

Robot Controller



Controller Series	IRCB501 Series	IRCB501 High-protection Series	
Mounting mode	Vertical mounting, horizontal mounting, 19" rack mounting	Vertical mounting, horizontal mounting, rack mounting	
Standard I/Os	16 inputs and 16 NPN outputs (extendable)		
Communication interfaces	Ethernet interface: Used for TCP/IP, Modbus TCP, Ethernet/IP, MC communication		
	EtherCAT-IN interface: EtherCAT slave -IN interface		
	EtherCAT-OUT interface: EtherCAT master -OUT interface		
	EtherCAT interface: Used for extension of external axes		
	RS232/RS485 interface: Used for serial and Modbus RTU communication (RS485 only)		
	USB2.0 interface: Used for backup/upload programs and export robot status information		
	Optional interface: Profinet slave		
Control mode	PC programming platform control, teach pendant control, remote I/O control, remote Modbus control, and API control		
Power supply	Input voltage: Single-phase 200 VAC to 240 VAC, 10A/20A, 50 Hz to 60 Hz	Input voltage: Single-phase 200 VAC to 250 VAC, 23A, 50 Hz to 60 Hz	
	Max. power consumption: 3.1 kW (depending on the robot model)	Max. power consumption: 4.5 kW (depending on the robot model)	
IP rating	IP20	IP54 + anti metal dust	
Operating conditions	Temperature: 5° C to 40° C ; Relative humidity: 20% to 95% RH@30° C (non-condensing)		
Dimensions	Standard	High- Power	
	330mm×338.5mm×130mm	330mm×400mm×130mm	
Weight	8kg	30kg	
Applicable Robots	SCARA: IR-S4/7/10 Series IR-TS4/5 Series 6-Axis: IRS311-7 Series IR-R4/R4H Series	SCARA: IR-S20 Series IR-GS20 Series IR-S50 Series 6-Axis: IR-R11 Series	6-Axis: IR-R10 Series, IR-R20 Series SCARA: IR-S50 Series (Optional) 6-Axis: IRS311-7 Series (Optional) , IR-R4 Series (Optional) , IR-R11 Series (Optional)

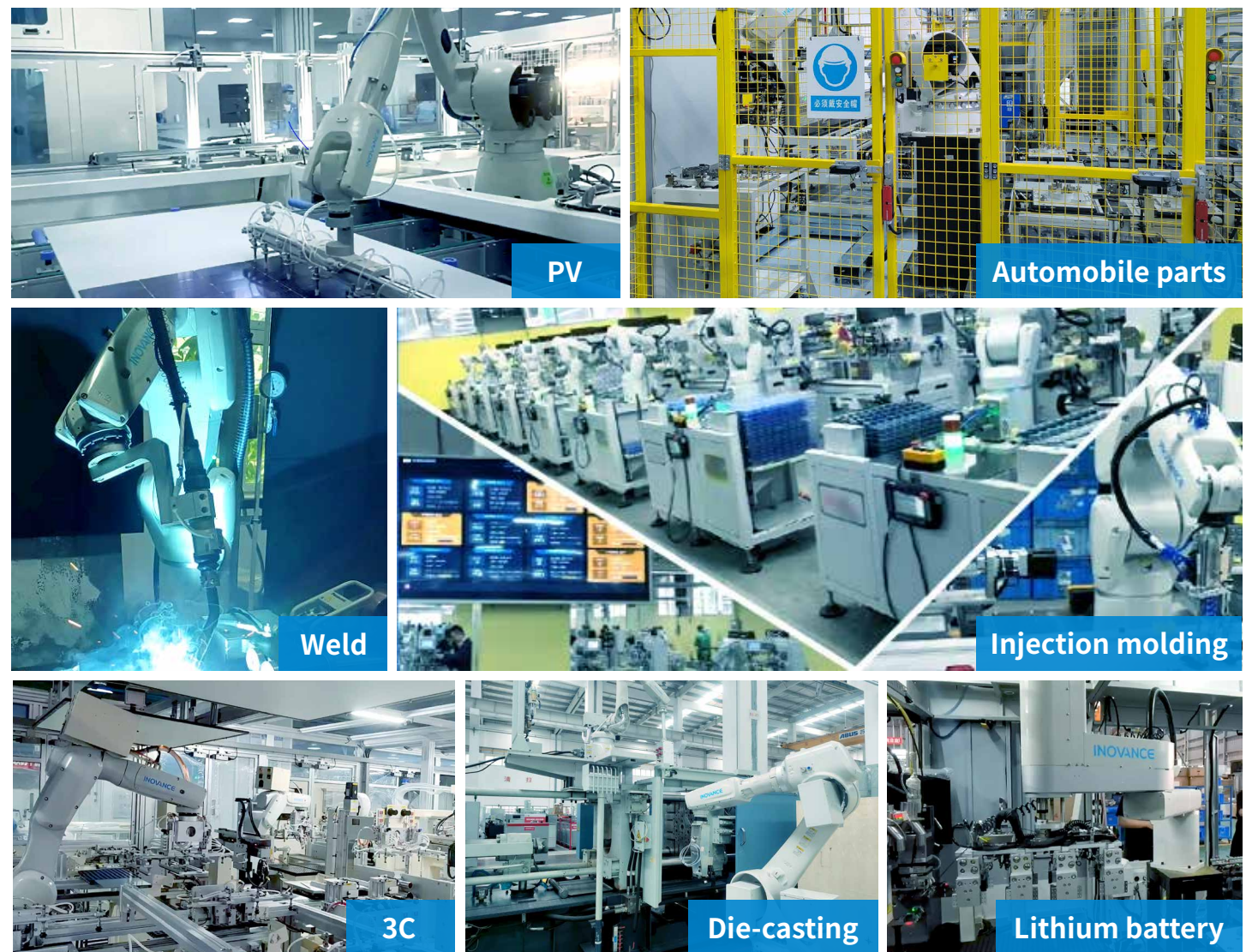
Teach Pendant Expansion Card



Teach Pendant Model	IRTP80-L5-INT
cable length	5m
screen	7-inch TFT-LCD, Touch screen operation, function keys
IP rating	IP54

Expansion Card Model	IRCB501-0016ETND-BD	IRCB501-1600END-BD	IRCB501-2ENID-BD	IRCB501-2PN-BD	IRCB501-FS-01-BD
Description	General I/O expansion card with 16 NPN outputs	General I/O expansion card with 16 inputs	2-channel differential input incremental encoder expansion card	PROFINET expansion card	Safety function expansion card
Matching controller	IRCB501 Series, IRCB501 High-protection Series				

Robot application scenarios



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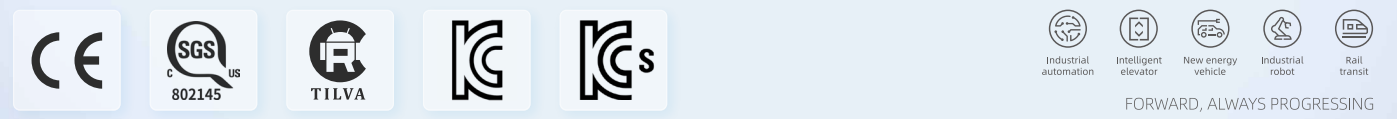
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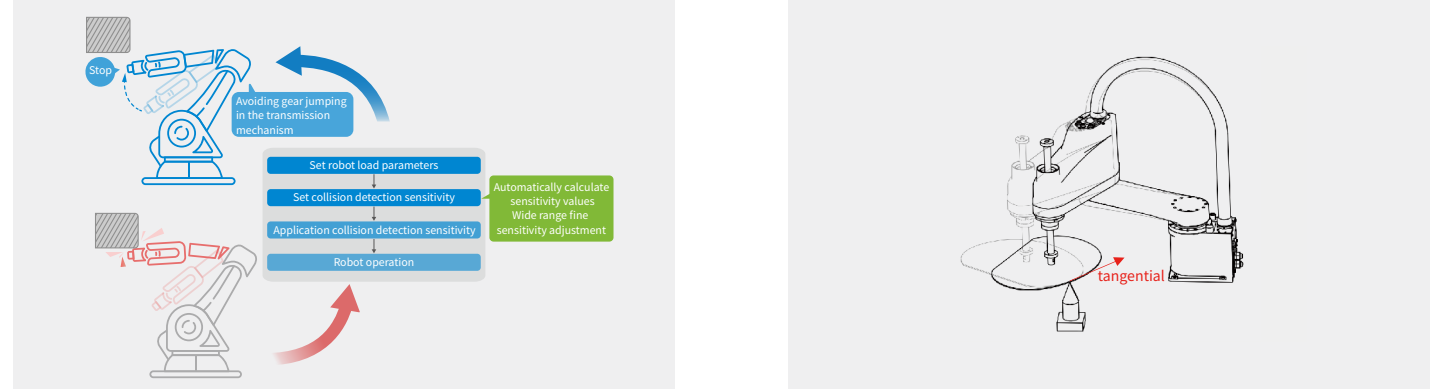
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INOVANCE ROBOT



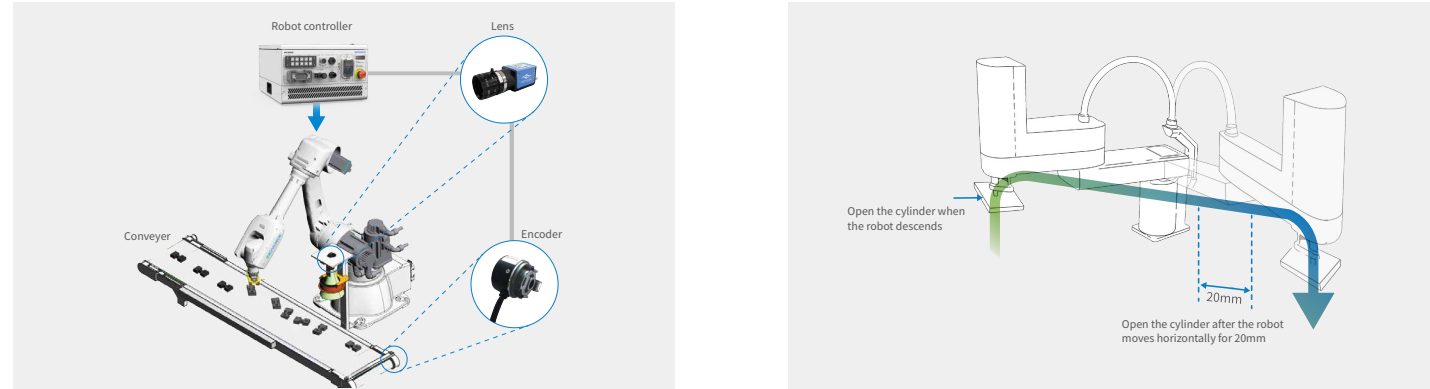
Robot controller functions



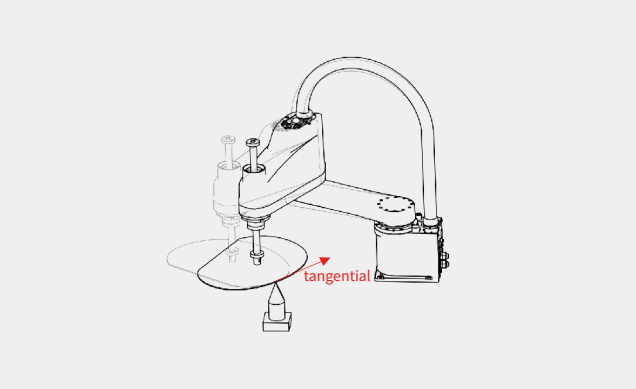
Collision detection
Real time detection of the robot's operating status can effectively avoid gear jumping caused by robot collisions at low speeds, and achieve rapid stopping at high speeds, reducing damage to the robot and equipment caused by collisions.



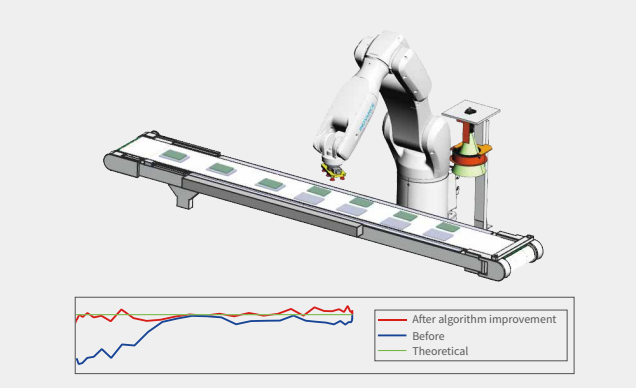
Vibration reduction
It can effectively reduce the shaking caused by resonance, eccentric load, and large load during the robot's movement process, making the robot's movement more stable and still ensuring excellent production performance during high-speed and high-precision operations.



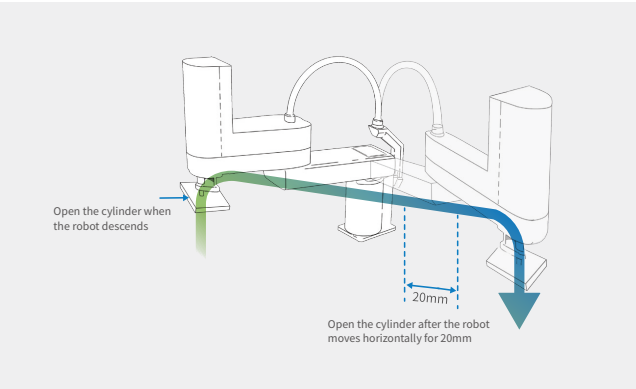
Dynamic following function
Whether it's a single product or multiple products of different types, colors, and sizes, it's easy to handle, switching between assembly line products with just one click. In situations where multiple machines are sorting at the same time, a set of vision can drive multiple robots, reducing the overall cost of the line.



Curve interpolation and fixed tool function
Even in situations where tools are fixed and robots hold workpieces for work, they can perform arbitrary curve interpolation according to requirements, and are widely used in processes such as gluing, polishing, and sewing. On the assembly line, interpolation of the trajectory in the following state can also be completed.



High precision
Fully considering the influence of the robot's body structure, external factors, and visual system on the robot's motion accuracy, high-precision control algorithms are adopted to meet the high-precision applications of loading, unloading, and fitting. This algorithm is also applicable to continuous motion trajectories.



Dynamatic I/O
In the robot motion path, precise control of IO opening and closing actions can be carried out based on actual conditions, which is widely used in detection, high-speed transportation, dispensing, laser and other occasions. IO control can be specified based on the position, time, and distance of the movement.

Technical Data



Series		IR-S4	IR-S7			IR-S10			IR-S20		IR-GS20		IR-S50	IR-TS4	IR-TS5	
Model		IR-S4-40Z15S-INT	IR-S7-50Z20S-INT	IR-S7-60Z20S-INT	IR-S7-70Z20S3-INT	IR-S10-60Z20S-INT	IR-S10-70Z20S-INT	IR-S10-80Z20S-INT	IR-S20-80Z42S-INT	IR-S20-100Z42S-INT	IR-GS20-80Z42S-INT	IR-GS20-100Z42S-INT	IR-S50-120Z40S-INT	IR-TS4-35Z15S-INT	IR-TS5-55Z15S-INT	
Code		-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arm length	J1+J2(mm)	400	500	600	700	600	700	800	800	1000	800	1000	1200	350	550	
	J1(mm)	225	225	325	425	225	325	425	350	550	350	550	600	175	275	
	J2(mm)	175	275	275	275	375	375	375	450	450	450	450	600	175	275	
Maximum speed	J1+J2(mm/s)	7200	7120	7850	8590	9100	9800	10500	9550	10800	9550	10800	7400	6180	9712	
	J3(mm/s)	1300	1600	1600	1600	1600	1600	1600	1010	1010	1010	1010	750	1300	1300	
	J4(°/s)	2600	2000	2000	2000	2700	2700	2700	705	705	705	705	600	2600	2000	
Repeatability	J1+J2(mm)	±0.01	±0.02	±0.02	±0.02	±0.02	±0.02	±0.025	±0.04	±0.04	±0.04	±0.04	±0.05	±0.01	±0.015	
	J3(mm)	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.02	±0.01	±0.01	
	J4(°)	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.005	±0.01	±0.01	
Load	Rated(kg)	2	3	3	3	5	5	5	10	10	10	10	-	2	2	
	Maximum(kg)	4	7	7	7	10	10	10	20	20	20	20	50	4	5	
Permissible moment inertia of J4	Rated(kg·m ²)	0.005	0.01	0.01	0.01	0.02	0.02	0.02	0.5	0.5	0.5	0.5	-	0.005	0.01	
	Maximum(kg·m ²)	0.05	0.12	0.12	0.12	0.3	0.3	0.3	1	1	1	1	2.45	0.05	0.12	
Mounting base dimensions(mm)		120×120(4-Φ9)	150×150(4-Φ9)	150×150(4-Φ9)	150×150(4-Φ9)	150×150(4-Φ9)	150×150(4-Φ9)	150×150(4-Φ9)	200×200(4-Φ16)	200×200(4-Φ16)	200×200(4-Φ16)	200×200(4-Φ16)	200×200(4-Φ14)	95×95×160(6-Φ6.6)	95×95×160(6-Φ6.6)	
Cable		Stand:3m/5m/10m/15m High Flexible:3m/5m/10m/15m							Stand:3m/5m/10m/15m High Flexible:3m/5m/10m/15m							
Weight(excluding cables)		12kg	17kg	17.5kg	19kg	18.5kg	19kg	20.5kg	53kg	56kg	54kg	57kg	136kg	18.5kg	20kg	
Press-in force of J3		100N	150N	150N	150N	200N	200N	200N	250N	250N	250N	250N	-	100N	150N	
Customer signal line		15 (15pin:D-sub) /15 (15pin:D-sub)							9(9 pin:D-sub), 15(15 pin:D-sub)					15 (15pin:D-sub)		
		CAT5E							CAT5E					CAT5E		
Customer air piping		Φ6 mm × 2, 0.59 Mpa							Φ6 mm × 2, 0.59 Mpa (6 kgf/cm2:86 psi)				Φ6 mm × 3, 0.59 Mpa		Φ6 mm × 2, 0.59 Mpa	
		Φ4 mm × 1, 0.59 Mpa							Φ4 mm × 2, 0.59 Mpa (6 kgf/cm2:86 psi)				Mpa		Φ4 mm × 1, 0.59 Mpa	
Operating conditions	Ambient temperature ^[1]	5~40° C (no excessive temperature changes)							5~40° C (no excessive temperature changes)							
	Relative humidity	10~80%							10~80%							
Shipment Conditions	Ambient temperature	-10°C ~55°C							-10°C ~55°C							
	Relative humidity	≤ 80% RH,non-condensing							≤ 80% RH,non-condensing							
Storage Conditions	Ambient temperature	-10°C ~55°C							-10°C ~55°C							
	Relative humidity	≤ 80% RH,non-condensing							≤ 80% RH,non-condensing							
Noise level ^[2]		Laeq=70dB(A)							Laeq=70dB(A)					Laeq=70dB(A)		
Maximum motion range	J1(°)	±132	±132	±132	±132	±132	±132	±132	±132	±132	±132	±132	±128	±225	±225	
	J2(°)	±141	±150	±150	±150	±150	±150	±150	±152	±152	±152	±152	±150	±225	±225	
	J3(mm)	150	200	200	200	200	200	200	420	420	420	420	400	150	150	
	J4(°)	±360	±360	±360	±360	±360	±360	±360	±360	±360	±360	±360	±360	±720	±720	
Standard cycle time(s) ^[3]		0.342	0.351	0.36	0.375	0.361	0.386	0.416	0.36	0.38	0.36	0.38	0.84	0.306	0.351	
Certification		CE,cSGSus,KCs,Kc							CE,cSGSus,KCs,Kc					CE,cSGSus,KCs,Kc		

- Note
- [1] If this product is used in a low temperature environment close to the lowest temperature of the product specification, or if it is suspended for a long time due to holidays and nights, it is recommended to warm up for 10 minutes before running
- [2] Noise test conditions: 4 joint linkage, 100% speed and acceleration, duty cycle 50%, measurement position: the front of the robot, 1000mm away from the action area, and more than 50mm from the base mounting surface.
- [3] Standard cycle time for 4kg SCARA: 1kg load, the time required for the robot to go back and forth with a gate command (300 mm horizontally, 25 mm vertically)
 Standard cycle time for 7kg/10kg SCARA : 2kg load, the time required for the robot to go back and forth with a gate command (300 mm horizontally, 25 mm vertically)
 Standard cycle time for 20kg SCARA : 2kg load, the time required for the robot to go back and forth with a gate command (300 mm horizontally, 25 mm vertically)
 Standard cycle time for 50kg SCARA : 5kg load, the time required for the robot to go back and forth with a gate command (300 mm horizontally, 25 mm vertically)
 Standard cycle time for 4kg/5kg Inverted SCARA : 1kg load, the time required for the robot to go back and forth with a gate command (300 mm horizontally, 25 mm vertically)

Technical Data



Series		IR-R4	IR-R4H	IRS311-7		IR-R11	IR-R10		IR-R20	
Model		IR-R4-56S-INT	IR-R4H-54S-INT	IRS311-7-70TS-INT	IRS311-7-90TS-INT	IR-R11-90S-INT	IR-R10-110S-INT	IR-R10-140S-INT	IR-R20-170S-INT	
Code		-	-	-	-	-	-	-	-	
Structural style		Vertical axis cascading structure				Vertical axis cascading structure				
Number of Axes		6 axes				6 axes				
Maximum reach (mm)		560.6	545.7	717	911	901.9	1101.6	1422	1723	
Repeatability (mm)		±0.01	±0.02	±0.02	±0.03	±0.02	±0.02	±0.05	±0.05	
Maximum Load(kg)		4	4	7	7	11.3	10	10	20	
IP rating		IP40 (IP67 optional)	IP40 (IP67 optional)	IP65	IP65	IP40	IP40	Body:IP65 Wrist:IP67	Body:IP65 Wrist:IP67	
Max.Speed	J1 (°/s)	450	450	450	300	300	300	200	190	
	J2 (°/s)	460	460	380	280	225	225	200	175	
	J3 (°/s)	520	520	520	360	330	330	200	200	
	J4 (°/s)	560	560	550	550	450	450	375	400	
	J5 (°/s)	560	560	550	550	420	420	375	360	
	J6 (°/s)	900	900	1000	620	720	720	600	610	
Maxi-mummotion range	J1 (°)	±170	±170	±170	±170	±170	±170	±170	±170	
	J2 (°)	-120~+110	-120~+110	-135~+80	-125~+80	-135~+100	-135~+100	-160~+60	-155~+80	
	J3 (°)	-69~+205	-65~+195	-70~+190	-70~+190	-66~+210	-66~+210	-80~+160	-75~+160	
	J4 (°)	±190	±190	±190	±190	±190	±190	±180	±180	
	J5 (°)	±120	±120	±120	±120	±125	±125	±140	±140	
	J6 (°)	±360	±360	±360	±360	±360	±360	±360	±360	
Allowed wrist torque	J4 (N·m)	8.86	8.86	16.6	16.6	20.45	18.59	22	42	
	J5 (N·m)	8.86	8.86	16.6	16.6	20.45	18.59	22	42	
	J6 (N·m)	4.9	4.9	9.4	9.4	10.8	9.8	10	20	
Allowed wrist inertia	J4 (N·m)	0.2	0.2	0.47	0.47	0.6	0.6	0.63	1.18	
	J5 (N·m)	0.2	0.2	0.47	0.47	0.6	0.6	0.63	1.18	
	J6 (N·m)	0.067	0.067	0.15	0.15	0.2	0.2	0.2	0.5	
Customer connections	Wiring	12 signal lines 30V 0.5A	12 signal lines 30V 0.5A, 8 signal lines 30V 0.2A	12 signal lines 30V 0.5A	12 signal lines 30V 0.5A	12 signal lines 30V 0.5A	12 signal lines 30V 0.5A	18 signal lines 30V 0.5A	18 signal lines 30V 0.5A	
	Air	Φ4 mm × 4, 0.59 Mpa	Φ4 mm × 4, 0.59 Mpa	Φ4 mm × 2, 0.59 Mpa	Φ4 mm × 2, 0.59 Mpa	Φ4 mm × 4, 0.59 Mpa	Φ4 mm × 4, 0.59 Mpa	Φ8 mm × 1, 0.59 Mpa	Φ8 mm × 1, 0.59 Mpa	
Operating conditions	Ambient temperature(°C)	0~45				0~45				
	Relative humidity	5% to 95% RH (non-condensing)	5% to 95% RH (non-condensing)	5% to 95% RH (non-condensing)	5% to 95% RH (non-condensing)	5% to 95% RH (non-condensing)	5% to 95% RH (non-condensing)	10% to 80% RH (non-condensing)	10% to 80% RH (non-condensing)	
	Maximum Temperature Gradient(°C/min)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Shipment Conditions	Ambient temperature(°C)	-10~55				0~45				
	Relative humidity	≤ 95% RH,non-condensing				≤ 80% RH,non-condensing				
Storage Conditions	Ambient temperature(°C)	-10~55				0~45				
	Relative humidity	≤ 95% RH,non-condensing				≤ 80% RH,non-condensing				
Cable		Stand:3m/5m/10m/15m High Flexible:3m/5m/10m/15m				Stand:3m/5m/10m/15m High Flexible:3m/5m/10m/15m		Stand:3m/5m/10m/15m	Stand:3m/5m/10m/15m High Flexible:5m/10m/15m	
Weight		24kg	24.5kg	38kg	40kg	45kg	48kg	130kg	245kg	
Controller		IRCB501 Series				IRCB501 Series		IRCB501 High-Protection Series		
Mounting mode		Floor mounted				Floor mounted				
Certification		CE,cSGSus,KCs,Kc				CE,cSGSus,KCs,Kc				