In compliance with:

**CEN ISO 13849-1:2015**

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

**MTTFd D Series**

B10d rating based on the calculated assumptions below is: -

\[ = 2,000,000 \text{ cycles} \]


\[ \equiv \text{Performance Level d (CEN ISO 13849-1. Table 2)} \]
\[ \equiv \text{Safety Integrity Level 2 (CEN ISO 13849-1. Table 3)} \]
\[ \equiv \text{MTTFd denotation HIGH (CEN ISO 13849-1. Table 4)} \]

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

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

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

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

\[ B10d \text{ no. cycles until 10% of components fail dangerously} \]
\[ = 2,000,000 \text{ cycles} \]

\[ \text{MTTFd} = B10d / (0.1 \times n_{op}) \]
\[ = 11,363.64 \text{ years} \]

\[ \lambda d = (0.1 \times n_{op}) / (B10d \times 220 \times 8) \]
\[ = 5.00 \times 10^{-8} \text{ per operating hour} \]

**Neal Partridge**

Head of Compliance