

CERTIFICATE



QUIFER 1107060 P0020 C002

exida Certification S.A. hereby confirms that the

QUIFER Scotch Yoke KSY/KSYM series actuators

QUIFER Actuators S.L.

Figueres (Girona), Spain

Has been assessed according to the relevant requirements of

IEC 61508:2010

Parts 1 - 2, and meets requirements providing a level of integrity to

Systematic Integrity : SIL 3 Capable

Random Integrity : 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 within the specified safety time.

Application Restrictions

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



Assessor



Certifying Assessor

Date: 5 March 2012

exida Certification SA, Nyon, Switzerland



Systematic Integrity: SIL 3 Capable

SIL 3 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. For a Scotch Yoke actuator used in final element assembly, SIL must also be verified for the specific application using the following failure data:

Summary for the Scotch Yoke KSY/KSYM actuators :

	Type A device, IEC 61508 failure rates					
	Without PVST			With PVST		
	λ_{safe}	λ_{dd}	λ_{du}	λ_{safe}	λ_{dd}	λ_{du}
Scotch Yoke KSY-100 actuators (double acting)	0	0	661	0	525	136
Scotch Yoke KSY-400, KSY-900 actuators (double acting)	0	0	757	0	610	147
Scotch Yoke KSY-1600, KSY-3500 actuators (double acting)	0	0	757	0	610	147
Scotch Yoke KSYM-100 actuators (spring return)	226	0	417	226	289	128
Scotch Yoke KSYM-400, KSYM-900 actuators (spring return)	226	0	495	226	337	158
Scotch Yoke KSYM-1600, KSYM-3500 actuators (spring return)	226	0	495	226	337	158

PVST - Partial Valve Stroke Test
All failure rates are given in FIT=10⁻⁹/h

Double acting actuator operation may only be considered in specific application cases as an adequate safety design. Spring-return operation is the highly recommended mode for safety applications. For more details see the safety manual or the assessment report.

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 mandatory parts this certificate:

- QUIFER 1107-060-C R003 V1R0 Assessment report.
- QUIFER Safety Manual Rev1 -12/2011