Functional Safety

Certificate No. FS/SHFS2309000385MD

SGS

Certificate Holder:	FAIR Innovation (Suzhou) Robot System Co., Ltd
	Room 1810, Building 2, 209 Zhuyuan Road, High-Tech Zone, Suzhou, Jiangsu, P.R.China
Manufacturer:	FAIR Innovation (Suzhou) Robot System Co., Ltd
	Building 6, No. 36 Zijin Street, Wuzhong District, Suzhou, Jiangsu, P.R.China
Trademarks:	FAIRINO
Certified Product:	FAIR collaborative robot
Model (s) No. / Series:	FR3, FR5, FR10, FR16, FR20
Assessment Performed:	ISO 13849-1: 2023
Conclusion:	The safety architecture and performance level meet PL d with Cat. 3 according to ISO 13849-1:2023, detail information of safety function items is shown in APPENDIX.

As shown in the technical report number(s): SHFS230900038571

This certificate confirms the achievement of the requirements of functional safety based on proof of the safety-related parameters (failure rate, DC / 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: 12/04/2024

Andrew Zhai
Technical Manager

Contact us to validate this document by email address: CN.DocCheck@sgs.com

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APPENDIX

Supplementary of Functional Safety Certificate

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Summary of Assessment Result in ISO 13849-1 report:

SF	Safety Function Name	Response Time	MTTF$_D$ (years)	PFH (1/h)	Safe State
SF1	Emergency stop	300ms	202.051	1.01×10^{-7}	Cat. 1 stop
SF2	Safeguard (Protective) Stop	300ms	191.317	1.01×10^{-7}	Cat. 2 stop
SF3	Joint Position Limit	500ms	158.530	1.01×10^{-7}	Cat. 2 stop
SF4	Joint Speed Limit	500ms	158.530	1.01×10^{-7}	Cat. 2 stop
SF5	Joint Torque Limit	500ms	140.411	1.01×10^{-7}	Cat. 2 stop
SF6	TCP Pose Limit	500ms	70.072	1.84×10^{-7}	Cat. 2 stop
SF7	TCP Speed Limit	500ms	70.072	1.84×10^{-7}	Cat. 2 stop
SF8	TCP Force Limit	500ms	38.006	5.16×10^{-7}	Cat. 2 stop
SF9	Momentum Limit	500ms	70.072	1.84×10^{-7}	Cat. 2 stop
SF10	Power Limit	500ms	38.006	5.16×10^{-7}	Cat. 2 stop
SF11	System Emergency Stop Output	300ms	191.317	1.01×10^{-7}	Output low level voltage
SF12	Robot Moving Status Output	300ms	68.728	1.84×10^{-7}	Output low level voltage
SF13	Robot Not Stopping Status Output	300ms	68.728	1.84×10^{-7}	Output low level voltage
SF14	Reduced Mode Status Output	300ms	68.728	1.84×10^{-7}	Output low level voltage
SF15	Non-reduced Mode Status Output	300ms	68.728	1.84×10^{-7}	Output low level voltage
SF16	Three-position Enabling	300ms	68.728	1.84×10^{-7}	Cat. 2 stop
SF17	Monitored Standstill	500ms	47.515	3.35×10^{-7}	Cat. 0 stop
SF18	Stopping Time Limiting	500ms	47.515	3.35×10^{-7}	Cat. 0 stop
SF19	Stopping Distance Limiting	500ms	47.515	3.35×10^{-7}	Cat. 0 stop

Note: All of safety functions above achieved PL d with Category 3 according to ISO 13849-1:2023.

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