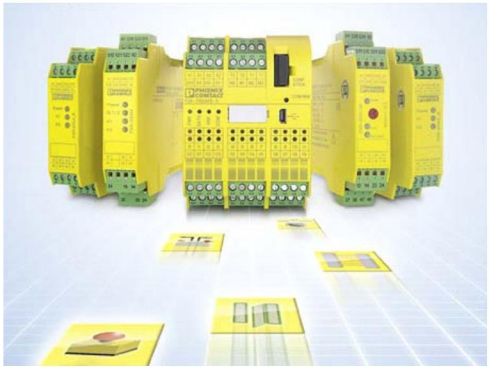
FUNCTIONAL SAFETY CHARACTERISTICS

Safety characteristics of Phoenix Contact safety products



Application note
105016_en_07

1 Aim of this document

This application note is a central data source for all safety characteristics of Phoenix Contact safety products.

It provides characteristics for:

- Machine building according to EN ISO 13849 and EN 62061
- Process automation according to IEC 61508

Phoenix Contact supports you here with the SISTEMA tool by providing you with a SISTEMA library containing all components that have already been certified according to the latest standards.

You can find the current SISTEMA library on our website under the keyword SISTEMA.

This document also contains the characteristics required to calculate safety loops in the process industry.

2 Table of contents

Make sure you always use the latest documentation.
It can be downloaded at phoenixcontact.net/products.

This document provides additional data to the respective documentation for the products enclosed.
The product documentation for the individual products takes priority and much be observed in each case.

Should you have any further questions, please contact the Safety service team.

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PHOENIX CONTACT
INSPIRING INNOVATIONS

3 Safety switching devices for machine building

3.1 Safety relays – PSRmini

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2904950	PSR-MS20	c	1	1	1.5E-09	20	≥ 00/--	8760 switching cycles per year at 4 A DC13 or 5 A AC15 Up to PL e/SILCL 3 possible depending on the application
2904951	PSR-MS25						≥ 00/--	
2702192	PSR-MS21	e	4	3	1.0E-09		≥ 00/--	8760 switching cycles per year at 4 A DC13 or 5 A AC15
2904952	PSR-MS30	e	4	3	1.5E-09		≥ 00/--	8760 switching cycles per year at 4 A DC13 or 5 A AC15
2904953	PSR-MS35						≥ 00/--	
2904954	PSR-MS40						≥ 00/--	
2904955	PSR-MS45						≥ 00/--	
2904956	PSR-MS50						≥ 00/--	
2904957	PSR-MS55						≥ 00/--	
2904958	PSR-MS60						≥ 00/--	
2700466	PSR-MC20	c	1	1			≥ 00/--	8760 switching cycles per year at 4 A DC13 or 5 A AC15 Up to PL e/SILCL 3 possible depending on the application
2700467							≥ 00/--	
2700498	PSR-MC30	e	4	3			≥ 00/--	8760 switching cycles per year at 4 A DC13 or 5 A AC15
2700499							≥ 00/--	
2700524	PSR-MC32				1.0E-09		≥ 00/--	8760 switching cycles per year at 5 A DC13 or 5 A AC15
2700525							≥ 00/--	
2700540	PSR-MC34				1.5E-09		≥ 00/--	8760 switching cycles per year at 4 A DC13 or 5 A AC15
2700548							≥ 00/--	
2702411	PSR-MC37				1.0E-09		≥ 00/--	8760 switching cycles per year at 5 A DC13 or 5 A AC15
2702412							≥ 00/--	
2700569	PSR-MC40				1.5E-09		≥ 00/--	8760 switching cycles per year at 4 A DC13 or 5 A AC15
2700570							≥ 00/--	
2700553	PSR-MC50						≥ 00/--	
2700564							≥ 00/--	
2700571	PSR-MC60	c	1	1	5.5E-07		≥ 00/100	
2700572							≥ 00/100	
2700574	PSR-MC62	e	4	3	1.0E-09		≥ 00/100	
2700575							≥ 00/100	

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2702094	PSR-MC70	c	1	1	2.5E-08		≥ 00/100	8760 switching cycles per year at 4 A DC13 or 5 A AC15 Up to PL e/SILCL 3 possible depending on the application
2702095							≥ 00/100	
2702096	PSR-MC72	e	4	3	1.5E-09	20	≥ 00/100	8760 switching cycles per year at 4 A DC13 or 5 A AC15
2702097							≥ 00/100	
2702382	PSR-MC82 [1)]				1.0E-09		≥ 00/--	8760 switching cycles per year at 3 A DC13 or 3 A AC15
2702383							≥ 00/--	

[1)] In conjunction with a suitable evaluating device

3.2 Safety relays – PSRclassic

[1] In conjunction with a suitable evaluating device

[2] Delayed contacts up to PL d, category 3

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2963802	PSR-ESA2-B	c	1	1	4.05E-10	20	≥ 00/--	8766 switching cycles per year B_{10D} = 230,000 at 3 A AC15 Up to PL e/SILCL 3 possible depending on the application
2963954							≥ 00/--	
2963750	PSR-ESA4	e	4	3	5.05E-10		≥ 00/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2963938							≥ 00/--	
2963763	PSR-ESA4-B						≥ 00/--	
2963941							≥ 00/--	
2901430	PSR-ESAM2/3x1-B	c	1	1	2.42E-10		≥ 00/--	8760 switching cycles per year B_{10D} = 300,000 at 5 A DC13 Up to PL e/SILCL 3 possible depending on the application
2901431							≥ 00/--	
2900525	PSR-ESAM4/2x1	e	4	3	5.05E-10		≥ 00/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2900526							≥ 00/--	
2900509	PSR-ESAM4/3x1-B				5.05E-10		≥ 00/--	
2900510							≥ 00/--	
2981114	PSR-ESAM4/3x1				1.26E-10		≥ 00/-- < 08/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
					8.87E-10		≥ 08/--	8766 switching cycles per year B_{10D} = 160,000 at 5 A DC13
2981127					1.26E-10		≥ 00/-- < 08/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
					8.87E-10		≥ 08/--	8766 switching cycles per year B_{10D} = 160,000 at 5 A DC13
2963912	PSR-ESAM4/8x1				5.06E-10		≥ 00/--	8766 switching cycles per year B_{10D} = 230,000 at 3 A AC15
2963996							≥ 00/--	
2901416	PSR-ESAM4-B AC				3.60E-10		≥ 00/--	8760 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2901417							≥ 00/--	
2901426							≥ 00/--	
2901427							≥ 00/--	
2901422							≥ 00/--	
2901425							≥ 00/--	
2901428							≥ 00/--	
2901429							≥ 00/--	

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2981800	PSR-ESD-30	e	4	3	1.80E-09	20	≥ 00/--	8766 switching cycles per year B_{10D} = 400,000 at 3 A AC15 DC13
2981813							≥ 00/--	
2981428	PSR-ESD-300 [2]				1.89E-09		≥ 00/--	8766 switching cycles per year B_{10D} = 230,000 at 3 A AC15
2981431							≥ 00/--	
2981125	PSR-ESD-T [2]				1.67E-09		≥ 00/--	
2981198							≥ 00/--	
2981059	PSR-ESL4-B				5.56E-10		≥ 00/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2981062							≥ 00/--	
2963718	PSR-ESM4				5.05E-10		≥ 00/--	
2963705							≥ 00/--	
2963776	PSR-ESM4-B						≥ 00/--	
2963925							≥ 00/--	
2981020	PSR-ESP4	c	1	1	9.93E-11		≥ 00/--	8766 switching cycles per year B_{10D} = 160,000 at 5 A AC15 Up to PL e/SILCL 3 possible depending on the application
2981017							≥ 00/--	
2981978	PSR-FSP/1x1 [1]	e	4	3	2.02E-11		≥ 00/--	8766 switching cycles per year B_{10D} = 1,000,000 at 5 A DC13
2981981							≥ 00/--	
2986960	PSR-FSP/2x1 [1]				2.02E-11		≥ 00/--	
2986957							≥ 00/--	
2963721	PSR-THC4				1.21E-09		≥ 00/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2963983							≥ 00/--	
2963734	PSR-URM4/5x1 [1]				1.47E-09		≥ 00/--	8766 switching cycles per year B_{10D} = 230,000 at 3 A AC15
2964005							≥ 00/--	
2981033	PSR-URM4/5x1-B [1]				1.02E-10		≥ 00/--	
2981046							≥ 00/--	
2903583	PSR-URML4				5.56E-10		≥ 00/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2903584							≥ 00/--	
2702924	PSR-URM4 42-230UC [1]				1.00E-09		≥ 00/--	8766 switching cycles per year $B10_D$ = 200,000 at 5 A AC15
2702925							≥ 00/--	

[1] In conjunction with a suitable evaluating device

[2] Delayed contacts up to PL d, category 3

3.3 Modular safety relay system – PSRmodular

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2981486	PSR-SDC4	e	4		2.53E-10		≥ 00/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2981499							≥ 00/--	
2981703	PSR-URD3/T2 [1)]						≥ 00/--	
2981729					1.35E-09		≥ 00/--	
2981732	PSR-URD3/3[1)]	d	3	3		20	≥ 00/--	
2981745							≥ 00/--	8766 switching cycles per year B_{10D} = 300,000 at 5 A DC13
2981512	PSR-URD3/30 [1)]				1.39E-09		≥ 00/--	
2981525							≥ 00/--	
2981677	PSR-URM4/B [1)]	e	4		9.70E-11		≥ 00/--	
2981680							≥ 00/--	
2981936	PSR-SIM4	-	-	-	-	-	≥ 00/--	Due to the series connection of safety door switches, the possible diagnostic coverage is reduced as are the maximum achievable safety classifications.
2981949							≥ 00/--	
2981871	PSR-SACB-4/4-L-5,0PUR-SD	-	-	-	-	-	≥ 00/--	
2981884							≥ 00/--	

[1] In conjunction with a suitable evaluating device

3.4 Multifunctional safety relays – PSRmultifunction

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2902725	PSR-MXF1	e	4	3	1.93E-10	20	≥ 00/--	8766 switching cycles per year B_{10D} = 780,000 at 5 A DC13 or 3 A AC15
2902726							≥ 00/--	
2903253							≥ 00/--	
2903254	PSR-MXF2						≥ 00/--	
2903255							≥ 00/--	
2903256							≥ 00/--	
2903257	PSR-MXF3						≥ 00/--	
2903258							≥ 00/--	
2903259							≥ 00/--	
2903260	PSR-MXF4						≥ 00/--	
2903261							≥ 00/--	
2903262							≥ 00/--	

4 Zero-speed and over-speed safety relays – PSRmotion

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2702355	PSR-MM25	e	3	3	5.79E-08	20	≥ 00/100	17520 switching cycles per year at 4 A DC13 or 5 A AC15
2702356							≥ 00/100	
2981538	PSR-RSM4	e	4	3	7.90E-09		≥ 00/--	In conjunction with suitable sensor systems.
2981541							≥ 00/--	

5 Safe coupling relays – PSRclassic

5.1 High demand – safety characteristic data

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2963747	PSR-24UC/URM/5X1/2X2	c	1	1	1.00E-07 [1] 1.35E-07 [2] 1.56E-07 [3]	20	≥ 11/--	**1)** 3 A AC15; 8760 switching cycles/year; 5 % of the overall SIL **2)** 3 A DC13; 8760 switching cycles/year; 5 % of the overall SIL **3)** 6 A AC1; 8760 switching cycles/year; 5 % of the overall SIL **4)** 3 A AC15; 8760 switching cycles/year; 10 % of the overall SIL **5)** 3 A DC13; 8760 switching cycles/year; 10 % of the overall SIL **6)** 6 A AC1; 8760 switching cycles/year; 10 % of the overall SIL
2963970							≥ 09/--	
2981444	PSR-24UC/URM/4X1/2X2	c	1	1	6.00E-07 [4] 6.00E-07 [5] 2.40E-07 [6]		≥ 04/--	
2981457							≥ 04/--	
2981839	PSR-24UC/URM/3X1/3X2	c	1	1	4.00E-07 [1] 4.00E-07 [2] 2.40E-07 [3]		≥ 06/--	
2981842							≥ 06/--	
2981952	PSR-24UC/URM/5X1/1X2	c	1	1	1.00E-07 [1] 1.35E-07 [2] 1.56E-07 [3]		≥ 04/--	
2981965							≥ 04/--	
2981402	PSR-120UC/URM/5X1/2X2	c	1	1	1.00E-07 [1] 1.35E-07 [2] 1.56E-07 [3]		≥ 08/--	
2981415							≥ 08/--	
2981363	PSR-24UC/URM/2X21	c	1	1	6.67E-07 [4] 3.33E-07 [5] 2.00E-07 [6]		≥ 03/--	
2981376	PSR-120UC/URM/2X21	c	1	1	6.67E-07 [4] 3.33E-07 [5] 2.00E-07 [6]		≥ 03/--	

5.2 Low demand – safety characteristic data

Order No.	Short designation	Device type	HFT	IEC 61508 SIL	PFD_{avg} (1/h)	T_{1max} (years)	t_M (years)	Data valid for HW/FW version	Note
2963747	PSR-24UC/URM/5X1/2X2	A	0	1	4.05E-03	4.6	20	≥ 11/--	-
2963970								≥ 09/--	-
2981444	PSR-24UC/URM/4X1/2X2	A	0	1	4.05E-03	4.6		≥ 04/--	-
2981457								≥ 04/--	-
2981839	PSR-24UC/URM/3X1/3X2	A	0	1	4.05E-03	4.6		≥ 06/--	-
2981842								≥ 06/--	-
2981952	PSR-24UC/URM/5X1/1X2	A	0	1	4.05E-03	4.6		≥ 04/--	-
2981965								≥ 04/--	-
2981402	PSR-120UC/URM/5X1/2X2	A	0	1	4.05E-03	4.6		≥ 08/--	-
2981415								≥ 08/--	-
2981363	PSR-24UC/URM/2X21	A	0	1	4.05E-03	4.6		≥ 03/--	-
2981376	PSR-120UC/URM/2X21	A	0	1	4.05E-03	4.6		≥ 03/--	-

6 Configurable safety modules – PSRtrisafe

6.1 High demand – safety characteristic data

Order No.	Short designation	Parameterization	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW version	Note
2986229 2986232	PSR-TRISAFE-S	1CH	d	2	2	16.1E-09	20	≥ 10/1636	-
		2CH	e	4	3				-
2986012 2986025	PSR-TRISAFE-M	1CH	d	2	2	17.1E-09		≥ 10/2033	-
		2CH	e	4	3				-
2986038 2986041	PSR-TS-SDI8-SDIO4	1CH	d	2	2	3.94E-09		≥ 10/1021	-
		2CH	e	4	3				-
2986096 2986106	PSR-TS-SDOR4	1CH	c	1	1	3.67E-07		≥ 03/1002	4 A DC13; 8760 switching cycles/year
						5.5E-07			5 A AC15; 8760 switching cycles/year
						1.41E-07		≤ 02/1002	5 A DC13; 8760 switching cycles/year
						1.0E-07			3 A AC15; 8760 switching cycles/year
		2CH	e	4	3	7.3E-10		≥ 03/1002	4 A DC13; 5 A AC15; 8760 switching cycles/year
						7.3E-10		≤ 02/1002	5 A DC13; 3 A AC15; 8760 switching cycles/year

6.1.1 High demand – alternative illustration as 1oo1 structure

Order No.	Short designation	Parameterization	Device type	HFT	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	λ_{Total} (FIT)	MTBF (years) [1]	PFH_D (1/h)	T_{1max} (years)	t_M (years)	Data valid for HW/FW version	Note
2986229 2986232	PSR-TRISAFE-S	1CH	B	0	2	99.81	0	1282	459	3.39	1745	64.78	3.39E-09	20	20	≥ 10/1636	-
		2CH			3												-
2986012 2986025	PSR-TRISAFE-M	1CH			2											≥ 10/2033	-
		2CH			3												-
2986038 2986041	PSR-TS-SDI8-SDIO4	1CH	B	0	2	99.88	0	1253	317	1.91	1572	71.91	1.91E-09			≥ 10/1021	[2]
		2CH			3												
2986096 2986106	PSR-TS-SDOR4	1CH	-	0	1	83.79	873	990	33	367	2263	49.94	3.67E-07			≥ 03/1002	4 A DC13
						93.88	873	1259	33	141	2305	49.02	1.41E-07			≤ 02/1002	5 A DC13;
		2CH			3	99.99	910	2681	23.75	0.17	3615	31.26	1.72E-10			≥ 03/1002	4 A DC13
						99.99	910	1781	21.51	0.13	2712	41.67	1.27E-10			≤ 02/1002	5 A DC13;

[1] Includes faults that are not part of the safety function. MTTR was set to 8 hours.

[2] Values calculated for configuring up to 8 inputs and up to 4 outputs.

6.2 Low demand – safety characteristic data

Order No.	Short designation	Parameterization	Device type	HFT	IEC 61508 SIL	PFD_{avg} (1/h)	T_{1max} (years)	t_M (years)	Data valid for HW/FW version	Note
2986229 2986232	PSR-TRISAFE-S	1CH	B	0	2	2.99E-04	20	20	≥ 10/1636	-
		2CH		1	3					-
2986012 2986025	PSR-TRISAFE-M	1CH		0	2				≥ 10/2033	-
		2CH		1	3					-
2986038 2986041	PSR-TS-SDI8-SDIO4	1CH	B	0	2	2.1E-04	20		≥ 10/1021	-
		2CH		1	3					-
2986096 2986106	PSR-TS-SDOR4	1CH	-	0	1	4.35E-03	5		≥ 03/1002	-
									≤ 02/1002	-
		2CH		1	3	1.18E-04	5		≥ 03/1002	-
									≤ 02/1002	-

6.2.1 Low demand – alternative illustration as 1oo1 structure

Order No.	Short designation	Parameterization	Device type	HFT	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	λ_{Total} (FIT)	MTBF (years) [1]	PFD_{avg} [2] (1/h)	T_{1max} (years)	t_M (years)	Data valid for HW/FW version	Note
2986229 2986232	PSR-TRISAFE-S	1CH	B	0	2	99.84	0	1638	505	3.39	2146	64.36	1.49E-05	20	20	≥ 10/1636	-
		2CH			3												-
2986012 2986025	PSR-TRISAFE-M	1CH			2											≥ 10/2033	-
		2CH			3												-
2986038 2986041	PSR-TS-SDI8-SDIO4	1CH	B	0	2	99.91	0	1729	349	1.91	2080	66.41	8.38E-06	20		≥ 10/1021	[3]
		2CH			3												
2986096 2986106	PSR-TS-SDOR4	1CH	-	0	1	94.26	873	2379	32	200	3484	32.44	9.69E-04	5		≥ 03/1002	-
																≤ 02/1002	-
		2CH			3	99.88	910	3700	21.18	5.45	4637	24.37	1.23E-04	5		≥ 03/1002	-
																≤ 02/1002	-

[1] Includes faults that are not part of the safety function. MTTR was set to 8 hours.

[2] For T_1 = 1 year

[3] Values calculated for configuring up to 8 inputs and up to 4 outputs.

7 Network safety solutions

[1] In conjunction with clock signals. See user documentation for the module.

[2] Version as per illustration 6-3 in the user manual. See table 7-3, illustration 6-3 and illustration 6-4 in the user manual.

Order No.	Short designation		EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW/FW version	Note
2916024	IB IL LPSDO 8	1CH	d	3	2	1E-08	20	≥ 00/100/100	-
		2CH	e	4	3	1E-09			
2700606	IB IL LPSDO 8 V2	1CH	d	3	2	1E-08		≥ 00/100/100	
		2CH	e	4	3	1E-09			
2701625	IB IL LPSDO-8-V3	1CH	d	3	2	1E-08		≥ 00/100/100	
		2CH	e	4	3	1E-09			
2916493	IB IL PSDO 4/4	1CH	d	3	2	1E-08		≥ 01/200/100	
		2CH	e	4	3	1E-09			
2985631	IB IL PSDO 8	1CH	d	3	2	1E-08		≥ 01/200/100	
		2CH	e	4	3	1E-09			
2985864	IB IL PSDOR 4	1CH-AC15	c	1	1	1E-08		≥ 00/200/100	The PFH_D value is an example value here. It depends on the parameterization and wiring. You can determine the exact value with the aid of the product documentation.
		1CH-DC13	c	1	1	1E-08			
		2CH-AC15 version A [2]	e	4	3	1E-09			
		2CH-AC15 version B [2]	e	4	3	1E-09			
		2CH-DC13 version A [2]	e	4	3	1E-09			
		2CH-DC13 version B [2]	e	4	3	1E-09			
2985688	IB IL PSDI 8	1CH	d	3 [1]	2	1E-08		≥ 00/200/-	-
		2CH	e	4	3	1E-09			
2700994	IB IL PSDI 16	1CH	d	3 [1]	2	1E-08		≥ 00/200/-	
		2CH	e	4	3	1E-09			
2702446	IB IL SAFE 2-ECO	1CH	c	1	1	1E-09		≥ 00/--	
		2CH	e	4	3				
2701559	AXL F PSDI8/4 1F	1CH	d	3 [1]	2	1E-08		≥ 00/100/-	
		2 CH	e	4	3	1E-09			
2701560	AXL F PSDO8/3 1F	1CH	d	3	2	1E-08		≥ 00/100/-	
		2CH	e	4	3	1E-09			
2702263	AXL F SSDI8/4 1F	1CH	d	3 [1]	2	1E-08		≥ 01/200/-	
		2CH	e	4	3	1E-09			
2702264	AXL F SSDO8/3 1F	1CH	d	3	2	1E-08		≥ 01/200/-	
		2CH	e	4	3	1E-09			
2702171	AXL F LPSDO8/3 1F	1CH	d	3	2	1E-08		≥ 00/100/-	
		2 CH	e	4	3	1E-09			

8 Safe control technology

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Data valid for HW/FW/FW version				Note
							HW	FW	FW COP	SIS FW HW/FW	
2916794	RFC 470S PN 3TX	e	4	3	1E-09	20	> 01	> 46F	> 360Q	> 10/236	-
2700651	FL PN/PN SDIO-2TX/2TX						> 01	> 100	> 010	-	

8.1 Safe analog value processing

Function block library for safety-related analog value acquisition with standard I/O modules.

The following characteristics are only valid if the total MTBF of the network infrastructure components used between the controller and SAFE AI station is ≥ 30 years.
If the total MTBF is < 30 years, please contact Phoenix Contact.

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	EN 62061 SILCL	PFH_D (1/h)	t_M (years)	Note
2400057	SAFE AI	e	4	3	2E-09 [1]	20	When only using safety-related input signals in the station
		d	3	2	5E-09 [2]		When using safety-related and non-safety-related input signals in the station

[1] When used with the AXL F AI8 1F module (Order No. 2688064)

[2] When used with the AXL F AI8 W 1F module (Order No. 2702525)

9 CONTACTRON hybrid motor starters

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	PFH_D (1/h)	t_M (years)	Note
2297031	ELR-W3-24DC/500AC-2I	e	3	2.67E-09	20	-
2297044	ELR-W3-230AC/500AC-2I			6.82E-09		
2297057	ELR-W3-24DC/500AC-9I			2.67E-09		
2297060	ELR-W3-230AC/500AC-9I			6.82E-09		
2900582 2900414 2900421	ELR-H5-IES-SC-24DC/500AC...			2.67E-09		
2903902 2903904 2903906	ELR-H5-IES-PT-24DC/500AC...					
2900692 2900420 2900422	ELR-H5-IES-SC-230AC/500AC...			6.82E-09		
2900559 2900561	ELR-H5-ES-SC-24DC/500AC...			2.67E-09		
2900566 2900567 2900569	ELR-H3-IES-SC-24DC/500AC...			2.40E-09		
2903914 2903916 2903918	ELR-H3-IES-PT-24DC/500AC...					
2900689 2900568 2900570	ELR-H3-IES-SC-230AC/500AC...			6.27E-09		

Order No.	Short designation	EN ISO 13849-1 PL	EN ISO 13849-1 Category	PFH_D (1/h)	t_M (years)	Note
2905151 2905138 2905152 2905139 2905153 2905140	ELR H5-IES...-IFS	e	3	0.1E-09	20	-
2905154 2905141 2905155 2905142 2905156 2905143	ELR H3-IES...-IFS					
2903933 2903934 2903935	ELR H5-IES...SWD...			0.1E-09		
2903936 2903937 2903938	ELR H3-IES...SWD...					
2908669 2908670	ELR H5-IES...-IOL					
2908671 2908672	ELR H3-IES...-IOL					

10 Safety relay modules for the process industry

10.1 Safe coupling relays – PSRmini

Alternative illustration as 1oo1 structure

Order No.	Short designation	Demand	Device type	HFT	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	λ_{Total} (FIT)	MTBF (years) [1]	PFD_{avg} [2] (1/h)	PFH_D (1/h)	T_{1max} (years)	t_M (years)	Data valid for HW/FW version
2700356	PSR-PS20	High [3]	A	0	3	99.98	989.32	148.96	52.58	0.20	1191.06	80.63	-	1.95E-10	20	20	≥ 00/--
		Low				99.66	0	1579	0	5.392	1584	63	2.36E-05	-	6		
2702524	PSR-PS22	High [4]				99.996	0	2857.88	5.45	0.11	2863.44	29.18	-	1.10E-10	20		≥ 00/--
		Low [4][5]				99.839	0	2639.18	0	4.26	2643.44	30.94	1.87E-05	-	6		
		High [6]				99.961	0	2855.45	6.86	1.12	2863.44	29.18	-	1.12E-09	20		
		Low [6]				99.907	0	2634.25	6.74	2.45	2643.44	30.94	7.08E-05	-	3.8		
2700357	PSR-PS21	High [3]			2	99.18	494.66	79.10	494.66	8.80	1077.22	91.65	-	8.80E-09	20		≥ 00/--
		Low				81.20	0	794.1	0	183.8	977.9	99	8.06E-04	-	1.6		
2700398	PSR-PS40	High			3	99.99	989.32	460.91	51.90	0.10	1502.24	64.01	-	1.04E-10	20		≥ 00/--
		Low				99.72	0	1891	0	5.236	1896	52	2.29E-05	-	6		
2700577 2700578	PSR-PC20	High [3]				99.98	989.32	230.38	52.58	0.20	1272.48	76.43	-	1.95E-10	20		≥ 00/--
		Low				99.68	0	1660	0	5.392	1666	60	2.36E-05	-	6		≥ 00/--
2700581 2700582	PSR-PC32	High [3]				99.99	0	3135.22	62.35	1	3198.57	22.44	-	1.00E-09	20		≥ 00/--
		Low				99.85	0	3577.81	0	5.5	3583.32	22.51	2.41E-05	-	6		≥ 00/--
2700588 2700589	PSR-PC40	High				99.99	989.32	397.43	51.90	0.10	1438.75	64.98	-	1.04E-10	20		≥ 00/--
		Low				99.71	0	1798	0	5.236	1803	54	2.29E-05	-	6		≥ 00/--
2904664 2904665	PSR-PC50	Low				99.60	4.27	849	4.21	3.40	860.88	110.5	1.49E-05	-	10		≥ 00/--
																	≥ 00/--
2702522 2702523	PSR-PC51	Low				99.68	0	1831.13	3.66	5.72	1840.51	66.98	2.5E-05	-	6		≥ 00/--
																	≥ 00/--

[1] Includes faults that are not part of the safety function. MTTR was set to 8 hours.

[2] For T_1 = 1 year

[3] Only in conjunction with a suitable evaluating device.

[4] Diagnostics / Proof test: Readback via N/C contact 22

[5] Diagnostics / Proof test: Error message about the diagnostic LEDs

[6] Diagnostics / Proof test: Error acknowledgment via A1 to DO

10.2 Safe coupling relays – PSRclassic

Alternative illustration as 1oo1 structure

Order No.	Short designation	Demand	Device type	HFT	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	λ_{Total} (FIT)	MTBF (years) [1]	PFD_{avg} [2] (1/h)	PFH_D (1/h)	T_{1max} (years)	t_M (years)	Data valid for HW/FW version
2981978 2981981	PSR-FSP	High [5]	A	0	3	99.99	198	62.7	3.66	0.02	264.38	319	-	2.02E-11	20	20	≥ 00/--
		Low [3]				99.77	0	909.7	0	2.09	911.79	113	9.15E-06	-	12		≥ 00/--
2981020 2981017	PSR-ESP4	High			1 [4]	99.99	949	58.3	44.5	0.093	1052	106.9	-	9.93E-11	20		≥ 00/--
		Low [3]				99.56	0	849	0	3.68	853	132.3	1.61E-05	-	9		≥ 00/--
2986960 2986957	PSR-FSP/2x1	High [5]			3	99.99	198	63.9	3.66	0.02	264.38	342	-	2.02E-11	20		≥ 00/--
		Low [3]				99.76	0	1026.9	0	2.42	1029.32	104	1.06E-05	-	5		≥ 00/--
2986575 2986588	PSR-FSP2/2x1	High [5]			2	99.61	99	55.7	99	1	254.7	361	-	1E-09	20		≥ 00/--
		Low [3]				81.97	0	455	0	100	555	185	4.38E-04	-	2.25		≥ 00/--
2901416 2901417 2901426 2901427 2901422 2901425 2901428 2901429	PSR-ESAM4-B AC	High			3	99.99	660	1298	26.7	0.359	1985	50.9	-	3.60E-10	20		≥ 00/--
		Low				99.66	0	1723	0	5.876	1729	57.46	2.57E-05	-	6.5		≥ 00/--

1 Includes faults that are not part of the safety function. MTTR was set to 8 hours.

2 For T_1 = 1 year

3 Calculated assuming an average ambient temperature of 40°C. At higher ambient temperatures, a safety factor of 1.8 should be applied to the failure rates.

4 Up to SIL 3 possible depending on the application.

5 Only in conjunction with a suitable evaluating device.

11 Signal conditioners

11.1 Analog IN / Analog OUT

For additional operating modes, please refer to the corresponding data sheet for the relevant product at phoenixcontact.net/products.

Alternative illustration as 1oo1 structure

Order No.	Short designation	Demand	Device type	Operating mode	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	MTBF (years)	PFD_{avg} [1] (1/h)	PFH_D (1/h)	DC (%)
2811284	MACX MCR-UI-UI(-SP)(-NC)	Low/High	A	[2]	2	83.50	0	317.3	0	62.9	259	2.76E-04	6.29E-08	0.00
2811572														
2811446		Low/High	A	[3]	2	83.00	0	318.2	0	62.1	259	2.83E-04	6.46E-08	0.00
2811556														
2811459	MACX MCR-UI-UI-UP(-SP)(-NC)	Low/High	A	[2]	2	86.10	0	369.8	0	59.5	228	2.61E-04	5.95E-08	0.00
2811585														
2811297		Low/High	A	[3]	2	82.80	0	353.7	0	69.7	228	3.19E-04	7.27E-08	0.00
2811569														
2865955	MACX MCR-SL-RPSSI-I(-SP)	Low/High	A	[4]	2	91.2	0	245	332	55.4	161	2.46E-04	5.54E-08	85.7
2924207														
2865968	MACX MCR-SL-RPSSI-I-UP(-SP)	Low/High	A	[4]	2	90.5	0	558	0	58.3	183	2.53E-04	5.83E-08	0.00
2924210														
2924825	MACX MCR-RPSSI-2I(-SP)	Low/High	A	[4]	2	85.5	0	145.5	224.1	62.3	197	2.73E-04	6.23E-08	78.3
2924838														
2865971	MACX MCR-SL-IDSI-I(-SP)	Low/High	A	[4]	2	94.7	0	496.5	0	27.9	204	1.22E-04	2.79E-08	0.00
2924223														
2904089	MACX MCR-SL-RPSS-2I-2I(-SP)	Low/High	A	[4]	2	87.6	0	195	198	55.3	254	2.48E-04	5.53E-08	78.1
2904090														

[1] For T_1 = 1 year

[2] Input isolator I ≙ I (4 … 20 mA)

[3] Output isolator I ≙ I (4 … 20 mA)

[4] Repeater power supply

11.2 Temperature

For additional operating modes, please refer to the corresponding data sheet for the relevant product at phoenixcontact.net/products.

Alternative illustration as 1oo1 structure

Order No.	Short designation	Demand	Device type	Operating mode	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	MTBF (years)	PFD_{avg} [1] (1/h)	PFH_D (1/h)	DC (%)
2811394	MACX MCR-T-UI-UP(-SP)(-C)	Low/High	B	[2]	2	94.00	0	0	805	43	97	2.95E-04	4.30E-08	94.00
2811860														
2811873		Low/High		[3]	2	93.00	0	0	789	56	97	3.75E-04	5.60E-08	93.00
2811970														
2811378	MACX MCR-T-UIREL-UP(-SP)	Low/High	B	[4]	2	94.00	0	234	543	43	85	2.88E-04	4.30E-08	92.00
2811828														

[1] For T_1 = 1 year

[2] Pt 100 3-conductor, output 4 ... 20 mA

[3] Voltage input mV, output 4 ... 20 mA

[4] Pt 100 3-conductor, output relay

11.3 Digital IN

For additional operating modes, please refer to the corresponding data sheet for the relevant product at phoenixcontact.net/products.

Alternative illustration as 1oo1 structure

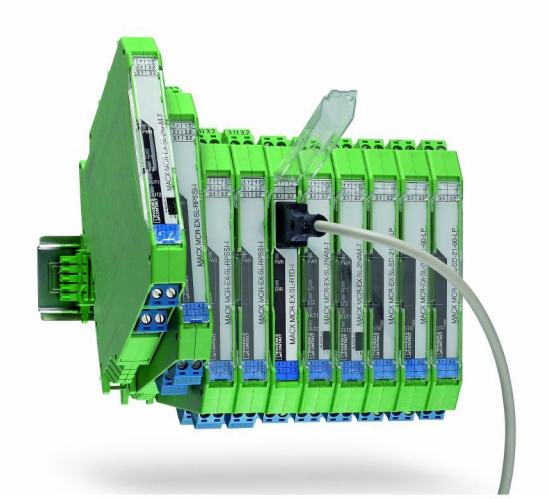
Order No.	Short designation	Demand	Device type	Operating mode	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	MTBF (years)	PFD_{avg} [1] (1/h)	PFH_D (1/h)	DC (%)
2865997	MACX MCR-SL-NAM-R(-SP)	Low	A	[2]	2	78.9	6	242	7	60	304	2.90E-04	-	10.0
2924252				[3]	2	78.0	1	249	6	64	304	3.08E-04	-	8.0
2865010	MACX MCR-SL-NAM-2RO(-SP)	Low	A	[2]	2	79.4	6	244	7	57	223	2.83E-04	-	10.0
2924265				[3]	2	78.0	1	251	6	64	223	3.09E-04	-	8.0
2865049	MACX MCR-SL-2NAM-RO(-SP)	Low	A	[2]	2	78.3	6	249	7	64	204	3.09E-04	-	9.0
2924294				[3]	2	78.3	1	248	6	62	204	3.01E-04	-	8.0
2865052	MACX MCR-SL-2NAM-R-UP(-SP)	Low	A	[2]	2	86.6	6	403	0	63	226	3.01E-04	-	0.0
2924304				[3]	2	86.4	0	413	0	65	226	3.10E-04	-	0.0
2865023	MACX MCR-SL-NAM-2T(-SP)	Low	A	[2]	2	83.0	11	203	2	43	336	1.88E-04	-	0.0
2924278				[3]	2	85.0	1	201	6	35	336	1.53E-04	-	0.0
2865036	MACX MCR-SL-2NAM-T(-SP)	Low	A	[2]	2	81.0	12	251	15	64	269	2.80E-04	-	0.0
2924281				[3]	2	81.0	2	262	12	64	269	2.80E-04	-	0.0

[1] For T_1 = 1 year

[2] Non-inverted output (N)

[3] Inverted output (I)

12 Ex i signal conditioners



12.1 Analog IN / Analog OUT

For additional operating modes, please refer to the corresponding data sheet for the relevant product at phoenixcontact.net/products.

Alternative illustration as 1oo1 structure

Order No.	Short designation	Demand	Device type	Operating mode	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	MTBF (years)	PFD_{avg} [1] (1/h)	PFH_D (1/h)	DC (%)
2865340 2924016	MACX MCR-EX-SL-RPSSI-I(-SP)	Low/High	A	[2]	2	91.0	0	247	333.3	56.7	161	2.52E-04	5.67E-08	85.4
2865793 2924029	MACX MCR-EX-SL-RPSSI-I-UP(-SP)	Low/High	A	[2]	2	90.5	0	558.0	0	58.3	183	2.53E-04	5.83E-08	0.0
2865366 2924236	MACX MCR-EX-SL-RPSSI-2I(-SP)	Low/High	A	[2]	2	85.5	0	145.5	224.1	62.3	197	2.73E-04	6.23E-08	78.3
2865405 2924032	MACX MCR-EX-SL-IDSI-I(-SP)	Low/High	A	[3]	2	94.7	0	496.5	0	27.9	204	1.22E-04	2.79E-08	0.0
2865382 2924676	MACX MCR-EX-SL-RPSS-2I-2I(-SP)	Low/High	A	[2]	3	92.3	0	316.0	345	55.3	159	2.52E-04	5.53E-08	86.2

[1] For T_1 = 1 year

[2] Repeater power supply

[3] Output isolator I ≙ I (4 … 20 mA)

12.2 Temperature

For additional operating modes, please refer to the corresponding data sheet for the relevant product at phoenixcontact.net/products.

Alternative illustration as 1oo1 structure

Order No.	Short designation	Demand	Device type	Operating mode	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	MTBF (years)	PFD_{avg} [1] (1/h)	PFH_D (1/h)	DC (%)
2865654	MACX MCR-EX-T-UI-UP(-SP)(-C)	Low/High	B	[2]	2	94.0	0	0	805	43	97	2.95E-04	4.30E-08	94.0
2924689														
2811763		Low/High		[3]	2	93.0	0	0	789	56	97	3.75E-04	5.60E-08	93.0
2924692														
2865751	MACX MCR-EX-T-UIREL-UP(-SP)	Low/High	B	[4]	2	94.0	0	234	543	43	85	2.88E-04	4.30E-08	92.0
2924799														
2864587	MCR-FL-TS-LP-I-EX	Low/High	B		2	>75	136	183	17	111	255	4.85E-04	-	13.0
2864545	MCR-HT-TS-I-EX	Low/High	B		2	>73	136	183	17	111	255	4.69E-04	-	13.0

[1] For T_1 = 1 year

[2] Pt 100 3-conductor, output 4 ... 20 mA

[3] Voltage input mV, output 4 ... 20 mA

[4] Pt 100 3-conductor, output relay

12.3 Digital IN / Digital OUT

For additional operating modes, please refer to the corresponding data sheet for the relevant product at phoenixcontact.net/products.

Alternative illustration as 1oo1 structure

Order No.	Short designation	Demand	Device type	Operating mode	SIL	SFF (%)	λ_{SD} (FIT)	λ_{SU} (FIT)	λ_{DD} (FIT)	λ_{DU} (FIT)	MTBF (years)	PFD_{avg} [1] (1/h)	PFH_D (1/h)	DC (%)
2865434	MACX MCR-EX-SL-NAM-R(-SP)	Low	A	2	2	78.9	6	242	7	60	304	2.90E-04	-	10.0
2924045				3		78.0	1	249	6	64	304	3.08E-04	-	8.0
2865450	MACX MCR-EX-SL-NAM-2RO(-SP)	Low	A	2	2	79.4	6	244	7	57	223	2.83E-04	-	10.00
2924061				3		78.0	1	251	6	64	223	3.09E-04	-	8.0
2865476	MACX MCR-EX-SL-2NAM-RO(-SP)	Low	A	2	2	78.3	6	249	7	64	204	3.09E-04	-	9.0
2924087				3		78.3	1	248	6	62	204	3.01E-04	-	8.0
2865984	MACX MCR-EX-SL-2NAM-R-UP(-SP)	Low	A	2	2	86.6	6	403	0	63	226	3.01E-04	-	0.0
2924249				3		86.4	0	413	0	65	226	3.10E-04	-	0.0
2865463	MACX MCR-EX-SL-NAM-2T(-SP)	Low	A	2	2	83.0	11	203	2	43	336	1.88E-04	-	0.0
2924074				3		85.0	1	201	6	35	336	1.53E-04	-	0.0
2865489	MACX MCR-EX-SL-2NAM-T(-SP)	Low	A	2	2	81.0	12	251	15	64	269	2.80E-04	-	0.0
2924090				3		81.0	2	262	12	64	269	2.80E-04	-	0.0
2866006	MACX MCR-EX-SL-NAM-NAM(-SP)	Low	A	2	2	84.0	0	106	72	32	266	1.74E-04	-	69.0
2924883				3		83.0	0	108	72	36	266	1.74E-04	-	66.0
2905723	MACX MCR-EX-SL-NAM-YO(-SP)	Low	A	2	2	84.0	0	106	72	32	266	1.74E-04	-	69.0
2905724				3		83.0	0	108	72	36	266	1.74E-04	-	66.0
2907404	MACX MCR-EX-SL-NAM-HO(-SP)	Low	A	2	2	84.0	0	106	72	32	266	1.74E-04	-	69.0
2907405				3		83.0	0	108	72	36	266	1.74E-04	-	66.0
2865492	MACX MCR-EX-SL-SD-21-25-LP(-SP)	Low/High	A	-	3	100.0	0	50	0	0	237	0.00E+00	-	0.0
2924113														
2865764	MACX MCR-EX-SL-SD-21-40-LP(-SP)	Low/High	A	-	3	100.0	0	50	0	0	237	0.00E+00	-	0.0
2924139														
2865609	MACX MCR-EX-SL-SD-24-48-LP(-SP)	Low/High	A	-	3	100.0	0	50	0	0	237	0.00E+00	-	0.0
2924126														
2865515	MACX MCR-EX-SL-SD-21-60-LP(-SP)	Low/High	A	-	3	100.0	0	50	0	0	237	0.00E+00	-	0.0
2924100														
2924867	MACX MCR-EX-SL-SD-23-48-LFD (-SP)	Low/High	A	-	3	94.8	0	406	45.1	24.6	167	1.08E-04	2.46E-8	64.7
2924870														
2905669	MACX MCR-EX-SL-SD-21-25-LFD (-SP)	Low/High	A	-	3	94.8	0	406	45.1	24.6	167	1.08E-04	2.46E-8	64.7
2905674														
2906155	MACX MCR-EX-SL-SD-24-48-LFD (-SP)	Low/High	A	-	3	94.8	0	406	45.1	24.6	167	1.08E-04	2.46E-8	64.7
2906156														

[1] For T_1 = 1 year

[2] Non-inverted output (N)

[3] Inverted output (I)

13 Explanation of terms

Abbreviation	Term	Explanation
EN ISO 13849-1		
PL	Performance level	Classification of the ability of safety functions to meet a safety demand.
Category	Category	Classification of the resistance to faults according to EN ISO 13849-1.
PFH_D	Probability of dangerous failure per hour	Probability of dangerous failure per hour
t_M	Mission time	Duration of use
EN IEC 61508 / 61511 / 62061		
HFT	Hardware fault tolerance	Ability of a function unit to continue with the execution of a demanded function despite existing faults or deviations.
SIL	Safety Integrity Level	Safety integrity level
SILCL	Safety integrity level claim limit	SIL claim limit (suitability)
SFF	Safe Failure Fraction	Fraction of safe failures
λ_{SD}	Failure rate – safe detected	Failure rate of safe detected failures
λ_{SU}	Failure rate – safe undetected	Failure rate of safe undetected failures
λ_{DD}	Failure rate – dangerous detected	Failure rate of dangerous detected failures
λ_{DU}	Failure rate – dangerous undetected	Failure rate of dangerous undetected failures
λ_{Total}	Total failure rate	Failure rate of all failures
DC	Diagnostic coverage	Diagnostic coverage
MTBF	Mean time between failure	Average failure time period
PFD_{avg}	Average probability of failure on demand	Average probability of failure on demand
FIT	Failure in time (in 10^9 hours)	Failures per unit time (1 failure every 10^9 hours)
T_{1max}	Proof test interval	Repeat testing

14 Revision history

Revision	Date	Contents
00	12/2011	First publication
01	01/2012	Layout adjustments PSR-SIM4 modular safety relay added PSR-SACB-4/4-L-5,0PUR-SD accessory added
02	04/2012	FL PN/PN SDIO-2TX/2TX safe PROFINET gateway added
03	01/2014	Layout adjustments Values for ESA2-B and ESAM2/3x1 corrected in “Safety relays” on page 2 and PSR-URML4, PSR-URM4 42-230UC, and PSR-MXF added “Forcibly guided coupling relays” moved to page 6 in Section 3, “Safety switching devices” (previously Section 6) Values for order numbers 2986229, 2986232, 2986012, 2986025, 2986038, and 298604 updated in “PSR-TRISAFE configurable safety module” on page 7 and order numbers 2986096 and 2986106 added Order numbers 2700994 and 2701625 added in “Safe control technology” on page 10, PL and Cat. corrected for IL-PSDOR-4-1CH-AC15 and IL-PSDOR-4-1CH-DC13, note text for order number 2985864 reduced Designation for order number 2916794 corrected in “Safe control technology” on page 10. “Safe coupling relay” on page 12 renamed (previously “Process technology”), PSR-ETP/1x1 added and footnote for PSR-FSP and PSR-ETP/1x1 inserted. Added “Signal conditioners” on page 13 “Ex i signal conditioners” on page 16 added “Explanation of terms” on page 19 extended
04	03/2015	Layout adjustments / Structure revised / Sections renamed in accordance with the designations of the product ranges Column for HW/FW version inserted in tables, if relevant “Safety relays – PSRmini” on page 2 inserted Second data record for order number 2981114/2981127 “PSR-ESAM4/3x1” on page 4 inserted “Multifunctional safety relays – PSRmultifunction” on page 7 inserted (previously included in Section 3.1 “Safety relays”) Data in “Configurable safety modules – PSRtrisafe” on page 11 revised Order number 2701559/270160 in “Network safety solutions” on page 14 inserted Order numbers 2903902, 2903904, 2903906, 2903914, 2903916, and 2903918 in “CONTACTRON hybrid motor starters” on page 16 inserted Data for “CONTACTRON hybrid motor starters” on page 16 updated “Safe coupling relays – PSRmini” on page 18 inserted In “Safe coupling relays – PSRclassic” on page 19 for PSR-FSP, PSR-ESP4, PSR-FSP2/2X1, PSR-ESAM4-B AC HFT changed from 1 to 0 Data for signal conditioners “Analog IN / Analog OUT” on page 20 updated Data for Ex i signal conditioners “Analog IN / Analog OUT” on page 23 updated
04_c00	04/2015	Notes for TRISAFE-S, -M, and -SDI8-SDIO4 on Page 11 modified

Revision	Date	Contents
05	06/2016	**Section 3.1 “Safety relays – PSRmini”** : New products inserted: PSR-MS21, PSR-MC60, PSR-MC62, PSR-MC70, PSR-MC72, PSR-MC82 **Section 3.2 “Safety relays – PSRclassic”** : PL/Cat./SILCL/PFH_D for PSR-ESP4 modified **Section 4 “Zero-speed and over-speed safety relays – PSRmotion”** : New product inserted: PSR-MM25 **Section 6 “Configurable safety modules – PSRtrisafe”** : HW/FW version column revised Note for TRISAFE-S 1CH and TRISAFE-M 1CH removed **Section 7 “Network safety solutions”** : Cat./SILCL (for 1CH-AC15 and 1CH-DC13) for order number 2985864 IB IL PSDO 4 adjusted Characteristics for 2CH-CAP-B for order number 2985864 IB IL PSDOR 4 removed Footnote 1 inserted New products inserted: AXL F SSDI8/4 1F, AXL F SSDO8/3 1F, AXL F LPSDO8/3 1F **Section 8.1 “Safe analog value processing”** inserted **Section 9 “CONTACTRON hybrid motor starters”** : Heading modified (previously “CONTACTRON solid-state contactors”) New products inserted: ELR H5-IES…-IFS , ELR H3-IES…-IFS , ELR H5-IES…SWD… , ELR H3-IES…SWD… **Section 10.2 “Safe coupling relays – PSRclassic”** : T_{1max} for PSR-FSP (low demand) modified SIL for PSR-ESP4 modified and corresponding footnote inserted Footnote for low demand values for PSR-FSP, PSR-ESP4, PSR-FSP2/2x1 inserted **Section 11 “Signal conditioners”** : Order number for MACX MCR-T-UIREL-UP(-SP)(-C) corrected Order numbers removed: 2811514, 2811831, 2865065, 2924317, 2865078, 2924320, 2924333, 2924346 **Section 12 “Ex i signal conditioners”** : Order numbers removed: 2865722, 2924809, 2865939, 2924142, 2865573, 2924168, 2865942, 2865586 New products inserted: MACX MCR-EX-SL-NAM-YO(-SP), MACX MCR-EX-SL-NAM-HO(-SP), MACX MCR-EX-SL-SD-21-25-LFD(-SP), MACX MCR-EX-SL-SD-24-48-LFD(-SP)

Revision	Date	Contents
06	03/2017	**Page 1:** Information about important product information added **Section 3.1 “Safety relays – PSRmini” :** New products added: PSR-MC32, PSR-MC37 PFH_D figures for PSR-MC60 and PSR-MC62 added Order numbers 2902935 and 2902936 replaced by order numbers 2702924 and 2702925 **Section 5 “Safe coupling relays – PSRclassic”** : Section fully revised due to new SIL qualification of the products **Section 6 “Configurable safety modules – PSRtrisafe”** : Section fully revised, new data added, for PSR-TS-SDI8-SDIO4: PFH_D figures changed, SILCL on 1CH assignment changed **Section 7 “Network safety solutions”** : New product added: IB IL SAFE 2-ECO Footnote 2 added **Section 8 “Safe control technology” :** Order number 2985563 removed **Section 9 “CONTACTRON hybrid motor starters”** : Order numbers removed: 2900558, 2900688, 2900560, 2900562, 2900550, 2900552, 2900554, 2900686, 2900553, 2900555 PFH_D figure for ELR H3-IES…SWD… changed New products added: ELR H5-IES...-IOL and ELR H5-IES...-IOL **Section 10.1 “Safe coupling relays – PSRmini”** : New products added: PSR-PS22, PSR-PC32, PSR-PC51 **Section 10.2 “Safe coupling relays – PSRclassic”** : Footnote for low demand figures for PSR-FSP/2x1 added Order numbers removed: 2986711, 2986562 **Section 12 “Ex i signal conditioners”** : Order numbers removed: 2865502, 2924197 High demand changed for order numbers 2865492 to 2906156 λ_{SU} and MTBF values changed for order numbers 2865492 to 2924100
07	03/2018	**Section 5 “Safe coupling relays – PSRclassic”** : Safety characteristic data changed (PFH_D and PFD_{avg} values)