

SIL



Functional Safety Certificate

No. 2X221110.HFCCC08

Test Report / Technical Construction File no. SIL-SHHZK-2022-A1

Certificate's Holder: Hankun (Beijing) Fluid Control Technology Co., Ltd.
Room 2606-1, 22nd Floor, Building 3, No.16 South Third Ring West Road,
Fengtai District, Beijing, China

Manufacturer: Hanzhongkun (Shanghai) Control System Co., Ltd.
F1, Building No.5, No. 98 Songhai Road, Qingpu District, Shanghai, China

Product: Pneumatic Actuator

Model(s): HPR Series, HPL Series, HPD Series, HPY Series

Standard: Has been assessed per the relevant requirements of:
IEC 61508:2010 Parts 1-7

And meets requirements providing a level of integrity to:

Systematic Capability: SC 3(SIL 3 Capable)

Random Capability: Type A Element

SIL 3@ HFT=1, SIL 2 @ HFT= 0; Route 2_H device

PFD_{avg} and Architecture Constraints must be verified each application

*Safety function:

The actuators are used to control 0~90°C rotation valve and other similar products, such as butterfly valve, ball valve, throttle, plug valves, louver valve, driving the valve to the required safe position.

*Application Restriction:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.

* Is suitable to be safety function according to the description and the configuration defined in Annex I

Verification Mark:



The Verification Mark can be affixed on the product. It is NOT permitted to alter the Verification Mark in any way

Remark: This SIL Verification of Compliance has been issued on a voluntary basis. ECM confirms that a Test Report is existent for the above listed product(s) and found to meet the requirements of above standards for application in safety related system up to Safety Level of **SIL 3**. The unit must be properly designed into a Safety Instrument Function as per the requirements in the Safety Manual. The Verification Mark shown above can be affixed on the product. It is NOT permitted to alter the Verification Mark in any way. In addition the Verification's Holder is NOT allowed to transfer the Verification to third parties. This certificate can be checked for validity at www.entecerma.it

Date of issue 10 November 2022

Expiry date 09 November 2027

For online check:



Approver
Ente Certificazione Macchine
Legal Representative
Luca Bedonni



Ente Certificazione Macchine

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Annex I

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1. The use of the product [Actuator] must obey the required rules to maintain the SIL 3 Capable properties. These rules are stated in the Assessment Report, reference No.: [SIL Capability assessment report].
2. The product version of hardware components used for validation and type tests are the following:

Product:	Model(s):
Pneumatic Actuator	HPR Series, HPL Series, HPD Series, HPY Series

3. Assessed documents for the present certification are defined in the Assessment Report [SIL Capability assessment report].
4. Acceptable environmental constraints for the system are stated in the safety manual (Ref: [SIL-SHHZK.01-03]). These elements must be checked for each integration of the product.
5. The SIL capable certified of the product is the following:
Safety Function: Move the valve to the designed safe position.
6. The fail rates in FIT (FIT=1 failure/10⁹ hours) is the following:

Safety Function	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Spring return	0	75	0	160
Double acting / single piston	0	82	0	115
Double acting / double piston	0	82	0	107
Spring return with Partial valve stroke testing	75	0	65	95
Double acting / single piston with Partial valve stroke testing	82	0	43	72
Double acting / double piston with Partial valve stroke testing	82	0	56	51

7. The safety integrity level (SIL) of the entire Safety Instrument Function (SIF) must be verified via a calculation of PFD_{avg} considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each subsystem must be checked to assure compliance with minimum Hardware Fault Tolerance (HFT) requirements.