

## Random Hardware Reliability Certificate

### **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 hardware failures and architectural constraints.

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

- **Engineering Safety Consultants Ltd Report: K011\_FM001 rev. 1;**
- **Renewal Letter from QTRCO Inc, signed by Mitchel Ramirez, QHSE Engineer, Dated 01<sup>st</sup> September 2022.**

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 (2010 Edition) with regards to:

- Random Hardware Failure (see tables below);
- Architectural Constraint.

Device (No XRC PSTD)	$\lambda_{DU}$ (/hr)	$\lambda_{DD}$ (/hr)	$\lambda_S$ (/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)	$\lambda_{DU}$ (/hr)	$\lambda_{DD}$ (/hr)	$\lambda_S$ (/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



## ENGINEERING SAFETY CONSULTANTS

*The Global Provider of Functional Safety Expertise and Technical Consultancy*

**Note 1:** The analysis assumed 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.

Managing Director: Simon Burwood  
Member of IEC 61508 (MT61808-1-2) & IEC 61511 (MT61511) Maintenance Committees  
Assessment Date: April 2020  
Renewal Date: September 2022, valid to September 2024  
Certificate: K011\_CT001 rev. 2

Page 2 of 2

**ENGINEERING SAFETY CONSULTANTS LTD**  
2nd Floor, Exchequer Court, 33 St. Mary Axe,  
London, EC3A 8AA UK  
Telephone/Fax: +44 (0)20 8542 2807  
E-Mail: [info@esc.uk.net](mailto:info@esc.uk.net) Web: [www.esc.uk.net](http://www.esc.uk.net)  
Registered in England and Wales: 7006868  
Registered Office: 33 St. Mary Axe, London, EC3A 8AA