



Certificate / Certificat Zertifikat / 合格証

ROT 1101097 C003

exida hereby confirms that the:

Rotex Solenoid & Air Operated Valves Type 32P

**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

**PFH/PFD_{avg} and Architecture Constraints
must be verified for each application**

Safety Function:

The Solenoid/Air Operated 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.

The manufacturer
may use the mark:



Revision 2.4 February 28, 2019

Surveillance Audit Due
November 1, 2021



ISO/IEC 17065
PRODUCT CERTIFICATION BODY
#1004



Evaluating Assessor

Certifying Assessor

ROT 1101097 C003

Systematic Capability: SC 3 (SIL 3 Capable)**Random Capability: Type A, Route 2_H Device****PFH/PFD_{avg} and Architecture Constraints
must be verified for each application****Systematic Capability:**

These products have 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.

32P Solenoid Valve Series Assessed¹

Valve Group	Valve Type Series	Description and Application
Type 32P-A	3008, 3008C, 3038, 3038C, 3055, 3055C, 3089C, 3166, 31119, 31120, 31123, 31147, 31147ISEP, 31205, 31209, 31210, 32301, 32347, 32347ISEP, I3003, I3004, I3005, I3008, P3001, P3003, P3006, P3007, P3008, P3009, P3013, M3001, M3002, M3008, M3009, M3010, M3011, M3014, M3016 & M3017	3/2 Single Solenoid, DTT (De-energize To Trip) or ETT (Energize To Trip), ≤8 W Coils Mxxxx are DTT only
Type 32P-B	51400, 51400C, 51424, 51424IS, 51424LW, 51424SEP, 51432, 51433, 51434, I3010, I5001, I5001EP, I5003, I5003EP, P5001, P5002, P5007, P5009, M5001, M5002, M5005, M5006 & M5007	5/2 Single Solenoid, DTT (De-energize To Trip) or ETT (Energize To Trip), ≤8 W Coils Mxxxx are DTT only
Type 32P-C	57400, 57404, 57405, I5002, I5002EP, I5004, I5004EP, P5004, P5005, P5008 & P5010	5/2 Double Solenoid, ETT only, ≤8 W Coils
Type 32P-D	33101 & 33347	3/2 Single Air Operated, DTT or ETT
Type 32P-E	53400 & 53402	5/2 Single Air Operated, DTT or ETT

IEC 61508 Failure Rates in FIT²

Valve Group and Application	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
32P-A Valve Types; DTT	0	223	0	212
32P-A Valve Types; ETT	0	46	0	333
32P-B Valve Types; DTT	0	265	0	376
32P-B Valve Types; ETT	0	74	0	503
32P-C Valve Types; ETT	0	91	0	539
32P-D Valve Types; DTT	0	153	0	134
32P-D Valve Types; ETT	0	44	0	236
32P-E Valve Types; DTT	0	222	0	361
32P-E Valve Types; ETT	0	88	0	478
Adder for Type 62 or 66 Coil, DTT	0	23	0	0

¹ Includes Coil Types 16, 17, 19, 22, 25, 37, 39, 58, 62, 65CR, 66, 67, 71, & 87, Voltages 12 to 240V, and excludes Latching Coil (LC)

² FIT = 1 failure / 10⁹ hours

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/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 V3R1 (or later)

Safety Manual: IM/V/060 Rev 5 (or later)

**Rotex Solenoid &
Air Operated Valves –
Type 32P**



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