CERTIFICATE NO FS/71/220/25/1724

ZERTIFIKAT NR.:

LICENCE HOLDER
GENEHMIGUNGSINHABER

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

MANUFACTURING PLANT
FERTIGUNGSSTÄTTE

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

PROJECT NO/-ID
PROJEKT-NR/-ID

W077-AU01

LICENSED TEST MARK
GENEHMIGTES PRÜFZEICHEN

SGS TÜV SAAR FUNKTIONALE SICHERHEIT GEPRÜFT FUNCTIONAL SAFETY APPROVED

Technical REPORT NO.
TECHNISCHER BERICHT NR.

W0770001
W0770002

Tested according to
Geprüft nach

EN ISO 13849-1:2023/ EN ISO 13849-2:2012

Certified product(s)
Zertifizierte(s) Produkt(e)

Industrial Robot

Model(s)
Modell(e)

Detail model information sees APPENDIX II

Technical Data and Parameter
Technische Daten und Parameter

The product fulfils the requirements of functional safety according to above standards in accordance with PL d with Category 3.

Specific Requirements
Spezifische Anforderungen

This certificate confirms the achievement of the requirements based on the following proofs:

- Proof of systematic safety integrity for defined phases of the life cycle and techniques and measures acc. EN ISO 13849-1/-2.
- SF´s defined according to C-Standard, refer W0770001, W0770002
- Proof of the required safety-related parameters (failure rate, $MTTF_D$, DC, CCF, Category, PFH)
- Proofs that process and methods are established at the manufacturer guaranteeing that unexceptionable processes in terms of risk analysis, design, production, validation, change management and quality management comply with the safety-related standard.

Certification Body for Functional Safety SGS-TÜV Saar GmbH

The validation status is documented via SGS Certification Database.

The test mark regulation is an integral part of this certificate.

Munich, March 12, 2025

Robert Sammer

SGS-TÜV Saar GmbH, Benzstr. 28,
D-82178 Puchheim near Munich, Deutschland / *Germany.*

Website: www.sgs-tuv-saar.com/fs
E-Mail: fs@sgs.com

APPENDIX I

Supplementary of Functional Safety Certificate

Summary of Assessment Result in ISO 13849-1 Report:

General Technical Safety Parameters	Assessment Result
Performance Level	PL d
Category	Category 3
Diagnostic Coverage	DC ≥ 90%
Common Cause Failure	CCF = 75

Detail technical safety parameters for each safety functions are listed in the following table:

SF	Safety Function Name	$MTTF_D$ (years)		PFH (1/h)		Response Time	Safe State
		W077 0001	W0770 002	W0770001	W0770002		
SF1	System Emergency Stop	73	93	7.68×10^{-8}	4.94×10^{-8}	20ms	Cat. 0 STOP
SF2	System Protective Stop	73	93	7.68×10^{-8}	4.94×10^{-8}	20ms	Cat. 0 STOP
SF3	External Emergency Stop	92	127	4.94×10^{-8}	4.29×10^{-8}	50ms (Cat. 0 stop) 1000ms (Cat. 1 stop)	Cat. 0 STOP / Cat. 1 STOP
SF4	External Protective Stop	92	127	4.94×10^{-8}	4.29×10^{-8}		
SF5	System Emergency Stop Status Output	364	364	4.29×10^{-8}	4.29×10^{-8}	10ms	DO Output High-Z
SF6	Teach Pendant/Control Cabinet Emergency Stop Status Output	87	87	5.79×10^{-8}	5.79×10^{-8}	10ms	DO Output High-Z
SF7	Robot Moving Status Output	58	84	1.03×10^{-7}	5.79×10^{-7}	10ms	DO Output High-Z
SF8	Robot Stopped Status Output	58	84	1.03×10^{-7}	5.79×10^{-7}	10ms	DO Output High-Z
SF9	Safety Status Output	711	711	4.29×10^{-8}	4.29×10^{-8}	10ms	DO Output High-Z
SF10	Safety Manual Mode	40	59	1.78×10^{-7}	1.03×10^{-7}	50ms (Cat. 0 stop) 1000ms (Cat. 1 stop)	Cat. 0 STOP / Cat. 1 STOP
SF11	Joint Position Monitor	83	109	5.79×10^{-8}	4.29×10^{-8}		
SF12	Joint Speed Monitor	83	109	5.79×10^{-8}	4.29×10^{-8}		
SF13	TCP Position Monitor	40	59	1.78×10^{-7}	1.03×10^{-7}		
SF14	TCP Speed Monitor	40	59	1.78×10^{-7}	1.03×10^{-7}		
SF15	3-Position Enabling Function	134	149	4.29×10^{-8}	4.29×10^{-8}	500ms	Brake action

APPENDIX II

Supplementary of Functional Safety Certificate

Model supplement description:

W0770001

Model	Manipulator Model	Cabinet Model
IRS311-3-60TSd-fhi-INT	IRB311-3-60TSd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6LD-INT
IRS311-7-aTSd-fhi-INT	IRB311-7-aTSd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6LD-INT
IRS311-7-90TS5-GJ-B1	IRB311-7-90TS5-GJ-B1	IRCB501-6ND-INT
		IRCB501-6LD-INT

Table 1 Models of 6_axis Industrial Robot

Model	Manipulator Model	Cabinet Model	Model	Manipulator Model	Cabinet Model
IR-R4-acd-fhi-INT	IRB-R4-acd-fhi-INT	IRCB501-6ND-INT	IR-R4H-54cd-fhi-INT	IRB-R4H-54cd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6LD-INT			IRCB501-6LD-INT
IR-R7-acd-fhi-INT	IRB-R7-acd-fhi-INT	IRCB501-6ND-INT	IR-R7H-acd-fhi-INT	IRB-R7H-acd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6LD-INT			IRCB501-6LD-INT
IR-R10-acd-fhi-INT	IRB-R10-acd-fhi-INT	IRCB501-6ND-INT	IR-R10H-acd-fhi-INT	IRB-R10H-acd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6FD-INT			IRCB501-6FD-INT
IR-R11-90cd-fhi-INT	IRB-R11-90cd-fhi-INT	IRCB501-6ND-INT	IR-CR4-acd-fhi-INT	IRB-CR4-acd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6FD-INT			IRCB501-6LD-INT
IR-CR4H-54cd-fhi-INT	IRB-CR4H-54cd-fhi-INT	IRCB501-6ND-INT	IR-CR7-acd-fhi-INT	IRB-CR7-acd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6LD-INT			IRCB501-6LD-INT
IR-CR7H-acd-fhi-INT	IRB-CR7H-acd-fhi-INT	IRCB501-6ND-INT	IR-CR10-acd-fhi-INT	IRB-CR10-acd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6LD-INT			IRCB501-6FD-INT
IR-CR10H-acd-fhi-INT	IRB-CR10H-acd-fhi-INT	IRCB501-6ND-INT	IR-CR11-90cd-fhi-INT	IRB-CR11-90cd-fhi-INT	IRCB501-6ND-INT
		IRCB501-6FD-INT			IRCB501-6FD-INT

Table 2 Models of 6_axis Industrial Robot

APPENDIX II

Supplementary of Functional Safety Certificate

Model supplement description:

W0770001

Model	Manipulator Model	Cabinet Model	Model	Manipulator Model	Cabinet Model
IR-R10-acd-fhi-INT	IRB-R10-acd-fhi-INT	IRCB501-6ND-INT	IR-R12-140cd-fhi-INT	IRB-R12-140cd-fhi-INT	IRCB501-6ND-INT
IR-R13-140cd-fhi-INT	IRB-R13-140cd-fhi-INT	IRCB501-6ND-INT	IR-R15-145cd-fhi-INT	IRB-R15-145cd-fhi-INT	IRCB501-6ND-INT
IR-R16-200cd-fhi-INT	IRB-R16-200cd-fhi-INT	IRCB501-6ND-INT	IR-R20-acd-fhi-INT	IRB-R20-acd-fhi-INT	IRCB501-6ND-INT
IR-R25-acd-fhi-INT	IRB-R25-acd-fhi-INT	IRCB501-6ND-INT	IRGF-R10-acd-fhi-INT	IRGF-R10-acd-fhi-INT	IRCB501-6ND-INT
IRGF-R20-acd-fhi-INT	IRGF-R20-acd-fhi-INT	IRCB501-6ND-INT	IR-R35-170cd-fhi-INT	IRB-R35-170cd-fhi-INT	IRCB501-6ND-INT
IR-CR10-acd-fhi-INT	IRB-CR10-acd-fhi-INT	IRCB501-6ND-INT	IR-CR12-140cd-fhi-INT	IRB-CR12-140cd-fhi-INT	IRCB501-6ND-INT
IR-CR13-140cd-fhi-INT	IRB-CR13-140cd-fhi-INT	IRCB501-6ND-INT	IR-CR15-145cd-fhi-INT	IRB-CR15-145cd-fhi-INT	IRCB501-6ND-INT
IR-CR16-200cd-fhi-INT	IRB-CR16-200cd-fhi-INT	IRCB501-6ND-INT	IR-CR20-acd-fhi-INT	IRB-CR20-acd-fhi-INT	IRCB501-6ND-INT
IR-CR25-acd-fhi-INT	IRB-CR25-acd-fhi-INT	IRCB501-6ND-INT			

Table 3 Models of 6_axis Industrial Robot

APPENDIX II

Supplementary of Functional Safety Certificate

Model supplement description:

W0770001

Note:

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

'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 information.

for Table 1 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-6ND-INT. Blank: Indicates a standard cabinet, IRCB501-6LD-INT.

for Table 2 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-6ND-INT. Blank: Indicates a standard cabinet, IRCB501-6LD-INT or IRCB501-6FD-INT.

for Table 3 'f' stands for customization cabinets information which should be Blank. Blank: Indicates a standard cabinet, IRCB501-6ND-INT.

'h' stands for customization of Manipulator which should be SV/A/AD/HXW/Blank; SV: Built-in solenoid valve, A: 90 Degree Bellow, AD: Using a low base, HXW: Including optional accessories, such as aviation plug, IO cable, network cable; Blank: No customization of manipulator.

'i' stands for information on usage scenarios which should be GJ/Blank; GJ: Silicone crystal industry, Blank: No Customized Information.

Additional:

Pendant Models: IRTP80-Le(*), IRTP81-Le(*), IR-TP200-Le(*).

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

'(*)' 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.

APPENDIX II

Supplementary of Functional Safety Certificate

Model supplement description:

W0770002

Model	Manipulator Model	Cabinet Model
IR-CS50-120Zbcd-fhi-INT	IRB-CS50-120Zbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT
IR-S50-120Zbcd-fhi-INT	IRB-S50-120Zbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT
IR-GS50-120Zbcd-fhi-INT	IRB-GS50-120Zbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT

Table 4 Models for scara Industrial Robot

Model	Manipulator Model	Cabinet Model	Model	Manipulator Model	Cabinet Model
IR-CS20-aZbcd-fhi-INT	IRB-CS20-aZbcd-fhi-INT	IRCB501-4MD-INT	IR-S20-aZbcd-fhi-INT	IRB-S20-aZbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT			IRCB501-4ED-INT
IR-GS20-aZbcd-fhi-INT	IRB-GS20-aZbcd-fhi-INT	IRCB501-4MD-INT	IR-S25-aZbcd-fhi-INT	IRB-S25-aZbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT			IRCB501-4ED-INT
IR-GS25-aZbcd-fhi-INT	IRB-GS25-aZbcd-fhi-INT	IRCB501-4MD-INT	IR-S30-aZbcd-fhi-INT	IRB-S30-aZbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT			IRCB501-4ED-INT
IR-GS30-aZbcd-fhi-INT	IRB-GS30-aZbcd-fhi-INT	IRCB501-4MD-INT	IR-S35-aZbcd-fhi-INT	IRB-S35-aZbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT			IRCB501-4ED-INT
IR-GS35-aZbcd-fhi-INT	IRB-GS35-aZbcd-fhi-INT	IRCB501-4MD-INT	/	/	/
		IRCB501-4ED-INT			/

Table 5 Models of scara Industrial Robot

APPENDIX II

Supplementary of Functional Safety Certificate

Model supplement description:

W0770002

Model	Manipulator Model	Cabinet Model	Model	Manipulator Model	Cabinet Model
IR-S4-40Zbcd-fhi-INT	IRB-S4-40Zbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4AD-INT	IR-S7-aZbcd-fhi-INT	IRB-S7-aZbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD-INT
IR-S7-60Z20S3-C2	IRB-S7-60Z20S3-C2	IRCB501-4MD-INT IRCB501-4CD-INT	IR-GS10-aZbcd-fhi-INT	IRB-GS10-aZbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD-INT
IR-S10-aZbcd-fhi-INT	IRB-S10-aZbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD-INT	IR-CS3-40Zbcd-fhi-INT	IRB-CS3-40Zbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4AD-INT
IR-CS6-aZbcd-fhi-INT	IRB-CS6-aZbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD-INT	IR-CS10-aZbcd-fhi-INT	IRB-CS10-aZbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD-INT

Table 6 Models of scara Industrial Robot

Model	Manipulator Model	Cabinet Model	Model	Manipulator Model	Cabinet Model
IR-CTS3-35Zbcd-fhi-INT	IRB-CTS3-35Zbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD - INT	IR-CTS4-35Zbcd-fhi-INT	IRB-CTS4-35Zbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD - INT
IR-TS4-35Zbcd-fhi-INT	IRB-TS4-35Zbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD - INT	IR-TS5-55Zbcd-fhi-INT	IRB-TS5-55Zbcd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD - INT

Table 7 Models of scara Industrial Robot

Model	Manipulator Model	Cabinet Model
IRS111-3-aZbTSd-fhi-INT	IRB111-3-aZbTSd-fhi-INT	IRCB501-4MD-INT IRCB501-4AD-INT
IRS111-10-50ZbTSd-fhi-INT	IRB111-10-50ZbTSd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD-INT
IRS111-20-aZbTSd-fhi-INT	IRB111-20-aZbTSd-fhi-INT	IRCB501-4MD-INT IRCB501-4CD-INT

Table 8 Models of scara Industrial Robot

CERTIFICATE

APPENDIX II

Supplementary of Functional Safety Certificate

Model supplement description:

W0770002

Model	Manipulator Model	Cabinet Model
IR-C8-62Zbcd-fhi-INT	IRB-C8-62Zbcd-fhi-INT	IRCB501-4MD-INT
		IRCB501-4ED-INT

Table 9 Models of scara Industrial Robot

Note:

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

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

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

for Table 4 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-4MD-INT. Blank: Indicates a standard cabinet, IRCB501-4ED-INT.

for Table 5 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-4MD-INT. Blank: Indicates a standard cabinet, IRCB501-4ED-INT.

for Table 6 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-4MD-INT. Blank: Indicates a standard cabinet, IRCB501-4AD-INT or IRCB501-4CD-INT.

for Table 7 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-4MD-INT. Blank: Indicates a standard cabinet, IRCB501-4CD-INT.

for Table 8 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-4MD-INT. Blank: Indicates a standard cabinet, IRCB501-4AD-INT or IRCB501-4CD-INT.

for Table 9 'f' stands for customization cabinets information which should be C/Blank; C: Indicates a non-standard cabinet, IRCB501-4MD-INT. Blank: Indicates a standard cabinet, IRCB501-4ED-INT.

'h' stands for customization of Manipulator which should be SV/A/AD/HXW/Blank; SV: Built-in solenoid valve, A: 90 Degree Bellow, AD: Using a low base, HXW: Including optional accessories, such as aviation plug, IO cable, network cable; Blank: No customization of manipulator.

'i' stands for information on usage scenarios which should be GJ/Blank; GJ: Silicone crystal industry, Blank: No Customized Information.

Additional:

Pendant Models: IRTP80-Le(*), IRTP81-Le(*), IR-TP200-Le(*).

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

'(*)' 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.