In compliance with:

**CEN ISO 13849-1:2015**

Safety of machinery, safety related parts of control systems

Part 1: general principles of design

**MTTFd KP & KLP Series**

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

= **2,000,000 cycles**

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

≡ Performance Level d (CEN ISO 13849-1:2015 Table 2)
≡ Safety Integrity Level 3 (CEN ISO 13849-1:2015 Table 3)
≡ MTTFd denotation HIGH (CEN ISO 13849-1:2015 Table 4)

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

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

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

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

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

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

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

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