

# INOVANCE

## Industrial Robots Overview

A robot for every application



### Features & functions

- Excellent performance and fast cycle times
- Multiple fieldbus interfaces
- Lighter and more compact body
- Intuitive and easy to use

EtherCAT<sup>®</sup>

EtherNet/IP<sup>™</sup>

PROFI<sup>®</sup>  
NET

Modbus

CE

SGS  
US  
802145

K<sub>s</sub>

K

# 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 slave IN-OUT interface: EtherCAT slave interface		
	EtherCAT master OUT interface: EtherCAT master to control 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		
Control mode	Different control options: Windows application, teach pendant, Modbus TCP, windows API.		
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)	Temperature: 0° C to 45° C Relative humidity: 20% to 95% RH@30° C (non-condensing)	
Dimensions	Standard 330 mm × 338.5 mm × 130 mm	High-Power 330 mm × 400 mm × 130 mm	445 mm × 575 mm × 276 mm
	Weight	8 kg	
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



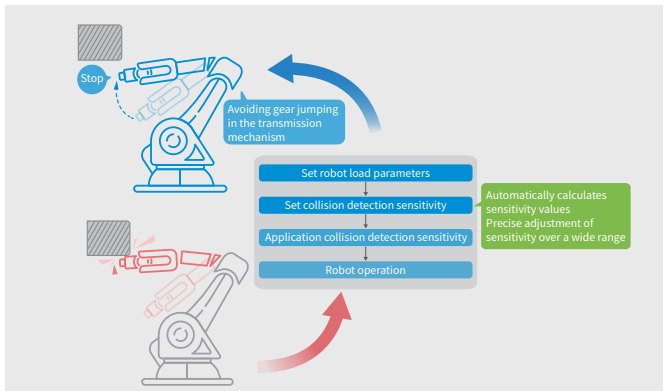
Teach Pendant Model	IRTP80-L5-INT
Cable length	5m
Screen	7-inch TFT-LCD, Touch screen operation, function keys
IP rating	IP54

## Expansion Card



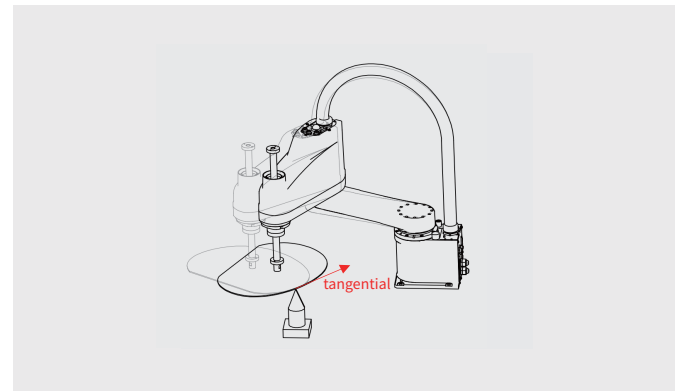
Expansion Card Model	IRCB501-0016ETND-BD	IRCB501-1600END-BD	IRCB501-2ENID-BD	IRCB501-2PN-BD	IRCB501-FS-01-BD
Description	General I/O expansion card with 16 NPN outputs	General I/O expansion card with 16 inputs	2-channel differential input incremental encoder expansion card	PROFINET expansion card	Safety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

# Robot controller functions



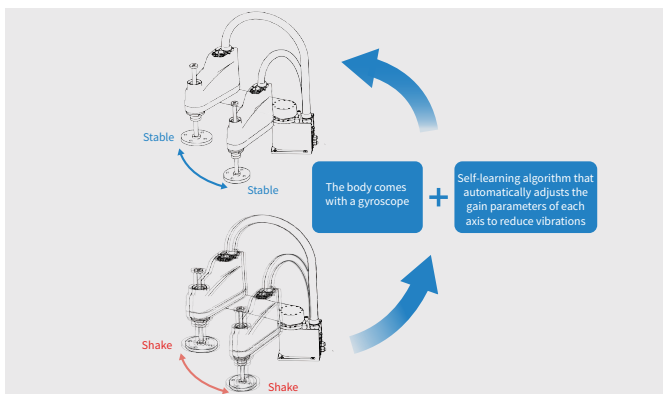
## Collision detection

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.



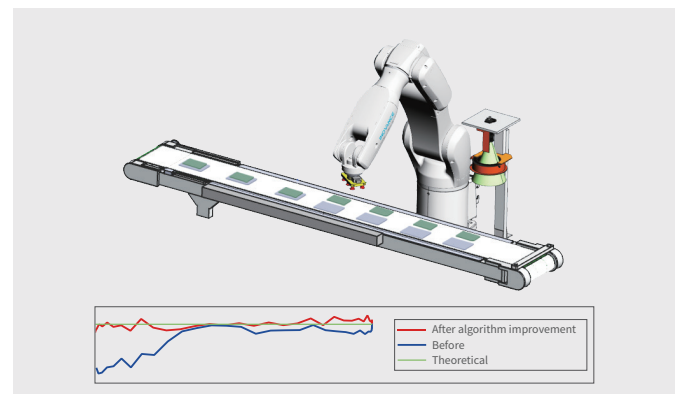
## External centre point (ECP)

When the tool is at a fixed point and the robot is holding the workpiece, it is possible to perform precise interpolations to follow the contour of the workpiece using the position of the fixed tool as the central point. Thanks to the ECP function, the teaching process is simplified in this type of application.



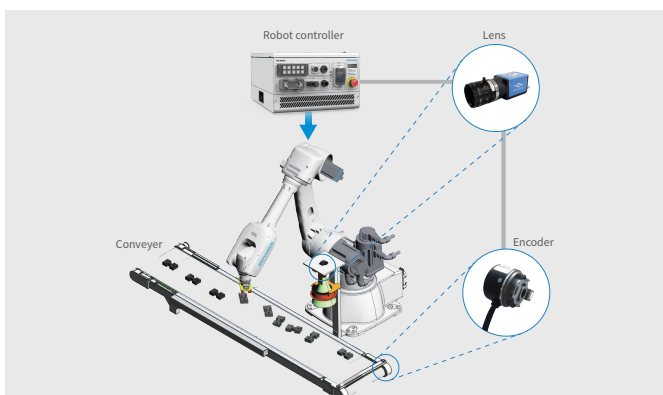
## Vibration reduction

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.



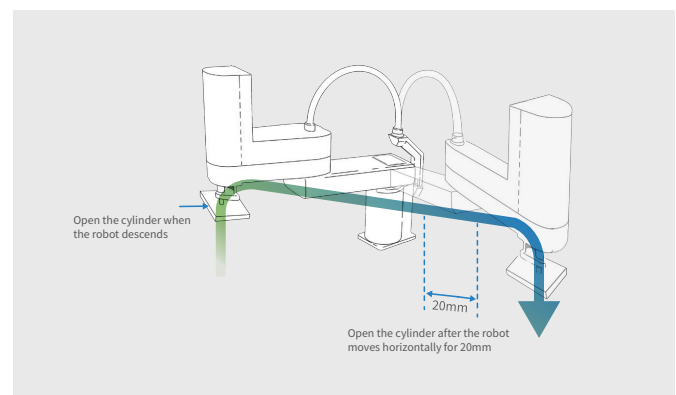
## High precision

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



## Dynamic following function

The optional external encoder card allows obtaining the movement speed of the parts to easily perform a pick & place on the fly. The robot is able to accurately follow the moving parts and with the help of artificial vision, pick up them without altering the production line.



## Synchronized I/Os

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

# Technical Data



Series		IR-S4	IR-S7			IR-S10	
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
Code		-	-	-	-	-	-
Arm length	J1+J2 (mm)	400	500	600	700	600	700
	J1 (mm)	225	225	325	425	225	325
	J2 (mm)	175	275	275	275	375	375
Maximum speed	J1+J2 (mm/s)	7200	7120	7850	8590	9100	9800
	J3 (mm/s)	1300	1600	1600	1600	1600	1600
	J4 (°/s)	2600	2000	2000	2000	2700	2700
Repeatability	J1+J2 (mm)	±0.01	±0.02	±0.02	±0.02	±0.02	±0.02
	J3 (mm)	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
	J4 (°)	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
Load	Rated (kg)	2	3	3	3	5	5
	Maximum (kg)	4	7	7	7	10	10
Permissible moment inertia of J4	Rated (kg·m <sup>2</sup> )	0.005	0.01	0.01	0.01	0.02	0.02
	Maximum (kg·m <sup>2</sup> )	0.05	0.12	0.12	0.12	0.3	0.3
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)
Cable		Stand: 3m/5m/10m/15m High Flexible: 3m/5m/10m/15m					
Weight (excluding cables)		12 kg	17 kg	17.5 kg	19 kg	18.5 kg	19 kg
Press-in force of J3		100N	150N	150N	150N	200N	200N
Customer signal line		15 (15pin: D-sub)/15 (15pin: D-sub) CAT5E					
Customer air piping		Φ6 mm × 2, 0.59 Mpa Φ4 mm × 1, 0.59 Mpa					
Operating conditions	Ambient temperature <sup>[1]</sup>	5~40° C (no excessive temperature changes)					
	Relative humidity	10~80%					
Shipment Conditions	Ambient temperature	-10°C ~55°C					
	Relative humidity	≤ 80% RH, non-condensing					
Storage Conditions	Ambient temperature	-10°C ~55°C					
	Relative humidity	≤ 80% RH, non-condensing					
Noise level <sup>[2]</sup>		Laeq=70dB(A)					
Maximum motion range	J1 (°)	±132	±132	±132	±132	±132	±132
	J2 (°)	±141	±150	±150	±150	±150	±150
	J3 (mm)	150	200	200	200	200	200
	J4 (°)	±360	±360	±360	±360	±360	±360
Standard cycle time (s) <sup>[3]</sup>		0.342	0.351	0.36	0.375	0.361	0.386
Certification		CE, cSGSus, KCs, Kc					

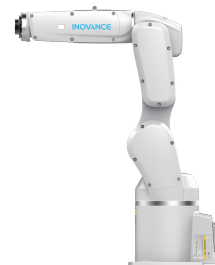
● Note

- [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)



	IR-S20		IR-GS20		IR-S50	IR-TS4	IR-TS5	
	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
	-	-	-	-	-	-	-	-
	800	800	1000	800	1000	1200	350	550
	425	350	550	350	550	600	175	275
	375	450	450	450	450	600	175	275
	10500	9550	10800	9550	10800	7400	6180	9712
	1600	1010	1010	1010	1010	750	1300	1300
	2700	705	705	705	705	600	2600	2000
	±0.025	±0.04	±0.04	±0.04	±0.04	±0.05	±0.01	±0.015
	±0.01	±0.01	±0.01	±0.01	±0.01	±0.02	±0.01	±0.01
	±0.01	±0.01	±0.01	±0.01	±0.01	±0.005	±0.01	±0.01
	5	10	10	10	10	-	2	2
	10	20	20	20	20	50	4	5
	0.02	0.5	0.5	0.5	0.5	-	0.005	0.01
	0.3	1	1	1	1	2.45	0.05	0.12
	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)
	Stand: 3m/5m/10m/15m High Flexible: 3m/5m/10m/15m							
	20.5 kg	53 kg	56 kg	54 kg	57 kg	136 kg	18.5 kg	20 kg
	200N	250N	250N	250N	250N	-	100N	150N
	9 (9 pin: D-sub), 15 (15 pin: D-sub)						15 (15pin:D-sub)	
							CAT5E	
	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 × 2, 0.59 Mpa (6 kgf/cm2:86 psi)						Φ4 mm × 1, 0.59 Mpa	
	5~40° C (no excessive temperature changes)							
	10~80%							
	-10°C ~55°C							
	≤ 80% RH, non-condensing							
	-10°C ~55°C							
	≤ 80% RH, non-condensing							
	Laeq=75dB(A)					Laeq=70dB(A)		
	±132	±132	±132	±132	±132	±128	±225	±225
	±150	±152	±152	±152	±152	±150	±225	±225
	200	420	420	420	420	400	150	150
	±360	±360	±360	±360	±360	±360	±720	±720
	0.416	0.36	0.38	0.36	0.38	0.84	0.306	0.351
	CE, cSGSus, KCs, Kc							

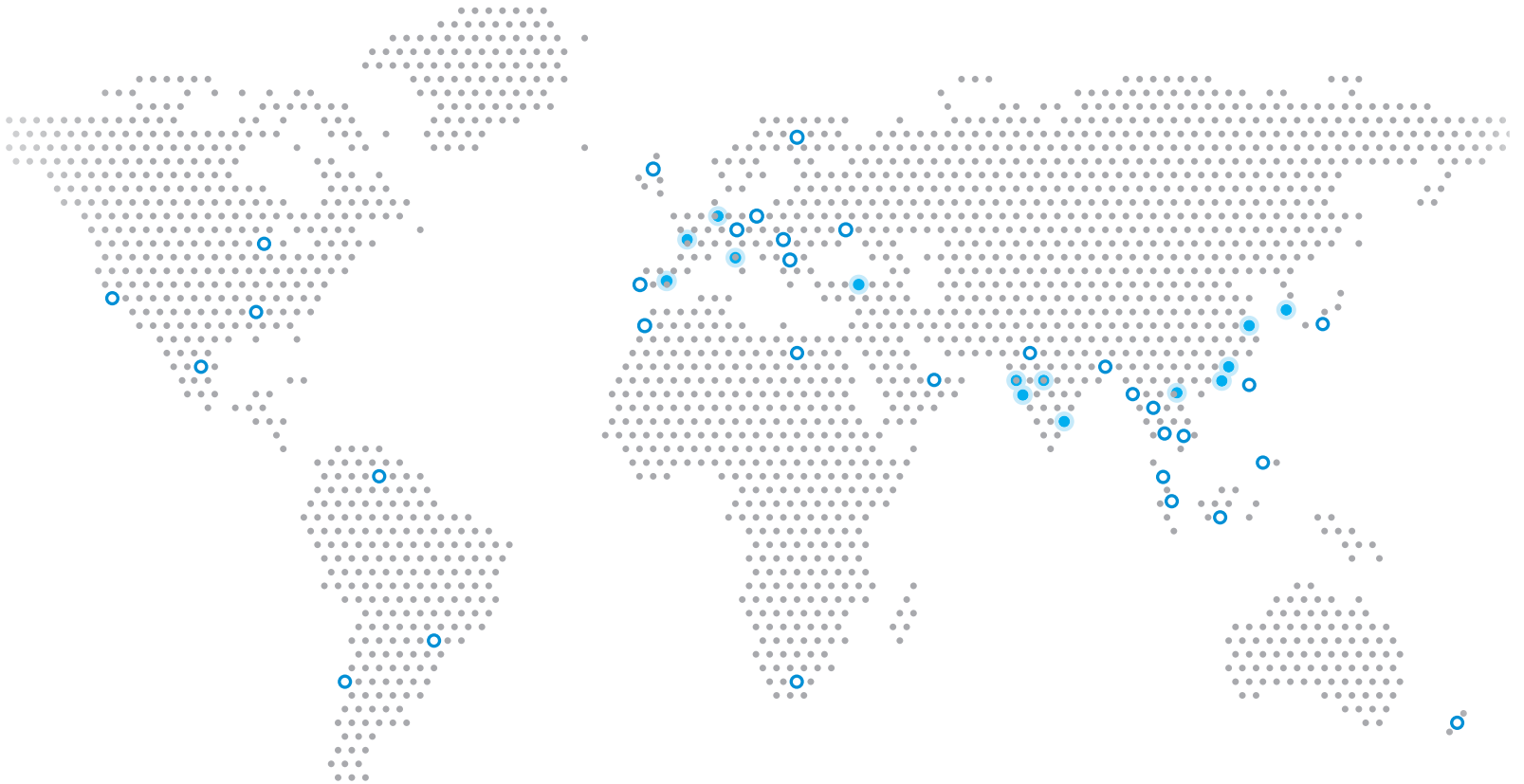
# Technical Data



Series		IR-R4	IR-R4H	IRS311-7	
Model		IR-R4-56S-INT	IR-R4H-54S-INT	IRS311-7-70TS-INT	IRS311-7-90TS-INT
Code		-	-	-	-
Structural style		Vertical axis cascading structure			
Number of axis		6 axes			
Maximum reach (mm)		560.6	545.7	717	911
Repeatability (mm)		±0.01	±0.02	±0.02	±0.03
Maximum load (kg)		4	4	7	7
IP rating		IP40 (IP67 optional)	IP40 (IP67 optional)	IP65	IP65
Max. speed	J1 (° /s)	450	450	450	300
	J2 (° /s)	460	460	380	280
	J3 (° /s)	520	520	520	360
	J4 (° /s)	560	560	550	550
	J5 (° /s)	560	560	550	550
	J6 (° /s)	900	900	1000	620
Maximum motion range	J1 (°)	±170	±170	±170	±170
	J2 (°)	-120~+110	-120~+110	-135~+80	-125~+80
	J3 (°)	-69~+205	-65~+195	-70~+190	-70~+190
	J4 (°)	±190	±190	±190	±190
	J5 (°)	±120	±120	±120	±120
	J6 (°)	±360	±360	±360	±360
Allowed wrist torque	J4 (N·m)	8.86	8.86	16.6	16.6
	J5 (N·m)	8.86	8.86	16.6	16.6
	J6 (N·m)	4.9	4.9	9.4	9.4
Allowed wrist inertia	J4 (N·m)	0.2	0.2	0.47	0.47
	J5 (N·m)	0.2	0.2	0.47	0.47
	J6 (N·m)	0.067	0.067	0.15	0.15
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
	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
Operating conditions	Ambient temperature (° C)	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)
	Maximum temperature gradient (° C/min)	1.5	1.5	1.5	1.5
Shipment conditions	Ambient temperature (° C)	-10~55			
	Relative humidity	≤ 95% RH, non-condensing			
Storage conditions	Ambient temperature (° C)	-10~55			
	Relative humidity	≤ 95% RH, non-condensing			
Cable		Stand: 3m/5m/10m/15m High Flexible: 3m/5m/10m/15m			
Weight		24 kg	24.5 kg	38 kg	40 kg
Controller		IRCB501 Series			
Mounting mode		Floor mounted			
Certification		CE, cSGSus, KCs, Kc			



IR-R11	IR-R10			IR-R20
IR-R11-90S-INT	IR-R10-110S-INT	IR-R10-140S-INT	IR-R10-200S-INT	IR-R20-170S-INT
Vertical axis cascading structure				
6 axes				
901.9	1101.6	1422	2045	1723
±0.02	±0.02	±0.05	±0.05	±0.05
11.3	10	10	10	20
IP40	IP40	Body: IP65 Wrist: IP67	Body: IP65 Wrist: IP67	Body: IP65 Wrist: IP67
300	300	200	190	190
225	225	200	175	175
330	330	200	200	200
450	450	375	400	400
420	420	375	360	360
720	720	600	610	610
±170	±170	±170	±170	±170
-135~+100	-135~+100	-160~+60	-155~+80	-155~+80
-66~+210	-66~+210	-80~+160	-75~+160	-75~+160
±190	±190	±180	±180	±180
±125	±125	±140	±140	±140
±360	±360	±360	±360	±360
20.45	18.59	22	22	42
20.45	18.59	22	22	42
10.8	9.8	9.8	10	20
0.6	0.6	0.63	1	1.18
0.6	0.6	0.63	1	1.18
0.2	0.2	0.2	0.2	0.5
12 signal lines 30V 0.5A	12 signal lines 30V 0.5A	18 signal lines 30V 0.5A	18 signal lines 30V 0.5A	18 signal lines 30V 0.5A
Φ4 mm × 4, 0.59 Mpa	Φ4 mm × 4, 0.59 Mpa	Φ8 mm × 1, 0.59 Mpa	Φ8 mm × 1, 0.59 Mpa	Φ8 mm × 1, 0.59 Mpa
0~45				
5% to 95% RH (non-condensing)	5% to 95% RH (non-condensing)	10% to 80% RH (non-condensing)	10% to 80% RH (non-condensing)	10% to 80% RH (non-condensing)
1.5	1.5	1.5	1.5	1.5
0~45				
≤ 80% RH, non-condensing				
0~45				
≤ 80% RH, non-condensing				
	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
45 kg	48 kg	130 kg	245 kg	240 kg
IRCB501 Series		IRCB501 High-Protection Series		
Floor mounted				
CE, cSGSus, KCs, Kc				



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