

The manufacturer
may use the mark:



Reports:

ROT 11/01-097 R002 V1 R1
Assessment Report

ROT 11/01-097 R001 V1 R1
FMEDA Report

Validity:

This assessment is valid for
Rotex Type 32D Direct
Acting Solenoid models
listed on page 2.

This assessment is valid
until January 1, 2015.

Revision 1.0 December 22, 2011



Certificate / Certificat Zertifikat / 合格証

ROT 1101097 C001

exida hereby confirms that the:

Rotex Direct Acting Solenoids Type 32D

**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**

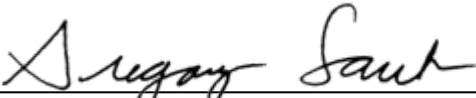
Safety Function:

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.




Evaluating Assessor


Certifying Assessor

ROT 1101097 C001

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.

Direct Acting Solenoid Valve Series Assessed¹

Valve Group	Valve Type Series	Description and Application
Type 32D-A	M3015	Direct Acting, manually reset Valve, De-energize To Trip (DTT) only
Type 32D-B	20105, 20205, 30308, 30316, 30318, 30332, 30333, 30334, 30318LW, M3006, P3005, P3012, & P3014	Direct Acting, De-energize To Trip (DTT) or Energize To Trip (ETT), 3-8 W Coils
Type 32D-C	20106, 20206, 30309, 30317, 30319, 30329, & M3007	Direct Acting, De-energize To Trip (DTT) or Energize To Trip (ETT), >10W Coils

IEC 61508 Failure Rates in FIT*

Valve Group and Application	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
32D-A; DTT	0	139	0	144
32D-B Valve Types; DTT	0	139	0	144
32D-B Valve Types; DTT w/PVST [†]	139	0	135	9
32D-B Valve Types; ETT	0	47	0	188
32D-B Valve Types; ETT w/PVST [†]	47	0	181	7
32D-C Valve Types; DTT	0	364	0	156
32D-C Valve Types; DTT w/PVST [†]	364	0	146	10
32D-C Valve Types; ETT	0	49	0	249
32D-C Valve Types; ETT w/PVST [†]	49	0	240	9

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 Direct Acting Solenoids – Type 32D
Rotex Automation Limited
Vadodara, Gujarat - India



Form	Version	Date
C61508	2.7-3	Mar 2011