1. PRODUCT DESCRIPTION.

The models C2463B Omniterm LPR is a high-reliability Loop Repeater module. The LPR accepts a 0-25mA input and repeats this current signal on the output. The output is isolated from the input.

Omniterm LPR is designed to operate with 4-20mA input range in safety-related applications, so that current output outside this range can be used for fault detection.

For detailed specifications consult the product datasheet.

2. CONDITIONS OF USE IN SAFETY-RELATED APPLICATIONS.

- The LPR must be used within its electrical and mechanical specifications.
- EMC environment must be "typical industrial environment" as specified in IEC61000-4-4.
- Input current range must be 4-20mA under normal conditions.
- The unit receiving the output signal (logic solver) must be able to recognise signals ≤3.6mA and ≥21mA as indication of a fault condition.

3. RELIABILITY INFORMATION.

Hardware reliability analysis yields the results as summarised in the Table below. The LPR has no software.

Subsystem	Type A
DC	83%
SFF	86%
PFD_{avg}, (TI = 1 year)	7.66×10^{-4}
PFD_{avg}, (TI = 2 years)	1.52×10^{-3}
MTBF (in years)	90.7
λ (total)	1259 FIT
λ_{SD}	28 FIT
λ_{SU}	221 FIT
λ_{DD}	837 FIT
λ_{DU}	173 FIT

An MTTR of 8hrs was used in the above PFD calculations. For compliance with SIL requirements, see "Explanation of results".

KEY:

DC = Diagnostic Coverage	λ = failure rate per billion hours (1 FIT = 1 failure in 10^9 hours)
SFF = Safe Failure Fraction	Failure Rate Categories:
PFD = Probability of Failure on Demand	SU = Safe Undetected
TI = Test Proof Interval	SD = Safe Detected
MTBF = Mean Time Between Failures	DU = Dangerous Undetected
MTTR = Mean Time To Repair	DD = Dangerous Detected

4. EXPLANATION OF RESULTS.

Any hardware failure, which does not affect output current accuracy is considered a safe failure. Any hardware failure which results in output current becoming smaller than 3.6mA or greater than 21mA is considered a 'dangerous-detected' failure.

Any hardware failure, which affects LPR output accuracy, with current remaining in the 4-20mA range, is deemed a 'dangerous-undetected' failure. The Omniterm LPR module does not generate independent diagnostic signals.

PFD figures for the LPR with Proof Test Interval of 1 year are better than the SIL2 requirements of EN61508-1 par. 7.6.2.9, Table 2. Since LPR is only one part of the entire safety function it should not claim more than 10% of the required PFD range. It fulfils this requirement as well. The results also exceed the requirements of IEC61508-2 par. 7.4.5.4 Table 2 for SIL2 Type A subsystems without hardware fault tolerance.

PFD figures for Proof Test Interval of 2 years are better than the SIL1 requirements of EN61508-1 and fulfil the requirement not to claim more than 10% of allowed range.

The listed failure rates are valid for operating stress conditions of a "typical industrial environment" similar to that specified in IEC61000-4-4 with an average temperature over a long period of time not greater than 40°C.

A user of the model C2463B Omniterm LPR and module can utilise the failure rates presented in this report in order to determine Safety Integrity Level (SIL) of the entire safety function.

5. DISCLAIMER

This datasheet provides reliability figures only. Omniflex does not assume responsibility for the correct and safe application of the LPR and its reliability data. In safety-related applications, it is the user's responsibility to comply with all other requirements of EN61508, which may be applicable to the safety system in question.

Omniflex reserves the right to change specifications without notice.