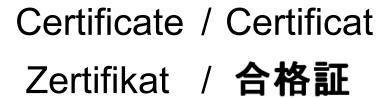


The manufacturer may use the mark:



Revision 3.0 March 3, 2022 Surveillance Audit Due April 3, 2025



FLO 1303024 C007

exida hereby confirms that the:

Flowserve Rack & Pinion Actuators:
Norbro 33, 40R, & 40 Series
Worcester F39 Series
Limitorque LRP Series

Flowserve Flow Control Haywards Heath, West Sussex - UK

Have 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 actuator 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

Certificate / Certificat / Zertifikat / 合格証

FLO 1303024 C007

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:

These product have 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:

Device	Description and Application			
Norbro 33 Series	Spring Return & Double Acting Actuators, Sizes 25 to 50			
Norbro 40R Series	Spring Return & Double Acting Actuators, Sizes 05 to 42			
Norbro 40 Series	Spring Return & Double Acting Actuators, Sizes 45 & 50			
Worcester F39 Series	Spring Return & Double Acting Actuators, Sizes 05 to 50			
Limitorque LRP Series	Spring Return & Double Acting Actuators, Sizes 10 to 40			

IEC 61508 Failure Rates in FIT1

Device	$\lambda_{ extsf{SD}}$	λ _{su}	$\lambda_{ extsf{DD}}$	λ_{DU}
Spring Return, De-energize to Trip	0	305	0	372
Double Acting	0	0	0	636

¹ 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: FLO 13/03-0024 R007 V3 R2 (or later)

Safety Manual: FLOSILNOR334040R Rev 2 (or later)

Flowserve Rack & Pinion Actuators:

Norbro 33, 40, & 40R Worcester F39 Limitorque LRP



80 N Main St Sellersville, PA 18960

T-109, V5R2