In compliance with:

CEN ISO 13849-1:2015
Safety of machinery, safety related parts of control systems Part 1: general principles of design

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

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

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

\( d_{op} \), 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 no. cycles until 10% of components fail dangerously \( = 2,000,000 \text{ cycles} \)

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

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

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