In compliance with:

**CEN ISO 13849-1:2015**

Safety of machinery, safety related parts of control systems Part 1: general principles of design

**MTTFd MLK Series**

**B10d** rating based on the calculated assumptions below is:-

\[= 26,400 \text{ cycles}\]

Calculation data assumptions (CEN ISO 13849-1:2015, Annex C):

≡ **Performance Level b (CEN ISO 13849-1, Table 2)**
≡ **Safety Integrity Level 1 (CEN ISO 13849-1, Table 3)**
≡ **MTTFd denotation HIGH (CEN ISO 13849-1, Table 4)**

\[t_{cycle}, \text{ mean time between two successive cycles} = 3600 \text{ seconds (1 cycle per hour)}\]

\[h_{op}, \text{ mean operation in hours per day} = 1 \text{ shift x 8 hours.}\]

\[d_{op}, \text{ mean operation in days per year} = 220 \text{ days.}\]

\[\Pi_{op} = (d_{op} \times h_{op} \times 3600) / t_{cycle} = 1760 \text{ mean annual operations}\]

B10d no. cycles until 10% of components fail dangerously

\[\text{MTTFd} = \text{B10d} / (0.1 \times \Pi_{op}) = 26,400 \text{ cycles}\]

\[\lambda_d = (0.1 \times \Pi_{op}) / (\text{B10d} \times 220 \times 8) = 150 \text{ years}\]

\[\lambda_d = 3.79 \times 10^{-6} \text{ per operating hour}\]

**Neal Partridge**

Head of Compliance