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HCFA



ATC

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Due to the delay in updating the paper version, please refer to the
official website for the latest product information.



Hu-MLS Hu-MRS Series

Humanoid Robot Joint Actuator Catalog

High integration

High performance

High precision

High Response



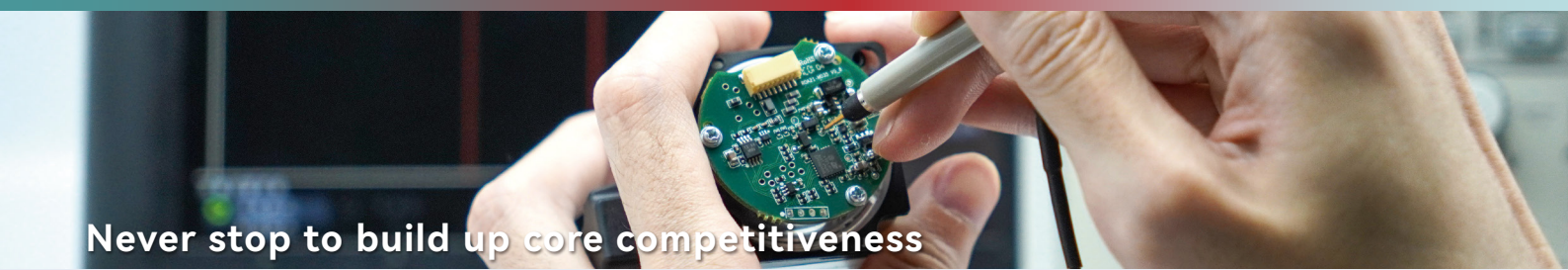


Zhejiang Hechuan Technology Co., Ltd., established in 2011, is a company that focuses on the research and development, manufacturing, sales and application integration of industrial automation products, and committed to providing core components and system integration solutions for smart factories.

The main products include controllers, servo systems, vision systems, encoders, VFDs, HMIs, electric rollers, precision transmission components, etc., covering the entire field of industrial automation.

We have newly established a 200-mu high-efficiency precision industrial transmission industrialization base. By introducing industry professionals, it has orderly promoted the industrialization application of precision guide rails, lead screws and other transmission components.

In November 2023, HCFA Technology and Bosch Rexroth signed a strategic cooperation agreement. Bosch Rexroth strategically invested in HCFA Technology and planned to cooperate to establish a subsidiary. Based on common innovation concepts and innovative thinking, the two parties will integrate their respective advantages, form resource complementarity, and carry out in-depth cooperation, striving to become ecological partners in the entire value chain of industrial automation and promote the further development of China's industrial automation industry.



R&D Centers
6
Set up nationally

R&D investment
10%+
Proportion of revenue

R&D personnel
300+
Elite gathering

- Established six R&D centers in Longyou, Hangzhou, Shenzhen, Dalian, Suzhou and Germany
- Self-designed ASIC and SOC chips, realize localization replacement
- First-class AMR magnetic technology/high-precision encoder in the industry

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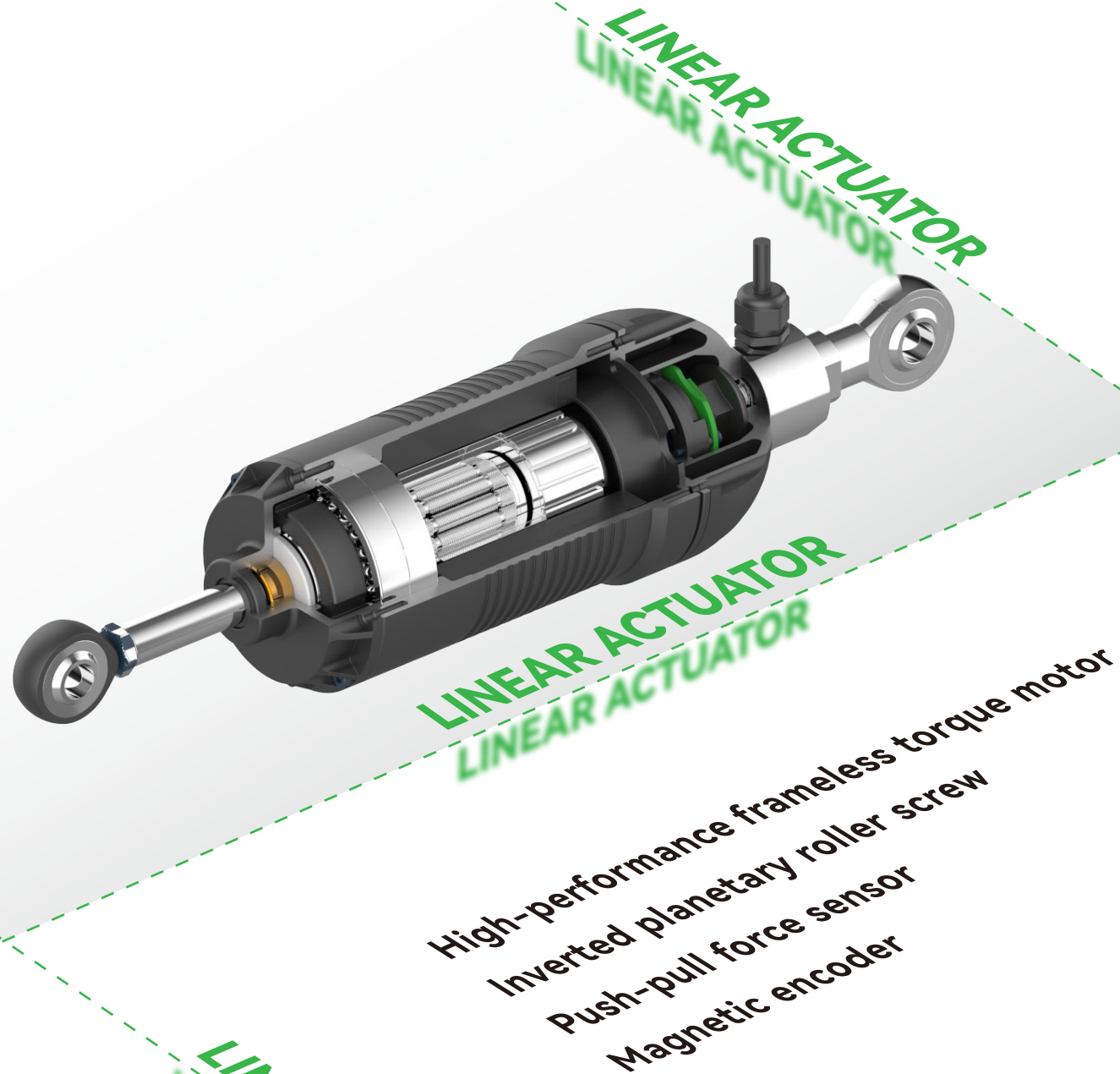
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Product Overview

■ Linear Actuator

The actuator uses a high-performance frameless torque motor from HCFA Technology, an integrated direct-drive reversing planetary roller screw, and a rotor magnet surface-mounted on the screw nut to form a motor rotor, making the product more efficient and energy-saving. The HCFA high-precision encoders are installed at the tail of the screw nut, and a bidirectional push-pull force sensor is designed at the fixed end of the actuator to achieve excellent response and control performance.



■ Rotary Actuator

The actuator is matched with HCFA Technology's frameless torque motor with high torque density performance, which uses a high-precision, long-life harmonic reducer as the core transmission component to achieve low-speed and high-torque transmission and stable output. The output feedback end is equipped with HCFA's high-precision inductive dual encoder, which has excellent position accuracy feedback.



Product Advantages

The core power of the actuator is equipped with HCFA's high-performance frameless torque motor. The transmission components of the linear actuator use integrated direct-drive reversing planetary roller screw technology, and the lead screw nut and motor rotor are integrated to achieve the conversion of motor rotational motion to push rod linear motion. The sensor part is matched with HCFA's 17-bit magnetic encoder; the transmission component of the rotary actuator is customized with a housing - integrated long-life harmonic reducer to achieve low-speed and high-torque transmission output of the actuator. The tail end of the actuator is equipped with HCFA's high-precision inductive dual encoder, which can realize full closed-loop control of the rotary actuator and greatly improve positioning accuracy. The actuator product has stable performance, and the core components are independently developed and produced, which can quickly meet customized proofing design needs, help customers shorten the robot development cycle , and collaboratively solve various challenging problems.

High integration

Three core components of frameless torque motor, harmonic reducer or lead screw and encoder are integrated into the design.

High performance

High thrust /torque density: the highest thrust density of the entire linear actuator series exceeds 3300N/KG, and the highest torque density of the entire rotary actuator series exceeds 107N.m/KG.

High precision

The linear actuator stroke repeatability accuracy is less than $\pm 0.01\text{mm}$, and the absolute positioning accuracy is less than $\pm 0.01\text{mm}$; the rotary actuator repeatability accuracy is less than $\pm 36\text{arc sec}$, and the absolute positioning accuracy is less than $\pm 108\text{arc sec}$.

High Response

Ultra-low inertia rotor structure, the dynamic response speed of the joint actuator is less than 0.5ms .

Product Specifications

Naming Rule for Linear Actuator

Hu - MLS 80 S70 - 6 R 000

① ② ③ ④ ⑤ ⑥

① Product series	
Hu-MLS	Linear Actuator

② Max. linear thrust	
05	500N
39	3900N
50	5000N
80	8000N
.....	

③ Max. linear travel	
S35	35mm
S50	50mm
S70	70mm
.....	

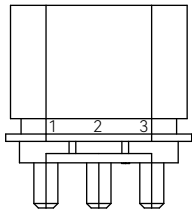
④ Supply voltage	
4	DC12V
6	DC48V
8	DC24V
9	DC36V

⑤ Encoder communication	
R	RS-485
B	BISS-C

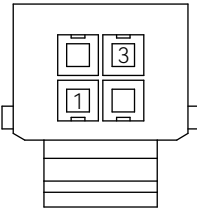
⑥ Custom Code	
000	Standard type
001	Customized model 1
.....	

Interface Definition for Linear Actuator

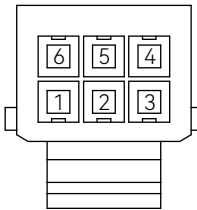
Motor power end		
Pins	Function definition	Color
1	U	Red
2	V	White
3	W	Black

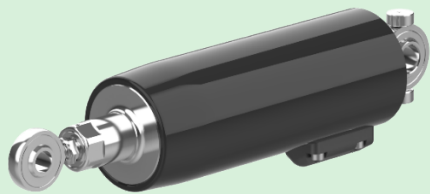


Temperature control end		
Pins	Function definition	Color
1	/	Black
3	/	Black



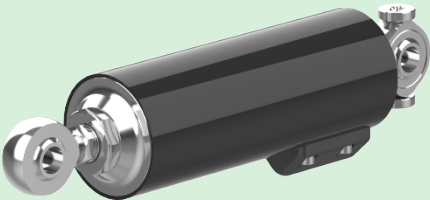
Encoder end		
Pins	Function definition	Color
1	BATT	Red and black
2	+D0	White and Red
3	-D0	White
4	VCC	Orange
5	GND	Blue
6	PE	Green





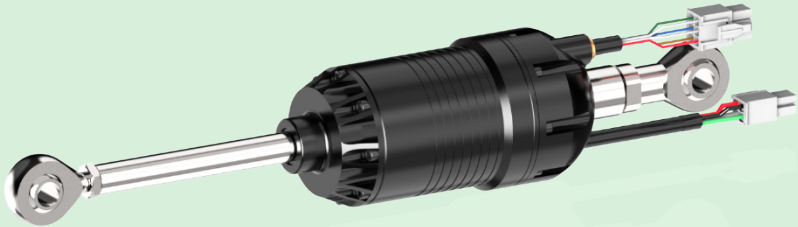
Linear Actuator
Hu-MLS05S35-6R000

Items		Unit	Hu-MLS05S35-6R000
Actuator parameters	Rated thrust	N	200
	Max. thrust	N	500
	Rated linear speed	mm/s	50
	Max. linear speed	mm/s	80
	Travel	mm	35
	Max. linear acceleration	m/s ²	0.9
	Encoder type	-	Magnetic encoder
	Encoder accuracy	-	17bit
	Weight	kg	0.3
Transmission parameters	Screw type	-	Ball Screw
	Axial clearance	mm	0.02
Installation dimensions	Installation dimensions	mm	141~176
	Fixed-end mounting hole diameter	mm	φ8
	Moving-end mounting hole diameter	mm	φ6
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	20
	Rated torque	N.m	0.12
	Instantaneous max. torque	N.m	0.25
	Rated current	A	1.7
	Instantaneous max. current	A	3.4
	Rated speed	rpm	1500
	Max. speed	rpm	2400
	Rotor pole pairs	-	5
	Thermistor B3950	Ω	10K

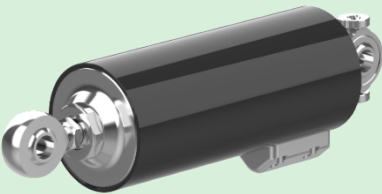


Linear Actuator
Hu-MLS15S50-6R000

Items		Unit	Hu-MLS15S50-6R000
Actuator parameters	Rated thrust	N	600
	Max. thrust	N	1500
	Rated linear speed	mm/s	80
	Max. linear speed	mm/s	125
	Travel	mm	50
	Max. linear acceleration	m/s ²	0.9
	Encoder type	-	Magnetic encoder
	Encoder accuracy	-	17bit
	Weight	kg	0.75
Transmission parameters	Screw type	-	Reversing planetary roller screw
	Axial clearance	mm	0.02
Installation dimensions	Installation dimensions	mm	198~248
	Fixed-end mounting hole diameter	mm	φ6
	Moving-end mounting hole diameter	mm	φ6
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	125
	Rated torque	N.m	0.4
	Instantaneous max. torque	N.m	1
	Rated current	A	6
	Instantaneous max. current	A	15
	Rated speed	rpm	1600
	Max. speed	rpm	2500
	Rotor pole pairs	-	7
	Thermistor B3950	Ω	10K



Linear Actuator
Hu-MLS39S50-6R000



Linear Actuator
Hu-MLS50S70-6R000

Items		Unit	Hu-MLS39S50-6R000
Actuator parameters	Rated thrust	N	1600
	Max. thrust	N	3900
	Rated linear speed	mm/s	80
	Max. linear speed	mm/s	130
	Travel	mm	50
	Max. linear acceleration	m/s ²	0.9
	Encoder type	-	Magnetic encoder
	Encoder accuracy	-	17bit
	Weight	kg	1.4
Transmission parameters	Screw type	-	Reversing planetary roller screw
	Axial clearance	mm	0.02
Installation dimensions	Installation dimensions	mm	282~332
	Fixed-end mounting hole diameter	mm	φ10
	Moving-end mounting hole diameter	mm	φ10
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	168
	Rated torque	N.m	1
	Instantaneous max. torque	N.m	2.5
	Rated current	A	7.5
	Instantaneous max. current	A	22
	Rated speed	rpm	1600
	Max. speed	rpm	2600
	Rotor pole pairs	-	7
	Thermistor B3950	Ω	10K

Items		Unit	Hu-MLS50S70-6R000
Actuator parameters	Rated thrust	N	1660
	Max. thrust	N	5000
	Rated linear speed	mm/s	150
	Max. linear speed	mm/s	300
	Travel	mm	70
	Max. linear acceleration	m/s ²	0.9
	Encoder type	-	Magnetic encoder
	Encoder accuracy	-	17bit
	Weight	kg	1.4
Transmission parameters	Screw type	-	Reversing planetary roller screw
	Axial clearance	mm	0.02
Installation dimensions	Installation dimensions	mm	196~266
	Fixed-end mounting hole diameter	mm	φ10
	Moving-end mounting hole diameter	mm	φ10
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	440
	Rated torque	N.m	1.4
	Instantaneous max. torque	N.m	3.5
	Rated current	A	17.5
	Instantaneous max. current	A	48
	Rated speed	rpm	3000
	Max. speed	rpm	6000
	Rotor pole pairs	-	7
	Thermistor B3950	Ω	10K



Linear Actuator
Hu-MLS80S70-6R000

Items		Unit	Hu-MLS80S70-6R000
Actuator parameters	Rated thrust	N	3200
	Max. thrust	N	8000
	Rated linear speed	mm/s	80
	Max. linear speed	mm/s	110
	Travel	mm	70
	Max. linear acceleration	m/s ²	0.9
	Encoder type	-	Magnetic encoder
	Encoder accuracy	-	17bit
	Weight	kg	2.5
Transmission parameters	Screw type	-	Reversing planetary roller screw
	Axial clearance	mm	0.02
Installation dimensions	Installation dimensions	mm	263~333
	Fixed-end mounting hole diameter	mm	φ12
	Moving-end mounting hole diameter	mm	φ10
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	400
	Rated torque	N.m	1.5
	Instantaneous max. torque	N.m	3.75
	Rated current	A	13
	Instantaneous max. current	A	32.5
	Rated speed	rpm	2500
	Max. speed	rpm	3300
	Rotor pole pairs	-	10
	Thermistor B3950	Ω	10K

■ Naming Rule for Rotary Actuator

Hu - MRS 030 N - 6 D 000
① ② ③ ④ ⑤ ⑥

① Product series	
Hu-MRS	Rotary actuator

③ Braking	
B	With brake
N	Without brake

⑤ Encoder communication	
D	Dual encoder
S	Single encoder

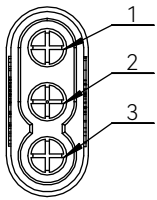
② Max. output torque	
030	30N.m
070	70N.m
100	100N.m
190	190N.m
.....	

④ Supply voltage	
4	DC12V
6	DC48V
8	DC24V
9	DC36V

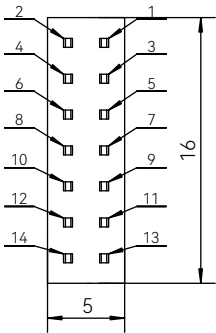
⑥ Custom code	
000	Standard type
001	Customized model 1
.....	

■ Interface Definition for Rotary Actuator

Motor power end	
Pins	Function definition
1	U
2	V
3	W

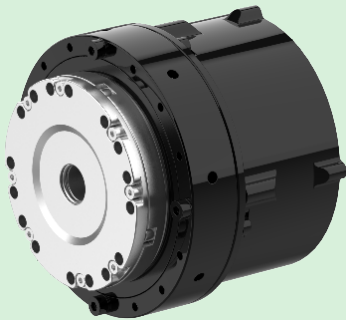


Temperature control&Encoder end		
Pins	Function definition	Notes
1	/	Temperature control
2	/	
3	GND	Reducer end
4	+D0	
5	+5V	
6	-D0	
7	PE	Motor end
8	+5V	
9	GND	
10	PE	
11	BISS_SLO-	
12	BISS_SCK+	
13	BISS_SLO+	
14	BISS_SCK-	





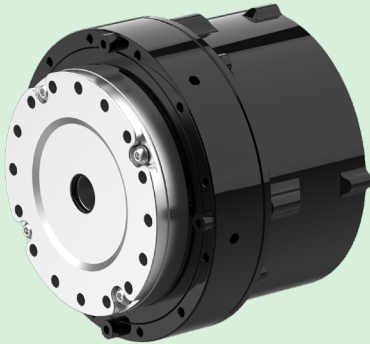
Rotary Actuator
Hu-MRS030N-6D000



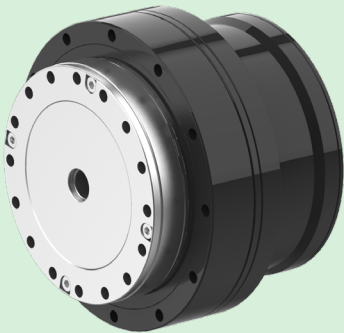
Rotary Actuator
Hu-MRS070N-6D000

Items		Unit	Hu-MRS030N-6D000
Actuator parameters	Max. output speed	rpm	49.5
	Reduction ratio	-	101
	Rated torque	N.m	9.6
	Max. allowable torque at average load	N.m	13.5
	Max. allowable torque during start-stop	N.m	34
	Max. instantaneous permissible torque	N.m	66
	Allowable average input speed	rpm	3500
	Encoder Type	-	Inductive dual encoder
	Encoder accuracy	-	17bit
	Weight	kg	0.9
Dimensions	Max. outer diameter	mm	φ70
	Axial length	mm	69
	Hollow size	mm	φ10
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	157
	Rated torque	N.m	0.3
	Instantaneous max. torque	N.m	0.9
	Rated current	A	4
	Instantaneous max. current	A	13
	Rated speed	rpm	3500
	Max. speed	rpm	6000
	Rotor pole pairs	-	7
	Thermistor B3950	Ω	10K

Items		Unit	Hu-MRS070N-6D000
Actuator parameters	Max. output speed	rpm	44.5
	Reduction ratio	-	101
	Rated torque	N.m	30
	Max. allowable torque at average load	N.m	49
	Max. allowable torque during start-stop	N.m	66
	Max. instantaneous permissible torque	N.m	134
	Allowable average input speed	rpm	3500
	Encoder Type	-	Inductive dual encoder
	Encoder accuracy	-	17bit
	Weight	kg	1
Dimensions	Max. outer diameter	mm	φ80
	Axial length	mm	70
	Hollow size	mm	φ10
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	190
	Rated torque	N.m	0.6
	Instantaneous max. torque	N.m	1.8
	Rated current	A	6
	Instantaneous max. current	A	19.8
	Rated speed	rpm	3000
	Max. speed	rpm	4500
	Rotor pole pairs	-	10
	Thermistor B3950	Ω	10K



Rotary Actuator
Hu-MRS100N-6D000



Rotary Actuator
Hu-MRS190N-6D000

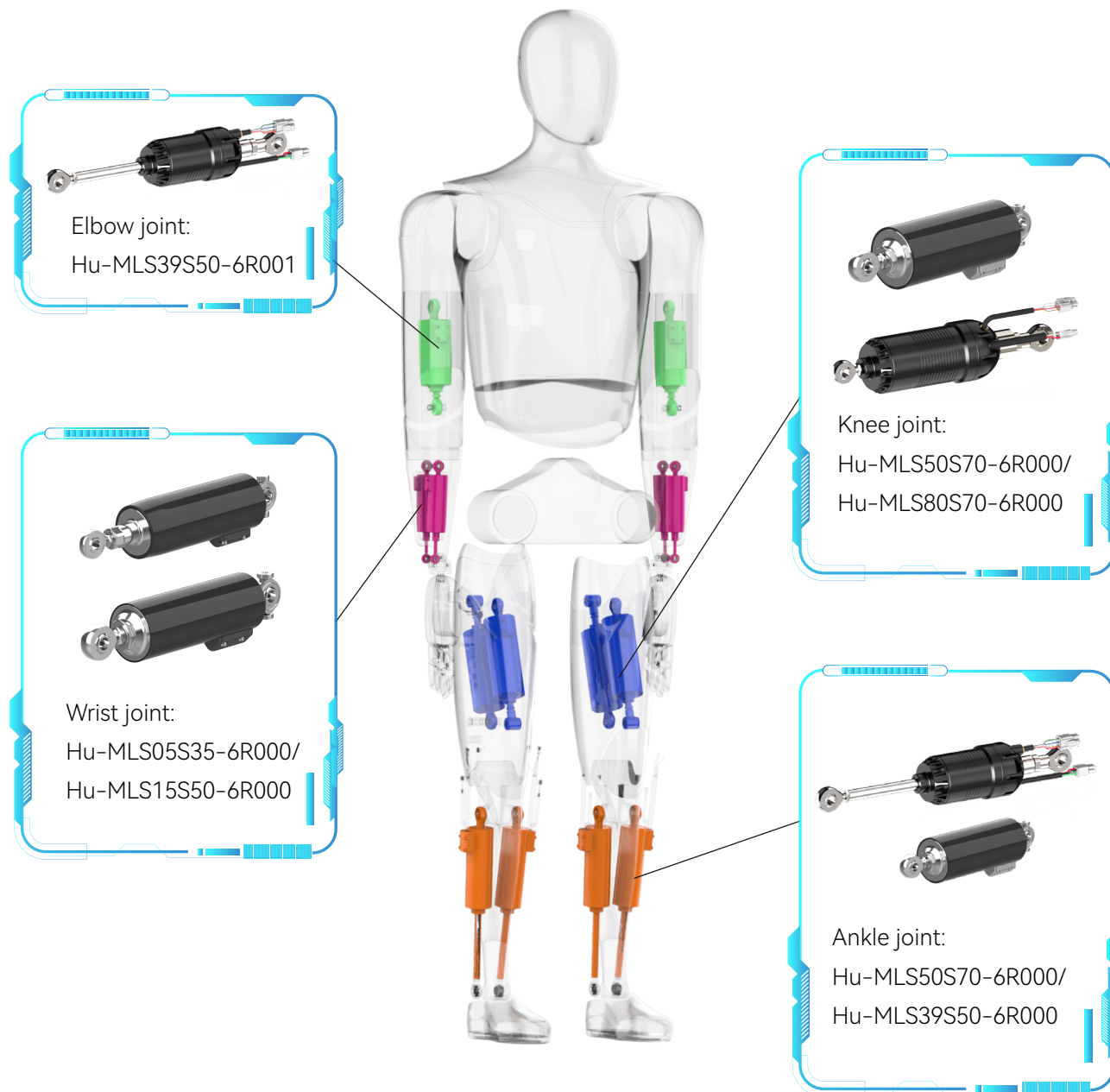
Items		Unit	Hu-MRS100N-6D000
Actuator parameters	Max. output speed	rpm	39.6
	Reduction ratio	-	101
	Rated torque	N.m	50
	Max. allowable torque at average load	N.m	61
	Max. allowable torque during start-stop	N.m	102
	Max. instantaneous permissible torque	N.m	182
	Allowable average input speed	rpm	3500
	Encoder Type	-	Inductive dual encoder
	Encoder accuracy	-	17bit
	Weight	kg	1.3
Dimensions	Max. outer diameter	mm	φ90
	Axial length	mm	76
	Hollow size	mm	φ10
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	298
	Rated torque	N.m	0.95
	Instantaneous max. torque	N.m	2.5
	Rated current	A	12
	Instantaneous max. current	A	32
	Rated speed	rpm	3000
	Max. speed	rpm	4000
	Rotor pole pairs	-	10
	Thermistor B3950	Ω	10K

Items		Unit	Hu-MRS190N-6D000
Actuator parameters	Max. output speed	rpm	39.6
	Reduction ratio	-	101
	Rated torque	N.m	84
	Max. allowable torque at average load	N.m	133
	Max. allowable torque during start-stop	N.m	194
	Max. instantaneous permissible torque	N.m	351
	Allowable average input speed	rpm	3500
	Encoder Type	-	Inductive dual encoder
	Encoder accuracy	-	17bit
	Weight	kg	1.8
Dimensions	Max. outer diameter	mm	φ110
	Axial length	mm	82
	Hollow size	mm	φ10
Electrical parameters	Rated voltage	VDC	48
	Rated output power	W	393
	Rated torque	N.m	1.25
	Instantaneous max. torque	N.m	2.5
	Rated current	A	11.5
	Instantaneous max. current	A	23
	Rated speed	rpm	3000
	Max. speed	rpm	4000
	Rotor pole pairs	-	10
	Thermistor B3950	Ω	10K

Applications

The Hu-MLS/Hu-MRS series of joint actuator products are designed to provide the best power component selection solutions for humanoid robots. The entire product series can cover the joint requirements of humanoid robots throughout the body.

■ Linear Actuator



■ Rotary Actuator

