



***To whom it may concern***

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The table below gives the MTBF (Mean Time Between Failure) for MiCOM products P20 P30 & P40 ranges, updated in January 2012.

The method of calculation is given on the last page of this document.

For any further questions, please contact me.

Regards,

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Product	MTBF in year
P120	173
P121	125
P122	109
P122C	102
P123	111
P124	134
P125	108
P126	296
P127	99
P130	48
P132	53
P138	71
P139	46
P141	40
P142	58
P143	38
P144	50
P145	47
P220	32
P225	48
P226C	24
P241	27
P242	98
P243	49
P341	30
P342	29
P343	58
P344	106
P345	94
P430	51
P432	60
P433	75
P435	59
P436	130
P437	49

Product	MTBF in year
P438	31
P439	61
P441	41
P442	35
P443	59
P444	58
P445	33
P521	42
P530	39
P541	44
P542	23
P543	39
P544	18
P545	67
P546	23
P547	340
P591	107
P592	253
P593	64
P594	45
P595	33
P630	30
P631	43
P632	37
P633	52
P634	38
P638	71
P642	23
P643	66
P741	30
P742	123
P743	75
P746	37
P821	132
P841	45
P842	16
P920	40

Product	MTBF in year
P921	126
P922	112
P923	238
P925	63
P941	57
P942	14
P943	88
P991	836
P992	627



### **Calculation of Reliability Statistics for Relays and Instruments**

The attached information is a calculation of operational reliability for products in the range of MiCOM relays produced by Schneider Electric Infrastructure Automation. It is based on global production figures compared to global returns figures.

These figures are based on actual service life of the products and are thus justifiable. We do not provide figures based on synthetic calculations.

The failure percentages are based on data from the years since 91/92, when the Modifications and Repairs system was computerised. The sales figures are actual values provided by the manufacturing system.

Various arbitrary assumptions have been made including:

All products take at least two years to reach a consistent sales figure.

Actual sales are used, but all products are assumed to have been sold in the middle of each year, so will have been in service (on average) for half of that year.

MTBF = Product years service / Products reported failed and returned  
(see detailed explanation under the formula below).

Models which have been on sale for more than 10 years are generally regarded as mature products with relatively stable MTBF figures and they are usually fixed at a specific point in time, which is quoted on any MTBF reply.

All assumptions can be challenged, but they represent the best data currently available.

The calculation for MTBF is based on the following :

$$\text{MTBF} = \text{Product years service} / \text{Products reported failed and returned}$$

The formula used is of the form below to calculate service years,

$$=\text{SUM}(((\text{B}/2)+(\text{B}*\text{N1}))+((\text{C}/2)+(\text{C}*\text{N2}))+((\text{D}/2)+(\text{D}*\text{N3}))+((\text{E}/2)+(\text{E}*\text{N4}))+((\text{F}/2)+(\text{F}*\text{N5}))+((\text{G}/2)+(\text{G}*\text{N6}))).$$

Where:

B is the sales in the first year, C is the sales in the second year and so on.

N1 to N6 (with additional factor for each extra year included in the calculation) are the service time (in years), calculated as the number of days/365 from the end of the year in question, to the end date of the calculation period.

In the year in which a product is sold, it is not recorded in MTBF results exactly when the sale was made, so all sales are assumed to be made in the middle of that year - hence the factor B/2, C/2, etc. Then the products are in service for the whole of the remaining years up to the end of the period for the calculation, which is the N1 to N6 factor multiplied by the number of products sold in each year.

$$\text{MTBF} = \text{Product years service} / \text{Products reported failed and returned}$$

Current sales and failure data are updated on an annual basis.