



Certificate / Certificat Zertifikat / 合格証

DUN 2312104 C008

exida hereby confirms that the:

Series-S Heavy Duty Scotch Yoke Actuator

**Duncan Engineering Limited
Maharashtra - India**

Has been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-2

and meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**PFH/PFD_{avg} and Architecture Constraints
must be verified for each application**

Safety Function:

The actuator will move to the designed safe position per the valve design within the specified safety time.

Application Restrictions:

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



Evaluating Assessor

Certifying Assessor

The manufacturer
may use the mark:



Revision 1.0 July 30, 2024
Surveillance Audit Due
August 01, 2027



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Systematic Capability: SC 3 (SIL 3 Capable)**Random Capability: Type A, Route 2_H Device****PFH/PFD_{avg} and Architecture Constraints
must be verified for each application****Systematic Capability:**

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element. This device meets *exida* criteria for Route 2_H.

Versions:

Actuator Type	Frame Size	Cylinder Size
Series S - Double Acting Scotch Yoke Actuator	S1 to S5	200 to 800
Series S - Spring Return Scotch Yoke Actuator	S1 to S5	200 to 800

IEC 61508 Failure Rates in FIT*

Static Application	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Scotch Yoke Actuator, Double Acting	0	0	0	633
Scotch Yoke Actuator, Spring Return	0	177	0	475

* FIT = 1 failure / 10⁹ hours

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/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 element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: DUN 23/12-104 R016 V1R1 (or later)

Safety Manual: DEL-SSM-ENG-03 R0 (or later)

