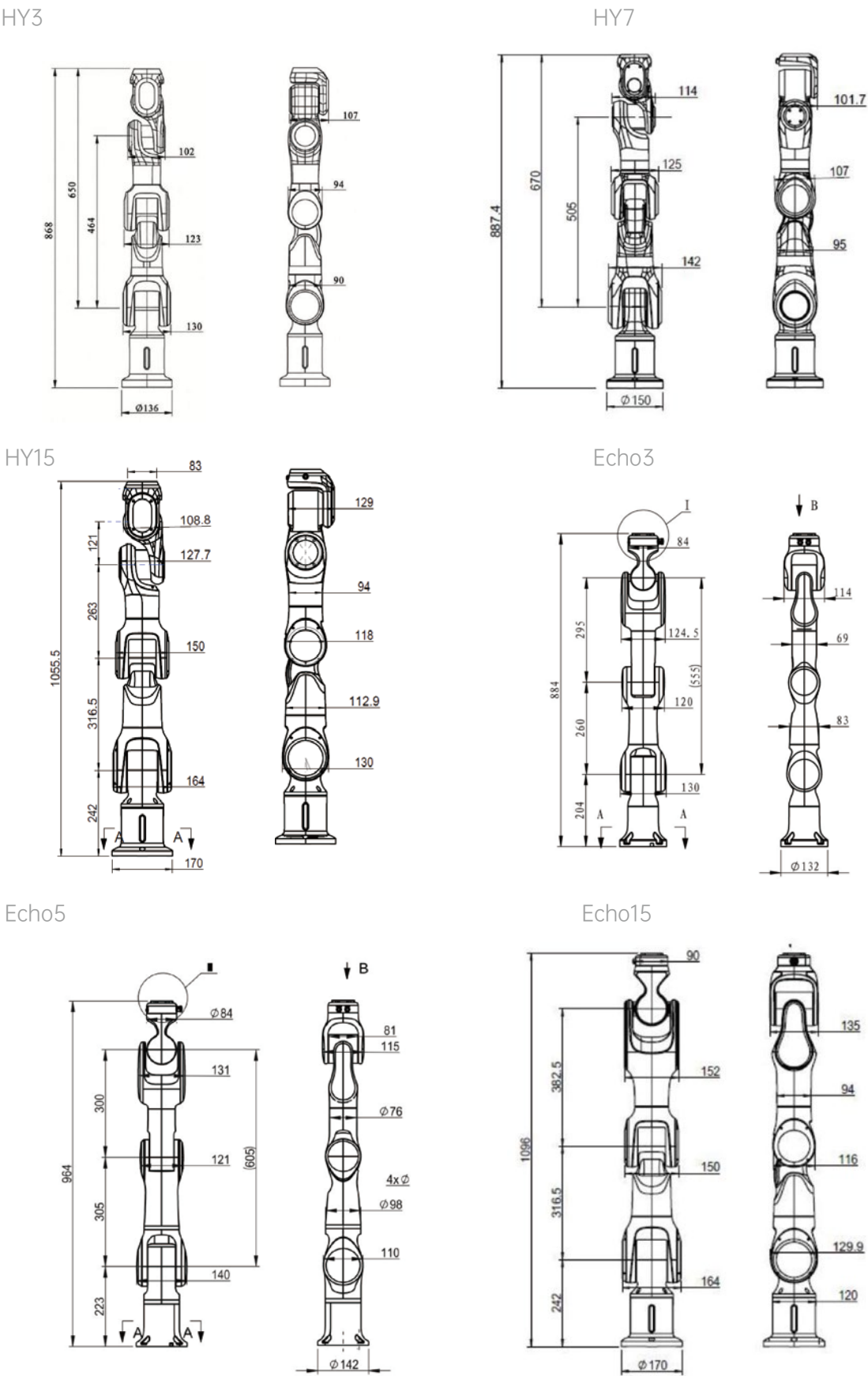
Model	HY 3	HY 7	HY 15	Echo 3	Echo 5	Echo 15
Degree of Freedom	7	7	7	7	7	7
Rated Payload	3.5KG	7KG	15KG	3KG	5KG	15KG
Repeatability	±0.02mm	±0.03mm	±0.05mm	±0.02mm	±0.03mm	±0.05mm
Arm Configuration	Spatial Cross-Axis			Coplanar Cross-Axis		
Weight	<8KG	<12KG	<22KG	<8KG	<12KG	<22KG
Arm Reach	625 mm	670 mm	850 mm	555 mm	605 mm	850 mm
Max TCP Speed	≥2m/s	≥2m/s	≥2m/s	≥2m/s	≥2m/s	≥2m/s
Joint Range	Axis 1	±360°	±360°	±360°	±360°	±360°
	Axis 2	±90°	±90°	±90°	±120°	±120°
	Axis 3	±3600°	±360°	±360°	±360°	±360°
	Axis 4	-110°-+45°	-110°-+45°	-110°-+45°	-90°-+135°	-90°-+135°
	Axis 5	±360°	±360°	±360°	±360°	±360°
	Axis 6	±90°	±90°	±60°	±60°	±60°
	Axis 7	±90°	±90°	±90°	±90°	±90°
End-Effector Camera (Optional)		Internal Cable Routing, No Exposed Wiring				
End-Effector Interface		Supports RS485、EtherCAT				
Communication		EtherCAT				
Torque Sensor		Standard on All Joints				
Brake Control Method		Standard on All Joints				
Power Supply		48V DC(±15%)				
Noise Level		≤45 dB				
IP Rating		IP54				
Certifications		CECertified、ISO/TS15066, 13849-1PLd(Cat.3), ENISO12100:2010				



Humanoid Robot (7DOF) Controller

Model	C300 Control Box
Dimensions	152 × 112 × 69.5 mm

Drawing >>>



Elfin Collaborative Robots

Overview >>>

The Elfin series collaborative robots can be applied in fields such as automated integrated production lines, assembly, picking, welding, grinding, and painting, and have successfully been exported to over 50 countries and regions, including Europe, America, Asia, Oceania, and Africa. The Elfin series collaborative robots feature a unique dual-joint module design, where one motion module contains two joints, forming a distinctive kinematic structure. This not only differentiates them from most collaborative robots on the market in appearance but also allows for greater flexibility during operation.

Why Elfin >>>

1. High Speed:

Joint maximum speed increase **1.5** times
Maximum joint speed can reach **370°/s**

2. High Precision:

Maximum repeat positioning accuracy: **±0.015mm**
Maximum absolute positioning accuracy: **±0.15mm**
Maximum trajectory accuracy: **±0.2mm**

3. Low Jitter:

Industry-leading jitter suppression solution,
slow jitter **≤ ±0.3mm**

4. Optimized Singularities:

Unique robotic arm design effectively reduces singularities during robot movement

Joint Movement:



Industry

3C

Automobile

Metal Processing

New Energy

Education and Research

Application

Loading and Unloading

Assembly

Welding

Palletizing

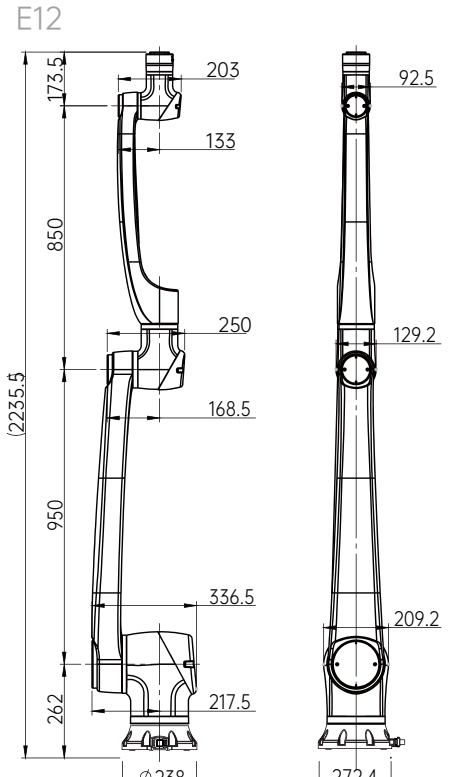
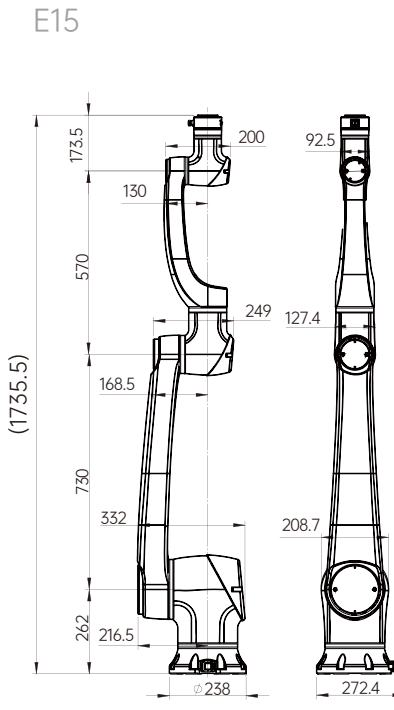
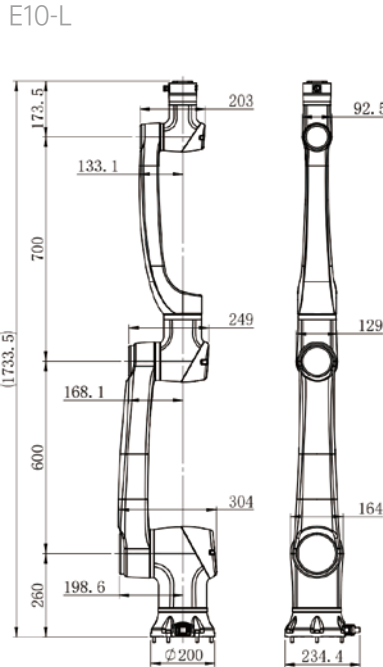
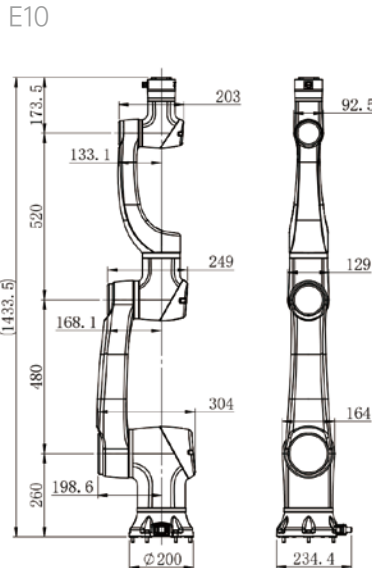
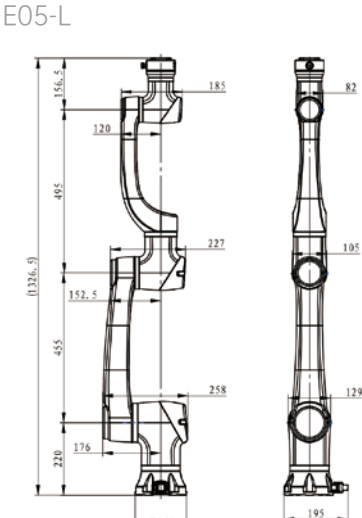
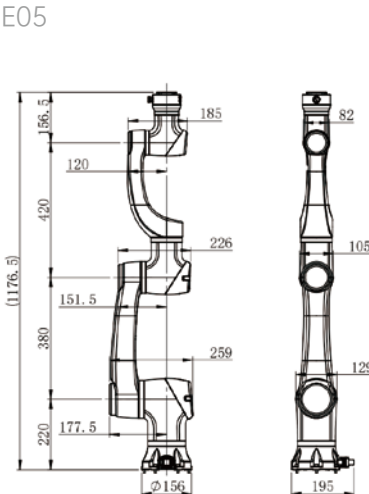
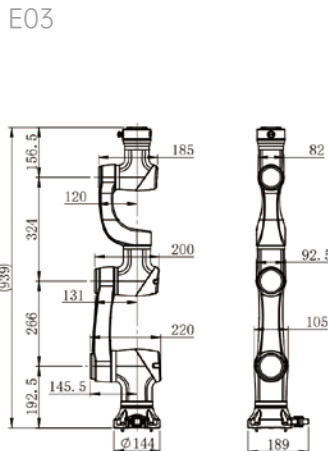
Dispensing and Coating

Detection

Elfin Series Parameters

Model	E03	E05	E05-L	E10	E10-L	E12	E15
Weight	18kg	25kg	26kg	43kg	45kg	70kg	60kg
Payload	4kg	7kg	5kg	12kg	10kg	12kg	18kg
Reach	590mm	800mm	950mm	1000mm	1300mm	1800mm	1300mm
Power Consumption	100W Typical Application	180W Typical Application	180W Typical Application	350W Typical Application	350W Typical Application	600W Typical Application	600W Typical Application
Joint Range	J1、J4、J6: ±360°	J1、J4、J6: ±360°	J1、J4、J6: ±360°	J1、J4、J6: ±360°	J1、J4、J6: ±360°	J1、J4、J6: ±360°	J1、J4、J6: ±360°
	J2: ±135°	J2: ±135°	J2: ±135°	J2: ±135°	J2: ±135°	J2: ±135°	J2: ±135°
	J3: ±150°	J3: ±153°	J3: ±153°	J3: ±153°	J3: ±153°	J3: ±155°	J3: ±153°
	J5: ±147°	J5: ±180°	J5: ±180°	J5: ±180°	J5: ±180°	J5: ±180°	J5: ±180°
Joint Speed	J1-J4: 180°/s	J1-J4: 180°/s	J1-J4: 180°/s	J1-J2: 100°/s	J1-J2: 100°/s	J1-J2: 80°/s	J1-J2: 80°/s
	J5-J6: 200°/s	J5-J6: 200°/s	J5-J6: 200°/s	J3-J4: 150°/s J5-J6: 180°/s	J3-J4: 150°/s J5-J6: 180°/s	J3-J4: 120°/s J5-J6: 150°/s	J3-J4: 120°/s J5-J6: 150°/s
Tool Speed (Effective payload status)	2m/s	3m/s	3m/s	2m/s	2.5m/s	2.5m/s	2m/s
Repeatability (Effective payload, rated speed status)	±0.02mm	±0.02mm	±0.02mm	±0.03mm	±0.03mm	±0.05mm	±0.05mm
Degree of Freedom	6						
End I/O port	Digital input: 3, digital output: 3, analog input: 2						
Control box I/O port	Digital input: 16, digital output: 16, analog input: 2, analog output: 2						
I/O Source	24V 2A						
Communication	TCP/IP, ModbusTCP, Profinet (optional), Ethernet/IP (optional)						
Programming	Graphical programming, remote call interface						
IP Classification	IP54/IP66 (optional)						
Collaborative	10 advanced security configuration functions						
Main material	Aluminum alloy						
Working Temperature	0-50℃						
Power input	200-240V AC (optional 100-240V AC), 50-60Hz						

Drawing >>>



Configuration Instructions	Robot	Control Box	Teach Pendant	Cable	Applications
Standard		Standard Control Box	Standard teach pendant (Resolution 1920×1200, screen size 11 inches)	5m	/
Mini Control Box		Mini Control Box Power Supply(Optional)	Tablet teach pendant (optional)	5m	Applied for automation equipment, AGV, mobile robots, etc.



Standard Control Box		Mini Control Box (optional)		Teach Pendant	
Compatible Models	E03,E05,E05-L,E10,E10-L (1KW) / E12,E15(2KW)	Dimensions (L*W*H)	348×221.5×76.5(mm)	Dimensions (L*W*H)	290x234x108(mm)
Dimensions (L*W*H)	445.2mm x 237mm x (330+90)mm	Input power supply	DC30~60V	Weight	2.5kg
Bracket Height	90mm	Electrical Control Cabinet I/O Power Supply	DC24V	Screen Size	11”
Weight	18KG (1KW) /18KG (2KW)	Electrical Control Cabinet I/O Ports	8 Channels Input 8 Channels Output	Resolution	1920x1200
Output Power Supply	48V DC	IP Classification	IP20	E-Stop Button	1
Working Environment	Temperature: 0~50℃ Humidity: 90% relative humidity (non-condensing)	Standard Communication Configuration	TCP/IP communication interface		
IP Classification	IP20				

E10

High degree of automation 1 operator can manage more than ten robots, improving efficiency.



E15

More efficient Robots operate more precisely, helping to improve overall efficiency at this station by 60%.



E10

Labor-saving 1 person can oversee multiple devices, only needing to add materials regularly



E10

High Precision Scanning Easily achieve a scanning accuracy of 5 microns.



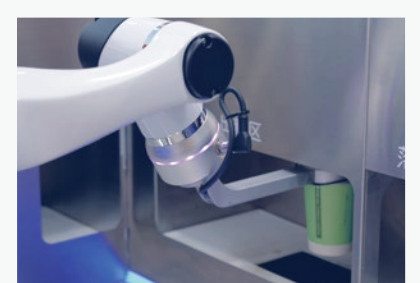
E15

Efficient and precise The robot's end is equipped with a vision system, allowing for fully autonomous operation.



E03

High return rate A single robot beverage station can produce over 300 cups of tea daily.



Elfin-Pro Collaborative Robots

Overview >>>

The Elfin-Pro series collaborative robots are developed based on the Elfin series, inheriting the advantages of a complete range of product models, convenient deployment, high precision, high flexibility, dual-joint module design, and modular design. At the same time, the product capabilities have been completely upgraded, integrating cutting-edge AI technology to achieve integrated end-effect or force control and integrated AI vision. With a new surface treatment process, it combines aesthetics and practicality, resulting in more stable and reliable performance, safer human-robot collaboration, and broader application scenarios.

Why Elfin-Pro >>>

1. Integrated End Force Control:

Accuracy reaches **2N, 0.1Nm**
Reaches industry-leading levels

2. Integrated AI Vision:

Visual positioning accuracy can reach up to **±0.1mm**
Supports **10+** visual positioning modes
Only **10** images are needed to complete rapid AI learning for specific scenarios
Supports automatic focusing and multiple light sources

3. Self-developed Software and Hardware Platform:

Easy to operate, quick programming, strong interactivity, and high scalability

4. Force Control Exploration, Intelligent Assembly

Empowers flexible production of small batches and multiple varieties

5. Higher protection, wider application:

Achieves IP66 protection level, suitable for more production environments

Joint Movement:



E03-Pro
590mm
4KG

E05-Pro
800mm
7KG

E05L-Pro
950mm
5KG

E10-Pro
1000mm
12KG

E10L-Pro
1300mm
10KG

E12-Pro
1800mm
12KG

E15-Pro
1300mm
18KG

Industry

Automobile

Consumption

New Energy

Medical Experiment

Physical Therapy

Precision Machining

Application

Welding

Massage

Polishing

Grinding

Assembly

Screen Testing

Elfin-Pro Series Parameters ⚡

Model	E03-Pro	E05-Pro	E05L-Pro	E10-Pro	E10L-Pro	E12-Pro	E15-Pro
Weight	18kg	25kg	26kg	43kg	45kg	70kg	60kg
Payload	4kg	7kg	5kg	12kg	10kg	12kg	18kg
Reach	590mm	800mm	950mm	1000mm	1300mm	1800mm	1300mm
Power Consumption	100W Typical Application	180W Typical Application	180W Typical Application	350W Typical Application	350W Typical Application	600W Typical Application	600W Typical Application
Joint Range	J1、J4、J6: ±360° J2: ±135° J3: ±150° J5: ±147°	J1、J4、J6: ±360° J2: ±135° J3: ±153° J5: ±180°	J1、J4、J6: ±360° J2: ±135° J3: ±153° J5: ±180°	J1、J4、J6: ±360° J2: ±135° J3: ±153° J5: ±180°	J1、J4、J6: ±360° J2: ±135° J3: ±153° J5: ±180°	J1、J4、J6: ±360° J2: ±135° J3: ±155° J5: ±180°	J1、J4、J6: ±360° J2: ±135° J3: ±153° J5: ±180°
Joint Speed	J1-J4: 180°/S J5-J6: 200°/S	J1-J4: 180°/S J5-J6: 200°/S	J1-J4: 180°/S J5-J6: 200°/S	J1-J2: 100°/S J3-J4: 150°/S J5-J6: 180°/S	J1-J2: 100°/S J3-J4: 150°/S J5-J6: 180°/S	J1-J2: 80°/S J3-J4: 120°/S J5-J6: 150°/S	J1-J2: 80°/S J3-J4: 120°/S J5-J6: 150°/S
Tool Speed (Effective payload status)	2m/s	3m/s	3m/s	2m/s	2.5m/s	2.5m/s	2m/s
Repeatability (Effective payload, rated speed status)	±0.02mm	±0.02mm	±0.02mm	±0.03mm	±0.03mm	±0.05mm	±0.05mm
Degree of Freedom	6						
End I/O port	Digital input: 3, digital output: 3, analog input: 2						
Control box I/O port	Digital input: 16, digital output: 16, analog input: 2, analog output: 2						
I/O Source	24V 2A						
Communication	TCP/IP , ModbusTCP , Profinet (Optional) , Ethernet/IP (Optional)						
Programming	Graphical programming, remote call interface						
Collaborative	10 advanced security configuration functions						
Main material	Aluminum alloy						
Working Temperature	0-50°C						
Power input	100-240V AC, 50-60Hz						
Cable	Cable to control box: 5m, cable to teach pendant: 5m						

Force Control Parameters (Optional)		Visual Parameters (Optional)	
	Payload >10KG	Payload ≤10KG	Focus height 100mm~500mm
Range	Fx=Fy=500N,Fz=900N, Mx=My=Mz=48Nm	Fx=Fy=Fz=200N, Mx=My=Mz=10Nm	Application accuracy ±0.2mm
Accuracy	Fx=Fy=±3N, Fz=±4.5N, Mx=My=Mz=±0.24Nm	Fx=Fy=Fz=±3N, Mx=My=Mz=±0.10Nm	Hardware size 93.78mm x 54.45mm x146.24mm
Precision	Fx=Fy=±1.5N, Fz=±2.25N, Mx=My=Mz=±0.12Nm	Fx=Fy=Fz=±1N, Mx=My=Mz=±0.05Nm	Camera pixel 6 million pixels



Standard Control Box	
Compatible Models	E03-Pro,E05-Pro,E05L-Pro,E10-Pro,E10L-Pro(1KW) E12-Pro,E15-Pro (2KW)
Dimensions (L*W*H)	445.2mm x 237mm x (330+90)mm
Stand Height	90mm
Weight	18KG (1KW) /18KG (2KW)
Power Output	48V DC
Working Temperature	0~50°C
Working Humidity	90% Relative Humidity (non-condensing)
IP Classification	IP20
Communication frequency	1000Hz



Mini Control Box (Optional)	
Dimensions	348×221.5×76.5(mm)
Power Input	DC30~60V
I/O Source	DC24V
I/O Port	Inputs 8 , Outputs 8
IP Classification	IP20
Communication	TCP / IP Modbus



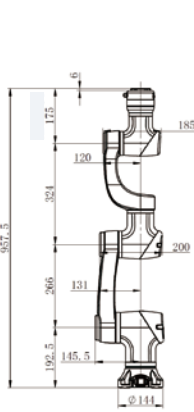
Teach Pendant	
Dimensions	290x234x108(mm)
Weight	2.5kg
Display	11"
Resolution	1920x1200
E-Stop Button	1

Configuration Details >>>

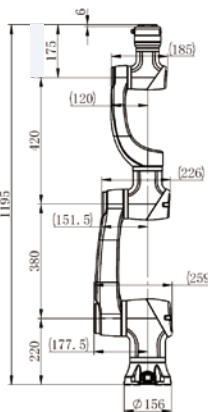
Configuration Instructions	Robot	Control Box	Teach Pendant	IP Classification
Integrated End Force Control		Standard control box	Standard teach pendant	IP54 or IP66
AI Vision integration		Standard control box External WIFI For Wireless Commissioning (Optional)	Standard teach pendant	IP54

Drawing (Force Control) >>>

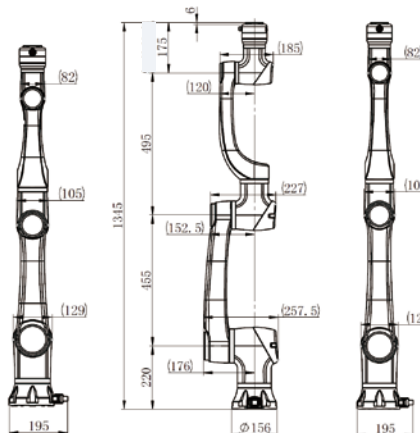
E03-Pro



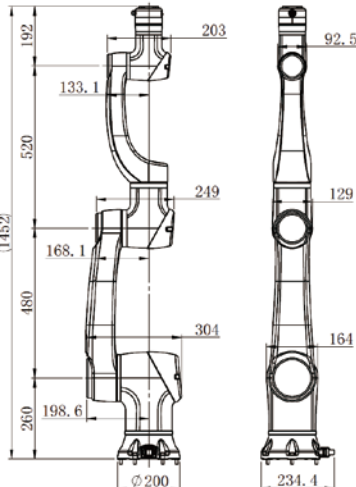
E05-Pro



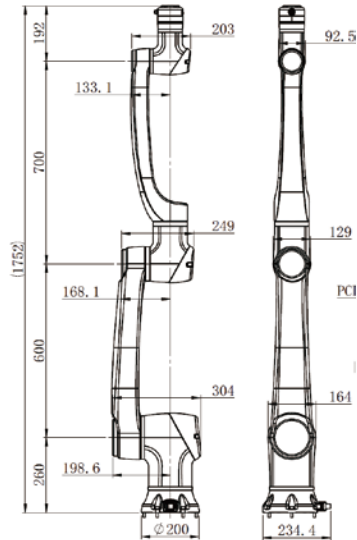
E05L-Pro



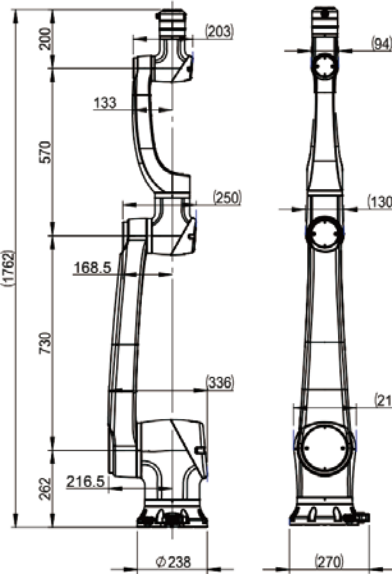
E10-Pro



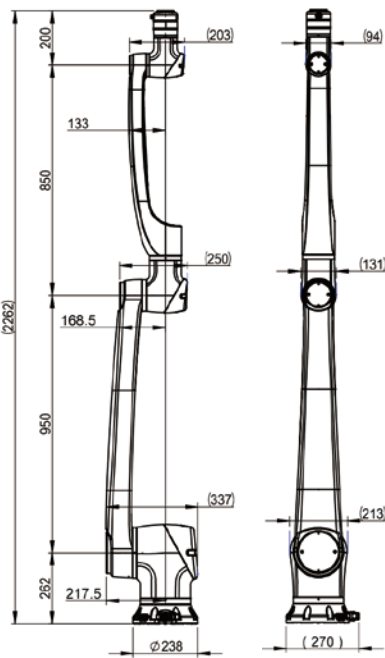
E10L-Pro



E15-Pro



E12-Pro



Elfin-Pro Collaborative Robots

Industry Applications

Automated Carbon Fiber Lamination Application

E10-Pro

In Romania, E10-Pro helps a company engaged in the production of carbon fiber products enhance its flexible production capacity. During the carbon fiber lamination process, it faces the challenge of diverse specifications, shapes, and materials of the workpieces to be processed. E10-Pro deeply integrates with 3D vision equipment and intelligent sensors, and after collecting information about the carbon fiber workpiece molds, it can quickly formulate the optimal working path and efficiently complete the carbon fiber lamination and molding operations.

- Flexible production** Enhances the flexible production capacity of small and medium-sized factories to meet the demand for diverse varieties and small batches of production.
- High-precision tactile feedback** Real-time detection of the contact force on the workpiece surface to ensure a smooth laminating process.

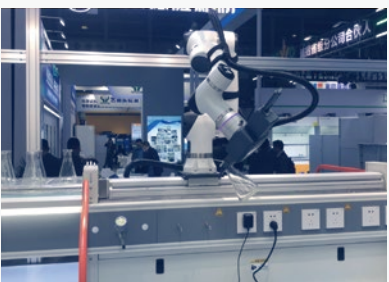


Education Industry Laboratory Construction

E05-Pro

High-end laboratories are an important application area for the Elfin-Pro series collaborative robots. The unmanned laboratory application solution based on the Huayan E05-Pro collaborative robot (linked to the seventh axis) allows the robotic arm to replace manual labor, automatically completing procedures such as liquid transfer, weighing, dripping, and testing, and performing outstandingly in automated experiments, precision operations, and high-throughput screening.

- Equipped with integrated AI vision capabilities, covering 80% of visual application scenarios**
- The cleanliness of the robotic arm reaches ISO 5, meeting the stringent requirements of laboratories**
- Based on high-performance vibration suppression algorithms, force control algorithms, and high-precision motion control algorithms, providing an extremely precise operating experience**



Metal Processing Industry Ship Welding

E03-Pro

In the shipbuilding industry, there is a relatively high demand for medium and thick plate welding, and customers specifically request that "the welding robot should be lightweight and able to adapt to the complex shipyard environment." The E03-Pro collaborative robot has a body weight of 18KG, allowing a single person to carry it to any location in the welding workshop; it is easy to operate and can quickly complete automated welding setup through drag teaching (with integrated end-effector force control capability) and graphical programming, ensuring welding quality.

- Lightweight and efficient** One ordinary welder can operate 4 welding robots simultaneously, and adults can easily lift them.
- Enhances competitiveness** Contributes to further improving the intelligence level of the welding workshop.



Health Industry Massage Therapy

E05-Pro

The application of collaborative robots in the massage therapy field is a new development in recent years. It can help high-end health and wellness institutions improve service quality and alleviate the pressure of labor shortages among therapists. Partners use Huayan robotics with end-effector massage tools to perform pressing, pushing, kneading, and other operations, programming a series of massage solutions into the robot system to create diverse massage packages for customers to choose from. This standardized massage robot equipment fills the gap in the current market for flexible massage devices.

- Simple operation** In the massage therapy industry, there are many female practitioners; Huayan robotics only require a drag force of less than 3N for smooth dragging; they can also replicate the massage techniques of therapists, ensuring consistent service.
- Safe collaboration** Huayan robots are equipped with over 10 advanced safety collaboration configurations, ensuring no threat to human safety in case of emergencies.
- Easy to integrate** Precise positioning, supports personalized customization, more considerate; standardized products, overall delivery is more reassuring.



Food Industry Laboratory Applications

E10-Pro (Vision Version)

The client is a leading global company in plant extracts, supplying raw materials to numerous beverage customers both domestically and internationally, with a leading market share. In its product research and development laboratory, basic tasks such as sampling, liquid transfer, and instrument operation are highly repetitive and time-consuming (accounting for over 70%), with an error rate of 5%-10%. Two E10-Pro (vision version) collaborative robots are deployed to interconnect and interact with other laboratory testing instruments, automatically completing operations such as opening lids, sampling, transporting, and dispensing liquids.

- Integrated AI Vision** The E10-Pro Vision version supports visual correction, can autonomously determine operation points, and is more efficient.
- ISO 5 Cleanliness** The cleanliness of the robotic arm reaches ISO 5, meeting the stringent requirements of laboratories.
- Simple and Flexible** Supports drag-and-drop teaching, graphical programming, and quick replacement of test samples.

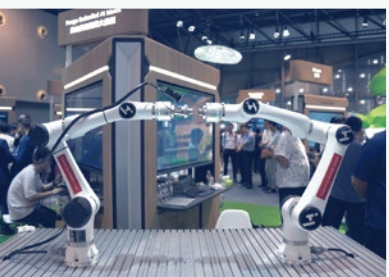


3C Industry Precision Component Assembly

E05-Pro

The dynamic insertion application of rigid components is an AI technology application instance jointly created by Huayan Robotics and Huawei Cloud, mainly used in the insertion and assembly scenarios of precision components in the 3C product line. Through the combination of edge and cloud intelligence, models such as force perception and vision collaborate in real-time, offering advantages of greater precision, intelligence, and efficiency compared to manual assembly.

- More precise** The dynamic insertion accuracy of rigid components reaches the hundred-micron level, with a success rate of 99.99%.
- More efficient** Compared to manual operations, automatic operations can be completed in an average of only 7-8 seconds.
- More intelligent** Collaborating with Huawei, deeply integrating with Huawei Cloud AI capabilities.



S Heavy Payload Robots

Overview >>>

The S series Heavy Payload robots feature heavy load capacity and long reach, capable of easily handling 60KG overloads with a working radius of 1700mm~2200mm. They can be widely used in applications such as loading and unloading machine tools, palletizing, assembly, and heavy material handling. Building on the technological advantages of the Elfin series, there has been a qualitative leap in product performance, safety protection, response speed, and anti-interference capability, making it a powerful tool for users to comprehensively enhance production efficiency.

Why S >>>

1. Heavy Load:
Maximum rated load **60KG**
Industry-leading level

2. Longer arm reach:
Maximum arm reach **2200mm**

3. High Repeatability:
Up to **±0.02mm**

4. Ultra-fast response:
End-effector EtherCAT bus communication
Compatible with high power supply and gigabit Ethernet
Achieving **1000Hz** real-time control refresh frequency

5. High-speed Palletizing:
In high-speed mode
Palletizing speed can reach up to **13cycles/minute**
Palletizing time for the same task can be reduced by **38%**

6. High Configuration Optional:
1.Electronic Skin
2.Integrated visual integration, capable of transmitting video over a gigabit
3.Integrated end-effector force control, accuracy **$F_x=F_y=1.5N$, $F_z=2.25N$, $M_x=M_y=M_z=0.12Nm$**

7. 48V low voltage power supply

8. Self-developed high-power frameless torque motor

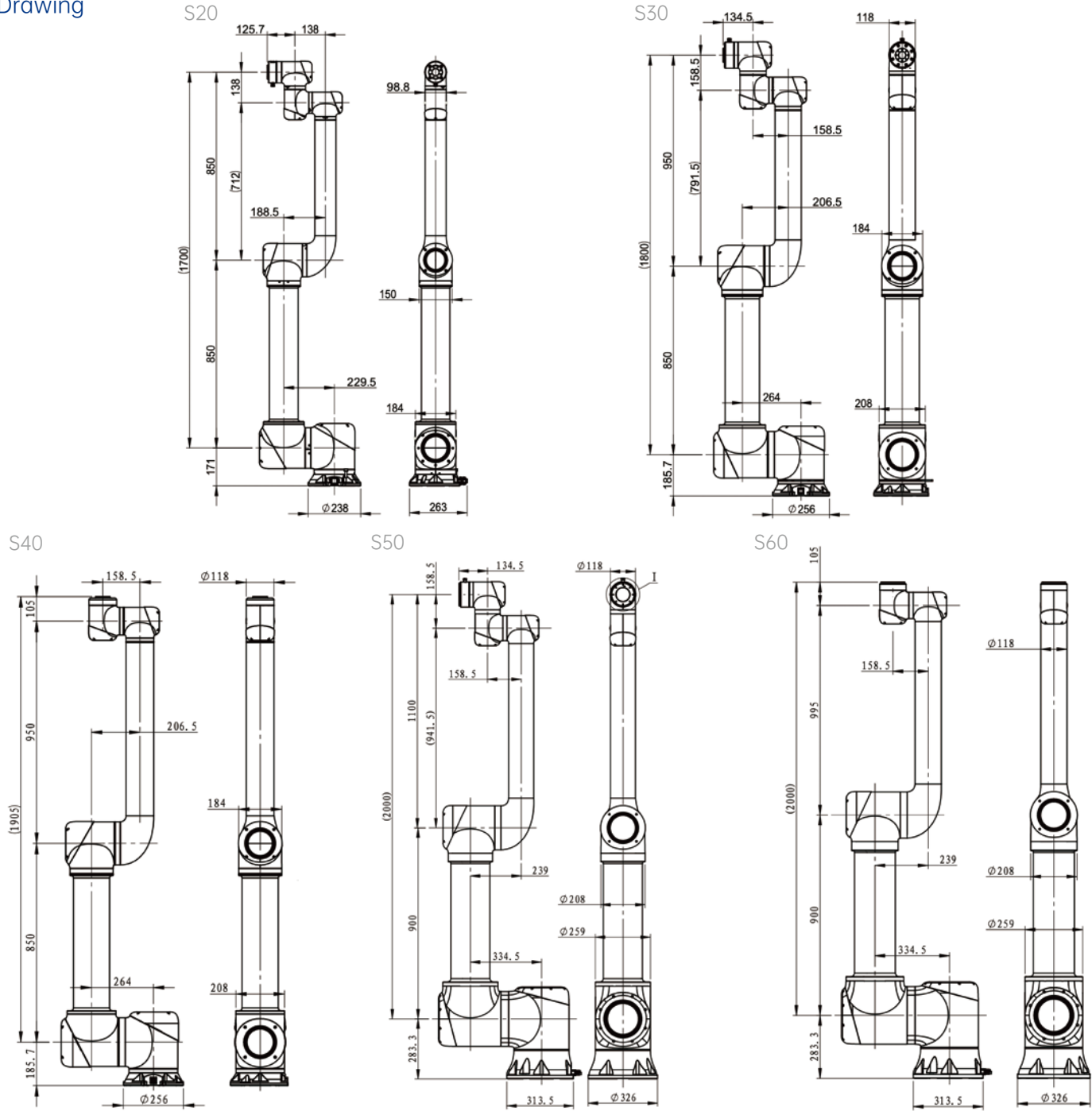




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Configuration Instructions	Robot	Control Box	Teach Pendant	Cable	Applications
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Huayan Robotics

S Heavy Payload Robots

Industry Applications

Logistics industry Cage stacking

S30

The customer is one of the absolute giants in the domestic logistics field, with a significant demand for stacking and unstacking at their logistics storage points. The domestic logistics industry is developing rapidly, and manual operations are increasingly unsustainable. Therefore, the customer introduced a one-stop stacking workstation created by Huayan Robotics and its partners for cage stacking operations. It is based on a high-load robot with a rated load of 30KG and equipped with a vision system, capable of meeting most logistics package (carton) needs, and has received positive feedback from customers for its flexibility and automation.

Smarter Huayan Robotics uses a dual-camera solution to accurately identify the size, specifications, location and other information of incoming materials, making grasping and stacking more accurate without manual intervention.

More flexible Supports more than 10 different specifications of materials, with a stacking volume rate of over 65% for cage trolleys with a height greater than 2 meters.

More efficient Compared to a 5% cargo loss rate for manual stacking, the cargo loss rate for Huayan robotics is only 1/10000, helping enterprises improve quality and efficiency.



Modern Agriculture Robot Automatic Palletizing

S20

The client is located in the three northeastern provinces, one of China's important grain-producing areas, with a high level of agricultural modernization. The client has deployed Huayan S series robots in their greenhouse, which efficiently interact with track carts to automatically complete operations such as seedling tray lifting, stacking, and arranging, further achieving cost reduction and efficiency enhancement.

Precise and Efficient Operation Utilizes high-precision motion control to quickly and accurately complete transplanting and stacking, significantly improving operational efficiency.

Stable, Durable, and Reliable Adapts to greenhouse temperature and humidity environments, running continuously without failure for long periods, ensuring production rhythm.

Intelligent Flexible Adaptation Adjusts operation trajectories flexibly through visual recognition and algorithms, easily handling various seedling tray specifications.



Food industry Stacking applications

S30

The zero auxiliary food products produced by the customer have a packaged weight of about 10KG per box. To save on hardware costs, during the actual stacking operation, one set of Huayan stacking workstation is used to handle 2 production lines simultaneously, stacking for 2 pallets, achieving a stacking height requirement of 2.2 meters, effectively doubling efficiency.

Appropriate rhythm Supports automatic switching between single and double suction modes, with a stacking rhythm of 16-20 boxes per minute.

Special stacking types Based on the stacking process package, can quickly customize different complex stacking types for single and double layers.

Flexible production Meets the stacking needs of the vast majority of customer production lines, basically achieving "no-sense" production change, with high flexibility.



Daily chemical industry Packaging product offline stacking

S30

A certain chemical company's production line has introduced the Huayan S30 collaborative robot, achieving efficient automated stacking operations. This robot features high flexibility, capable of adapting to various bottle and box stacking requirements, with a maximum stacking height of 2.2 meters, effectively improving warehouse space utilization. Its operation is smooth and positioning is precise, significantly reducing manual labor intensity, ensuring production rhythm and stack stability, and providing reliable support for the company's continuous cost reduction and efficiency enhancement.

Fast speed The rated load supports 30KG and can stack at a maximum speed of 13 cycles per minute, supporting 24-hour operation.

Compact footprint The deployment area for a single machine only requires 1㎡, safe collaboration without the need for guardrails.

Simple operation Based on the stacking process package, input parameters to complete the custom stacking type.



Metal processing Mobile grinding robot

S20

The Huayan S series robots assist partners in creating an intelligent mobile grinding robot workstation, capable of performing grinding, polishing, and deburring tasks in scenarios involving large steel structures, vehicle maintenance and decoration, and offshore vessels. The maximum arm reach of the Huayan S series reaches 1700mm, and when combined with a mobile cart, it offers a larger working range, better adapting to complex production workshop environments.

Multipurpose In addition to grinding, it can also handle drilling operations for structural component frames and sealing plates, as well as aluminum welding tasks.

Simple structure The overall structure is compact and aesthetically pleasing, with a moderate proportion, small size, moderate weight, and easy and quick mobility.

Cost-saving Simple operation, versatile functions, wide application, and short payback period.



Food and beverage sector Packaging stacking applications

S20

The client is a globally renowned food and beverage manufacturing enterprise, with numerous factories worldwide, a large shipment volume, and a complex product range. As labor costs rise, labor-intensive assembly lines are gradually losing their value. On one of the client's production lines, the Huayan S series heavy-load robots equipped with a vision system replace manual labor, efficiently completing tasks such as loading packaging materials and removing straps, resulting in a smooth operation process.

1.High return, low investment: 1 machine replaces 3+ workers, low maintenance cost, no repairs for 2 consecutive years.

2.Standardized products support large-scale replication, promoted in over 600 customer factories.

3.Easy to use, supports 24-hour continuous operation, meets the high-load production needs of factories.



Elfin-Ex & Smart-Ex Explosion-proof Collaborative Robots

Overview

The explosion-proof collaborative robots launched by Huayan has been certified by the National Instrumentation Explosion-Proof Safety Supervision and Inspection Station, and can replace workers to operate normally in explosive hazardous environments, significantly reducing operational risks.

This series of products adopts a medium-isolated ignition source leakage compensation type positive pressure explosion-proof system, with a multi-seal structure design for the housing, achieving a composite explosion-proof structure such as intrinsic safety and positive pressure; equipped with a positive pressure monitoring system, it can monitor the positive pressure protection gas pressure of the robot in real-time and provide power-off protection functions, preventing explosive flammable gases and dust from entering the robot's interior, thus avoiding explosion risks.

Basic Configuration



Positive pressure explosion-proof robotic arm

Built-in pressure sensor, positive pressure explosion-proof structure



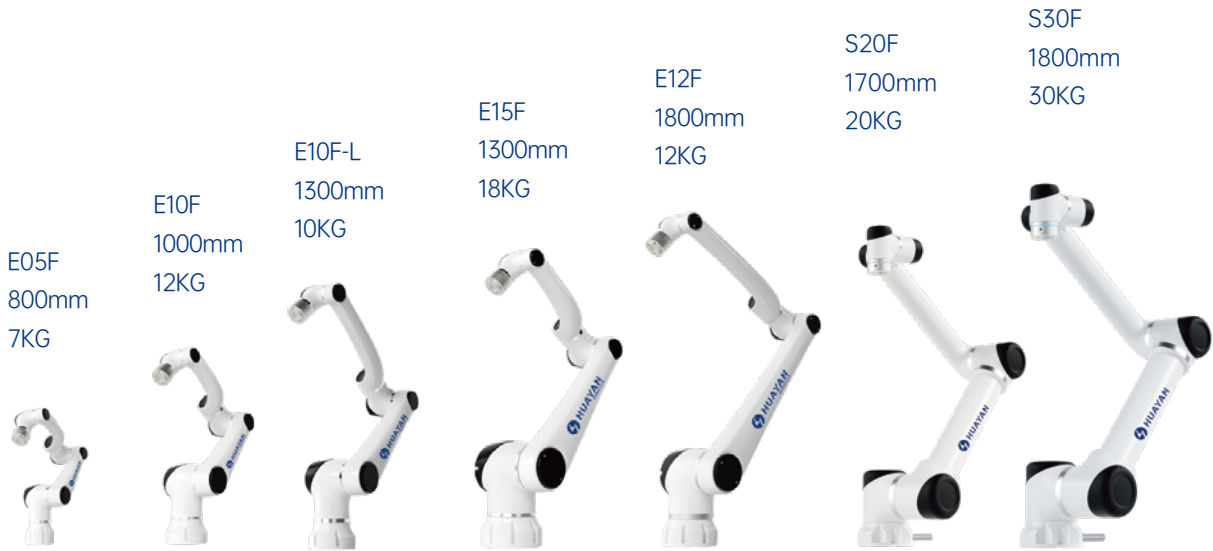
Intrinsic safety explosion-proof Teach Pendant, explosion-proof platform computer

Intrinsic safety explosion-proof



Positive pressure explosion-proof electric control cabinet, economical explosion-proof cabinet

The robotic arm control module and robotic arm pressure sensor are placed inside the explosion-proof cabinet , which is equipped with a pressure monitoring system to ensure the normal operation of the robotic arm and power-off protection in case of pressure abnormalities in real time



Why Elfin-Ex & Smart-Ex

1. National Explosion-proof Certification (NEPSI):

Meets GB/T3836-2021 standards
(Explosion-proof mark: Ex ib pxb IIC T6 Gb/Ex ib pxb IIIC T80°C Db)
Explosion-proof grade is industry-leading among similar products
2. Unique structural design achieves multiple explosion-proof features:

Using a medium-isolated ignition source with a positive pressure compensation type explosion-proof structure, the housing is designed with a multi-seal structure to achieve a composite explosion-proof structure such as intrinsic safety and positive pressure.
3. IP66 protection rating:

Sealed reliably, resistant to water splashes, and rejecting various types of dust intrusion, suitable for scenarios with significant dust and liquid splashes.
4. Complete model range, load selection available:

Available in various models to meet the needs of more scenarios and industries.
5. Simple, easy to use, flexible, and convenient:

No professional knowledge of explosion-proof technology or programming is required; even beginners can easily get started. Supports quick drag-and-drop operations, automatic programming, and high intelligence.



Elfin-Ex & Smart-Ex Series Parameters

Economic Explosion-Proof Cobot

Configuration 1



Explosion-proof robot arm

Built-in pressure sensor, positive pressure explosion-proof construction



Economic version of electric control box

Wireless router and audible and visual alarms, with wireless ipad operation, body pressure monitoring and power failure protection in abnormal conditions



Explosion-proof Teach Pendant / Explosion-proof Tablet

The economical version of the electric control box should be placed in a safe environment, and the robotic arm and electric control box should be debugged in a non-explosion-proof environment. The maximum length of the connection cable between the robotic arm and the electric control box is 20 meters, and the maximum wireless communication distance of the explosion-proof Teach Pendant 50 meters.

Standard Explosion-Proof Cobot

Configuration 1



Explosion-proof robot arm

Built-in pressure sensor, positive pressure explosion-proof construction



Explosion-proof Electric Control Box

Robotic arm control module, explosion-proof cabinet with pressure monitoring system to ensure normal operation of the arm in real time and protection against power failure in case of pressure abnormalities



Explosion-proof Teach Pendant / Explosion-proof Tablet

Can be used in explosive environments.

Configuration Instructions

Standard version: Both the robot arm and electronic control box have positive pressure explosion-proof function, can be placed in explosive hazardous areas, to meet the requirements of explosion-proof certification, and have explosion-proof certificates.

Economic version: The robot arm has positive pressure explosion-proof function, the electronic control box does not have explosion-proof function, and should be placed in the safe area; it meets the requirements of explosion-proof certification, and has an explosion-proof certificate.

Customized version: Customized development of explosion-proof function according to customers' requirements, to meet the special requirements of customers.

Economic version of electric control box (Optional)		Explosion-proof Electric Control Box (Optional)	
Dimensions (L*W*H)	600x350x655(500+155)(mm)	Dimensions (L*W*H)	800x520x1600(mm)
Weight	50kg	Weight	100kg
I/O interface	16 DI (8 DI configurable), 16 DO (8 DO configurable), 2 AI, 2 AO	I/O Interface	16 DI(8 DI configurable), 16 DO(8 DO configurable),2 AI,2 AO
I/O Power Supply	24V/1.5A(Internal Power Supply)or3A(External Power Supply)	I/O Power Supply	24V/1.5A(Internal Power Supply)or 3A(External Power Supply)
Communication	Modbus TCP,Ethernet TCP/IP	Communication	Modbus TCP,Ethernet TCP/IP
Power Supply	AC220V 50-60HZ	Power Supply	AC220V 50-60HZ
IP Classification	IP66	Explosion-proof IP Classification	Ex ib pxb IIC T6 Gb/Ex ib pxb IIIC T80°C Db
Working Temperature	-20~40°C	IP Classification	IP66
Working Humidity	90% relative humidity (non-condensing)	Working Temperature	-20~40°C
		Working Humidity	90% relative humidity (non-condensing)

Explosion-proof Standard Certification >>>

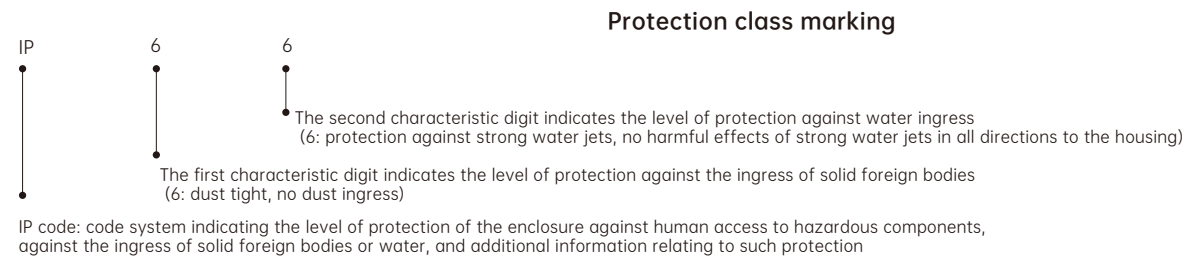
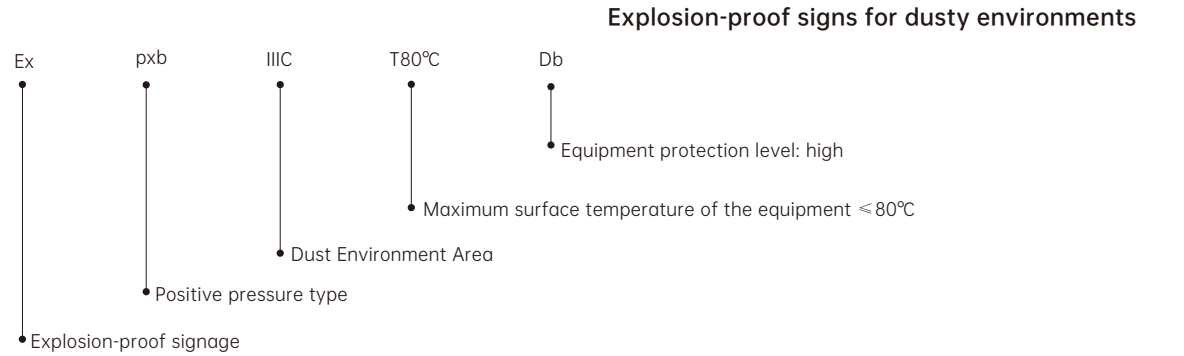
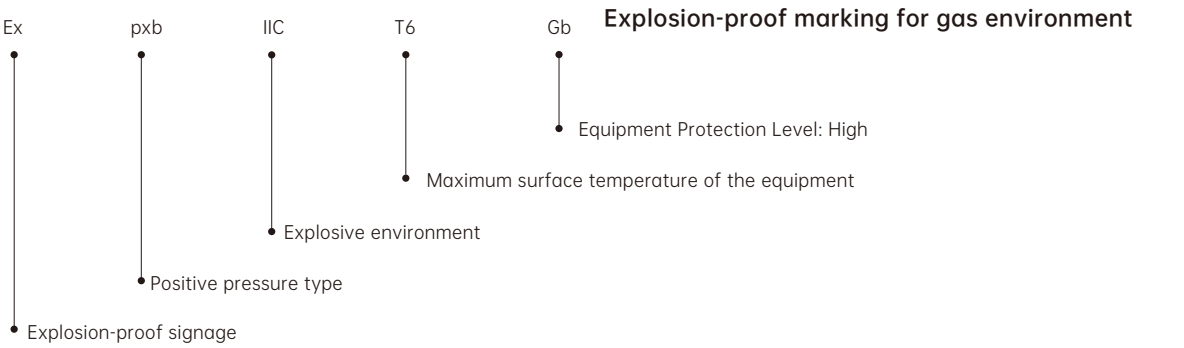
- 1

Certified by the national instrumentation explosion- proof safety inspection station
- 2

Complies with GB3836/GB12476 national standards
- 3

Meets the requirements for normal operation in Zone 1 and Zone 2 explosive gas environments and Zone 21 and Zone 22 explosive dust environments
- 4

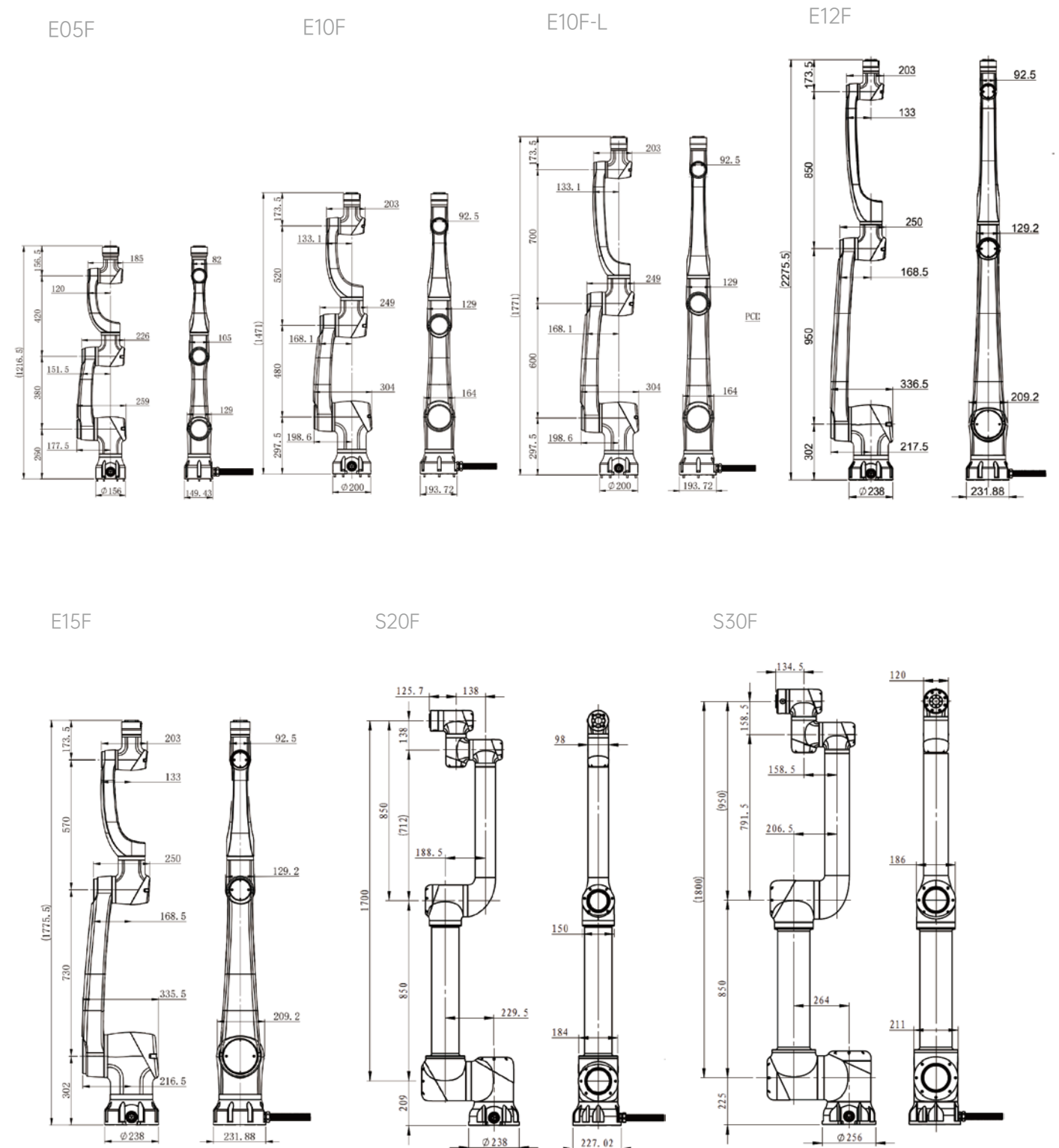
Can be used for special operations in explosive and combustible dust environments



Elfin-Ex & Smart-Ex Series Parameters

Model	E05F	E10F	E10F-L	E12F	E15F	S20F	S30F
Weight	25kg	43kg	45kg	72kg	60kg	68kg	95kg
Payload	7kg	12kg	10kg	12kg	18kg	20kg	30kg
Reach	800mm	1000mm	1300mm	1800mm	1300mm	1700mm	1800mm
Power Consumption	180W Typical Application	350W Typical Application	350W Typical Application	600W Typical Application	600W Typical Application	800W Typical Application	1000W Typical Application
Joint Range	J1、J4、J6：±360°	J1、J4、J6： ±360°	J1、J4、J6： ±360°	J1、J4、J6： ±360°	J1、J4、J6： ±360°	J1、J4、J5、J6：±360°	J1、J4、J5、J6：±360°
	J2： ±135°	J2： ±135°	J2： ±135°	J2： ±135°	J2： ±135°	J2： -190°/ +10°	J2： -190°/ +10°
	J3： ±153°	J3： ±153°	J3： ±153°	J3： ±155°	J3： ±153°	J3： ±168°	J3： ±168°
	J5： ±180°	J5： ±180°	J5： ±180°	J5： ±180°	J5： ±180°		
Joint Speed	J1-J4： 180°/s	J1-J2： 100°/s	J1-J2： 100°/s	J1-J2： 80°/s	J1-J2： 80°/s	J1-J2： 90°/s	J1-J2： 120°/s
	J5-J6： 200°/s	J3-J4： 150°/s	J3-J4： 150°/s	J3-J4： 120°/s	J3-J4： 120°/s	J3： 120°/s	J3： 120°/s
		J5-J6： 180°/s	J5-J6： 180°/s	J5-J6： 150°/s	J5-J6： 150°/s	J4-J6： 180°/s	J4-J6： 180°/s
Tool speed	3m/s	2m/s	2.5m/s	2.5m/s	2m/s	3.5m/s	3.7m/s
Repeatability	±0.02mm	±0.03mm	±0.03mm	±0.05mm	±0.05mm	±0.05mm	±0.05mm
Explosion-proof IP Classification			Ex ib pxb IIC T6 Gb/Ex ib pxb IIIC T80℃ Db				
Degree of freedom				6			
Control box I/O port		Digital input: 16, digital output: 16, analogue input: 2, analogue output: 2					
Communication		TCP/IP , ModbusTCP , Profinet (Optional) , Ethernet/IP (Optional)					
Programming		Graphical programming, remote call interface					
IP Classification				IP66			
Collaborative			10 advanced security configuration functions				
Main material				Aluminum alloy			
Working Temperature				0~40℃			
Power input				200-240V AC, 50-60Hz			
Working Humidity				≤90%			
Cable			Maximum length customizable 15-20m				

Drawing >>>



Elfin-Ex & Smart-Ex Explosion-proof Collaborative Robots Industry Applications

Application of Paint Spraying on Wooden Furniture Surfaces in the Furniture Manufacturing Industry

E05F

A certain high-end overseas wooden furniture company has long faced challenges such as high labor costs, low efficiency, poor consistency, and high safety risks in manual spray painting operations. To address this, the company introduced the Huayan E05F explosion-proof collaborative robot to create a spray painting workstation for wooden furniture, used for precise spray painting processes on furniture surfaces. The robotic arm is suspended and linked with the top seventh axis, allowing workers to only need to load and unload materials periodically.

1. Huayan Robotics has completed national explosion-proof certification, perfectly meeting the safety requirements of the flammable and explosive environment in the oil spraying workshop.

2. The flexible collaborative characteristics support quick switching of production lines, adapting to the multi-variety small batch production model.

3. Compared to manual operation, the high-precision trajectory control of the robotic arm ensures uniformity of the paint surface, significantly enhancing product quality.



Automobile Manufacturing Industry Wheel Hanger Line Spray Painting

E15F

Customers have deployed 4 E15F explosion-proof collaborative robots on the hub suspension line spraying production line. The spraying robots are interconnected with the 3D laser cameras positioned at the front of the production line. When different varieties, specifications, and placement forms of hubs pass through the 3D laser cameras, the system automatically models and generates spraying trajectories. The 4 robots cooperate with each other to accurately complete the spraying tasks, allowing the production line to fully achieve on-demand product change and a higher degree of flexible operation.

National explosion-proof certification has passed NEPSI authoritative certification, achieving multiple explosion-proof forms such as intrinsic safety and positive pressure, with reliable explosion-proof performance.

Flexible manufacturing Laser cameras generate spraying trajectories, enabling quick product change and improving efficiency by more than 2 times.

Save coating Millisecond-level opening and closing sensitivity saves a large amount of coating for the hub suspension line.



Explosive Industry Powder Injection

E10F

The end users come from the explosive industry, mainly engaged in the production of industrial explosives, industrial detonators, and cord-type pyrotechnics. In order to fulfill the primary responsibility for safe production, the client had previously connected and debugged with a domestic robot manufacturer, but the results were unsatisfactory. After the Huayan E10F took over, it was deployed in a completely enclosed explosion-proof space, achieving "stable and non-shaking during the powder injection process" and "smooth and even injection actions," and it can work in conjunction with explosion-proof safety doors to fully automate the powder injection process, greatly enhancing safety.

National Explosion-proof Certification E10F has obtained national explosion-proof certification (NEPSI), with multiple explosion-proof mechanisms, capable of operating normally in the core area of explosive production.

Safer Production In the past, workers needed to enter the explosion-proof area for explosive injection operations, but now they can remotely control the robot through a local area network for production, making it much safer.



Service Industry Robot Automatic Refueling

E15F

The refueling robot launched by Huayan Robotics in collaboration with partners is based on the E15F, which has passed national explosion-proof certification. It quickly integrates with a 3D vision recognition system, an integrated end-effector (including suction tools, clamps, etc.), the seventh axis, and related business software. It can actively learn, recognize, and determine the positions of different car fuel caps, autonomously completing actions such as opening the cap, grabbing the fuel/gas nozzle, refueling, hanging up the fuel/gas nozzle, and closing the car trunk.

Simple Operation Customers can place fuel/gas orders through an app, fully automated, with operations completed in 2 minutes.

Flexible Deployment Supports inverted and wall-mounted deployment methods, occupies a small footprint, and requires minimal modification to gas station facilities and equipment.

High Return Supports 24-hour continuous operation, greatly improving the operational efficiency of traditional gas stations.



Automobile Manufacturing Industry Bumper Spray Painting

E10F-L

In this project, the Huayan Elfin-Ex series explosion-proof collaborative robot is used. Through trusses and external axes, it can simultaneously spray paint bumpers for four different vehicle models in a 4m×7m paint booth. After the equipment is started, it uses a 3D vision system to locate the bumpers and autonomously switches between color spray guns, clear coat guns, or blow guns from the tool area according to the spraying process, with no manual intervention required throughout the entire process.

National Explosion-proof Certification Has passed NEPSI authoritative certification, achieving multiple explosion-proof forms such as intrinsic safety and positive pressure, with reliable explosion-proof performance.

Minimal Modification, Quick Installation Simple deployment, no large-scale modifications required; overall installation/debugging completed in 5 days without affecting daily operations.



Hardware Industry Automatic Spray Painting on Production Line

E10F-L

The hardware production line spray painting operations face issues such as "difficulty in recruitment" and "risk of occupational diseases," making machine replacement an inevitable option to enhance market competitiveness. The client ultimately chose the Huayan explosion-proof collaborative robot because it can easily handle small batches and a variety of hardware production lines, with clear advantages in flexibility and automation.

Trajectory Following The end effector spray gun of the robotic arm moves synchronously with the workpiece, enhancing spraying efficiency and quality.

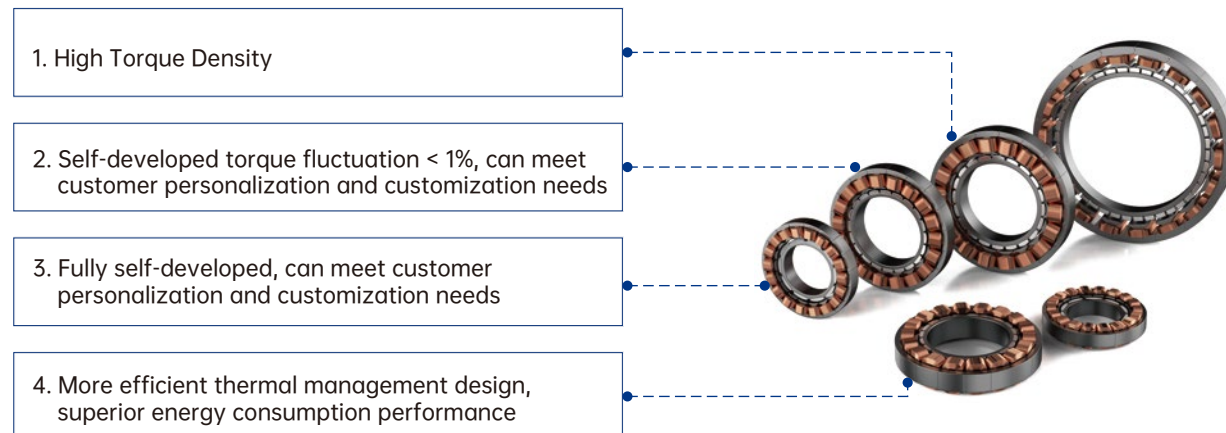
Simple Operation Provides a spraying process package, supports drag-and-drop teaching and offline programming, quickly generating spraying trajectories.

Wide Application Supports five common spraying processes including liquids and powders, meeting the vast majority of business needs.

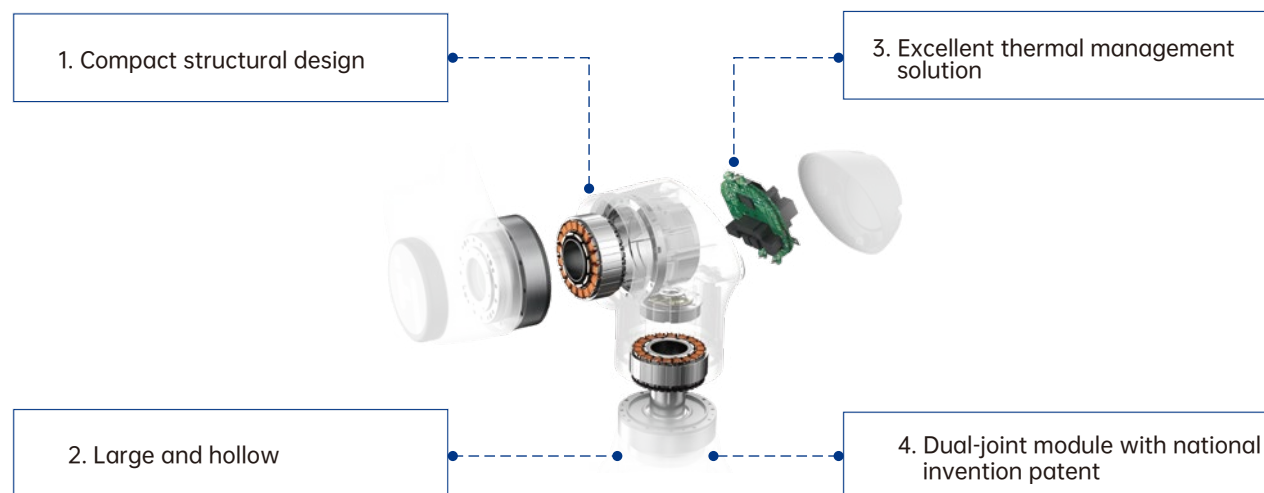


Core Components

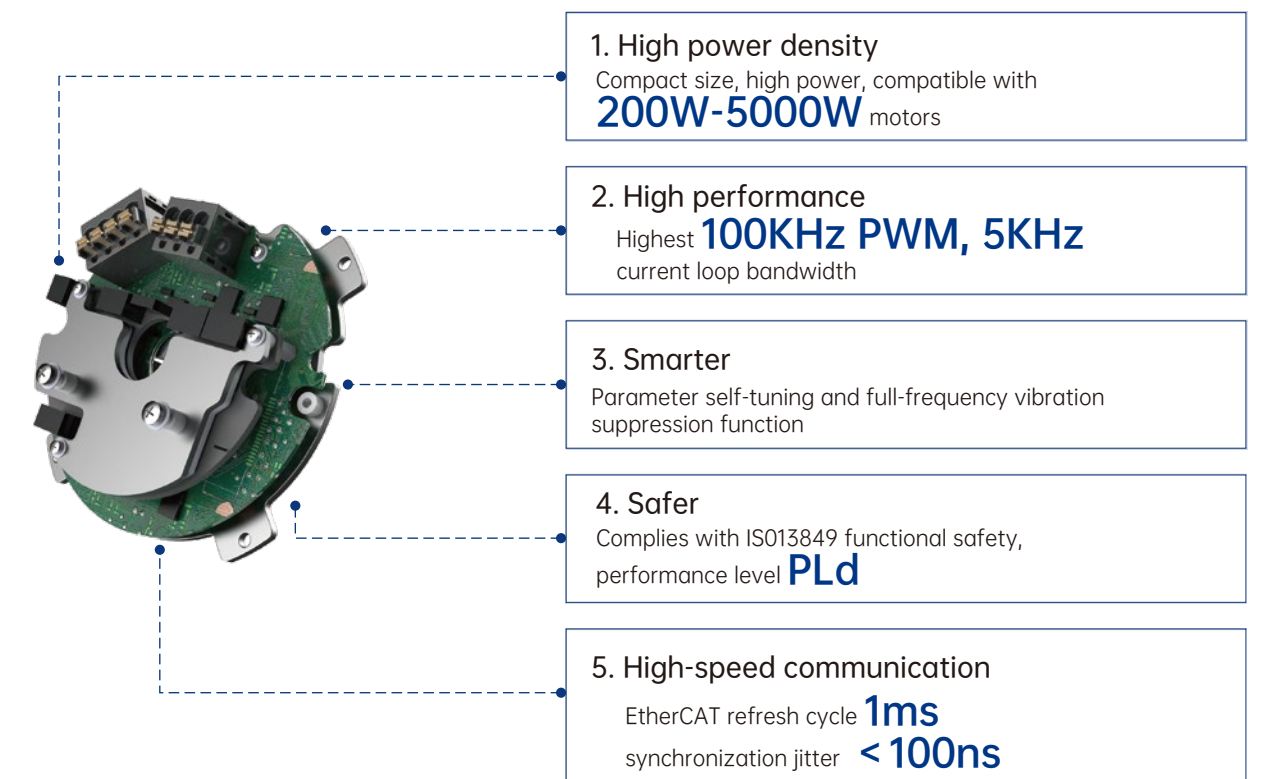
Motor



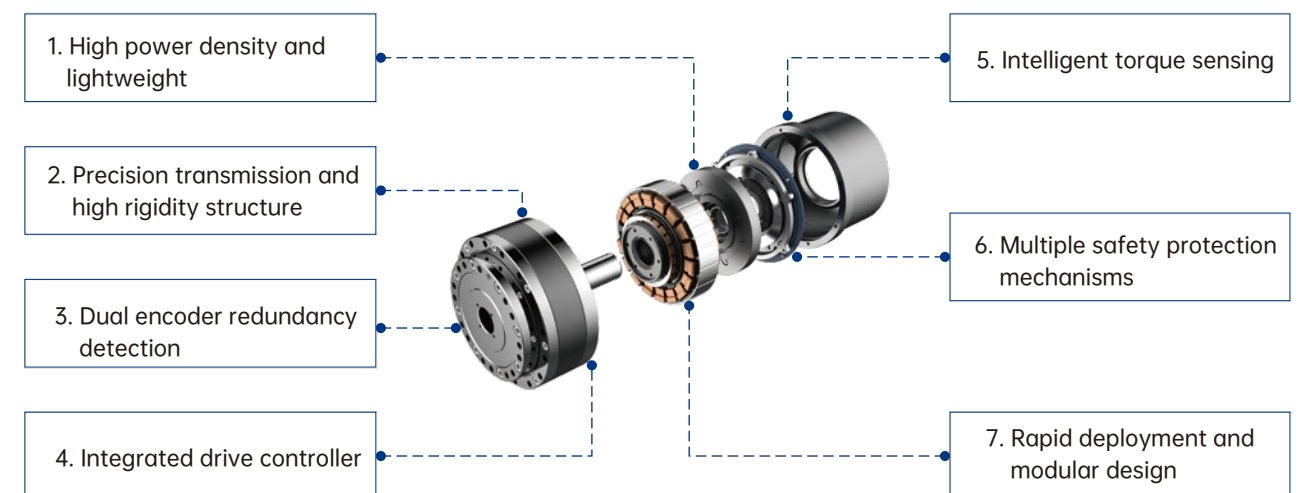
Joint Module



Servo drive



Humanoid Joint Module



Application

Collaborative robot

Humanoid robot

Medical Robots

Industrial Automation

Exoskeleton

Service Robots

Specialized Robots

Core Component Parameters

Motor >>>

Product Type	Robot Motor	Meta Motor	Tubular motor	DDR motor	Micro motor
Model	14M	Meta14M	HLC008	HF180-50	HRBI-1920
Rated Torque(Tc)	0.21Nm	0.27Nm	2.7Nm	1.17Nm	0.017Nm
Peak Torque (Tp)	0.63Nm	0.81Nm	10.8Nm	2.45Nm	0.046Nm
Maximum Speed (n)	4700rpm	5600rpm	/	1200rpm	12000rpm
Operating Voltage (Vdc)	48V	48V	/	310V	24V
Dimensions	φ52mm*10mm	φ52mm*10mm	/	/	φ19mm*20mm
Polar Moment (N-N)	/	/	30mm	/	—
Magnet Rod Diameter (D)	/	/	8mm	/	—
Repeatability (arc sec)	/	/	/	±5	—

Actuator Joint Module >>>

Product Type	Specification 14	Specification 17	Specification 20	Specification 25	Specification 32
Maximum outer diameter (mm)	70	80	90	110	142
Hollow hole diameter (mm)	13	13	17	17	17
Weight (kg)	1.0	1.5	2.1	3.5	7.0
Speed ratio	100	100	100	100	120
Maximum output speed (rpm)	39	37	34	34	21
Rated torque (Nm)	14	51	64	140	280
Peak torque (Nm)	36	70	107	204	459

Servo Drive >>>

Product Type	Single-MD1-EC4803	Single-MD1-EC4810	Single-MD1-EC4831	Double-MD2-EC4803	Dual-MD2-EC4810	Double-MD2-EC4831
Working Voltage	36-60V	36-60V	36-60V	36-60V	36-60V	36-60V
Rated Output Current	11	20	84	3	20	31
Maximum Output Current	34	65	260	7	65	98
Dimensions*W*H(mm)	75*74*30	108*108*30	168*170*71	80*60*31	122*90*42	148*150*60

Actuator for Humanoid Robots >>>

Specifications	11	14	17	20	25	32
Maximum outer diameter (mm)	55	62	72	84	100	132
Length (mm)	65	75	85	98	109	148
Inner hole diameter (mm)	12	9	9	13	16	23
Weight (kg)	0.39	0.685	1.07	1.72	2.53	5.8
Speed ratio	100	100	100	100	100	120
Maximum output speed (rpm)	30	30	30	30	30	20
Rated torque (Nm)	7.7	16	33	59	112	281
Peak torque (Nm)	19	35	70	107	204	459
Rated Current (A)	2	2	4	6	16	22
Peak Current (A)	5	6	12	14.5	35	65
Repeat Positioning Accuracy (arc sec)	≤ 30			≤ 30		
Working environment temperature (°C)	0~45			0~45		
Rated voltage (V)	DC48V			DC48V		
Communication method	EtherCAT			EtherCAT		
Encoder	Dual Magnetic Grating Encoder			Dual Magnetic Grating Encoder		
Brake	/			Electromagnetic brake		
Torque sensor	Optional			Optional		



Elfin-Pro Collaborative Robots

E03-Pro	E05-Pro	E05L-Pro	E10-Pro	E10L-Pro	E15-Pro	E12-Pro
Reach: 590mm	800mm	950mm	1000mm	1300mm	1300mm	1800mm
Payload: 4KG	7KG	5KG	12KG	10KG	18KG	12KG



Elfin Collaborative Robots

E12	E15	E10-L	E10	E05-L	E05	E03
Reach: 1800mm	1300mm	1300mm	1000mm	950mm	800mm	590mm
Payload : 12KG	18KG	10KG	12KG	5KG	7KG	4KG



S Heavy Payload Robots

S20	S30	S40	S50	S60
Reach: 1700mm	1800mm	2000mm	2000mm	2000mm
Payload: 20KG	30KG	40KG	50KG	60KG



Elfin-Ex & Smart-Ex Explosion-proof Collaborative Robots

E05F	E10F	E10F-L	E15F	E12F	S20F	S30F
Reach: 800mm	1000mm	1300mm	1300mm	1800mm	1700mm	1800mm
Payload:7KG	12KG	10KG	18KG	12KG	20KG	30KG