



ZHIDONGLI ROBOTICS

PRODUCT SERIES



ZHIDONGLI ROBOTICS CO.,LTD.

Embodied Robot Complete-Body Solution Provider

COMPANY PROFILE

About ZDL Robotics

ZDL Robotics Co., Ltd. is a national high-tech enterprise specializing in the R&D, design, production, and sales of core components for humanoid robots and power modules for mobile robots, and serves as a provider of embodied robot platform solutions. Leveraging its deep expertise in intelligent drive technology, forward design of humanoid limbs, and high-performance control technology for humanoid arms, the company has established a comprehensive product portfolio of robot core components. Its offerings include high-power-density low-voltage servo drives, high-torque-density joint modules, high-reliability force-controlled joint modules, dual-differential steer-by-wire chassis, high-performance force-controlled humanoid arms, and highly reliable wheeled-chassis embodied robot platform solutions. Among these products, the company's humanoid robot joint modules demonstrate outstanding performance. Its linear joint modules can deliver a maximum load force of 10,000 N, with a load-force density of 5,800 N/kg, while its rotary joint modules provide a maximum torque output of 250 Nm and a torque density of 120 Nm/kg, with key performance indicators reaching internationally leading levels. These innovations have not only enabled the industrialization of cutting-edge technologies, but have also created significant market value in the robotics industry.

At present, ZDL has completed full-stack in-house R&D of humanoid robot hardware, achieved key technological breakthroughs in the cerebellum model of the motion control system, realized full delivery capabilities for fully force-controlled humanoid dual arms and complete embodied robot platform solutions, and is accelerating the transition to mass production. Looking ahead, the company will continue to deepen technological innovation and empower new breakthroughs in the global embodied intelligence industry.



Deep expertise in force-control technology for intelligent joint modules



Comprehensive forward-design capability for humanoid limbs



Advanced motion-control technology for humanoid limbs

Wheeled Humanoid Robot



PRODUCT DETAILED PARAMETERS

Module	Parameter Item	Specification Description	Specification Drawing
Overall System	Height	1.7 m	
	Weight	Approx.100kg (including battery)	
	DOF	22 (excluding end-effectors)	
	Power Consumption	200Wstandby,1500Wpeak	
	Computing Unit	NVIDIA Jetson Orin NX	
	Protection Rating	IP40	
	Basic Computing	157 TOPS (INT8)	
	OTA Update	Supported	
	Secondary Deveoloment	C++ / ROS / Python	
	Safety Protection	Overcurrent,overvoltage,temperature,overload protection	
Mobile Chassis	Type	Dual-differential drive-by-wire chassis	
	Mobility	Omnidirectional movement and on-the-spot rotation	
	Max Speed	Up to 1.5 m/s	
	Position & Navigation	Fusion of LiDAR, visual V-SLAM, IMU, and wheel odometry for centimeter-level positioning	
	Sensors	6 ultrasonic radars,1 chassis camera	
	Battery	30 Ah (built into chassis)	
	Battery Life	About 6 hours	
Torso & Lift	Lift Travel	600 mm (adapts flexibly to workbenches of different heights)	
	Lift Speed	Up to 100mm/s	
	Waist DOF	4	
Dual-Arm System	Single-Arm DOF	7 (excludingend-effector)	
	Single-Arm Reach	About 800 mm	
	Single-Arm Payload	3 kg (including end-effector)	
	End-Effector Options	7-DOF dexterous hand, gripper	
Perception System	Head Vision	1 LiDAR,1 depth camera	
	Chest Perception	1depth camera,1 IMU	
Cerebellum Controller (Embedded cerebellum controller for autonomous driving, delivering ultra-high stability and deterministic core performance)	CPU	RK3588	
	RAM	4GB/8GB/16GB LPDDR4X	
	ROM	32GB/64GB/256GB eMMC	
	Operating System	WH-RT real-time Linux	
	System Response Latency	480 ns	
	Communication Protocols	EtherCAT*2 / CAN*2 / UART*6	
	Command Frequency	32 kHz	
	EtherCAT Jitter	1.08 us	

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Embodied Data Collection Robot



PRODUCT DETAILED PARAMETERS

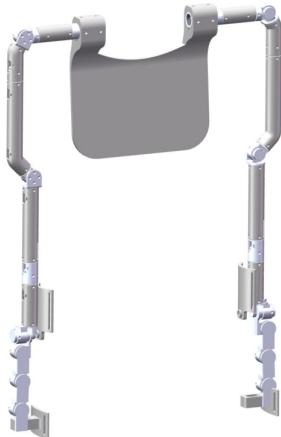
Module	Parameter Item	Specification Description	Specification Drawing
Overall System	Height	1.75 m	
	Weight	Approx.100kg(including battery)	
	DOF	21 (excluding end-effectors)	
	Power Consumption	200Wstandby,1500Wpeak	
	Computing Unit	NVIDIA Jetson Orin NX	
	Protection Rating	IP40	
	Basic Computing	157 TOPS (INT8)	
	OTA Update	Supported	
	Secondary Deveolment	C++ / ROS / Python	
	Safety Protection	Overcurrent,overvoltage,temperature,overload protection	
Mobile Chassis	Type	Dual-differential drive-by-wire chassis	
	Mobility	Omnidirectional movement and on-the-spot rotation	
	Max Speed	Up to 1.5 m/s	
	Position & Navigation	Fusion of LiDAR, visual V-SLAM, IMU, and wheel odometry for centimeter-level positioning	
	Sensors	8 ultrasonic radars,1 chassis camera	
	Battery	35 Ah (built into chassis)	
	Battery Life	About 6 hours	
Torso & Lift	Lift Travel	300 mm (adapts flexibly to workbenches of different heights)	
	Lift Speed	Up to 100mm/s	
	Waist DOF	3	
Dual-Arm System	Single-Arm DOF	7 (excludingend-effector)	
	Single-Arm Reach	800 mm	
	Single-Arm Payload	3 kg (including end-effector)	
	End-Effector Options	7-DOF dexterous hand, gripper	
Perception System	Head Vision	1 LiDAR,1 depth camera	
	Chest Perception	1depth camera,1 IMU	

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Teleoperation Kit



PRODUCT DETAILED PARAMETERS

Module	Parameter Item	Specification Description	Specification Drawing
Data Collection Dual-Arm Exoskeleton	DOF	18 DOF (dual arms)	
	Weight	2.5 kg (excluding battery)	
	Battery Life	8 h	
	Dimensions	890 mm*560 mm*200 mm	
	User Height	160 cm-180 cm	
	Encoder Type	Absolute	
	Communication Frequency	Wireless 200 Hz / Wired 1000 Hz	
	Compatible OS	Linux	
	Communication Mode	Wireless/Wired	
	Resolution	0.1°	
	End-Effector Position Accuracy	$X \leq 0.5 \text{ mm}, Y \leq 0.5 \text{ mm}, Z \leq 0.1 \text{ mm}$	
	End-Effector Orientation Accuracy	Roll $\leq 0.1^\circ$, Pitch $\leq 0.1^\circ$, Yaw $\leq 0.1^\circ$	
Data Collection Glove	Track DOF	44 DOF (both hands)	
	Weight	600 g	
	Communication Mode	Wireless	
	Communication Frequency	Wireless 200 Hz	
	Pose Accuracy	Roll $\leq 2^\circ$, Pitch $\leq 0.5^\circ$, Yaw $\leq 0.5^\circ$	
	Angular Resolution	0.01°	
VR Teleoperation Kit	Refresh Rate	90 Hz	
	Field of View	105°	
	Average PPD	20.6	
	Env. Tracking Cameras	4	
	Communication Mode	Wireless	
Two-Finger Gripper	Max Gripping Span	100 mm	
	Communication Interface	CAN	
	Operating Modes	Position Mode, Velocity Mode, Torque Mode, MIT Mode	

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PRODUCT DETAILED PARAMETERS

Humanoid Arm (HA Series)			HA7R-8S		HA7R-3N	
HA7R-8S  HA7R-3N 			Overall Parameters	Effective Payload (including hand)	8 kg	3 kg
				Weight (excluding hand):	12 kg	6.5 kg
				Reach Radius:	860 mm	795 mm
				Degrees of Freedom:	7	7
				Average Power Consumption:	Approx. 160 W	105 W
				Secondary Development:	ROS SDK、Python API、C++API	
				Teaching Method:	Drag teaching, Remote control teaching	
				Method:	Flange connection (customizable)	
				Mounting Flange:	85 mm	75 mm
				Noise:	≤52 dB (Tested at 1m distance, background noise <30dB)	
				Max Arm Temperature Rise:	≤25 °C	
				Com munication Protocol:	EtherCAT	
				Supply Voltage:	48 VDC	
				Material:	Aluminum alloy, Nylon	
				Base Diameter:	80 mm	
				Safety Protection:	Overcurrent, Overload, Overvoltage/Undervoltage, Overspeed, Stall protection	Overcurrent, Overvoltage, Temperature, Overload protection
				Whole Arm Self-Collision Protection:	Available (Controller level)	Available (Controller level)
				Impedance Control:	Joint space and Cartesian space impedance control	-
				Force Control Indicators:	Cartesian space force control error < 2N	-
Tach Pendant Optional	Dimensions:	280 mm*199 mm*70.7 mm				
	Weight:	1.2 kg				
	Display:	8-inch resistive color LCD TFT touchscreen, 800*600 pixels				
	Cable Length:	4.5 m				
Controller Parameters	Protection Class	IP65				
	Dimensions:	110 mm*81 mm*1.6 mm (without case) 114 mm*86 mm*30 mm (with case)				
		Weight:	91.5 g (without case) 390 g (with case)			
	CPU:		RK3588			
	RAM:	8G				
	ROM:	64G				
	OS:	Wanghuo Real-time Linux				
	Interface:	WiFi6、LAN*2				
	Power Supply Method:	5.5*2.1mm DC jack and 2-pin 3.5mm pitch connector, 12V DC input				
	Max Power Consumption	52W				
	Supply Current	2A				
	Joint Parameters	Range of Motion:	Joint1: ±180°、Joint2: -20°~180°、Joint3: ±180°、Joint4: 0~135°、Joint5: ±180°、Joint6: ±30°、Joint7: ±50°			
			Max Joint Output Speed:	Joint1~4: 3.6 rad/s、Joint5~7: 4.1 rad/s	Joint1~2 : 3.6 rad/s 、Joint3~4 : 4.8 rad/s 、Joint5~6 : 4.2 rad/s 、Joint7: 4.7 rad/s	
		Max Allowable Average Load Torque:		Joint1~4: 51 Nm、Joint5~7: 6.5 Nm	Joint1~2: 49 Nm、Joint3~4: 13.5 Nm、Joint5~6: 8.9 Nm、Joint7: 4.8 Nm	
			Joint Encoder:	Dual encoder	Dual encoder	
Working Mode:		CST、CSV、CSP、PP、PD modes	CST、CSV、CSP、PP、PD modes			
Joint Force Sensor:		Built-in (Optional)	-			
Brake Type:		Permanent magnet brake (Joints1、2、3、4)				

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PRODUCT DETAILED PARAMETERS

Dual-Differential Drive-by-Wire Chassis HLON-100N		Mechanical & Dimensional Specifications	
		Maximum payload:	100 kg
		Ground clearance:	25 mm
		Wheel configuration:	3-wheel (2 differential drive + 1 caster)
		Drive wheel material:	Polyurethane
		Drive wheel size	Diameter 150 mm, width 42 mm
		Caster wheel material:	Polyurethane
		Caster wheel size:	Diameter 85 mm, width 49 mm
		Track width:	550 mm
		Wheelbase:	340 mm
		Minimum turning radius:	400 mm
		Maximum anti-tip capability :	85 Nm
Drive & Motion Performance		Electrical Performance	
Drive motor type:	Brushless DC motor	Overall dimensions:	600 mm*580 mm*280 mm
Single-wheel output torque (rated/peak):	10.24 Nm / 30.72 Nm	Net chassis weight:	48 kg
Single-wheel output speed (rated/peak):	187.5 rpm / 250 rpm		
Travel speed (rated/peak):	1.5 m/s / 2 m/s	Operating voltage:	48 VDC
Minimum turning radius:	400 mm	Rated power:	400 W
Maximum climbing angle:	5 °	Rated operating current:	8 A
Obstacle-crossing height:	10 mm	Peak operating current:	24 A (for 3 s)
Repeat positioning accuracy:	±10 mm / 10 m	Battery charging interface model:	LP20 2-pin single-port (front-mount type)
Other		Built-in power management(PMIC):	yes
Operating temperature range:	-10 °C~+50 °C	Main controller communication interface:	M8
Storage temperature range:	-20 °C~+60 °C	Communication protocols:	EtherCAT/Modbus RTU
Protection rating:	IP54	Reserved expansion interfaces:	2 RS485 channels, 2 input channels, and 2 output channels
Safety features:	Emergency-stop button interface / stall protection	Built-in sensors (chassis level):	Ultrasonic radar

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PRODUCT DETAILED PARAMETERS

Parameter Category		Parameters	Harmonic 11 Module	Harmonic 14 Module	Harmonic 17 Module	Harmonic 25 Module	Harmonic 32 Module
			HR0090 -052H101-48M0	HR0120 -070H081-48M0	HR0240 -080H101-48M0	HR0680 -110H101-48M0	HR1000 -142H161-48M0
Dimensions	Joint diameter	mm	52	70	80	110	142
	Joint length	mm	80	86.5	91.5	122	153
	Hollow bore diameter	mm	6	9.8	12	20	22
	Joint weight	kg	0.4	1.1	1.4	2.9	6.7
Reducer Parameters	Reduction ratio*	-	101	81	101	101	161
	Reducer backlash	arcsec	≤20	≤20	≤20	≤20	≤20
	Transmission accuracy	arcmin	<1	<1	<1	<1	<1
	Average service life	h	20000	20000	20000	20000	20000
Output Performance	Start-stop allowable torque	N·m	8.5	30	70	204	433
	Average load torque	N·m	6.5	14	46	140	281
	Max instantaneous torque	N·m	16	61	138	369	841
	Rated speed	rpm	34	43	34	34	20
	Max speed	rpm	50	52	42	42	25
	Repeat positioning accuracy	arcsec	<60	<60	<60	<60	<60
	Absolute positioning accuracy	arcsec	<300	<300	<300	<300	<300
Servo System	Motor power	W	90	120	240	680	1000
	Rated voltage	VDC	48	48	48	48	48
	Rated current	A(rms)	2.5	3.7	6.5	18	23.2
	Peak current	A(rms)	8	5.5	14	37	53
	Encoder	Single Encoder*	●	●	●	●	●
		Dual Encoder*	○	○	○	-	-
	Communication Protocol	EtherCAT	●	●	●	●	●
CANopen		○	○	○	○	○	
Others	Brake	-	-	●	●	●	●
	Torque Sensor:*	-	○	○	○	○	○
	IP Rating	-	IP40				
	Operating Temperature	℃	● 0~40℃ ○ -40~60℃				
	Storage Temperature	℃	-40~80℃				
	Ambient Humidity	℃	90% relative humidity (non-condensing)				
Notes	• The reduction ratio of the harmonic drive can be configured,please contact us for detailed parameters. • The single encoder is a multi-turn absolute encoder. • A dual-encoder configuration is optional. Dimensions may vary; please contact us for detailed parameters. • A torque sensor can be configured. Dimensions may vary; please contact us for detailed parameters.						
Illustrations	 Harmonic 11 Module HR0090 -052H101-48M0 Harmonic 14 Module HR0120 -070H081-48M0 Harmonic 17 Module HR0240 -080H101-48M0 Harmonic 25 Module HR0680 -110H101-48M0 Harmonic 32 Module HR1000 -142H161-48M0						

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HR0680-110P050-48M0	Mechanical Specifications	Motor Specifications
 <i>250N·m</i>	Rated Torque: 88 N·m	Rated Power: 680W
	Maximum Acceleration: 250 N·m	Rated Voltage: 48V
	Rated Speed: 70 rpm	Rated Current: 20A
	Peak Speed: 90 rpm (no-load)	Peak Current: 60A
	Speed Reducer Specifications	Encoder Type: Multi-turn Absolute
	Type: Planetary gearbox	Communication Protocol: EtherCAT
	Reduction Ratio: 50	Additional information
	Transmission Accuracy: 5 arcmin	Protection Class: IP40
	Average Service Life: 10000h	Operating Environment:
	Boundary dimensions	Operating Temperature: 0~40°C (-40~60°C optional)
	Diameter: 110mm	Storage Temperature: -40~80°C
	Length: 102mm	Ambient Humidity: 90% relative humidity (non-condensing)
	Weight: 2.1kg	

HR0420-090P050-48M0	Mechanical Specifications	Motor Specifications
 <i>150N·m</i>	Rated Torque: 55 N·m	Rated Power: 420W
	Maximum Acceleration: 150 N·m	Rated Voltage: 48V
	Rated Speed: 70 rpm	Rated Current: 11A
	Peak Speed: 100 rpm (no-load)	Peak Current: 35A
	Speed Reducer Specifications	Encoder Type: Multi-turn Absolute
	Type: Planetary gearbox	Communication Protocol: EtherCAT
	Reduction Ratio: 50	Additional information
	Transmission Accuracy: 5 arcmin	Protection Class: IP40
	Average Service Life: 10000h	Operating Environment:
	Boundary dimensions	Operating Temperature: 0~40°C (-40~60°C optional)
	Diameter: 90mm	Storage Temperature: -40~80°C
	Length: 108mm	Ambient Humidity: 90% relative humidity (non-condensing)
	Weight: 1.5kg	

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PRODUCT DETAILED PARAMETERS

HT0450-072S002-48M0	Mechanical Specifications	Motor Specifications	Dimensions & Miscellaneous
 <i>10000N</i>	Screw Type: Inverted Planetary Roller Screw	Rated Power: 450W	Diameter: 72mm
	Screw Lead: 2mm	Rated Voltage: 48V	Length: 210mm
	Rated Thrust: 3400N	Rated Current: 14A	Weight: 1.7kg
	Maximum Thrust: 10000N	Peak Current: 42A	Protection Class: IP40
	Rated Speed: 0.1m/s	Encoder Type: Multi-turn Absolute Encoder	Operating Environment: Operating Temperature: 0~40°C (-40~60°C optional)
	Maximum Speed: 0.12m/s		
	Maximum Stroke: 85mm	Communication Protocol: EtherCAT	Storage Temperature: -40~80°C Ambient Humidity: 90% relative humidity (non-condensing)
	Backlash: ≤0.05mm		

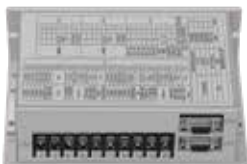
HT0226-064S002-48M0	Mechanical Specifications	Motor Specifications	Dimensions & Miscellaneous
 <i>5000N</i>	Screw Type: Inverted Planetary Roller Screw	Rated Power: 226W	Diameter: 64mm
	Screw Lead: 2mm	Rated Voltage: 48V	Length: 205mm
	Rated Thrust: 1700N	Rated Current: 6.9A	Weight: 1kg
	Maximum Thrust: 5000N	Peak Current: 21A	Protection Class: IP40
	Rated Speed: 0.1m/s	Encoder Type: Multi-turn Absolute Encoder	Operating Environment: Operating Temperature: 0~40°C (-40~60°C optional)
	Maximum Speed: 0.16m/s		
	Maximum Stroke: 80mm	Communication Protocol: EtherCAT	Storage Temperature: -40~80°C Ambient Humidity: 90% relative humidity (non-condensing)
	Backlash: ≤0.05mm		

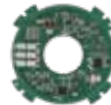
HT0040-048S002-48M0	Mechanical Specifications	Motor Specifications	Dimensions & Miscellaneous
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PRODUCT DETAILED PARAMETERS

	P0750-E48S2	P0400-E48S3	P1000-E48S4
			
Rated output current:	2*20A	3*10A	4*26.4A
Maximum output current:	2*60A	3*20A	4*79.2A
Rated power:	2*750W	3*400W	4*1000W
Rated voltage:	48VDC		
Regenerative braking:	External		
Feedback method:	Single-turn absolute / multi-turn absolute		
Control modes:	CST、CSV、CSP、PP、PD		
Monitoring functions:	Speed, position, motor torque, motor current, bus voltage, internal module temperature, etc.		
Protection functions:	Overspeed, overvoltage, overcurrent, overload, encoder abnormalities, excessive position/speed deviation, etc.		
Communication method:	EtherCAT		
Ambient temperature:	-20~65°C		
Protection rating:	IP20		

Parameter Types	Linear 1000N	Linear 5000N	Planetary 250Nm	Planetary 150Nm	Harmonic 17	Harmonic 25	Harmonic 32
Rated output current:	10A	8A	20A	12A	10A	20A	33A
Maximum output current:	30A	24A	60A	16A	30A	60A	66A
Rated power:	400W	270W	680W	420W	350W	680W	1000W
Rated voltage:	48VDC						
Regenerative braking:	External						
Feedback method:	multi-turn absolute						
Control modes:	CST、CSV、CSP、PP、PD						
Monitoring functions:	Speed, position, motor torque, motor current, bus voltage, internal module temperature, etc.						
Protection functions:	Overspeed, overvoltage, overcurrent, overload, encoder abnormalities, excessive position/speed deviation, etc.						
Communication method:	EtherCAT						
Ambient temperature:	-20~65°C			-20~45°C	-20~48°C	-20~68°C	-20~65°C
Protection rating:	IP20						
Illustration:							

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