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Reliability values acc. to EN ISO 13849-1

Values for complete systems:
Subsystems can represent a safety function by itself or they can be used together with other subsystems.
ATTENTION: In some subsystems, positively driven relays are included which are not wear-free. Several different systems which have restrictions regarding the number of switching cycles are listed in the EUCHNER library. If other values are required these values can be requested from EUCHNER directly.

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CEM-A... Read head for CES evaluation system	The read head CEM-A... is already included in the evaluation unit and doesn't have a safety value.	-	-	-
CEM...-C40... Safety switch with guard locking	CEM...-C40... Safety switches with guard locking for process protection and integrated evaluation electronics	4,5E-09	e	4
CES...-AS1, non-contact safety system	CES evaluation unit Unicode or Multicode for one or four read heads with AS-i interface inclusive read heads and actuators. Read heads CES..., CKS..., ET-AX... or CEM... ATTENTION: CET-AX... with mounting head upward only category 3 and PFHd = 4.3E-08	6,5E-09	e	4
CES-A-.BA... complete, <= 0.1 A, <= 760,000 cycles per year, non contact safety system	CES evaluation unit for 1 read head Unicode or Multicode with read head and actuator. Read head CES..., CKS... or CEM... ATTENTION: maximum number of switching cycles 760,000 per year, switching current <= 0.1 A at 24 V DC	4,3E-08	e	3
CES-A-.BA... complete, <= 1 A, <= 153,000 cycles per year, non contact safety system	CES evaluation unit for 1 read head Unicode or Multicode with read head and actuator. Read head CES..., CKS... or CEM... ATTENTION: maximum number of switching cycles 153,000 per year, switching current <= 1 A at 24 V DC	4,3E-08	e	3

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Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CES-A-.BA... complete, <= 3 A, <= 34,600 cycles per year, non contact safety system	CES evaluation unit for 1 read head Unicode or Multicode with read head and actuator. Read head CES..., CKS... or CEM... ATTENTION: maximum number of switching cycles 34,600 per year, switching current <= 3 A at 24 V DC	4,3E-08	e	3
CES-AR-.ES..., <= 0.1 A, <= 720,000 cycles per year, non contact safety system	CES evaluation unit for up to 12 serial wired safety switches family AR. ATTENTION: maximum number of switching cycles 720,000 per year, switching current <= 0.1A at 24 V DC	1,5E-08	e	4
CES-AR-.ES..., <= 1 A, <= 540,000 cycles per year, non contact safety system	CES evaluation unit for up to 12 serial wired safety switches family AR. ATTENTION: maximum number of switching cycles 540,000 per year, switching current <= 1 A at 24 V DC	1,5E-08	e	4
CES-AR-.ES... , <= 3 A, <= 107,000 cycles per year, non contact safety system	CES evaluation unit for up to 12 serial wired safety switches family AR. ATTENTION: maximum number of switching cycles 107,000 per year, switching current <= 3 A at 24 V DC	1,5E-08	e	4
CES-AZ-.BS... complete, <= 0.1 A, <= 760,000 cycles per year, non contact safety system	CES evaluation unit for 1 read head Unicode or Multicode with read head and actuator. Read head CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 760,000 per year, switching current <= 0.1 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFHd = 4.3E-08	4,3E-08	e	3

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CES-AZ-.BS... complete, <= 1 A, <= 153,000 cycles per year, non contact safety system	CES evaluation unit for 1 read head Unicode or Multicode with read head and actuator. Read head CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 153,000 per year, switching current <= 1 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFHd = 4.3E-08	4,3E-08	e	3
CES-AZ-.BS... complete, <= 3 A, <= 34,600 cycles per year, non contact safety system	CES evaluation unit for 1 read head Unicode or Multicode with read head and actuator. Read head CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 34,600 per year, switching current <= 3 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFHd = 4.3E-08	4,3E-08	e	3
CES-A.-.EA... complete, <= 0.1 A, <= 506,000 cycles per year, non contact safety system	CES evaluation unit for 2 or 4 read heads Unicode or multicode with up to 2 resp. 4 read heads and actuators. Read heads CES..., CKS... or CEM... ATTENTION: maximum number of switching cycles 506,000 per year, switching current <= 0.1 A at 24 V DC	1,3E-08	e	4
CES-A.-.EA... complete, <= 1 A, <= 100,000 cycles per year, non contact safety system	CES evaluation unit for 2 or 4 read heads Unicode or Multicode with up to 2 resp. 4 read heads and actuators. Read heads CES..., CKS... or CEM... ATTENTION: maximum number of switching cycles 100,000 per year, switching current <= 1 A at 24 V DC	1,3E-08	e	4

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Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CES-A.-.EA... complete, <= 3 A, <= 23,000 cycles per year, non contact safety system	CES evaluation unit for 2 or 4 read heads Unicode or Multicode with up to 2 resp. 4 read heads and actuators. Read heads CES..., CKS... or CEM... ATTENTION: maximum number of switching cycles 23,000 per year, switching current <= 3 A at 24 V DC	1,5E-08	e	4
CES-AZ-.ES... complete, <= 0.1 A, <= 760,000 cycles, non contact safety system	CES evaluation unit for 1 up to 4 read heads Unicode or multicode with up to 1 resp. 4 read heads and actuators. Read heads CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 760,000 per year, switching current <= 0.1 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFHd = 4.3-08	1,9E-08	e	4
CES-AZ.-.ES... complete, <= 1 A, <= 153,000 cycles per year, non contact safety system	CES evaluation unit for 1 up to 4 read heads Unicode or multicode with up to 1 resp. 4 read heads and actuators. Read heads CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 153,000 per year, switching current <= 1 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFH$_d$ = 4.3-08	1,9E-08	e	4

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Subsystems: non-contact safety switches				
Name	**Documentation**	**PFH$_d$**	**PL**	**Cat**
CES-AZ.-.ES... complete, <= 3 A, <= 34,600 cycles per year, non contact safety system	CES evaluation unit for 1 up to 4 read heads Unicode or Multicode with up to 1 resp. 4 read heads and actuators. Read heads CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 34,600 per year, switching current <= 3 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFH$_d$ = 4.3-08	1,9E-08	e	4
CES-AZ-.LS... complete, <= 0.1 A, <= 760,000 cycles, non contact safety system	CES evaluation unit for up to 4 read heads Unicode with up to 4 read heads and actuators. Read heads CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 760,000 per year, switching current <= 0.1 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFHd = 4.3-08	1,9E-08	e	4
CES-AZ.-.LS... complete, <= 1 A, <= 153,000 cycles per year, non contact safety system	CES evaluation unit for up to 4 read heads Unicode with up to 4 read heads and actuators. Read heads CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 153,000 per year, switching current <= 1 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFH$_d$ = 4.3-08	1,9E-08	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH_d	PL	Cat
CES-AZ.-.LS... complete, <= 3 A, <= 34,600 cycles per year, non contact safety system	CES evaluation unit for up to 4 read heads Unicode with up to 4 read heads and actuators. Read heads CES..., CKS..., CET-AX... or CEM... ATTENTION: maximum number of switching cycles 34,600 per year, switching current <= 3 A at 24 V DC ATTENTION: CET-AX... with mounting head upward only category 3 and PFH_d = 4.3-08	1,9E-08	e	4
CES-CB-... complete	CES evaluation unit for 1 up to 4 read heads Unicode or Multicode. Read heads CES..., CKS..., CET-AX... or CEM... ATTENTION: CET-AX... with mounting head upward only category 3 and PFH_d = 4.3-08	7,2E-09	e	4
CES-A-C5E... complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	4,3E-08	e	3
CES-A-W5... complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	3,7E-09	e	4
CES-A-C5H... complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	3,7E-09	e	4
CES-AH... complete, non contact safety system	CES compact unit with integrated read head, incl. actuator.	1,0E-07	d	3
CES-AP-C01...complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	2,1E-09	e	4
CES-AP-C.2...complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	1,8E-09	e	4
CES-AR-C01... complete, non contact safety system	CES compact evaluation unit with integrated read head, for serial wiring incl. actuator.	2,1E-09	e	4
CES-AR-C.2... complete, non contact safety system	CES compact evaluation unit with integrated read head, for serial wiring incl. actuator.	1,9E-09	e	4
CES-A-S5H... complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	3,7E-09	e	4

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Subsystems: non-contact safety switches				
Name	Documentation	PFH_d	PL	Cat
CES-FD-AP... field evaluation unit, non contact safety system	CES-FD field evaluation unit with separate read head and actuator.	4,5E-09	e	4
CES-I-AP..C04.. complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	4,1E-09	e	4
CES-I-AR..C04.. complete, non contact safety system	CES compact evaluation unit with integrated read head, incl. actuator.	4,1E-09	e	4
CES-I-AS...C04..	Non contact safety switch incl. Read heads with integrated AS-Interface	4,5E-09	e	4
CES-I-B...C07..	CES compact evaluation unit with integrated read head, incl. actuator. BR versions are suitable for series connection	6,0E-10	e	4
CET-AP... complete, non contact safety system with guard locking and guard locking monitoring	CET non contact guard locking with guard locking monitoring incl. actuator.	3,1E-09	e	4
CET-AR... complete, non contact safety system with guard locking and guard locking monitoring	CET non contact guard locking with guard locking monitoring, for serial wiring incl. actuator.	3,1E-09	e	4
CET...-AS1 complete, non contact safety system	CET locking unit with integrated AS-interface, incl. actuator.	3,1E-09	e	4
CET-AX... Read head for CES evaluation unit	The read head CET-AX... is already included in the evaluation unit and doesn't have a safety value.	-	-	-
CKS-A... Read head for CES evaluation unit	The read head CKS-A... is already included in the evaluation unit and doesn't have a safety value.	-	-	-
CKS2-... complete, non contact key system	Transponder-coded key system CKS2, incl. CKS-key	4,1E-09	e	4
CMS...AS1	BR versions are suitable for series connection	4,3E-08	e	3

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CMS-E-AR, up to 2 read heads, <= 0.1 A, <= 96,000 cycles per year, non contact safety system	CMS evaluation unit completely with maximum 2 read heads and actuators. ATTENTION: maximum number of switching cycles 96,000 per year, switching current <= 0.1 A at 24 V DC	1,0E-07	d	3
CMS-E-AR, up to 2 read heads, <= 1 A, <= 75,000 cycles per year, non contact safety system	CMS evaluation unit completely with maximum 2 read heads and actuators. ATTENTION: maximum number of switching cycles 75,000 per year, switching current <= 1 A at 24 V DC	1,0E-07	d	3
CMS-E-AR, up to 2 read heads, <= 3 A, <= 18,000 cycles per year, non contact safety system	CMS evaluation unit completely with maximum 2 read heads and actuators. ATTENTION: maximum number of switching cycles 18,000 per year, switching current <= 3 A at 24 V DC	1,0E-07	d	3
CMS-E-AR, more than 2 read heads, <= 0.1 A, <= 96,000 cycles per year, non contact safety system	CMS evaluation unit completely with more than 2 read heads and actuators. ATTENTION: maximum number of switching cycles 96,000 per year, switching current <= 0.1 A at 24 V DC	1,1E-06	c	1
CMS-E-AR, more than 2 read heads, <= 1 A, <= 75,000 cycles per year, non contact safety system	CMS evaluation unit completely with more than 2 read heads and actuators. ATTENTION: maximum number of switching cycles 75,000 per year, switching current <= 1 A at 24 V DC	1,1E-06	c	1
CMS-E-AR, more than 2 read heads, <= 3 A, <= 18,000 cycles per year, non contact safety system	CMS evaluation unit completely with more than 2 read heads and actuators. ATTENTION: maximum number of switching cycles 18,000 per year, switching current <= 3 A at 24 V DC	1,1E-06	c	1
CMS-E-BR, 1 read head, <= 0.1 A, <= 100,000 cycles per year, non contact safety system	CMS evaluation unit completely with 1 read head and actuator. ATTENTION: maximum number of switching cycles 100,000 per year, switching current <= 0.1 A at 24 V DC	2,5E-08	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CMS-E-BR, 1 read head, <= 1 A, <= 18,500 cycles per year, non contact safety system	CMS evaluation unit completely with 1 read head and actuator. ATTENTION: maximum number of switching cycles 18,500 per year, switching current <= 1 A at 24 V DC	2,5E-08	e	4
CMS-E-BR, 1 read head, <= 3 A, <= 9,000 cycles per year, non contact safety system	CMS evaluation unit completely with 1 read head and actuator. ATTENTION: maximum number of switching cycles 9,000 per year, switching current <= 3 A at 24 V DC	2,5E-08	e	4
CMS-E-BR, more than 1 read head, <= 0.1 A, <= 100,000 cycles per year, non contact safety system	CMS evaluation unit completely with more than 1 read head and actuator. ATTENTION: maximum number of switching cycles 100,000 per year, switching current <= 0.1 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3
CMS-E-BR, more than 1 read head, <= 1 A, <= 18,500 cycles per year, non contact safety system	CMS evaluation unit completely with more than 1 read head and actuator. ATTENTION: maximum number of switching cycles 18,500 per year, switching current <= 1 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3

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Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CMS-E-BR, more than 1 read head, <= 3 A, <= 9,000 cycles per year, non contact safety system	CMS evaluation unit completely with more than 1 read head and actuator. ATTENTION: maximum number of switching cycles 9,000 per year, switching current <= 3 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3
CMS-E-ER, 1 read head, <= 0.1 A, <= 166,000 cycles per year, non contact safety system	CMS evaluation unit completely with 1 read head and actuator. ATTENTION: maximum number of switching cycles 166,000 per year, switching current <= 0.1 A at 24 V DC	2,5E-08	e	4
CMS-E-ER, 1 read head, <= 1 A, <= 70,000 cycles per year, non contact safety system	CMS evaluation unit completely with 1 read head and actuator. ATTENTION: maximum number of switching cycles 70,000 per year, switching current <= 1 A at 24 V DC	2,5E-08	e	4
CMS-E-ER, 2 read heads, <= 0.1 A, <= 166,000 cycles per year, non contact safety system	CMS evaluation unit completely 2 read heads and actuators. ATTENTION: maximum number of switching cycles 166,000 per year, switching current <= 0.1 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CMS-E-ER, 2 read heads, <= 0.1 A, <= 166,000 cycles per year, non contact safety system	CMS evaluation unit completely 2 read heads and actuators. ATTENTION: maximum number of switching cycles 166,000 per year, switching current <= 0.1 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3
CMS-E-ER, 2 read heads, <= 1 A, <= 70,000 cycles per year, non contact safety system	CMS evaluation unit completely with 2 read heads and actuators. ATTENTION: maximum number of switching cycles 70,000 per year, switching current <= 1 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3
CMS-E-FR, 1 read head, <= 0.1 A, <= 166,000 cycles per year, non contact safety system	CMS evaluation unit completely with 1 read head and actuator. ATTENTION: maximum number of switching cycles 166,000 per year, switching current <= 0.1 A at 24 V DC	2,5E-08	e	4
CMS-E-FR, 1 read head, <= 1 A, <= 70,000 cycles per year, non contact safety system	CMS evaluation unit completely with 1 read head and actuator. ATTENTION: maximum number of switching cycles 70,000 per year, switching current <= 1 A at 24 V DC	2,5E-08	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH_d	PL	Cat
CMS-E-FR, more than 1 read head, <= 0.1 A, <= 166,000 cycles per year, non contact safety system	CMS evaluation unit completely with more than 1 read head and actuator. ATTENTION: maximum number of switching cycles 166,000 per year, switching current <= 0.1 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3
CMS-E-FR, more than 1 read head, <= 1 A, <= 70,000 cycles per year, non contact safety system	CMS evaluation unit completely with more than 1 read head and actuator. ATTENTION: maximum number of switching cycles 70,000 per year, switching current <= 1 A at 24 V DC (with protected cable laying) ATTENTION: if cables are laid without protection and more than one door must be opened frequently or if cables are laid without protection and more than 5 doors are connected in series: --> PLc --> PFHd = 1,1 x 10^-6	1,0E-07	d	3

Subsystems: non-contact safety switches				
Name	Documentation	PFH_d	PL	Cat
CTA-L*-B..complete, non contact safety system with guard locking and guard locking monitoring	CTA Non-contact guard locking with guard lock monitoring incl. actuator. BR versions are suitable for series connection	5,4E-09	e	4
CTA-I*-B..complete, non contact safety system with guard locking without guard locking monitoring	CTA Non-contact guard locking without guard lock monitoring incl. actuator. BR versions are suitable for series connection	5,4E-09	e	4
CTA-I-B...complete, non contact safety system without guard locking	CTA Non-contact switch without guard locking incl. actuator. BR versions are suitable for series connection	5,4E-09	e	4
CTP-L*-A..complete, non contact safety system with guard locking and guard locking monitoring	CTP Non-contact guard locking with guard lock monitoring incl. actuator. AR versions are suitable for series connection	4,1E-09	e	4
CTP-I*-A..complete, non contact safety system with guard locking without guard locking monitoring	CTP Non-contact guard locking without guard lock monitoring incl. actuator. AR versions are suitable for series connection	4,1E-09	e	4
CTP-I-A...complete, non contact safety system without guard locking	CTP Non-contact switch without guard locking incl. actuator. AR versions are suitable for series connection	4,1E-09	e	4
CTP-LBI-AP...complete, non contact bistable safety system with guard locking and guard locking monitoring	CTP non-contact bistable guard locking with guard lock monitoring incl. actuator.	4,1E-09	e	4
CTP-LBI-AP...Control of the guard locking	Internal electronics for controlling the guard locking	2,1E-09	b	B
CTP-L*-B..complete, non contact safety system with guard locking and guard locking monitoring	CTP Non-contact guard locking with guard lock monitoring incl. actuator. BR versions are suitable for series connection	5,4E-09	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
CTP-I*-B..complete, non contact safety system with guard locking without guard locking monitoring	CTP Non-contact guard locking without guard lock monitoring incl. actuator. BR versions are suitable for series connection	5,4E-09	e	4
CTP-I-B...complete, non contact safety system without guard locking	CTP Non-contact switch without guard locking incl. actuator. BR versions are suitable for series connection	5,4E-09	e	4
CTM-L*-B..complete, non contact safety system with guard locking and guard locking monitoring	CTM Non-contact guard locking with guard lock monitoring incl. actuator. BR versions are suitable for series connection	4,5E-09	e	4
CTM-I*-B..complete, non contact safety system with guard locking without guard locking monitoring	CTM Non-contact guard locking without guard lock monitoring incl. actuator. BR versions are suitable for series connection	4,5E-09	e	4
CTM-L*-B..Control of the guard locking	Internal electronics for controlling the guard locking	1,0E-07	d	3
CTS-C...complete, non contact safety system with guard locking and with/without guardlocking monitoring	CTS-C configurable, non-contact guard locking with guard lock monitoring incl. actuator. The following applies to CTS-C1 (closed-circuit principle): Depending on the actuator used, the system operates as - Guard locking for personnel protection - Guard locking for process protection The following applies to CTS-C2 (operating current principle): - Guard locking for process protection only BR versions are suitable for series connection.	6,4E-09	e	4
ESL... Safety system with handle	Interlocking device for safeguarding of machines and other equipment, incl. actuator.	1,9E-09	e	4

MGBS-L*-A..complete, non contact safety system with guard locking and guard locking monitoring	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Monitoring of guard locking and the position of the safety guard. AR versions are suitable for series connection	4,1E-09	e	4
MGBS-I*-A..complete, non contact safety system with guard locking without guard locking monitoring	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Monitoring the position of the safety guard. AR versions are suitable for series connection	4,1E-09	e	4
MGBS-I-A...complete, non contact safety system without guard locking	Interlocking system with guard locking monitoring for safeguarding of movable guards. Monitoring the position of the safety guard. AR versions are suitable for series connection	4,1E-09	e	4

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Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
MGBS-LBI-AP...complete, non contact bistable safety system with guard locking and guard locking monitoring	bistable locking system with guard locking monitoring for safeguarding of movable guards. Monitoring of guard locking and the position of the safety guard. AR versions are suitable for series connection	4,1E-09	e	4
MGBS-LBI-AP...Control of the guard locking	bistable locking system with guard locking monitoring for safeguarding of movable guards. Control of the guard locking	2,1E-09	b	B
MGBS-L*-B..complete, non contact safety system with guard locking and guard locking monitoring	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Monitoring of guard locking and the position of the safety guard. BR versions are suitable for series connection	5,4E-09	e	4
MGBS-I*-B..complete, non contact safety system with guard locking without guard locking monitoring	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Monitoring the position of the safety guard. BR versions are suitable for series connection	5,4E-09	e	4
MGBS-I-B...complete, non contact safety system without guard locking	Interlocking system with guard locking monitoring for safeguarding of movable guards. Monitoring the position of the safety guard. BR versions are suitable for series connection	5,4E-09	e	4
MGB... Multifunctional Gate Box. Control of the guard locking	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Control of the guard locking Valid for all versions except Profinet.	2,8E-09	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
MGB... Multifunctional Gate Box	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Monitoring of guard locking and the position of the safety guard. Valid for all versions except Profinet. ATTENTION: E-stop functionality has to be calculated separately with an additional subsystem e-stop evaluation (not part of the MGB!) using the element "MGB e-stop device"! For more information see this element.	3,7E-09	e	4
MGB2-L*-B...Classic, non contact safety system with guard locking and guard locking monitoring	Interlocking or guard locking system for safeguarding safety doors on machines and systems. Monitoring of the guard locking and the position of the safety guard. Valid for all variants except Profinet. ATTENTION: The safety functions, which are included in the MSM submodules, must be calculated separately! Further information in the specific element.	2,9E-09	e	4
MGB2-I*-B...Classic, non contact safety system with guard locking without guard locking monitoring	Interlocking or guard locking system for safeguarding safety doors on machines and systems. Monitoring of the position of the safety guard. Valid for all variants except Profinet. ATTENTION: The safety functions, which are included in the MSM submodules, must be calculated separately! Further information in the specific element.	2,9E-09	e	4
MGB2-L*-B..Classic, control of the guard locking	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Control of the guard locking Valid for all versions except Profinet.	2,9E-09	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
MGB..EI... Multifunctional Gate Box with Ethernet/IP	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Valid for all versions with integrated Ethernet/IP. ATTENTION: E-stop functionality and enabling switch functionality have to be calculated separately using the according subsystems evaluation in MGB-EI. For more information see these subsystems.	3,4E-09	e	4
MGB..EI... E-stop evaluation	E-stop evaluation within MGB with integrated Ethernet. The evaluation of the E-stop is carried out in dual channel mode in Category 4, with a Diagnostic Coverage of DC 99%. ATTENTION: E-Stop functionality has to be calculated separately using element "MGB..EI... e-stop" and this subsystem! Composition of block diagram for e-stop device in MGB Ethernet: Typically the evaluation is built by the subsystem control together with the subsystem "MGB..EI... e-stop evaluation" in combination with another subsystem using the element "MGB..EI e-stop".	3,1E-09	e	4
MGB..EI... Enabling switch evaluation	Enabling switch evaluation within MGB with integrated Ethernet/IP. The evaluation of the enabling switch is carried out in dual channel mode in Category 4, with a Diagnostic Coverage of DC 99%. ATTENTION: The enabling switch functionality has to be calculated using the according element of the used enabling switch and this subsystem!	3,1E-09	e	4
MGB..EI... Solenoid control evaluation	Internal electronic in the MGB for solenoid control evaluation	4,9E-09	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH_d	PL	Cat
MGB..PN... Multifunctional Gate Box with Profinet	Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Valid for all versions with integrated Profinet. ATTENTION: E-stop functionality and enabling switch functionality have to be calculated separately using the according subsystems evaluation in MGB-PN! For more information see these subsystems.	4,1E-08	e	4
MGB..PN... E-stop evaluation	E-stop evaluation within MGB with integrated Profinet. The evaluation of the E-stop is carried out in dual channel mode in Category 4, with a Diagnostic Coverage of DC 99%. ATTENTION: E-Stop functionality has to be calculated separately using element "MGB..PN... e-stop" and this subsystem! Composition of block diagram for e-stop device in MGB Profinet: Typically the evaluation is built by the subsystem control together with the subsystem "MGB..PN... e-stop evaluation" in combination with another subsystem using the element "MGB..PN e-stop".	4,1E-08	e	4
MGB..PN... Solenoid control evaluation	Internal electronic in the MGB for solenoid control evaluation	3,9E-08	e	4
MGB..PN... Enabling switch evaluation	Enabling switch evaluation within MGB with integrated Profinet. The evaluation of the enabling switch is carried out in dual channel mode in Category 4, with a Diagnostic Coverage of DC 99%. ATTENTION: The enabling switch functionality has to be calculated using the according element of the used enabling switch and this subsystem!	4,1E-08	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH$_d$	PL	Cat
MGB2..Modular.. Multifunctional Gate Box 2	Safety functions: Monitoring of the guard lock and the position of the safety guard Control of the guard locking Interlocking system or locking system with guard locking monitoring for safeguarding of movable guards. Industrial Ethernet connection via bus module MBM..Modular ATTENTION: The emergency stop function, the enabling function and the key switch function must be evaluated separately via the associated subsystem evaluation in the "MGB2..Modular. Evaluation of safety signals in included submodules"! Further notes in the corresponding subsystems.	2,62E-09	e	4
MGB2..Modular... Evaluation of safety signals in included submodules	Evaluation of safety signals in contained submodules within the MGB2 Modular Locking Module. The submodules are evaluated on two channels in category 4 with a diagnostic DC coverage of 99%. ATTENTION: The emergency stop/key switch function has to be implemented using the element "MSM.. Emergency Stop Control Panel/Key Switch" and this subsystem! Structure of the block diagram for the safety signals in MSM submodules: Typical is the evaluation in the controller + subsystems MBM + subsystem Evaluation of safety signals in contained submodules + another subsystem containing the element "MSM..." connected in series	2,62E-09	e	4

Subsystems: non-contact safety switches				
Name	Documentation	PFH_d	PL	Cat
MBM..EC..Modular.. busmodule	MBM-EC Modular For the connection of MGB2 or MCM modules Connection to ETHERCat	2,8E-09	e	4
MBM..PN..Modular.. V1.x.x busmodule	MBM-PN Version V1.x.x For the connection of MGB2 or MCM modules Connection to PROFINET/PROFIsafe	3,4E-09	e	4
MBM..PN..Modular.. V2.x.x busmodule	MBM-PN Version V2.x.x For the connection of MGB2 or MCM modules Connection to PROFINET/PROFIsafe	5,4E-09	e	4
MCM..Modular..Evaluation of safety signals in included submodules	Evaluation of safety signals in contained submodules within the MCM Modular. The submodules are evaluated on two channels in category 4 with a diagnostic coverage of 99% DC. ATTENTION: The emergency stop/key switch function has to be implemented with the "MSM.. Emergency Stop/Key Switch" and this subsystem! Structure of the block diagram for the safety signals in MSM submodules: Typical is the evaluation in the controller + subsystems MBM + subsystem Evaluation of safety signals in contained submodules + another subsystem containing the element "MSM... " connected in series	2,8E-09	e	4

Subsystems: safety relay				
Name	Documentation	PFH_d	PL	Cat
ESM-2H2... , <= 0.1 A, <= 500,000 cycles per year, safety relay 2-Hand	All versions of type series ESM-2H2... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	1,2E-08	e	4
ESM-2H2... , <= 1 A, <= 100,000 cycles per year, safety relay 2-Hand	All versions of type series ESM-2H2... ATTENTION: maximum number of switching cycles 100,000 per year, switching current <= 1 A at 24 V DC	1,2E-08	e	4
ESM-2H2... , <= 3 A, <= 22,500 cycles per year, safety relay 2-Hand	All versions of type series ESM-2H2... ATTENTION: maximum number of switching cycles 22,500 per year, switching current <= 3 A at 24 V DC	1,2E-08	e	4
ESM-BA2... , <= 0.1 A, <= 500,000 cycles per year, safety relay base unit	All versions of type series ESM-BA2... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	1,2E-08	e	4
ESM-BA2... , <= 1 A, <= 73,000 cycles per year, safety relay base unit	All versions of type series ESM-BA2 .. ATTENTION: maximum number of switching cycles 73,000 per year, switching current <= 1 A at 24 V DC	1,2E-08	e	4
ESM-BA2... , <= 2 A, <= 17,000 cycles per year, safety relay base unit	All versions of type series ESM-BA2... ATTENTION: maximum number of switching cycles 17,000 per year, switching current <= 2 A at 24 V DC	1,2E-08	e	4
ESM-BA3... , <= 0.1 A, <= 500,000 cycles per year, safety relay base unit	All versions of type series ESM-BA3... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	1,2E-08	e	4

Subsystems: safety relay				
Name	Documentation	PFH_d	PL	Cat
ESM-BA3... , <= 1 A, <= 350,000 cycles per year, safety relay base unit	All versions of type series ESM-BA3... ATTENTION: maximum number of switching cycles 350,000 per year, switching current <= 1 A at 24 V DC	1,2E-08	e	4
ESM-BA3... , <= 2 A, <= 100,000 cycles per year, safety relay base unit	All versions of type series ESM-BA3... ATTENTION: maximum number of switching cycles 100,000 per year, switching current <= 2 A at 24 V DC	1,2E-08	e	4
ESM-BA7... , <= 0.1 A, <= 500,000 cycles per year, safety relay base unit	All versions of type series ESM-BA7... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	2,5E-08	e	4
ESM-BA7... , <= 1 A, <= 350,000 cycles per year, safety relay base unit	All versions of type series ESM-BA7... ATTENTION: maximum number of switching cycles 350,000 per year, switching current <= 1 A at 24 V DC	2,5E-08	e	4
ESM-BA7... , <= 2 A, <= 100,000 cycles per year, safety relay base unit	All versions of type series ESM-BA7... ATTENTION: maximum number of switching cycles 100,000 per year, switching current <= 2 A at 24 V DC	2,5E-08	e	4
ESM-BL2... , <= 0.1 A, <= 500,000 cycles per year, safety relay base unit	All versions of type series ESM-BL2... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	1,03E-07	d	3
ESM-BL2... , <= 1 A, <= 73,000 cycles per year, safety relay base unit	All versions of type series ESM-BL2... ATTENTION: maximum number of switching cycles 73,000 per year, switching current <= 1 A at 24 V DC	1,03E-07	d	3

EUCHNER
More than safety.

Subsystems: safety relay				
Name	Documentation	PFH_d	PL	Cat
ESM-BL2... , <= 2 A, <= 17,000 cycles per year, safety relay base unit	All versions of type series ESM-BL2... ATTENTION: maximum number of switching cycles 17,000 per year, switching current <= 2 A at 24 V DC	1,03E-07	d	3
ESM-BT4... , <= 0.1 A, <= 500,000 cycles per year, safety relay base unit	All versions of type series ESM-BT4... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	4,22E-08	e	3
ESM-BT4... , <= 1 A, <= 350,000 cycles per year, safety relay base unit	All versions of type series ESM-BT4... ATTENTION: maximum number of switching cycles 350,000 per year, switching current <= 1 A at 24 V DC	4,22E-08	e	3
ESM-BT4... , <= 2 A, <= 100,000 cycles per year, safety relay base unit	All versions of type series ESM-BT4... ATTENTION: maximum number of switching cycles 100,000 per year, switching current <= 2 A at 24 V DC	4,22E-08	e	3
ESM-CB... , <= 0.1 A, <= 500,000 cycles per year	Safety relay with IO-Link ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	1,00E-09	e	4
ESM-CB... , <= 1 A, <= 50,000 cycles per year	Safety relay with IO-Link ATTENTION: maximum number of switching cycles 50,000 per year, switching current <= 1 A at 24 V DC	1,00E-09	e	4
ESM-CB... , <= 4 A, <= 15,000 cycles per year	Safety relay with IO-Link ATTENTION: maximum number of switching cycles 15,000 per year, switching current <= 4 A at 24 V DC	1,00E-09	e	4

Subsystems: safety relay				
Name	Documentation	PFH$_d$	PL	Cat
ESM-ES3... , <= 0.1 A, <= 500,000 cycles per year, safety relay extension unit	All versions of type series ESM-ES3... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC ATTENTION: category 4 only combined with ESM-BA... base unit and assembly within an electrical cabinet, otherwise category 3 with PFHd=4.22E-08	1,20E-08	e	4
ESM-ES3... , <= 1 A, <= 73,000 cycles per year, safety relay extension unit	All versions of type series ESM-ES3... ATTENTION: maximum number of switching cycles 73,000 per year, switching current <= 1 A at 24 V DC ATTENTION: category 4 only combined with ESM-BA... base unit and assembly within one electrical cabinet, otherwise category 3 with PFH$_d$=4.22E-08	1,20E-08	e	4
ESM-ES3... , <= 2 A, <= 17,000 cycles per year, safety relay extension unit	All versions of type series ESM-ES3... ATTENTION: maximum number of switching cycles 17,000 per year, switching current <= 2 A at 24 V DC ATTENTION: category 4 only combined with ESM-BA... base unit and assembly within one electrical cabinet, otherwise category 3 with PFH$_d$=4.22E-08	1,20E-08	e	4
ESM-TE3... , <= 0.1 A, <= 500,000 cycles per year, safety relay extension unit	All versions of type series ESM-TE3... ATTENTION: maximum number of switching cycles 500,000 per year, switching current <= 0.1 A at 24 V DC	1,03E-07	d	3
ESM-TE3... , <= 1 A, <= 73,000 cycles per year, safety relay extension unit	All versions of type series ESM-TE3... ATTENTION: maximum number of switching cycles 73,000 per year, switching current <= 1 A at 24 V DC	1,03E-07	d	3

Subsystems: safety relay				
Name	Documentation	PFH_d	PL	Cat
ESM-TE3... , <= 2 A, <= 17,000 cycles per year, safety relay extension unit	All versions of type series ESM-TE3... ATTENTION: maximum number of switching cycles 17,000 per year, switching current <= 2 A at 24 V DC	1,03E-07	d	3

Subsystems: AS-i safety monitors and outputs

Name	Documentation	PFH$_d$	PL	Cat
GMO... Safety monitor with gateway	All versions of type series GMO... with different power supply possibilities.	4,0E-09	e	4
GMOX... Safety monitor with gateway	All versions of type series GMOX... with different power supply possibilities.	5,4E-09	e	4
SBM... AS-i Safety base monitor with integrated master	All versions of monitor type series SBM...	5,1E-09	e	4
SFM-... AS-i safety monitor	All versions of monitor type series SFM-...	9,1E-09	e	4
SMOX... AS-i safety monitor	All versions of monitor type series SMOx...	5,4E-09	e	4
SOM... safe AS-i output	All safe AS-i output modules SOM...	3,3E-09	e	4

Subsystems: Safety Controler

Name	Documentation	PFH$_d$	PL	Cat
MSC-CB-AC-FI8FO2-	MSC is a modular safety controller. It consists of a master unit (MSC-CB), which can be configured using the "EUCHNER Safety Designer". Expansion units can be connected to the Master via the proprietary MSC bus. MSC-CB has: - 2 MASTER ENABLE inputs; - 8 digital inputs; - 2 OSSD pairs; - 2 programmable digital signal outputs; - 2 inputs for Feedback - 4 TEST outputs for sensor monitoring; - 6x terminal set. Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	6,1E-09	e	4

Subsystems: Safety Controler				
Name	Documentation	PFH$_d$	PL	Cat
MSC-CB-AC-FI8FO4S-...	MSC is a modular safety controller. It consists of a master unit (MSC-CB), which can be configured using the "EUCHNER Safety Designer". Expansion units can be connected to the Master via the proprietary MSC bus. MSC-CB has: - 8 digital inputs - up to 4 control inputs - 4 single-channel semiconductor outputs (PL e, category 4) - up to 4 monitoring outputs - 2 inputs for Feedback - up to 4 TEST outputs for sensor monitoring - 6x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	5,7E-09	e	4
MSC-...-FI16-...	MSC Expansion Unit with: - 16 digital inputs; - 4 TEST outputs for sensor monitoring; - 6x terminal set. Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	4,9E-09	e	4

Subsystems: Safety Controler					
Name	Documentation		PFH_d	PL	Cat
MSC-...-FM4-...	MSC Expansion Unit with: - 12 digital inputs; - 8 TEST outputs for sensor monitoring; - 6x terminal set. Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.		5,6E-09	e	4
MSC-...-AC-FI8FO2-...	MSC Expansion Unit with: - 8 digital inputs; - 2 OSSD pairs; - 2 programmable digital signal outputs; - 2 inputs for Feedback - 4 TEST outputs for sensor monitoring; - 6x terminal set. Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.		5,7E-09	e	4
MSC-...-FI8-...	MSC Expansion Unit with: - 8 safety inputs; - 4 TEST outputs for sensor monitoring; - 4x terminal set. Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.		4,5E-09	e	4

Subsystems: Safety Controler				
Name	Documentation	PFH$_d$	PL	Cat
MSC-...-AC-FO2-...	MSC Expansion Unit with: - 2 OSSD pairs; - 2 programmable digital signal outputs; - 2 inputs for Feedback - 4x terminal set. Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	4,1E-09	e	4
MSC-...-AC-FO4-...	MSC Expansion Unit with: - 4 OSSD pairs; - 4 programmable digital signal outputs; - 4 inputs for Feedback - 6x terminal set. Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	5,8E-09	e	4
MSC-...-AZ-FO4-...	MSC Expansion Unit with: - 4 Relay Outputs - 4 inputs for Feedback - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	2,9E-09	e	4
MSC-...-AZ-FO4O8-...	MSC Expansion Unit with: - 4 Relay Outputs - 8 programmable digital signal outputs - 4 inputs for Feedback - 6x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	2,9E-09	e	4

Subsystems: Safety Controler				
Name	Documentation	PFH_d	PL	Cat
MSC-... SPM0	MSC Expansion Unit for safe speed control with: - Connection of two proximity switches - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	6,0E-09	e	4
MSC-... SPM1H	MSC Expansion Unit for safe speed control with: - Connection of two proximity switches - Conneciton of one HTL Encoder - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	6,7E-09	e	4
MSC-... SPM1TB	MSC Expansion Unit for safe speed control with: - Connection of two proximity switches - Conneciton of one TTL Encoder - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	7,8E-09	e	4

Subsystems: Safety Controler					
Name	Documentation		PFH$_d$	PL	Cat
MSC-...SPM1S	MSC Expansion Unit for safe speed control with: - Connection of two proximity switches - Conneciton of one sin/cos Encoder - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.		7,9E-09	e	4
MSC-...SPM2H	MSC Expansion Unit for safe speed control with: - Connection of two proximity switches - Conneciton of two HTL Encoders - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.		7,4E-09	e	4
MSC-...SPM2TB	MSC Expansion Unit for safe speed control with: - Connection of two proximity switches - Conneciton of two TTL Encoders - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.		9,6E-09	e	4

Subsystems: Safety Controler				
Name	Documentation	PFH$_d$	PL	Cat
MSC-... SPM2S	MSC Expansion Unit for safe speed control with: - Connection of two proximity switches - Conneciton of two sin/cos Encoders - 4x terminal set Important notice: the final PFHd value, Category and PL depends on the total number of modules connected, as well as the software configuration.	9,9E-09	e	4

Values for blocks:
A block does not fulfill any safety function by itself. It can be loaded from the EUCHNER SISTEMA
library within a subsystem and is configured completely. The calculation is made automatically.

Blocks: EKS FSA			
Name	Documentation	MTTF$_d$ [a]	DC
Electronic-Key-System EKS FSA (data channel plus 1 switching output)	EKS with additional switching output for safety related applications. Key holding devices with PROFIBUS-, PROFINET, USB- or Ethernet Interfaces. ATTENTION: Data Channel AND additional one switching output (LA) have to be evaluated!	416	92%
Electronic-Key-System EKS FSA (data channel plus 2 switching outputs)	EKS with additional switching output for safety related applications. Key holding devices with PROFIBUS-, PROFINET, USB- or Ethernet Interfaces. Both switching outputs (LA and LB) are used. ATTENTION: Data channel AND additional both switching channels (LA and LB) have to be evaluated!	803	92%
Electronic-Key-System EKS Light FSA compact	EKS light compact unit with switched outputs for safety related applications. Both switching outputs (LA1 and LA2) are used. ATTENTION: Standard outputs AND additional both switching channels (LA1 and LA2) have to be evaluated!	200	92%
Electronic-Key-System EKS Light FSA modular	EKS light modular unit incl. read head FHM with switched outputs for safety related applications. Both switching outputs (LA1 and LA2) are used. ATTENTION: Standard outputs AND additional both switching channels (LA1 and LA2) have to be evaluated!	200	92%

Values for electromechanical safety components (not wear-free).

MTTF$_d$ calculation according to annex C of EN ISO 13849-1.

In SISTEMA you can find the values in the EUCHNER library. The number of the yearly cycles has to be added at every element. Then SISTEMA is calculating the MTTF$_d$ value automatically.

Elements: switch with guard-locking		
Name	Documentation	B10d [cycles]
NZ..VZ..VS Safety switch with separate actuator - metal housing - with guard locking, without guard locking monitoring	All safety switches type series NZ..VZ..VS with separate actuator (guard locking without guard locking monitoring), with the different switching elements and plug connectors.	4,50E+06
STA... Safety switch with separate actuator - metal housing - with guard locking and guard locking monitoring	All safety switches type series STA (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front side and others. Also versions with integrated AS-Interface Safety at Work.	1,15E+07
STA-BI Safety switch with separate actuator - metal housing - with guard locking and guard locking monitoring	All safety switches type series STA-BI (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others.	3,00E+06
STA..TW.. Safety switch with separate actuator - metal housing - with guard locking and guard locking monitoring, with 2 actuating heads	All safety switches type series STA..TW.. (with guard locking and guard locking monitoring and 2 actuating heads) with separate actuators, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release and others.	4,50E+06
STM Safety switch with separate actuator - plastic housing with metal head - with guard locking and guard locking monitoring	All safety switches type series STM (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release and others.	2,00E+06

Elements: switch with guard-locking		
Name	Documentation	B10d [cycles]
STP Safety switch with separate actuator - plastic housing with metal head - with guard locking and guard locking monitoring	All safety switches type series STP (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others. Also versions with integrated AS-Interface Safety at Work.	5,00E+06
STP-BI Safety switch with separate actuator - plastic housing with metal head - with guard locking and guard locking monitoring	All safety switches type series STP-BI (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others.	3,00E+06
STP..TW .. Safety switch with separate actuator - plastic housing - with guard locking and guard locking monitoring, with 2 actuating heads in metal	All safety switches type series STP..TW (with guard locking and guard locking monitoring and 2 actuating heads) with separate actuators, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others. Also versions with integrated AS-Interface Safety at Work.	4,50E+06
STP..TW ..BI Safety switch with separate actuator - plastic housing - with guard locking and guard locking monitoring, with 2 actuating heads in metal	All safety switches type series STP..TW ..BI (with guard locking and guard locking monitoring and 2 actuating heads) with separate actuators, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others.	3,00E+06
TK Safety switch - plastic housing - with guard locking without guard locking monitoring	All safety switches type series TK (guard locking without guard locking monitoring), with the different switching elements and plug connectors.	2,00E+06

TP Safety switch with separate actuator - plastic housing - with guard locking and guard locking monitoring	All safety switches type series TP (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others. Also versions with integrated AS-Interface Safety at Work.	3,00E+06

Elements: switch with guard-locking

Name	Documentation	B10d [cycles]
TP..TW .. Safety switch with separate actuator - plastic housing - with guard locking and guard locking monitoring, with 2 actuating heads	All safety switches type series TP..TW (with guard locking and guard locking monitoring and 2 actuating heads) with separate actuators, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others.	2,00E+06
TX Safety switch with separate actuator - metal housing - with guard locking and guard locking monitoring	All safety switches type series TX (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others. Also versions with integrated AS-Interface Safety at Work.	6,00E+06
TZ Safety switch with separate actuator - metal housing - with guard locking and guard locking monitoring	All safety switches type series TZ (with guard locking and guard locking monitoring) with separate actuator, with the different switching elements and plug connectors. Also all mechanical versions such as escape release, emergency release, mechanical release, push buttons on the front and others. Also versions with integrated AS-Interface Safety at Work.	3,00E+06

Elements: switch with separated actuator

Name	Documentation	B10d [cycles]
GP... Safety switch with separate actuator - plastic housing	All safety switches type series GP with separate actuator, with the different switching elements and plug connectors. Also versions with integrated AS-Interface Safety at Work.	3,00E+06
NM.VZ... Safety switch with separate actuator - plastic housing	All safety switches type series NM..VZ with separate actuator, with the different switching elements and plug connectors.	4,00E+06
NP... Safety switch with separate actuator - plastic housing	All safety switches type series NP with separate actuator, with the different switching elements and plug connectors.	3,00E+06

Elements: switch with separated actuator

Name	Documentation	B10d [cycles]
NX.. Safety switch with separate actuator - metal housing	All safety switches type series NX with separate actuator, with the different switching elements and plug connectors. Also versions with integrated AS-Interface Safety at Work.	4,50E+06
NZ.VZ... Safety switch with separate actuator - metal housing	All safety switches type series NZ..VZ (except NZ-VZ-VS...) with separate actuator, with the different switching elements and plug connectors. Also versions with integrated AS-Interface Safety at Work.	4,50E+06
SGA... Safety switch with separate actuator - metal housing	All safety switches type series SGA with separate actuator, with the different switching elements and plug connectors. Also versions with integrated AS-Interface Safety at Work.	3,00E+06
SGP... Safety switch with separate actuator - plastic housing with metal head	All safety switches type series SGP with separate actuator, with the different switching elements and plug connectors. Also versions with integrated AS-Interface Safety at Work.	3,00E+06
SGP...TW Safety switch with separate actuator - plastic housing with 2 actuating metal heads	All safety switches type series SGP..TW (2 actuating heads) with separate actuators, with the different switching elements and plug connectors.	2,00E+06

Elements: switch with integrated actuator

Name	Documentation	B10d [cycles]
N1A.. Safety switch with integrated actuator with switching elements 508, 514 or 588 - metal housing	All safety switches type series N1A with safety function, with switching elements 508, 514 or 588 and plug connectors. Type series: N1AD, N1AR, N1ARL, N1AW	2,00E+07
NB01.. Safety switch with integrated actuator with switching element 588 - metal housing	All safety switches type series NB01 with safety function, with switching element 588 and plug connectors. Type series: NB01D, NB01R	2,00E+07
NM.. Safety switch with integrated actuator - plastic housing	All safety switches type series NM with safety function, with the different switching elements and plug connectors. Type series: NM..HB, NM..RB, NM..WO, NM..KB, NM..AV, NM..AG, NM..AL, NM..AG, NM..AK	2,00E+07

Elements: switch with integrated actuator

Name	Documentation	B10d [cycles]
NZ.. Safety switch with integrated actuator - metal housing	All safety switches type series NZ with safety function, with the different switching elements and plug connectors. Type series: NZ..HS, NZ..HB, NZ..RS, NZ..WO, NZ..RK, NZ..RG, NZ..RL, NZ..PS, NZ..PB Also versions with integrated AS-Interface Safety at Work.	2,00E+07

Elements: Non-contact safety switch magnetically coded (without EUCHNER evaluation unit)

Name	Documentation	B10d [cycles]
CMS-R-AZA...	Read head with according actuator based on reed contacts which is not connected to an EUCHNER CMS evaluation unit.	2,00E+07
CMS-R-BZB...	Read head with according actuator based on reed contacts which is not connected to an EUCHNER CMS evaluation unit.	2,00E+07

Elements: enabling switch

Name	Documentation	B10d [cycles]
HBA... Enabling switch 3-stage	All enabling switches 3-stage except type series ZXE integrated into pendant stations HBA.	1,00E+05
HBA... Enabling switch 3-stage ZXE	All enabling switches 3-stage type series ZXE integrated into pendant stations HBA.	7,50E+05
HBA... Enabling switch 2-stage ZS...	Enabling switches 2-stage are not covered by EN 60947-5-8. With this a B10d value cannot be given. For more information see Annex C of EN ISO 13849-1.	-
HBL... Enabling switch 3-stage ZSE	All enabling switches 3-stage type series ZSE integrated into pendant stations HBL.	5,00E+05
HBL... Enabling switch 2-stage ZS...	Enabling switches 2-stage are not covered by EN 60947-5-8. With this a B10d value cannot be given. For more information see Annex C of EN ISO 13849-1.	-
HBM... Enabling switch 3-stage	All enabling switches 3-stage except type series ZXE integrated into pendant stations HBM.	1,00E+05
HBM... Enabling switch 3-stage ZXE	All enabling switches 3-stage type series ZXE integrated into pendant stations HBM.	7,50E+05
HBM... Enabling switch 2-stage ZS...	Enabling switches 2-stage are not covered by EN 60947-5-8. With this a B10d value cannot be given. For more information see Annex C of EN ISO 13849-1.	-

Elements: enabling switch		
Name	Documentation	B10d [cycles]
ZSA... Enabling switch 3-stage, black housing G1	All enabling switches type series ZSA with the different switching elements as well as cables and plug connectors. Also kit version. Also versions with integrated AS-Interface Safety at Work.	5,00E+05
ZSA... Enabling switch 2-stage, black housing G1	Enabling switches 2-stage are not covered by EN 60947-5-8. With this a B10d value cannot be given. For more information see Annex C of EN ISO 13849-1.	-
ZSB... Enabling switch 3-stage, black housing G1	All enabling switches type series ZSB, black housing G1, with the different switching elements and control elements as well as cables and plug connectors. Also versions with integrated AS-Interface Safety at Work.	5,00E+05
ZSB... Enabling switch 3-stage, yellow housing G3	All enabling switches type series ZSB, yellow housing G3, with the different switching elements and control elements as well as cables and plug connectors.	5,00E+05
ZSE... Enabling switch 3-stage for panel mounting	All enabling switches type series ZSE with the different switching elements.	5,00E+05
ZSG... Enabling switch 2-stage for panel mounting	Enabling switches 2-stage are not covered by EN 60947-5-8. With this a B10d value cannot be given. For more information see Annex C of EN ISO 13849-1.	-
ZSM... Enabling switch 3-stage, grey housing	All enabling switches type series ZSM, grey housing, with the different switching elements and control elements as well as cables and plug connectors.	1,00E+05
ZSR... Enabling switch 3-stage, yellow housing G2	All enabling switches type series ZSR with the different switching elements as well as cables and plug connectors.	5,00E+05
ZXE... Enabling switch 3-stage for panel mounting	All enabling switches type series ZSX with the different switching elements.	7,50E+05

Element: rope pull switch

Name	Documentation	B10d [cycles]
RPS Rope pull switch	All rope pull switches of the RPS type series (except RPS-M) with the different switching elements and all accessories. Also versions with integrated AS-Interface Safety at Work.	1,00E+05
RPS-M.. Rope pull switch metal housing	All metal rope pull switches of the RPS-M type series with the different switching elements and all accessories.	2,00E+05

Elements: hinge switch

Name	Documentation	B10d [cycles]
ESH... Safety hinge	All safety switches type series ESH, except ESH..ARO (re-adjustable version) with the different switching elements and different plug connectors including the empty hinge.	2,00E+06
ESH-ARO... Safety hinge re-adjustable	All safety switches type series ESH...ARO (re-adjustable version) with the different switching elements and different plug connectors including the empty hinge.	2,00E+06

Elements: E-stop

Name	Documentation	B10d [cycles]
ES-FB1W ... E-Stop device	All E-Stop devices type series ES-FB1W .... Also versions with integrated AS-Interface Safety at Work.	1,00E+05
ES-XN... E-Stop device	All E-Stop devices type series ES-XN...	1,00E+05
ES-XW ... E-Stop device	All E-Stop devices type series ES-XW ... Also versions with integrated AS-Interface Safety at Work	1,00E+05
HBA... E-stop device	All e-stop devices built-in into an HBA	1,00E+05
HBL... E-stop device	All e-stop devices built-in into an HBL	1,00E+05
HBM... E-stop device	All e-stop devices built-in into an HBM	1,00E+05
MGB E-Stop devices	All E-Stop devices integrated in the MGB. ATTENTION: For electronics and guard locking see subsystems.	1,30E+05

Elements: E-stop		
Name	Documentation	B10d [cycles]
MGB...PN... E-stop devices	All E-Stop devices integrated in the MGB-PN with Profinet. ATTENTION: Evaluation has to be added as subsystem "MGB...PN... E-stop evaluation"	1,00E+05
MGB... EI... E-stop devices	All E-Stop devices integrated in the MGB-EI with Ethernet/IP. ATTENTION: Evaluation has to be added as subsystem "MGB... EI... E-stop evaluation"	1,00E+05
MSM... E-stop devices	Valid for all MSM modules integrated in the MGB2 with emergency stop. ATTENTION: The evaluation "MGB2..Modular. Evaluation of safety signals in contained submodules" has to be added as subsystem.	1,30E+05
MP-A-E... E-stop device for MGB	All e-stop devices for integrating into an MGB control unit incl. the switching elements.	1,00E+05
ZSB... E-stop device	All e-stop devices built-in into a ZSB	1,00E+05
ZSM... E-stop device	All e-stop devices built-in into a ZSM	1,00E+05

Elements: key switch

Name	Documentation	B10 [cycles]
MSM...SSG10 key switch	Valid for all MSM modules integrated in the MGB2 with SSG10 key switch. ATTENTION: The evaluation "MGB2..Modular. Evaluation of safety signals in contained submodules" has to be added as subsystem.	3,00E+04
MSM...OM.R key switch	Valid for all MSM modules integrated in the MGB2 with OM.R key switch ATTENTION: The evaluation "MGB2..Modular. Evaluation of safety signals in contained submodules" has to be added as subsystem.	3,00E+04
MSM...E2, E7, E22 key switch	Valid for all MSM modules integrated in the MGB2 with E2, E7, E22 key switch ATTENTION: The evaluation "MGB2..Modular. Evaluation of safety signals in contained submodules" has to be added as subsystem.	3,00E+04

Elements: decentralized periphery

Name	Documentation	PFH$_d$
MSM...R...for decentralized periphery	Valid for all MSM modules integrated in the MGB2 with decentralized periphery. **Can only be used in combination with MGB2 Modular!** When using the MGB2 Modular, the evaluation "MGB2..Modular.. Evaluation of safety signals in contained submodules" must be added as a subsystem.	9,06E-10

Note:

Bolts, flange connectors and similar accessories are not safety components. Therefor no safety-related values can be assigned. If standard or safety components are used, for which no value of the manufacturer and no value in the Appendix C of EN ISO 13849-1 is existing, then a MTTF$_d$ of 10 years be generally be accepted for these components (EN ISO 13849-1, section 4.5.2.)

The red marked numbers are B10 instead of B10d values