

The manufacturer
may use the mark:



Certificate / Certificat Zertifikat / 合格証

ROT 1101097 C002

exida hereby confirms that the:

**Rotex Solenoid Valves
Type 52S**

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

Has been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Integrity: SIL 3 Capable

Random Integrity: Type A Element

**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.

Reports:

ROT 11/01-097 R002 V1 R1
Assessment Report

ROT 11/01-097 R002 V1 R1
FMEDA Report

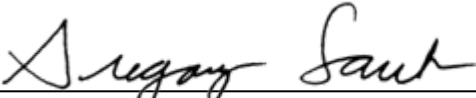
Validity:


This assessment is valid for
Rotex Type 52S Solenoid
Valve models listed on
page 2.

This assessment is valid
until March 1, 2015.

Revision 1.0 February 6, 2012




Evaluating Assessor


Certifying Assessor

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Systematic Integrity: SIL 3 Capable

Random Integrity: Type A Element

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

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.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated without “prior use” justification by end user or diverse technology redundancy in the design.

52S Solenoid Valve Series Assessed¹

Valve Group	Valve Type Series	Description and Application
Type 52S-A	51440, 51441, 51442, 51445, 51450, I5005, M5003, M5004, P5003, & P5011	5/2 Single Solenoid Internal Pilot, De-energize To Trip (DTT) or Energize To Trip (ETT), ≤8 W Coils
Type 52S-B	57440, 57441, 57445, 57450, I5006, P5006, & P5012	5/2 Double Solenoid Internal Pilot, Energize To Trip (ETT) only, ≤8 W Coils
Type 52S-C	53440	5/2 Single Air Operated, De-energize To Trip (DTT) or Energize To Trip (ETT)
Type 52S-D	58440	5/2 Double Air Operated, Energize To Trip (ETT) only

IEC 61508 Failure Rates in FIT*

Valve Group and Application	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
52S-A Valve Types; DTT	0	276	0	416
52S-A Valve Types; DTT w/ PVST [†]	276	0	387	29
52S-A Valve Types; ETT	0	107	0	529
52S-A Valve Types; ETT w/ PVST [†]	107	0	500	29
52S-B Valve Types; ETT	0	82	0	599
52S-B Valve Types; ETT w/ PVST [†]	82	0	563	36
52S-C Valve Types; DTT	0	160	0	319
52S-C Valve Types; DTT w/ PVST [†]	160	0	295	24
52S-C Valve Types; ETT	0	80	0	389
52S-C Valve Types; ETT w/ PVST [†]	80	0	364	25
52S-D Valve Types; ETT	0	40	0	414
52S-D Valve Types; ETT w/ PVST [†]	40	0	387	27

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.

¹ Excludes Latching Coil options LC

* FIT = 1 failure / 10⁹ hours

[†] PVST = automated Partial Valve Stroke Test

Rotex Solenoid Valves
– Type 52S

Rotex Automation
Limited
Vadodara, Gujarat -
India



Form	Version	Date
C61508	2.7-3	Mar 2011