

Functional Safety

Certificate No. FS/SHFS2407000346MD

Certificate Holder: Suzhou Inovance Technology Co., Ltd.
No.52, Tian E Dang Road, Wuzhong District, 215104, Suzhou City, Jiangsu Province, P.R. China.

Manufacturer: Suzhou Inovance Technology Co., Ltd.
No.52, Tian E Dang Road, Wuzhong District, 215104, Suzhou City, Jiangsu Province, P.R. China.

Trademarks: **INOVANCE**

Certified Product: Industrial Robot
Model (s) No. / Series: Refer to APPENDIX II

Assessment Performed: ISO 13849-1:2023, EN ISO 13849-1:2015

Conclusion: The safety architecture and performance level meet PL d with Cat. 3 according to ISO 13849-1:2023 & EN ISO 13849-1:2015, detail information of safety function items is shown in APPENDIX I.

As shown in the technical report number(s): SHFS240700034671

This certificate confirms the achievement of the requirements of functional safety based on proof of the safety-related parameters (failure rate, MTTF_D / PFH, safety architecture etc), proofs that processes, and methods are established at the manufacturer guaranteeing that unexceptionable processes in terms of risk analysis, design, production, validation, modification and quality management comply with the standard.

This certificate is issued by the company under its General Conditions for Certification Services accessible at <https://www.sgs.com/en/terms-and-conditions>. Attention is drawn to the limitations of liability defined therein and in the Test Report here above mentioned which findings are reflected in this Certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Authorized by:

Effective date:

30/07/2024



Andrew Zhai
Technical Manager

APPENDIX I

Supplementary of Functional Safety Certificate

Certificate No. FS/SHFS2407000346MD

Summary of Assessment Result in ISO 13849-1 report:

SF	Item & Description	Category & PL Achieved	Response Time	MTTF _D (years)	CCF	PFH	Safe State
SF1	System Emergency Stop	PL d with Cat. 3 DC ≥ 90%	20ms	93	75	4.94×10^{-8}	Cat. 0 STOP
SF2	System Protective stop		20ms	93	75	4.94×10^{-8}	Cat. 0 STOP
SF3	External Emergency Stop		Cat. 0 stop: 50ms	127	75	4.29×10^{-8}	Cat. 0 STOP / Cat. 1 STOP
SF4	External Protective stop		Cat. 1 stop: 1000ms	127	75	4.29×10^{-8}	Cat. 0 STOP / Cat. 1 STOP
SF5	Robot Estop Status Output		10ms	369	75	4.29×10^{-8}	DO Output Low
SF6	Robot Moving Status Output		10ms	84	75	5.79×10^{-8}	
SF7	Robot Stopping Status Output		10ms	84	75	5.79×10^{-8}	
SF8	Safe State Status Output		10ms	728	75	4.29×10^{-8}	
SF9	Safety Manual Mode		Cat. 0 stop: 50ms Cat. 1 stop: 1000ms	59	75	1.03×10^{-7}	Cat. 0 STOP / Cat. 1 STOP
SF10	Joint Position Monitor			109	75	4.29×10^{-8}	Cat. 0 STOP / Cat. 1 STOP
SF11	Joint Speed Monitor			109	75	4.29×10^{-8}	Cat. 0 STOP / Cat. 1 STOP
SF12	TCP Position Monitor			59	75	1.03×10^{-7}	Cat. 0 STOP / Cat. 1 STOP
SF13	TCP Speed Monitor			59	75	1.03×10^{-7}	Cat. 0 STOP / Cat. 1 STOP
SF14	3-Position Enabling Function		500ms	149	75	4.29×10^{-8}	Brake action

APPENDIX II

Supplementary of Functional Safety Certificate

Certificate No. FS/SHFS2407000346MD

Model description of product:

Product Description	Model	Manipulator model	Cabinet Model	Model	Manipulator model	Cabinet Model
Medium Cabinet	IR-S4-40Zbcd(*)-INT	IRB-S4-40Zbcd(*)-INT	IRCB501-4MD(*)-INT	IR-S7-aZbcd(*)-INT	IRB-S7-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-GS10-aZbcd(*)-INT	IRB-GS10-aZbcd(*)-INT	IRCB501-4MD(*)-INT	IR-S10-aZbcd(*)-INT	IRB-S10-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-S20-aZbcd(*)-INT	IRB-S20-aZbcd(*)-INT	IRCB501-4MD(*)-INT	IR-GS20-aZbcd(*)-INT	IRB-GS20-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-S25-aZbcd(*)-INT	IRB-S25-aZbcd(*)-INT	IRCB501-4MD(*)-INT	IR-GS25-aZbcd(*)-INT	IRB-GS25-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-S30-aZbcd(*)-INT	IRB-S30-aZbcd(*)-INT	IRCB501-4MD(*)-INT	IR-GS30-aZbcd(*)-INT	IRB-GS30-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-S35-aZbcd(*)-INT	IRB-S35-aZbcd(*)-INT	IRCB501-4MD(*)-INT	IR-GS35-aZbcd(*)-INT	IRB-GS35-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-CS3-40Zbcd(*)-INT	IRB-CS3-40Zbcd(*)-INT	IRCB501-4MD(*)-INT	IR-CS6-aZbcd(*)-INT	IRB-CS6-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-CS10-aZbcd(*)-INT	IRB-CS10-aZbcd(*)-INT	IRCB501-4MD(*)-INT	IR-CS20-aZbcd(*)-INT	IRB-CS20-aZbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-CS50-120Zbcd(*)-INT	IRB-CS50-120Zbcd(*)-INT	IRCB501-4MD(*)-INT	IR-CTS3-35Zbcd(*)-INT	IRB-CTS3-35Zbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-CTS4-35Zbcd(*)-INT	IRB-CTS4-35Zbcd(*)-INT	IRCB501-4MD(*)-INT	IR-C8-62Zbcd(*)-INT	IRB-C8-62Zbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-TS4-35Zbcd(*)-INT	IRB-TS4-35Zbcd(*)-INT	IRCB501-4MD(*)-INT	IR-TS5-55Zbcd(*)-INT	IRB-TS5-55Zbcd(*)-INT	IRCB501-4MD(*)-INT
	IRS111-3-aZbTSd(*)-INT	IRB111-3-aZbTSd(*)-INT	IRCB501-4MD(*)-INT	IRS111-10-50ZbTSd(*)-INT	IRB111-10-50ZbTSd(*)-INT	IRCB501-4MD(*)-INT
	IRS111-20-aZbTSd(*)-INT	IRB111-20-aZbTSd(*)-INT	IRCB501-4MD(*)-INT	IR-S50-120Zbcd(*)-INT	IRB-S50-120Zbcd(*)-INT	IRCB501-4MD(*)-INT
	IR-GS50-120Zbcd(*)-INT	IRB-GS50-120Zbcd(*)-INT	IRCB501-4MD(*)-INT	/	/	/
Small Cabinet	IR-S4-40Zbcd(*)-INT	IRB-S4-40Zbcd(*)-INT	IRCB501-4AD(*)-INT	IR-S7-aZbcd(*)-INT	IRB-S7-aZbcd(*)-INT	IRCB501-4CD(*)-INT
	IR-GS10-aZbcd(*)-INT	IRB-GS10-aZbcd(*)-INT	IRCB501-4CD(*)-INT	IR-S10-aZbcd(*)-INT	IRB-S10-aZbcd(*)-INT	IRCB501-4CD(*)-INT
	IR-S7-60Z20S3-C2	IRB-S7-60Z20S3-C2	IRCB501-4CD(*)-INT	IR-S20-aZbcd(*)-INT	IRB-S20-aZbcd(*)-INT	IRCB501-4ED(*)-INT
	IR-GS20-aZbcd(*)-INT	IRB-GS20-aZbcd(*)-INT	IRCB501-4ED(*)-INT	IR-S25-aZbcd(*)-INT	IRB-S25-aZbcd(*)-INT	IRCB501-4ED(*)-INT
	IR-GS25-aZbcd(*)-INT	IRB-GS25-aZbcd(*)-INT	IRCB501-4ED(*)-INT	IR-S30-aZbcd(*)-INT	IRB-S30-aZbcd(*)-INT	IRCB501-4ED(*)-INT
	IR-GS30-aZbcd(*)-INT	IRB-GS30-aZbcd(*)-INT	IRCB501-4ED(*)-INT	IR-S35-aZbcd(*)-INT	IRB-S35-aZbcd(*)-INT	IRCB501-4ED(*)-INT
	IR-GS35-aZbcd(*)-INT	IRB-GS35-aZbcd(*)-INT	IRCB501-4ED(*)-INT	IR-CS3-40Zbcd(*)-INT	IRB-CS3-40Zbcd(*)-INT	IRCB501-4AD(*)-INT

Product Description	Model	Manipulator model	Cabinet Model	Model	Manipulator model	Cabinet Model
	IR-CS6-aZbcd(*)-INT	IRB-CS6-aZbcd(*)-INT	IRCB501-4CD(*)-INT	IR-CS10-aZbcd(*)-INT	IRB-CS10-aZbcd(*)-INT	IRCB501-4CD(*)-INT
	IR-CS20-aZbcd(*)-INT	IRB-CS20-aZbcd(*)-INT	IRCB501-4ED(*)-INT	IR-CS50-120Zbcd(*)-INT	IRB-CS50-120Zbcd(*)-INT	IRCB501-4ED(*)-INT
	IR-CTS3-35Zbcd(*)-INT	IRB-CTS3-35Zbcd(*)-INT	IRCB501-4CD(*)-INT	IR-CTS4-35Zbcd(*)-INT	IRB-CTS4-35Zbcd(*)-INT	IRCB501-4CD(*)-INT
	IR-C8-62Zbcd(*)-INT	IRB-C8-62Zbcd(*)-INT	IRCB501-4ED(*)-INT	IR-TS4-35Zbcd(*)-INT	IRB-TS4-35Zbcd(*)-INT	IRCB501-4CD(*)-INT
	IR-TS5-55Zbcd(*)-INT	IRB-TS5-55Zbcd(*)-INT	IRCB501-4CD(*)-INT	IRS111-3-aZbTSd(*)-INT	IRB111-3-aZbTSd(*)-INT	IRCB501-4AD(*)-INT
	IRS111-10-50ZbTSd(*)-INT	IRB111-10-50ZbTSd(*)-INT	IRCB501-4CD(*)-INT	IRS111-20-aZbTSd(*)-INT	IRB111-20-aZbTSd(*)-INT	IRCB501-4CD(*)-INT
	IR-S50-120Zbcd(*)-INT	IRB-S50-120Zbcd(*)-INT	IRCB501-4ED(*)-INT	IR-GS50-120Zbcd(*)-INT	IRB-GS50-120Zbcd(*)-INT	IRCB501-4ED(*)-INT

Note:

'a' stand for the Manipulator length; special: 54 stands for 54.5cm.

'b' should be 10-60 for the length of the 3axis Lead screw.

'c' should be the installation environment, C: clean, S: standard, P: high protection, F: die casting, WS: wall+ standard, WC: wall+ clean, WP: wall+ high protection, EX: explosionproof.

'd' should be 3-20 or blank for the towing cable length.

'(*)' may include a suffix "XXXXXXXXXX", Where "XXXXXXXXXX" can be blank or combination of any alphanumeric and/or symbols that represents customer identity.

Additional:

Pendant Models: IRTP80-Le (*), IRTP81-Le (*).

'e' should be 3-30 or blank for the towing cable length.

'(*)': may include a suffix "XXXXXXXXXX", Where "XXXXXXXXXX" can be blank or combination of any alphanumeric and/or symbols that represents customer identity.

Expansion board Models: IRCB501-2ENID-BD, IRCB501-1600END-BD, IRCB501-0016ETND-BD, IRCB501-FS-01-BD, IRCB501-2PN-BD, IRCB501-6LDI3-BD.