



ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

Certificate of Conformity to IEC 61508 Safety Integrity Level (SIL) 2

Functional Safety of Safety-Related Programmable Electronic Systems

The QTRCO Inc, P551 Actuator Assembly (SR12 and SR16 Series) has been assessed and is considered capable for use in a low demand Safety Function up to and including SIL 2, with respect to random failure rates and architectural constraints.

The assessment was based on the assumptions, data provided, and recommendations given in:

- ESC Ltd Report: K011_FM001 rev. 1.

The product was assessed against the following failure mode:

- Ability to generate the minimum specified torque to move drive shaft to the predefined safe position when connected to valve.

The assessment was carried out to determine compliance with IEC 61508 with regards to:

- Random Hardware Failures;
- Architectural Constraints.

Device (No XRC PSTD)	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_S (/hr)	Device Type	SFF	PFD Achieved (refer to Note 1 & Note 2)
P551SR12	9.1E-08	0.0E+00	6.4E-07	A	87%	4.0E-04
P551SR12-TMLO	9.1E-08	0.0E+00	6.4E-07	A	87%	4.0E-04
P551SR16	9.3E-08	0.0E+00	6.4E-07	A	87%	4.1E-04
P551SR16-TMLO	1.0E-07	0.0E+00	6.4E-07	A	86%	4.5E-04
Devices (With XRC PSTD)	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_S (/hr)	Device Type	SFF	PFD Achieved (refer to Note 1 & Note 2)
P551SR12	5.9E-08	3.2E-08	6.4E-07	A	92%	2.8E-04
P551SR12-TMLO	5.9E-08	3.2E-08	6.4E-07	A	92%	2.8E-04
P551SR16	5.4E-08	5.4E-08	6.4E-07	A	93%	2.8E-04
P551SR16-TMLO	5.4E-08	4.8E-08	6.4E-07	A	93%	2.7E-04

Note 1: The analysis was based on the assumption that repairs would be carried out with a Mean Down Time (MDT) of 730 hours, a Proof Test Interval (PTI) of one year (8760 hours) and that the Partial Stroke Testing Device (PSTD) frequency (and associated response) is included in the assumed MDT period (i.e. not exceeding 730 hours).

Note 2: The remaining sensing, logic solver and additional final element sub-systems were excluded from the assessment, in order to allow for their PFD contributions, the devices were assessed against 20% of the SIL band.

The analysis covered use of additional features including the use of Top Mounted Lock-out and use of the XRCiser (XRC) PSTD.

IMPORTANT: It should be noted that this assessment does not include confirmation of the response time of the device. For response times (along with any relevant assumptions) reference should be made to the Safety Manual of each device and the total SIF response time **MUST** be compared against the process safety time for the specific application.#

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Member of the IEC 61508 committee
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