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SAIA BURGESS CONTROLS

Type / Field Failure Rate [FFR]	[mio h]	[Years @ 24h/D]	Example for a Typical Configuration	1/FFR	Summ	FFR Total	Availability:	Real configuration to be filled by the User	1 / FFR	Summ	FFR Total	Availability
PCD1, PCD2					6.5E-02	**15.5 [years]** 135 664 [h]	**100.00%**			7.4E-02	**13.5 [years]** 118 192 [h]	**100.00%**
C100, C150	8.8	1000	**1**	1.0E-03				**1**	1.0E-03			
C2000	8.8	1000	0					0				
M110, 120, M150	0.6	70	0					**1**	1.4E-02			
M17x, M48x	0.5	60	**1**	1.7E-02				0				
M5xxx [1]	0.2	20	0					0				
E11x, E16x, E61x	4.4	500	**3**	6.0E-03				0				
A200,220,250 [3]	3.5	400	**1**	2.5E-03				0				
A300, A400, A46x	6.1	700	**6**	8.6E-03				0				
W1xx	1.8	200	0					**3**	1.5E-02			
W2, W3, W4, W6	3.5	400	**1**	2.5E-03				0				
W5	2.6	300	**1**	3.3E-03				0				
H1	3.5	400	0					**1**	2.5E-03			
R6000	2.6	300	0					0				
F2xxx	2.6	300	0					0				
F5xx	2.6	300	0					0				
T8 [1]	1.8	200	0					0				
PCD7												
F1xx, F2xx	8.8	1000	**2**	2.0E-03				**2**	2.0E-03			
F6xx, F7xx, F8xx	0.9	100	**1**	1.0E-02				**1**	1.0E-02			
F74xx	1.8	200	**1**	5.0E-03				**1**	5.0E-03			
F75xx	1.8	200	**1**	5.0E-03				0				
R4xx	8.8	1000	**1**	1.0E-03				0				
R5xx	8.8	1000	**1**	1.0E-03				0				
H104S [1]	1.8	200	0					0				
D23x	0.8	90	0					0				
D4xx [1] [2] [5]	0.4	41	0					**1**	2.4E-02			
PCS1.Cxx [1]	0.4	40	0					0				

Availibility=FFR / (FFR + Rtime)

Availability is based on
- the condition where the customer is supposed to have spare modules
- so an estimated 'Repair time' of 4 hours to localize and replaced the defective module can be applied.

[1] **Previsional estimation**
[2] **Backlight: 50% luminosity after 50'000h**
[3] **Subject to limited Life Time; for Relais typical 0.7 x 10^6 cycles**
[5] **PCD7.D457VTSF: 2775. FIT, 360'326 h, 15014 T, 41.1 Jahre @65°C**

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SAIA BURGESS CONTROLS

Type / Field Failure Rate [FFR]	[mio h]	[Years @ 24h/D]	**Example** for a Typical Configuration	1/FFR	Summ	**FFR Total**		**Availability:**	**Real configuration** to be filled by the User	1 / FFR	Summ	**FFR Total**		**Availability**
PCD3					3.2E-02	**31.4**	**[years]** 275 422 [h]	**100.00%**			3.3E-02	**29.9**	**[years]** 261 708 [h]	**100.00%**
C100, C110	8.8	1000	**1**	1.0E-03					0					
C200	3.5	400	**0**						0					
M3xxx, M5xxx [4] **M6xxx @35°C**	0.9	97	**0**						0					
M3xxx, M5xxx [4] **M6xxx @50°C**	0.5	57	**1**	1.8E-02					**1**	1.8E-02				
M3xxx, M5xxx [4] **M6xxx @65°C**	0.3	33	**0**						0					
T66x [1]	0.2	20	**0**						0					
T76x [1]	1.8	200	**0**						0					
E11x, E16x, E61x	4.4	500	**3**	6.0E-03					**1**	2.0E-03				
A200,220,250 [3]	3.5	400	**1**	2.5E-03					**2**	5.0E-03				
A300, A400, A46x	6.1	700	**1**	1.4E-03					**1**	1.4E-03				
W1xx	1.8	200	**0**						0					
W2, W3, W4, W6	3.5	400	**0**						**3**	7.5E-03				
W5	2.6	300	**1**	3.3E-03					0					
H1	3.5	400	**0**						0					
R5xx, R6xx [1]	2.6	300	**0**						0					
F1xx	2.6	300	**0**						0					
F2xx	1.8	200	**0**						0					
PCD7														
F1xx	8.8	1000	**0**						0					
R-SD xxx	1.0	110	**0**						0					
D4xx [1] [2] [5]	0.4	41	**1**	2.4E-02					0					

How to interpret the value of MTBF?

After a Time of one MTBF all sample of a population has to be repaired and put again into service.
= if you have 100 or 1000x PCD3.M90 in service, after 31.4 years all 100 or 1000 failed once.
=during a time slice of 10 years the percentage of once failed devices is:
100% * Time duration / MTBF
100%* 10 years/ 31.4= 31.8%

In the practice:
- higher failures rate happened during the first year due to additional stress provoked by all manual interventions, and also in a smaller part due to the early mortality of components.
- good environment lowers the defective rate through lower and constant temperature and humidity, clean atmosphere, infrequent human intervention, etc. ... .

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[4] **MTBF calculated: 38.1Years @35°C, 29.9Years @50°C, 21.6Years @65°C,**
[5] **PCD7.D457VTSF: 115.1Years @35°C, 70.9Years @50°C, 21.6Years @65°C**

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C100, C110	8.8	1000	**1**	1.0E-03				0				
C200	3.5	400	**0**					0				
M3xxx, M5xxx [4] **M6xxx @35°C**	0.9	97	**0**		Chose in function of operating temperature **35°C**			0				
M3xxx, M5xxx [4] **M6xxx @50°C**	0.5	57	**1**	1.8E-02	**50°C**			**1**	1.8E-02			
M3xxx, M5xxx [4] **M6xxx @65°C**	0.3	33	**0**		**65°C**			0				
T66x [1]	0.2	20	**0**					0				
T76x [1]	1.8	200	**0**					0				
E11x, E16x, E61x	4.4	500	**3**	6.0E-03	Equivalent I/O for PCD3.M90			**1**	2.0E-03			
A200,220,250 [3]	3.5	400	**1**	2.5E-03				**2**	5.0E-03			
A300, A400, A46x	6.1	700	**1**	1.4E-03				**1**	1.4E-03			
W1xx	1.8	200	**0**					0				
W2, W3, W4, W6	3.5	400	**0**					**3**	7.5E-03			
W5	2.6	300	**1**	3.3E-03				0				
H1	3.5	400	**0**					0				
R5xx, R6xx [1]	2.6	300	**0**					0				
F1xx	2.6	300	**0**					0				
F2xx	1.8	200	**0**					0				
PCD7												
F1xx	8.8	1000	**0**					0				
R-SD xxx	1.0	110	**0**					0				
D4xx [1] [2] [5]	0.4	41	**1**	2.4E-02				0				

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PCD7.Dxxx, PCS1					8.7E-03	115.1 [years] 1 008 276 [h]	100.00%		8.7E-03	115.1 [years] 1 008 276 [h]	100.00%
D23x		0.8	90	0				0			
D4xx [1) 2) 5)]	@35°C	1.0	115	1	8.7E-03			1	8.7E-03		
D4xx [1) 2) 5)]	@50°C	0.6	71	0				0			
D4xx [1) 2) 5)]	@65°C	0.4	41	0				0			
PCS1.Cxx [1)]		0.4	40	0				0			

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