



The manufacturer
may use the mark:



Valid until November 1, 2018
Revision 1.0 October 26, 2015



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004

Certificate / Certificat Zertifikat / 合格証

ROT 1503014 C001

exida hereby confirms that the:

Rotex Direct Acting Redundant Solenoids - Type 32R

**Rotex Automation Limited
Vadodara, Gujarat - INDIA**

Have 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, Route 2_H Device

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

Safety Function:

The Solenoid Valve will move to the designed safe position when De-energized / Energized within the specified safety time.

Application Restrictions:

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



Jack Gao

Evaluating Assessor

Sugan Sawh

Certifying Assessor

Certificate / Certificat / Zertifikat / 合格証

ROT 1503014 C001

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**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.

Direct Acting Redundant Solenoid Valve Series Assessed¹

Valve Group	Valve Type Series	Description and Application
Type 32R-A	30127 LW2 & 30127-5	Redundant Solenoids, Direct Acting, De-energize To Trip (2oo2DTT) or Energize To Trip (1oo2ETT), <8W Coils, No Overrides
Type 32R-B	30127-10	Redundant Solenoids, Direct Acting, De-energize To Trip (2oo2DTT) or Energize To Trip (1oo2ETT), >10W Coils, No Overrides

IEC 61508 Failure Rates in FIT²

Valve Group and Application	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
32R-A Valve Types; DTT	0	34	0	298
32R-A Valve Types; DTT w/PVST ³	34	0	278	20
32R-A Valve Types; ETT	0	65	0	47
32R-A Valve Types; ETT w/PVST	65	0	45	2
32R-B Valve Types; DTT	0	56	0	323
32R-B Valve Types; DTT w/PVST	56	0	301	22
32R-B Valve Types; ETT	0	69	0	53
32R-B Valve Types; ETT w/PVST	69	0	51	2

¹ Excludes Latching Coil (LC) and Coils with Driver Circuitry (62 and 66) options

² FIT = 1 failure / 10⁹ hours

³ PVST = Partial Valve Stroke Test of a final element Device

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 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: ROT 11/01-097 R002 V2 R1 (or later)

Safety Manual: IM/V/0039 Rev 2 (or later)



64 N Main St
Sellersville, PA 18960

T-109, V1R1

Rotex Direct Acting
Solenoids – Type 32R