



The manufacturer
may use the mark:



Valid until May 1, 2016.

Revision 1.0 April 30, 2013



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004

Certificate / Certificat Zertifikat / 合格証

FLO 1303024 C002

exida hereby confirms that the:

Norbro 33/40/40R Series Actuators

**Flowserve Flow Control
Haywards Heath, West Sussex - UK**

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 Device

**PFD_{AVG} and Architecture Constraints
must be verified for each application**

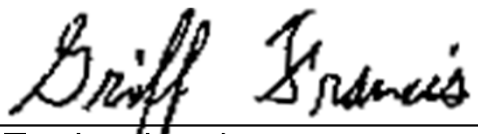
Safety Function:

The Actuator will move the Valve 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

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Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A Device

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**Norbro 30/40/40R
Series Actuators**

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 is imposed by the Architectural Constraints for each element.

IEC 61508 Failure Rates in FIT*

Failure rates for the Norbro 33, 40/40R Actuators Sizes 10 to 50

Application	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)
Spring Return	0	651	0	533
Spring Return with PVST	651	0	269	264
Double Acting	0	0	0	1032
Double Acting with PVST	0	0	820	212

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented 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.

The following documents are a mandatory part of certification:

Assessment Report: FLO 13-03-024 R002 V1 R1

Safety Manual: FLOSILNOR334040R-01

* FIT = 1 failure / 10⁹ hours



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T-002, V3R1-3