



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

PR Project name: MORELLO 2769

Project file name:	C:\PROGETTI\SETI\MORELLO\2026-MORELLO 2769 FORD\SISTEMA\MORELLO 2769.ssm
Creation date:	22/09/2026 11:10:11
Project status:	
Project number:	
Project version:	
Authors:	SETI
Project managers:	
Inspectors:	
Dangerous point/machine:	
Documentation:	
Document:	
Version of software:	3.0.4 build 5
Version of standard:	ISO 13849-1:2023, ISO 13849-2:2012
Checksum:	430e2b1517cb6c0fa98c4840c5970f12
Options:	☒ Use DC intermediate levels for calculation of PFH (more precise) ☐ MTTFD capping for category 4 lower from 2500 to 100 years.
Status:	☒ green
Note:	There are no warnings listed for this project (or it's subordinate basic elements).

Print options

- | | |
|--|---|
| ☒ Show device details | ☒ Show requirements on PL and Category |
| ☒ Show documentations on SF, SB, BL and EL | ☒ Show parameter documentations on PLr, PL, Category, CCF, MTTFD and DC |
| ☒ Show CCF and DC measures in detail | ☒ Show messages |

Contained safety functions**SF** Name: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Required: PLr c	Reached: PL c	PFH [1/h]: 2E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE



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PR Project name: MORELLO 2769

Required: PLr c	Reached: PL c	PFH [1/h]: 1,83E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Required: PLr c	Reached: PL c	PFH [1/h]: 1,79E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Required: PLr c	Reached: PL c	PFH [1/h]: 1,79E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Required: PLr c	Reached: PL c	PFH [1/h]: 2E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Required: PLr c	Reached: PL c	PFH [1/h]: 1,83E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -



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PR Project name: MORELLO 2769**SF** Name: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Required: PLr c Reached: PL c PFH [1/h]: 1,79E-6 Status: green

List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Required: PLr c Reached: PL c PFH [1/h]: 1,79E-6 Status: green

List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Required: PLr c Reached: PL c PFH [1/h]: 2E-6 Status: green

List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Required: PLr c Reached: PL c PFH [1/h]: 1,83E-6 Status: green

List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Required: PLr c Reached: PL c PFH [1/h]: 1,79E-6 Status: green

List of documented messages:

- No messages known -



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PR Project name: MORELLO 2769**List of devices with a permissible operation time (T10D) of less than 20 years:**

- No devices known -

SF Name: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Required: PLr c	Reached: PL c	PFH [1/h]: 1,79E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Required: PLr c	Reached: PL c	PFH [1/h]: 2E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Required: PLr c	Reached: PL c	PFH [1/h]: 1,83E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -

SF Name: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Required: PLr c	Reached: PL c	PFH [1/h]: 1,79E-6	Status: green
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List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

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SF Name: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT



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PR Project name: MORELLO 2769

Required: PLr c

Reached: PL c

PFH [1/h]: 1,79E-6

Status: green

List of documented messages:

- No messages known -

List of devices with a permissible operation time (T10D) of less than 20 years:

- No devices known -



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 2E-6

*Electromagnetic immunity, EMI (Annex L) Safety function*Route for fulfilment
of EMI measures: n/a

Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status: green



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Subsystems (1 / 4)

SB Name: Hetronic Radio Receiver Emergency Stop Button

Reference designator: 12W1

Inventory number: 12W1 - Pagina 12

Device details Subsystem

Device Manufacturer: HETRONIC

Device Identifier: 4C0459-01857.A-AZA

Device group:

Part number:

Revision:

Function: ☐ Input ☒ Logic
☐ Output ☐ unknown

Use case: Radio ricevitore HETRONIC a doppio canale per l'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: d PFH [1/h]: 2,9E-7



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Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Documentation:

Category Subsystem

Cat.: 3

Category requirements: fulfilled

Requirements for the category (alternativ procedure to determine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- Only well-tries components (clause 6.1.11) are used. (6.1.9) [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Each component has a minimum DC of Low. (6.1.9) [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 100 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 20 Points | Diversity | Diversity (section F.3.2)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tries | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 2)

 Name: Channel 1



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE**Blocks (1 / 1)****BL** Name: Contatti uscita sicurezza**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** REM**Device Identifier:****Device group:****Part number:****Revision:****Function:**☐ Input☒ Output☐ Logic☐ unknown**Technology:** electromechanic**Category:** 3**Use case:****Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**Channels / Test channels (2 / 2)****CH** Name: Channel 2**Blocks (1 / 1)****BL** Name: Contatti uscita sicurezza**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** REM**Device Identifier:****Device group:****Part number:****Revision:**



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Function:	☐ Input ☒ Output	☐ Logic ☐ unknown
Technology:	electromechanic	
Category:	3	
Use case:		
Description of the use case:		
<i>Documentation Block</i>		
Documentation:		
Document:		
<i>Status / Messages Block</i>		
Status:	green	

Subsystems (2 / 4)

SB Name: CS M•308 Multifunction module

Reference designator:	16A1	
Inventory number:		
<i>Device details Subsystem</i>		
Device Manufacturer:	Pizzato Elettrica S.r.l.	
Device Identifier:	Multifunction module	
Device group:	CS	
Part number:	CS MP308M0	
Revision:		
Function:	☐ Input ☐ Output	☒ Logic ☐ unknown
Use case:		
Description of the use case:		
<i>Documentation Subsystem</i>		
Documentation:	CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)	
For more specific data please consult our catalog.		
Document:		
<i>Performance Level Subsystem</i>		
PL determination:	Enter PL/PFH directly (manufacturer ensures compliance with the	



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

PL determination: requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e **PFH [1/h]:** 1,32E-9

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic ☐ Output ☒ unknown

Use case:

Description of the use case:



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input
☒ Output

☐ Logic
☐ unknown

Technology: unknown

Category:

-

Use case:

Standard caso d'uso

Description of the use case:

Documentation Block



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE**Documentation:**

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block*

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:**Document:***Diagnostic coverage Block*

DC [%]:	99 (High)
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Documentation:**Document:***Status / Messages Block*

Status:	green
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Channels / Test channels (2 / 2)**CH** Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block*

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☐ Logic ☒ Output ☐ unknown
Technology:	unknown



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Category:	-
Use case:	Standard caso d'uso
Description of the use case:	

Documentation Block

Documentation:
SIRIUS LEISTUNGSSCHUTZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
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Documentation:

Document:

Status / Messages Block

Status:	green
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Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE

Reference designator:	5.GF1
Inventory number:	1232SE-6321 48-80V 175A

Device details Subsystem

Device Manufacturer:	CURTIS modello 1232SE-6321 48-80V 175A
Device Identifier:	
Device group:	
Part number:	
Revision:	



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Function: ☐ Input ☐ Logic
☒ Output ☐ unknown

Use case: Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c PFH [1/h]: 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to determine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-trying components (clause 6.1.11) are being used. [fulfilled]
- Well-trying safety principles are being used. [fulfilled]

Documentation:



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Source (e.g. standard) Category:

File:

*Status / Messages Subsystem***Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☒ Input
☐ Output☐ Logic
☐ unknown**Technology:**

electronic

Category:

2

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 1,83E-6

*Electromagnetic immunity, EMI (Annex L) Safety function*Route for fulfilment
of EMI measures: n/a

Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status: green



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Subsystems (1 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB1

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function:

☒ Input☐ Logic☒ Output☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d PFH [1/h]: 3,17E-8

Documentation:

Mission time [a]: 20 Shortest mission time [a]: 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (2 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB4

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function:

☒ Input☐ Logic☒ Output☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d PFH [1/h]: 3,17E-8



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (3 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator:	14PB2
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Inventory number:

Device details Subsystem

Device Manufacturer:	EATON
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Device Identifier:	24SB1
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Device group:

Part number:

Revision:

Function:	☒ Input ☐ Logic
	☒ Output ☐ unknown

Use case:	Pulsante a fungo per 'arresto d'emergenza
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Description of the use case:

Documentation Subsystem

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (4 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB3

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic ☒ Output ☐ unknown



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (5 / 7)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Device details Subsystem

Device Manufacturer:	Pizzato Elettrica S.r.l.		
Device Identifier:	Multifunction module		
Device group:	CS		
Part number:	CS MP308M0		
Revision:			
Function:	☐ Input	☒ Logic	☐ unknown
	☐ Output		

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination:	Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)		
PL:	e		

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.		
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Reached PL:	e	PFH [1/h]:	1,32E-9
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Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
Category requirements:	fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

File:

Status / Messages Subsystem

Status: green

Subsystems (6 / 7)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

 Function:
 ☐ Input
 ☐ Logic
 ☐ Output
 ☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e PFH [1/h]: 9,06E-10

Documentation:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-trying safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]:	2500 (High)
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Mission time [a]:	20	Shortest mission time [a]:	20
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Diagnostic coverage Subsystem

DCavg [%]:	99 (High)
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Common cause failure Subsystem

CCF Points:	80 (fulfilled)
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CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-trying | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status:	green
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Channels / Test channels (1 / 2)

CH Name:	Channel 1
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Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** SIEMENS AG**Device Identifier:** SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Device group:** SIRIUS Schütze / Motorstarter**Part number:** 3RT20***Revision:****Function:**☐ Input☒ Output☐ Logic☐ unknown**Technology:** unknown**Category:** -**Use case:** Standard caso d'uso**Description of the use case:***Documentation Block***Documentation:**

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block***MTTFD [a]:** 37530,4 (High)**Mission time [a]:** 20**Shortest mission time [a]:** 20**B10 [cycles]:** 1000000**RDF [%]:** 73**B10D [cycles]:** 1369863**nop [cycles/a]:** 365**Documentation:****Document:***Diagnostic coverage Block***DC [%]:** 99 (High)**Documentation:****Document:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Status / Messages Block

Status: green

Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input

☒ Output

☐ Logic

☐ unknown

Technology: unknown

Category: -

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

B10 [cycles]: 1000000

RDF [%]: 73

B10D [cycles]: 1369863

nop [cycles/a]: 365

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:

Status / Messages Block

Status: green

Subsystems (7 / 7)

SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE

Reference designator: 5.GF1

Inventory number: 1232SE-6321 48-80V 175A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 175A

Device Identifier:

Device group:

Part number:

Revision:

 Function:
 ☐ Input
 ☒ Output
 ☐ Logic
 ☐ unknown

Use case: Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL:	c	PFH [1/h]:	1,7E-6
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Documentation:

Category Subsystem

Cat.:	1
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Category requirements:	fulfilled
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Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: INGRESSO DI SICUREZZA

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:

Device Identifier:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Device group:

Part number:

Revision:

Function:

☒ Input
☐ Output

☐ Logic
☐ unknown

Technology:

electronic

Category:

2

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status:

green

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input):

c

Documentation:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL:	c	PFH [1/h]:	1,79E-6
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Electromagnetic immunity, EMI (Annex L) Safety function

Route for fulfilment of EMI measures:	n/a
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Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status:	green
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Subsystems (1 / 4)**SB** Name: MicroScan3 Pro I/O - EFI pro (Stand 2024-01)

Reference designator:	27.SQ1
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Inventory number:

Device details Subsystem

Device Manufacturer:	SICK AG
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Device Identifier:	microScan3 Pro I/O - EFI pro V1.0.0
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Device group:	Sicherheits-Laserscanner
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Part number:	MICS3-CCAZxxAA1P01/ 111003x
Revision:	1.0.0

Function:	☒ Input ☐ Logic
	☐ Output ☐ unknown

Use case:	Standard caso d'uso
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Description of the use case:

Typ 3 (IEC 61496)

Documentation Subsystem

Documentation:

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m MICS3-CCAZ40AA1P01 1110035

5,5m MICS3-CCAZ55AA1P01 1110033

9 m MICS3-CCAZ90AA1P01 1110037

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: d

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 8E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 3

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (2 / 4)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e **PFH [1/h]:** 1,32E-9

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Status / Messages Subsystem

Status: green

Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic ☐ Output ☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e PFH [1/h]: 9,06E-10

Documentation:

Category Subsystem

Cat.: 4



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Category requirements:	fulfilled
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Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]:	2500 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20

Diagnostic coverage Subsystem

DCavg [%]:	99 (High)
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Common cause failure Subsystem

CCF Points:	80 (fulfilled)
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CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status:	green
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Channels / Test channels (1 / 2)

 Name: Channel 1

MTTFD [a]: 2500



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input☒ Output☐ Logic☐ unknown

Technology: unknown

Category: -

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

B10 [cycles]: 1000000

RDF [%]: 73

B10D [cycles]: 1369863

nop [cycles/a]: 365

Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE*Status / Messages Block***Status:** green**Channels / Test channels (2 / 2)****CH** Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** SIEMENS AG**Device Identifier:** SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Device group:** SIRIUS Schütze / Motorstarter**Part number:** 3RT20***Revision:****Function:** ☐ Input ☐ Logic
☒ Output ☐ unknown**Technology:** unknown**Category:** -**Use case:** Standard caso d'uso**Description of the use case:***Documentation Block***Documentation:**

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block***MTTFD [a]:** 37530,4 (High)**Mission time [a]:** 20 **Shortest mission time [a]:** 20**B10 [cycles]:** 1000000 **RDF [%]:** 73**B10D [cycles]:** 1369863 **nop [cycles/a]:** 365**Documentation:****Document:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:

Status / Messages Block

Status: green

Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE

Reference designator: 5.GF1

Inventory number: 1232SE-6321 48-80V 175A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 175A

Device Identifier:

Device group:

Part number:

Revision:

Function:

☐ Input☒ Output☐ Logic☐ unknown

Use case: Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL:	c	PFH [1/h]:	1,7E-6
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Documentation:

Category Subsystem

Cat.:	1
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Category requirements:	fulfilled
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Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: INGRESSO DI SICUREZZA

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:

Device Identifier:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Device group:

Part number:

Revision:

Function:

☒ Input
☐ Output

☐ Logic
☐ unknown

Technology:

electronic

Category:

2

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status:

green

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input):

c

Documentation:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL:	c	PFH [1/h]:	1,79E-6
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Electromagnetic immunity, EMI (Annex L) Safety function

Route for fulfilment of EMI measures:	n/a
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Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status:	green
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Subsystems (1 / 4)**SB** Name: MicroScan3 Pro I/O - EFI pro (Stand 2024-01)

Reference designator:	27.SQ2
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Inventory number:

Device details Subsystem

Device Manufacturer:	SICK AG
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Device Identifier:	microScan3 Pro I/O - EFI pro V1.0.0
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Device group:	Sicherheits-Laserscanner
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Part number:	MICS3-CCAZxxAA1P01/ 111003x
Revision:	1.0.0

Function:	☒ Input ☐ Logic
	☐ Output ☐ unknown

Use case:	Standard caso d'uso
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Description of the use case:	Typ 3 (IEC 61496)
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Documentation Subsystem

Documentation:

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m MICS3-CCAZ40AA1P01 1110035

5,5m MICS3-CCAZ55AA1P01 1110033

9 m MICS3-CCAZ90AA1P01 1110037

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: d

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 8E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 3

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (2 / 4)

 Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e PFH [1/h]: 1,32E-9

Documentation:

Mission time [a]: 20 Shortest mission time [a]: 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Status / Messages Subsystem

Status: green

Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic ☐ Output ☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e PFH [1/h]: 9,06E-10

Documentation:

Category Subsystem

Cat.: 4



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Category requirements:	fulfilled
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Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-trying safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]:	2500 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20

Diagnostic coverage Subsystem

DCavg [%]:	99 (High)
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Common cause failure Subsystem

CCF Points:	80 (fulfilled)
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CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-trying | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status:	green
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Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input
☒ Output

☐ Logic
☐ unknown

Technology: unknown

Category: -

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

B10 [cycles]: 1000000

RDF [%]: 73

B10D [cycles]: 1369863

nop [cycles/a]: 365

Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE*Status / Messages Block***Status:** green**Channels / Test channels (2 / 2)****CH** Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** SIEMENS AG**Device Identifier:** SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Device group:** SIRIUS Schütze / Motorstarter**Part number:** 3RT20***Revision:****Function:** ☐ Input ☐ Logic
☒ Output ☐ unknown**Technology:** unknown**Category:** -**Use case:** Standard caso d'uso**Description of the use case:***Documentation Block***Documentation:**

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block***MTTFD [a]:** 37530,4 (High)**Mission time [a]:** 20 **Shortest mission time [a]:** 20**B10 [cycles]:** 1000000 **RDF [%]:** 73**B10D [cycles]:** 1369863 **nop [cycles/a]:** 365**Documentation:****Document:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE*Diagnostic coverage Block***DC [%]:** 99 (High)**Documentation:****Document:***Status / Messages Block***Status:** green**Subsystems (4 / 4)****SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE****Reference designator:** 5.GF1**Inventory number:** 1232SE-6321 48-80V 175A*Device details Subsystem***Device Manufacturer:** CURTIS modello 1232SE-6321 48-80V 175A**Device Identifier:****Device group:****Part number:****Revision:****Function:**☐ Input☒ Output☐ Logic☐ unknown**Use case:** Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata**Description of the use case:***Documentation Subsystem***Documentation:****Document:***Performance Level Subsystem***PL determination:** Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)*Electromagnetic immunity, EMI (Annex L) Subsystem***Route for fulfilment of EMI measures:** The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.**PL requirements:** fulfilled**Function:** Input/Output



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL:	c	PFH [1/h]:	1,7E-6
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Documentation:

Category Subsystem

Cat.:	1
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Category requirements:	fulfilled
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Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: INGRESSO DI SICUREZZA

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:

Device Identifier:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - MOTOR BRAKING TORQUE

Device group:

Part number:

Revision:

Function:

☒ Input
☐ Output

☐ Logic
☐ unknown

Technology:

electronic

Category:

2

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status:

green

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input):

c

Documentation:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL:	c	PFH [1/h]:	2E-6
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Electromagnetic immunity, EMI (Annex L) Safety function

Route for fulfilment of EMI measures:	n/a
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Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status:	green
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Subsystems (1 / 4)

SB Name: Hetronic Radio Receiver Emergency Stop Button

Reference designator:	12W1
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Inventory number:	12W1 - Pagina 12
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Device details Subsystem

Device Manufacturer:	HETRONIC
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Device Identifier:	4C0459-01857.A-AZA
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Device group:

Part number:

Revision:

Function:	☐ Input ☐ Output	☒ Logic ☐ unknown
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Use case:	Radio ricevitore HETRONIC a doppio canale per l'arresto d'emergenza
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Description of the use case:

Documentation Subsystem

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: d **PFH [1/h]:** 2,9E-7

Documentation:

Category Subsystem

Cat.: 3

Category requirements: fulfilled

Requirements for the category (alternativ procedure to determine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- Only well-tries components (clause 6.1.11) are used. (6.1.9) [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Each component has a minimum DC of Low. (6.1.9) [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 100 (fulfilled)



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT**CCF Measures:**

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 20 Points | Diversity | Diversity (section F.3.2)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:**Document:***Status / Messages Subsystem***Status:** green**Message [Status of Message]:**

- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 2)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: Contatti uscita sicurezza**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** REM**Device Identifier:****Device group:****Part number:****Revision:****Function:**
☐ Input ☐ Logic
☒ Output ☐ unknown**Technology:** electromechanic**Category:** 3**Use case:****Description of the use case:***Documentation Block***Documentation:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT**Document:***Status / Messages Block***Status:** green**Channels / Test channels (2 / 2)****CH** Name: Channel 2**Blocks (1 / 1)****BL** Name: Contatti uscita sicurezza**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** REM**Device Identifier:****Device group:****Part number:****Revision:****Function:**☐ Input☒ Output☐ Logic☐ unknown**Technology:**

electromechanic

Category:

3

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**Subsystems (2 / 4)****SB** Name: CS M•308 Multifunction module**Reference designator:** 16A1**Inventory number:***Device details Subsystem***Device Manufacturer:** Pizzato Elettrica S.r.l.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e PFH [1/h]: 1,32E-9

Documentation:

Mission time [a]: 20 Shortest mission time [a]: 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT*Status / Messages Subsystem***Status:** green**Subsystems (3 / 4)****SB Name: PAIR OF POWER CONTACTORS****Reference designator:** 17.CR1 + 17.CR2**Inventory number:***Device details Subsystem***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**
☐ Input ☐ Logic
☐ Output ☒ unknown**Use case:****Description of the use case:***Documentation Subsystem***Documentation:****Document:***Performance Level Subsystem***PL determination:** Determine PL/PFH from Category, MTTFD and DCavg*Electromagnetic immunity, EMI (Annex L) Subsystem***Route for fulfilment of EMI measures:** The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.**PL requirements:** fulfilled**The PL shall be determined by the estimation of the following aspects (section 6.1.1):**

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10**Documentation:***Category Subsystem***Cat.:** 4



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Category requirements:	fulfilled
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Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-trying safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]:	2500 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20

Diagnostic coverage Subsystem

DCavg [%]:	99 (High)
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Common cause failure Subsystem

CCF Points:	80 (fulfilled)
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CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-trying | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status:	green
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Channels / Test channels (1 / 2)

CH Name: Channel 1
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MTTFD [a]: 2500



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input☒ Output☐ Logic☐ unknown

Technology: unknown

Category: -

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

B10 [cycles]: 1000000

RDF [%]: 73

B10D [cycles]: 1369863

nop [cycles/a]: 365

Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG		
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*		
Device group:	SIRIUS Schütze / Motorstarter		
Part number:	3RT20*		
Revision:			
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown	
Technology:	unknown		
Category:	-		
Use case:	Standard caso d'uso		

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:

Document:



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:

Status / Messages Block

Status: green

Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator: 5.GF1

Inventory number: 1232SE-6321 48-80V 250A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 250A

Device Identifier: 6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1

Device group:

Part number:

Revision:

Function:

☐ Input☒ Output☐ Logic☐ unknown

Use case: Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL:	c	PFH [1/h]:	1,7E-6
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Documentation:

Category Subsystem

Cat.:	1
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Category requirements:	fulfilled
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Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: INGRESSO DI SICUREZZA

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:

Device Identifier:



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Device group:

Part number:

Revision:

Function:

☒ Input
☐ Output

☐ Logic
☐ unknown

Technology:

electronic

Category:

2

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status:

green

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL:	c	PFH [1/h]:	1,83E-6
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Electromagnetic immunity, EMI (Annex L) Safety function

Route for fulfilment of EMI measures:	n/a
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Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status:	green
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Subsystems (1 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator:	14PB1
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Inventory number:

Device details Subsystem

Device Manufacturer:	EATON
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Device Identifier:	24SB1
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Device group:

Part number:

Revision:

Function:	☒ Input ☐ Logic
	☒ Output ☐ unknown

Use case:	Pulsante a fungo per 'arresto d'emergenza
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Description of the use case:

Documentation Subsystem

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (2 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB4

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic ☒ Output ☐ unknown



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (3 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB2

Inventory number:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic
☒ Output ☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d PFH [1/h]: 3,17E-8

Documentation:

Mission time [a]: 20 Shortest mission time [a]: 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:



Project name: MORELLO 2769

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SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (4 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB3

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic
☒ Output ☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (5 / 7)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case:

Description of the use case:

*Documentation Subsystem***Documentation:**

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e



Project name: MORELLO 2769

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SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e **PFH [1/h]:** 1,32E-9

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (6 / 7)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic ☐ Output ☒ unknown

Use case:

Description of the use case:

Documentation Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)



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SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-trying | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input

☒ Output

☐ Logic

☐ unknown

Technology: unknown

Category:

-

Use case:

Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le



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File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block*

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:**Document:***Diagnostic coverage Block***DC [%]:** 99 (High)**Documentation:****Document:***Status / Messages Block***Status:** green**Channels / Test channels (2 / 2)****CH** Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block*

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☐ Logic ☒ Output ☐ unknown
Technology:	unknown
Category:	-



Project name: MORELLO 2769

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SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]:	20	Shortest mission time [a]:	20
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B10 [cycles]:	1000000	RDF [%]:	73
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B10D [cycles]:	1369863	nop [cycles/a]:	365
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Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:

Status / Messages Block

Status: green

Subsystems (7 / 7)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator: 5.GF1

Inventory number: 1232SE-6321 48-80V 250A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 250A

Device Identifier: 6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1

Device group:

Part number:

Revision:

Function:

☐ Input
☒ Output

☐ Logic
☐ unknown



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Use case: Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c **PFH [1/h]:** 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:



Project name: MORELLO 2769

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SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT*Status / Messages Subsystem***Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☒ Input
☐ Output☐ Logic
☐ unknown**Technology:**

electronic

Category:

2

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT****Identifier of the Safety function:****Safety function type:**



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SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 1,79E-6

*Electromagnetic immunity, EMI (Annex L) Safety function*Route for fulfilment
of EMI measures: n/a

Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status: green

Subsystems (1 / 4)

SB Name: MicroScan3 Pro I/O - EFI pro (Stand 2024-01)

Reference designator: 27.SQ1



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Inventory number:

Device details Subsystem

Device Manufacturer:	SICK AG
Device Identifier:	microScan3 Pro I/O - EFI pro V1.0.0
Device group:	Sicherheits-Laserscanner
Part number:	MICS3-CCAZxxAA1P01/ 111003x
Revision:	1.0.0
Function:	☒ Input ☐ Logic ☐ Output ☐ unknown
Use case:	Standard caso d'uso

Description of the use case:

Typ 3 (IEC 61496)

Documentation Subsystem

Documentation:

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m	MICS3-CCAZ40AA1P01	1110035
5,5m	MICS3-CCAZ55AA1P01	1110033
9 m	MICS3-CCAZ90AA1P01	1110037

Document:

Performance Level Subsystem

PL determination:	Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)		
PL:	d		

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.		
Reached PL:	d	PFH [1/h]:	8E-8
Documentation:			
Mission time [a]:	20	Shortest mission time [a]:	20

Category Subsystem

Cat.:	3
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Project name: MORELLO 2769

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SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:	
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File:	
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Status / Messages Subsystem

Status:	green
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Subsystems (2 / 4)

SB Name: CS M•308 Multifunction module

Reference designator:	16A1
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Inventory number:	
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Device details Subsystem

Device Manufacturer:	Pizzato Elettrica S.r.l.
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Device Identifier:	Multifunction module
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Device group:	CS
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Part number:	CS MP308M0
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Revision:	
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Function:	☐ Input ☒ Logic
	☐ Output ☐ unknown

Use case:	
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Description of the use case:	
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Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:	
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Performance Level Subsystem

PL determination:	Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)
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PL:	e
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Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.
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Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Reached PL:	e	PFH [1/h]:	1,32E-9
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Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator:	17.CR1 + 17.CR2
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Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:	☐ Input ☐ Output	☐ Logic ☒ unknown
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Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Performance Level Subsystem

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)



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SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-trying | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG	
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*	
Device group:	SIRIUS Schütze / Motorstarter	
Part number:	3RT20*	
Revision:		
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown
Technology:	unknown	
Category:	-	
Use case:	Standard caso d'uso	

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:



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SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	

Document:

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	unknown
Category:	-
Use case:	Standard caso d'uso
Description of the use case:	



Project name: MORELLO 2769

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SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
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Documentation:

Document:

Status / Messages Block

Status:	green
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Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator:	5.GF1
Inventory number:	1232SE-6321 48-80V 250A
<i>Device details Subsystem</i>	
Device Manufacturer:	CURTIS modello 1232SE-6321 48-80V 250A
Device Identifier:	6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1
Device group:	
Part number:	
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Use case:	Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c **PFH [1/h]:** 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT**Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☒ Input
☐ Output☐ Logic
☐ unknown**Technology:**

electronic

Category:

2

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT****Identifier of the Safety function:****Safety function type:****Triggering event:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT**Reaction and
Behaviour on power failure:****Safe state:****Operation mode:****Interfaces:****Demand rate:****Running-on time:****Priority:****Documentation:****Document:***Required Performance Level Safety function***PLr (by direct input):** c**Documentation:****Document:****Source (e.g. standard):****File:***Performance Level Safety function***Reached PL:** c **PFH [1/h]:** 1,79E-6*Electromagnetic immunity, EMI (Annex L) Safety function***Route for fulfilment
of EMI measures:** n/a**Documentation:****Document:***List of devices with a permissible operation time (T10D) of less than 20 years:***Device list:***Status / Messages Safety function***Status:** green**Subsystems (1 / 4)****SB Name:** MicroScan3 Pro I/O - EFI pro (Stand 2024-01)**Reference designator:** 27.SQ2**Inventory number:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Device details Subsystem

Device Manufacturer:	SICK AG		
Device Identifier:	microScan3 Pro I/O - EFI pro V1.0.0		
Device group:	Sicherheits-Laserscanner		
Part number:	MICS3-CCAZxxAA1P01/ 111003x		
Revision:	1.0.0		
Function:	☒ Input	☐ Logic	
	☐ Output	☐ unknown	
Use case:	Standard caso d'uso		
Description of the use case:	Typ 3 (IEC 61496)		

Documentation Subsystem

Documentation:

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m MICS3-CCAZ40AA1P01 1110035

5,5m MICS3-CCAZ55AA1P01 1110033

9 m MICS3-CCAZ90AA1P01 1110037

Document:

Performance Level Subsystem

PL determination:	Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)		
PL:	d		

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.		
Reached PL:	d	PFH [1/h]:	8E-8
Documentation:			
Mission time [a]:	20	Shortest mission time [a]:	20

Category Subsystem

Cat.:	3
Category requirements:	fulfilled



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SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (2 / 4)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function:

☐ Input	☒ Logic
☐ Output	☐ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.



Project name: MORELLO 2769

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SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Reached PL:	e	PFH [1/h]:	1,32E-9
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Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator:	17.CR1 + 17.CR2
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Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:	☐ Input ☐ Output	☐ Logic ☒ unknown
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Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature |



Project name: MORELLO 2769

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SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Design/application/experience (section F.3.3)

- 5 Points | Components used are well-trying | Design/application/experience (section F.3.3)

- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)

- 5 Points | Training | Training (section F.3.5)

- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)

- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input

☒ Output

☐ Logic

☐ unknown

Technology: unknown

Category:

-

Use case:

Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	

Document:

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschütz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	unknown
Category:	-
Use case:	Standard caso d'uso
Description of the use case:	



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SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:

Status / Messages Block

Status: green

Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator:	5.GF1
Inventory number:	1232SE-6321 48-80V 250A
<i>Device details Subsystem</i>	
Device Manufacturer:	CURTIS modello 1232SE-6321 48-80V 250A
Device Identifier:	6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1
Device group:	
Part number:	
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Use case:	Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata



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SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c **PFH [1/h]:** 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem



Project name: MORELLO 2769

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SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR LEFT - UNCOMMANDED POWER MOVEMENT**Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☒ Input
☐ Output☐ Logic
☐ unknown**Technology:**

electronic

Category:

2

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE****Identifier of the Safety function:****Safety function type:****Triggering event:**



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 2E-6

Electromagnetic immunity, EMI (Annex L) Safety function

Route for fulfilment
of EMI measures: n/a

Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status: green

Subsystems (1 / 4)

SB Name: Hetronic Radio Receiver Emergency Stop Button

Reference designator: 12W1

Inventory number: 12W1 - Pagina 12



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Device details Subsystem

Device Manufacturer:	HETRONIC		
Device Identifier:	4C0459-01857.A-AZA		
Device group:			
Part number:			
Revision:			
Function:	☐ Input ☐ Output	☒ Logic ☐ unknown	
Use case:	Radio ricevitore HETRONIC a doppio canale per l'arresto d'emergenza		
Description of the use case:			

Documentation Subsystem

Documentation:	
Document:	

Performance Level Subsystem

PL determination:	Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)
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Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.		
PL requirements:	fulfilled		
Function:	Input/Output		
The PL shall be determined by estimating the following aspects using the alternative procedure in section 6 - Behaviour of the safety function under fault conditions [fulfilled] - Safety-related software according to clause 7 and Annex J or no software included [fulfilled] - Systematic failure (see clause 6.1.7 and Annex G) [fulfilled] - Ability to perform a safety function under expected environmental conditions [fulfilled] - Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled] - no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled] - The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled] - The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]			
Reached PL:	d	PFH [1/h]:	2,9E-7
Documentation:			

Category Subsystem

Cat.:	3
Category requirements:	fulfilled



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-ried safety principles are being used. [fulfilled]
- Only well-ried components (clause 6.1.11) are used. (6.1.9) [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Each component has a minimum DC of Low. (6.1.9) [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 100 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 20 Points | Diversity | Diversity (section F.3.2)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-ried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 2)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: Contatti uscita sicurezza

Reference designator:

Inventory number:

Device details Block



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Device Manufacturer:	REM	
Device Identifier:		
Device group:		
Part number:		
Revision:		
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown
Technology:	electromechanic	
Category:	3	
Use case:		
Description of the use case:		
<i>Documentation Block</i>		
Documentation:		
Document:		
<i>Status / Messages Block</i>		
Status:	green	

Channels / Test channels (2 / 2)**CH** Name: Channel 2**Blocks (1 / 1)****BL** Name: Contatti uscita sicurezza

Reference designator:		
Inventory number:		
<i>Device details Block</i>		
Device Manufacturer:	REM	
Device Identifier:		
Device group:		
Part number:		
Revision:		
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown
Technology:	electromechanic	
Category:	3	
Use case:		
Description of the use case:		



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE*Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**Subsystems (2 / 4)****SB Name:** CS M•308 Multifunction module**Reference designator:** 16A1**Inventory number:***Device details Subsystem***Device Manufacturer:** Pizzato Elettrica S.r.l.**Device Identifier:** Multifunction module**Device group:** CS**Part number:** CS MP308M0**Revision:****Function:**
☐ Input ☒ Logic
☐ Output ☐ unknown**Use case:****Description of the use case:***Documentation Subsystem***Documentation:**

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:*Performance Level Subsystem***PL determination:** Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)**PL:** e*Electromagnetic immunity, EMI (Annex L) Subsystem***Route for fulfilment of EMI measures:** The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.**Reached PL:** e **PFH [1/h]:** 1,32E-9



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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE**Documentation:**

Mission time [a]:	20	Shortest mission time [a]:	20
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*Category Subsystem***Cat.:** 4**Category requirements:** fulfilled**Requirements for the category:**

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:**Source (e.g. standard) Category:****File:***Status / Messages Subsystem***Status:** green**Subsystems (3 / 4)****SB Name: PAIR OF POWER CONTACTORS****Reference designator:** 17.CR1 + 17.CR2**Inventory number:***Device details Subsystem***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:**

Function:	☐ Input	☐ Logic
	☐ Output	☒ unknown

Use case:**Description of the use case:***Documentation Subsystem***Documentation:****Document:***Performance Level Subsystem***PL determination:** Determine PL/PFH from Category, MTTFD and DCavg



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)



Project name: MORELLO 2769

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SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:**Document:***Status / Messages Subsystem***Status:** green**Channels / Test channels (1 / 2)****CH** Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** SIEMENS AG**Device Identifier:** SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Device group:** SIRIUS Schütze / Motorstarter**Part number:** 3RT20***Revision:****Function:**
☐ Input ☐ Logic
☒ Output ☐ unknown**Technology:** unknown**Category:** -**Use case:** Standard caso d'uso**Description of the use case:***Documentation Block***Documentation:**

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block*



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			
Document:			
<i>Diagnostic coverage Block</i>			
DC [%]:	99 (High)		
Documentation:			
Document:			
<i>Status / Messages Block</i>			
Status:	green		

Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	unknown
Category:	-
Use case:	Standard caso d'uso
Description of the use case:	



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE*Documentation Block***Documentation:**

SIRIUS LEISTUNGSSCHUTZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block***MTTFD [a]:** 37530,4 (High)

Mission time [a]:	20	Shortest mission time [a]:	20
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B10 [cycles]:	1000000	RDF [%]:	73
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B10D [cycles]:	1369863	nop [cycles/a]:	365
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Documentation:**Document:***Diagnostic coverage Block***DC [%]:** 99 (High)**Documentation:****Document:***Status / Messages Block***Status:** green**Subsystems (4 / 4)****SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE****Reference designator:** 6.GF1**Inventory number:** 1232SE-6321 48-80V 175A*Device details Subsystem***Device Manufacturer:** CURTIS modello 1232SE-6321 48-80V 175A**Device Identifier:****Device group:****Part number:****Revision:**

Function:	☐ Input	☐ Logic
	☒ Output	☐ unknown

Use case: Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata**Description of the use case:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c **PFH [1/h]:** 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: INGRESSO DI SICUREZZA

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:

☒ Input
☐ Output

☐ Logic
☐ unknown

Technology:

electronic

Category:

2

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status:

green

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and

Behaviour on power failure:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 1,83E-6

*Electromagnetic immunity, EMI (Annex L) Safety function*Route for fulfilment
of EMI measures: n/a

Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status: green

Subsystems (1 / 7)**SB** Name: EMERGENCY STOP BUTTON

Reference designator: 14PB1

Inventory number:

Device details Subsystem

Device Manufacturer: EATON



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function:

☒ Input☐ Logic☒ Output☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d PFH [1/h]: 3,17E-8

Documentation:

Mission time [a]: 20 Shortest mission time [a]: 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (2 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB4

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function:

☒ Input☐ Logic☒ Output☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (3 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB2

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic
☒ Output ☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Reached PL:	d	PFH [1/h]:	3,17E-8
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Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (4 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator:	14PB3
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Inventory number:

Device details Subsystem

Device Manufacturer:	EATON
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Device Identifier:	24SB1
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Device group:

Part number:

Revision:

Function:	☒ Input ☐ Logic
	☒ Output ☐ unknown

Use case:	Pulsante a fungo per 'arresto d'emergenza
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Description of the use case:

Documentation Subsystem

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (5 / 7)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e PFH [1/h]: 1,32E-9

Documentation:

Mission time [a]: 20 Shortest mission time [a]: 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (6 / 7)

SB Name: PAIR OF POWER CONTACTORS



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Reference designator: 17.CR1 + 17.CR2

Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:

☐ Input
☐ Output

☐ Logic
☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e PFH [1/h]: 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]:	20	Shortest mission time [a]:	20
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Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Device details Block

Device Manufacturer:	SIEMENS AG		
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*		
Device group:	SIRIUS Schütze / Motorstarter		
Part number:	3RT20*		
Revision:			
Function:	☐ Input	☐ Logic	
	☒ Output	☐ unknown	
Technology:	unknown		
Category:	-		
Use case:	Standard caso d'uso		
Description of the use case:			

Documentation Block

Documentation:	SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)		
Document:			

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			
Document:			

Diagnostic coverage Block

DC [%]:	99 (High)		
Documentation:			
Document:			

Status / Messages Block

Status:	green		
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Channels / Test channels (2 / 2)

CH Name: Channel 2



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** SIEMENS AG**Device Identifier:** SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Device group:** SIRIUS Schütze / Motorstarter**Part number:** 3RT20***Revision:****Function:**☐ Input☒ Output☐ Logic☐ unknown**Technology:** unknown**Category:** -**Use case:** Standard caso d'uso**Description of the use case:***Documentation Block***Documentation:**

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block***MTTFD [a]:** 37530,4 (High)**Mission time [a]:** 20**Shortest mission time [a]:** 20**B10 [cycles]:** 1000000**RDF [%]:** 73**B10D [cycles]:** 1369863**nop [cycles/a]:** 365**Documentation:****Document:***Diagnostic coverage Block***DC [%]:** 99 (High)**Documentation:****Document:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Status / Messages Block

Status: green

Subsystems (7 / 7)

SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE

Reference designator: 6.GF1

Inventory number: 1232SE-6321 48-80V 175A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 175A

Device Identifier:

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic
☒ Output ☐ unknown

Use case: Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c PFH [1/h]: 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to determine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: INGRESSO DI SICUREZZA

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic
☐ Output ☐ unknown

Technology: electronic



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Category: 2

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status: green

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 1,79E-6



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE*Electromagnetic immunity, EMI (Annex L) Safety function***Route for fulfilment of EMI measures:** n/a**Documentation:****Document:***List of devices with a permissible operation time (T10D) of less than 20 years:***Device list:***Status / Messages Safety function***Status:** green**Subsystems (1 / 4)****SB Name:** MicroScan3 Pro I/O - EFI pro (Stand 2024-01)**Reference designator:** 27.SQ1**Inventory number:***Device details Subsystem***Device Manufacturer:** SICK AG**Device Identifier:** microScan3 Pro I/O - EFI pro V1.0.0**Device group:** Sicherheits-Laserscanner**Part number:** MICS3-CCAZxxAA1P01/ 111003x
Revision: 1.0.0**Function:** ☒ Input ☐ Logic
☐ Output ☐ unknown**Use case:** Standard caso d'uso**Description of the use case:**

Typ 3 (IEC 61496)

*Documentation Subsystem***Documentation:**

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m MICS3-CCAZ40AA1P01 1110035

5,5m MICS3-CCAZ55AA1P01 1110033

9 m MICS3-CCAZ90AA1P01 1110037

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: d

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 8E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 3

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (2 / 4)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e **PFH [1/h]:** 1,32E-9

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:

☐ Input
☐ Output

☐ Logic
☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination:

Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment
of EMI measures:

The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements:

fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL:

e

PFH [1/h]:

9,06E-10

Documentation:

Category Subsystem

Cat.:

4

Category requirements:

fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:**Source (e.g. standard) Category:****File:***MTTFD and Mission time Subsystem***MTTFD [a]:** 2500 (High)

Mission time [a]:	20	Shortest mission time [a]:	20
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*Diagnostic coverage Subsystem***DCavg [%]:** 99 (High)*Common cause failure Subsystem***CCF Points:** 80 (fulfilled)**CCF Measures:**

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:**Document:***Status / Messages Subsystem***Status:** green**Channels / Test channels (1 / 2)****CH** Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** SIEMENS AG



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*		
Device group:	SIRIUS Schütze / Motorstarter		
Part number:	3RT20*		
Revision:			
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown	
Technology:	unknown		
Category:	-		
Use case:	Standard caso d'uso		
Description of the use case:			

Documentation Block

Documentation:
SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			
Document:			

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	
Document:	

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input
☒ Output

☐ Logic
☐ unknown

Technology: unknown

Category: -

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

B10 [cycles]: 1000000

RDF [%]: 73

B10D [cycles]: 1369863

nop [cycles/a]: 365

Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Status / Messages Block

Status: green

Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE

Reference designator: 6.GF1

Inventory number: 1232SE-6321 48-80V 175A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 175A

Device Identifier:

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic
☒ Output ☐ unknown

Use case: Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE**Reached PL:** c **PFH [1/h]:** 1,7E-6**Documentation:***Category Subsystem***Cat.:** 1**Category requirements:** fulfilled**Requirements for the category (alternativ procedure to determine the PL according to section 6.1.9) (Inputs**

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries components (clause 6.1.11) are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]

Documentation:**Source (e.g. standard) Category:****File:***Status / Messages Subsystem***Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:** ☒ Input ☐ Logic
☐ Output ☐ unknown**Technology:** electronic**Category:** 2



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status: green

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 1,79E-6



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE*Electromagnetic immunity, EMI (Annex L) Safety function***Route for fulfilment of EMI measures:** n/a**Documentation:****Document:***List of devices with a permissible operation time (T10D) of less than 20 years:***Device list:***Status / Messages Safety function***Status:** green**Subsystems (1 / 4)****SB Name:** MicroScan3 Pro I/O - EFI pro (Stand 2024-01)**Reference designator:** 27.SQ2**Inventory number:***Device details Subsystem***Device Manufacturer:** SICK AG**Device Identifier:** microScan3 Pro I/O - EFI pro V1.0.0**Device group:** Sicherheits-Laserscanner**Part number:** MICS3-CCAZxxAA1P01/ 111003x
Revision: 1.0.0**Function:** ☒ Input ☐ Logic
☐ Output ☐ unknown**Use case:** Standard caso d'uso**Description of the use case:**

Typ 3 (IEC 61496)

*Documentation Subsystem***Documentation:**

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m MICS3-CCAZ40AA1P01 1110035

5,5m MICS3-CCAZ55AA1P01 1110033

9 m MICS3-CCAZ90AA1P01 1110037

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: d

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 8E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 3

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (2 / 4)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e **PFH [1/h]:** 1,32E-9

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE*Device details Subsystem***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☐ Input
☐ Output☐ Logic
☒ unknown**Use case:****Description of the use case:***Documentation Subsystem***Documentation:****Document:***Performance Level Subsystem***PL determination:**

Determine PL/PFH from Category, MTTFD and DCavg

*Electromagnetic immunity, EMI (Annex L) Subsystem***Route for fulfilment
of EMI measures:**

The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements:

fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL:

e

PFH [1/h]:

9,06E-10

Documentation:*Category Subsystem***Cat.:**

4

Category requirements:

fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]:	20	Shortest mission time [a]:	20
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Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*		
Device group:	SIRIUS Schütze / Motorstarter		
Part number:	3RT20*		
Revision:			
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown	
Technology:	unknown		
Category:	-		
Use case:	Standard caso d'uso		
Description of the use case:			

Documentation Block

Documentation:
SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:*MTTFD and Mission time Block*

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			
Document:			

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	
Document:	

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)**CH** Name: Channel 2

MTTFD [a]: 2500



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input☒ Output☐ Logic☐ unknown

Technology: unknown

Category: -

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

B10 [cycles]: 1000000

RDF [%]: 73

B10D [cycles]: 1369863

nop [cycles/a]: 365

Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Status / Messages Block

Status:	green
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Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - MOTOR BRAKING TORQUE

Reference designator:	6.GF1
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Inventory number:	1232SE-6321 48-80V 175A
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Device details Subsystem

Device Manufacturer:	CURTIS modello 1232SE-6321 48-80V 175A
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Device Identifier:	
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Device group:	
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Part number:	
---------------------	--

Revision:	
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Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
------------------	---

Use case:	Arresto per MOTOR BRAKING TORQUE agli inverter di trazione e sterzata
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Description of the use case:	
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Documentation Subsystem

Documentation:	
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Document:	
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Performance Level Subsystem

PL determination:	Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)
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Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.
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PL requirements:	fulfilled
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Function:	Input/Output
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The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Reached PL: c PFH [1/h]: 1,7E-6

Documentation:*Category Subsystem*

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to determine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:**Source (e.g. standard) Category:****File:***Status / Messages Subsystem*

Status: green

Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:** ☒ Input ☐ Logic
☐ Output ☐ unknown**Technology:** electronic**Category:** 2



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - MOTOR BRAKING TORQUE

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status: green

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 2E-6



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Electromagnetic immunity, EMI (Annex L) Safety function

Route for fulfilment of EMI measures: n/a

Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status: green

Subsystems (1 / 4)

SB Name: Hetricon Radio Receiver Emergency Stop Button

Reference designator: 12W1

Inventory number: 12W1 - Pagina 12

Device details Subsystem

Device Manufacturer: HETRONIC

Device Identifier: 4C0459-01857.A-AZA

Device group:

Part number:

Revision:

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case: Radio ricevitore HETRONIC a doppio canale per l'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

PL requirements:	fulfilled
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Function:	Input/Output
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The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL:	d	PFH [1/h]:	2,9E-7
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Documentation:

Category Subsystem

Cat.:	3
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Category requirements:	fulfilled
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Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- Only well-tried components (clause 6.1.11) are used. (6.1.9) [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Each component has a minimum DC of Low. (6.1.9) [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Diagnostic coverage Subsystem

DCavg [%]:	99 (High)
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Common cause failure Subsystem

CCF Points:	100 (fulfilled)
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CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 20 Points | Diversity | Diversity (section F.3.2)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Documentation:****Document:***Status / Messages Subsystem***Status:** green**Message [Status of Message]:**

- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used.
(Input/Output) [green]

Channels / Test channels (1 / 2)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: Contatti uscita sicurezza**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** REM**Device Identifier:****Device group:****Part number:****Revision:****Function:**
☐ Input ☐ Logic
☒ Output ☐ unknown**Technology:** electromechanic**Category:** 3**Use case:****Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**Channels / Test channels (2 / 2)****CH** Name: Channel 2



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Blocks (1 / 1)****BL** Name: Contatti uscita sicurezza**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** REM**Device Identifier:****Device group:****Part number:****Revision:****Function:**☐ Input☒ Output☐ Logic☐ unknown**Technology:**

electromechanic

Category:

3

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**Subsystems (2 / 4)****SB** Name: CS M•308 Multifunction module**Reference designator:** 16A1**Inventory number:***Device details Subsystem***Device Manufacturer:** Pizzato Elettrica S.r.l.**Device Identifier:** Multifunction module**Device group:** CS**Part number:** CS MP308M0**Revision:****Function:**☐ Input☐ Output☒ Logic☐ unknown**Use case:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: e **PFH [1/h]:** 1,32E-9

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (3 / 4)

SB Name: PAIR OF POWER CONTACTORS

Reference designator: 17.CR1 + 17.CR2

Inventory number:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:

☐ Input
☐ Output

☐ Logic
☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination:

Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment
of EMI measures:

The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements:

fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL:

e

PFH [1/h]:

9,06E-10

Documentation:

Category Subsystem

Cat.:

4

Category requirements:

fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]:	20	Shortest mission time [a]:	20
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Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature | Design/application/experience (section F.3.3)
- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)
- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)
- 5 Points | Training | Training (section F.3.5)
- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)
- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschutz 3RT 3RT20*		
Device group:	SIRIUS Schütze / Motorstarter		
Part number:	3RT20*		
Revision:			
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown	
Technology:	unknown		
Category:	-		
Use case:	Standard caso d'uso		
Description of the use case:			

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts Ie und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			
Document:			

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	
Document:	

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input☒ Output☐ Logic☐ unknown

Technology: unknown

Category: -

Use case: Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts le und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]: 37530,4 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

B10 [cycles]: 1000000

RDF [%]: 73

B10D [cycles]: 1369863

nop [cycles/a]: 365

Documentation:

Document:

Diagnostic coverage Block

DC [%]: 99 (High)

Documentation:

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Status / Messages Block

Status: green

Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator: 6.GF1

Inventory number: 1232SE-6321 48-80V 250A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 250A

Device Identifier: 6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic
☒ Output ☐ unknown

Use case: Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Reached PL:	c	PFH [1/h]:	1,7E-6
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Documentation:

Category Subsystem

Cat.:	1
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Category requirements:	fulfilled
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Requirements for the category (alternativ procedure to determine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Message [Status of Message]:

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)

CH Name: Channel 1

Blocks (1 / 1)

BL Name: INGRESSO DI SICUREZZA

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:	☒ Input ☐ Output	☐ Logic ☐ unknown
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Technology:	electronic
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Category:	2
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Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: RADIO CONTROLLER EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Use case:

Description of the use case:

Documentation Block

Documentation:

Document:

Status / Messages Block

Status: green

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Identifier of the Safety function:

Safety function type:

Triggering event:

Reaction and
Behaviour on power failure:

Safe state:

Operation mode:

Interfaces:

Demand rate:

Running-on time:

Priority:

Documentation:

Document:

Required Performance Level Safety function

PLr (by direct input): c

Documentation:

Document:

Source (e.g. standard):

File:

Performance Level Safety function

Reached PL: c PFH [1/h]: 1,83E-6



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT*Electromagnetic immunity, EMI (Annex L) Safety function*

Route for fulfilment of EMI measures: n/a

Documentation:

Document:

List of devices with a permissible operation time (T10D) of less than 20 years:

Device list:

Status / Messages Safety function

Status: green

Subsystems (1 / 7)**SB** Name: EMERGENCY STOP BUTTON

Reference designator: 14PB1

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic
☒ Output ☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (2 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB4

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic
☒ Output ☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d **PFH [1/h]:** 3,17E-8

Documentation:

Mission time [a]: 20 **Shortest mission time [a]:** 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (3 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB2

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Part number:

Revision:

Function:

☒ Input
☒ Output

☐ Logic
☐ unknown

Use case:

Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination:

Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL:

e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:

The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL:

d

PFH [1/h]:

3,17E-8

Documentation:

Mission time [a]:

20

Shortest mission time [a]:

20

Category Subsystem

Cat.:

4

Category requirements:

fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:

green

Message [Status of Message]:

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Subsystems (4 / 7)

SB Name: EMERGENCY STOP BUTTON

Reference designator: 14PB3

Inventory number:

Device details Subsystem

Device Manufacturer: EATON

Device Identifier: 24SB1

Device group:

Part number:

Revision:

Function: ☒ Input ☐ Logic
☒ Output ☐ unknown

Use case: Pulsante a fungo per 'arresto d'emergenza

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

Reached PL: d PFH [1/h]: 3,17E-8

Documentation:

Mission time [a]: 20 Shortest mission time [a]: 20

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Documentation:****Source (e.g. standard) Category:****File:***Status / Messages Subsystem***Status:** green**Message [Status of Message]:**

- Because of qualitative aspects (e.g. software), the subsystem is only suitable up to performance level "d". [green]

Subsystems (5 / 7)**SB Name:** CS M•308 Multifunction module**Reference designator:** 16A1**Inventory number:***Device details Subsystem***Device Manufacturer:** Pizzato Elettrica S.r.l.**Device Identifier:** Multifunction module**Device group:** CS**Part number:** CS MP308M0**Revision:****Function:**
☐ Input ☒ Logic
☐ Output ☐ unknown**Use case:****Description of the use case:***Documentation Subsystem***Documentation:**

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:*Performance Level Subsystem***PL determination:** Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)**PL:** e*Electromagnetic immunity, EMI (Annex L) Subsystem***Route for fulfilment of EMI measures:** The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Reached PL:	e	PFH [1/h]:	1,32E-9
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Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Subsystems (6 / 7)**SB Name: PAIR OF POWER CONTACTORS**

Reference designator:	17.CR1 + 17.CR2
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Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:	☐ Input	☐ Logic
	☐ Output	☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature |



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Design/application/experience (section F.3.3)

- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)

- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)

- 5 Points | Training | Training (section F.3.5)

- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)

- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input

☒ Output

☐ Logic

☐ unknown

Technology: unknown

Category:

-

Use case:

Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	

Document:

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschütz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	unknown
Category:	-
Use case:	Standard caso d'uso
Description of the use case:	



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	

Document:

Status / Messages Block

Status:	green
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Subsystems (7 / 7)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator:	6.GF1
Inventory number:	1232SE-6321 48-80V 250A
Device details Subsystem	
Device Manufacturer:	CURTIS modello 1232SE-6321 48-80V 250A
Device Identifier:	6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1
Device group:	
Part number:	
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Use case:	Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c **PFH [1/h]:** 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: BOARD MACHINE EMERGENCY - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☒ Input
☐ Output☐ Logic
☐ unknown**Technology:**

electronic

Category:

2

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT****Identifier of the Safety function:****Safety function type:****Triggering event:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Reaction and
Behaviour on power failure:****Safe state:****Operation mode:****Interfaces:****Demand rate:****Running-on time:****Priority:****Documentation:****Document:***Required Performance Level Safety function***PLr (by direct input):** c**Documentation:****Document:****Source (e.g. standard):****File:***Performance Level Safety function***Reached PL:** c **PFH [1/h]:** 1,79E-6*Electromagnetic immunity, EMI (Annex L) Safety function***Route for fulfilment
of EMI measures:** n/a**Documentation:****Document:***List of devices with a permissible operation time (T10D) of less than 20 years:***Device list:***Status / Messages Safety function***Status:** green**Subsystems (1 / 4)****SB Name:** MicroScan3 Pro I/O - EFI pro (Stand 2024-01)**Reference designator:** 27.SQ1**Inventory number:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Device details Subsystem

Device Manufacturer:	SICK AG		
Device Identifier:	microScan3 Pro I/O - EFI pro V1.0.0		
Device group:	Sicherheits-Laserscanner		
Part number:	MICS3-CCAZxxAA1P01/ 111003x		
Revision:	1.0.0		
Function:	☒ Input	☐ Logic	
	☐ Output	☐ unknown	
Use case:	Standard caso d'uso		
Description of the use case:	Typ 3 (IEC 61496)		

Documentation Subsystem

Documentation:

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m MICS3-CCAZ40AA1P01 1110035

5,5m MICS3-CCAZ55AA1P01 1110033

9 m MICS3-CCAZ90AA1P01 1110037

Document:

Performance Level Subsystem

PL determination:	Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)		
PL:	d		

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.		
Reached PL:	d	PFH [1/h]:	8E-8
Documentation:			
Mission time [a]:	20	Shortest mission time [a]:	20

Category Subsystem

Cat.:	3
Category requirements:	fulfilled



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Requirements for the category:**

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:**Source (e.g. standard) Category:****File:***Status / Messages Subsystem***Status:** green**Subsystems (2 / 4)****SB Name:** CS M•308 Multifunction module**Reference designator:** 16A1**Inventory number:***Device details Subsystem***Device Manufacturer:** Pizzato Elettrica S.r.l.**Device Identifier:** Multifunction module**Device group:** CS**Part number:** CS MP308M0**Revision:****Function:**
☐ Input ☒ Logic
☐ Output ☐ unknown**Use case:****Description of the use case:***Documentation Subsystem***Documentation:**

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:*Performance Level Subsystem***PL determination:** Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)**PL:** e*Electromagnetic immunity, EMI (Annex L) Subsystem***Route for fulfilment of EMI measures:** The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Reached PL:	e	PFH [1/h]:	1,32E-9
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Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Subsystems (3 / 4)**SB Name: PAIR OF POWER CONTACTORS**

Reference designator:	17.CR1 + 17.CR2
-----------------------	-----------------

Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:	☐ Input	☐ Logic
	☐ Output	☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature |



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Design/application/experience (section F.3.3)

- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)

- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)

- 5 Points | Training | Training (section F.3.5)

- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)

- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer: SIEMENS AG

Device Identifier: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20*

Device group: SIRIUS Schütze / Motorstarter

Part number: 3RT20*

Revision:

Function:

☐ Input

☒ Output

☐ Logic

☐ unknown

Technology: unknown

Category:

-

Use case:

Standard caso d'uso

Description of the use case:

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	

Document:

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

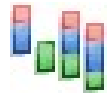
BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschütz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	unknown
Category:	-
Use case:	Standard caso d'uso
Description of the use case:	



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
---------	-----------

Documentation:

Document:

Status / Messages Block

Status:	green
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Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator: 6.GF1

Inventory number: 1232SE-6321 48-80V 250A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 250A

Device Identifier: 6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic ☒ Output ☐ unknown

Use case: Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c **PFH [1/h]:** 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: FRONT LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☒ Input
☐ Output☐ Logic
☐ unknown**Technology:**

electronic

Category:

2

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green**SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT****Identifier of the Safety function:****Safety function type:****Triggering event:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Reaction and
Behaviour on power failure:****Safe state:****Operation mode:****Interfaces:****Demand rate:****Running-on time:****Priority:****Documentation:****Document:***Required Performance Level Safety function***PLr (by direct input):** c**Documentation:****Document:****Source (e.g. standard):****File:***Performance Level Safety function***Reached PL:** c **PFH [1/h]:** 1,79E-6*Electromagnetic immunity, EMI (Annex L) Safety function***Route for fulfilment
of EMI measures:** n/a**Documentation:****Document:***List of devices with a permissible operation time (T10D) of less than 20 years:***Device list:***Status / Messages Safety function***Status:** green**Subsystems (1 / 4)****SB Name:** MicroScan3 Pro I/O - EFI pro (Stand 2024-01)**Reference designator:** 27.SQ2**Inventory number:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Device details Subsystem

Device Manufacturer:	SICK AG		
Device Identifier:	microScan3 Pro I/O - EFI pro V1.0.0		
Device group:	Sicherheits-Laserscanner		
Part number:	MICS3-CCAZxxAA1P01/ 111003x		
Revision:	1.0.0		
Function:	☒ Input	☐ Logic	
	☐ Output	☐ unknown	
Use case:	Standard caso d'uso		
Description of the use case:	Typ 3 (IEC 61496)		

Documentation Subsystem

Documentation:

Irrtümer und technische Änderungen bleiben vorbehalten. Verbindlich sind nur die Daten in der Betriebsanleitung des jeweiligen Produktes.

Die Daten gelten für die folgenden Produktfamilien:

Typ

Reichweite Code Art.Nr.

microScan3 Pro I/O - EFI Pro (8 Felder gleichzeitig, ausser 9 m Variante: 4; 128 gesamt)

4 m MICS3-CCAZ40AA1P01 1110035

5,5m MICS3-CCAZ55AA1P01 1110033

9 m MICS3-CCAZ90AA1P01 1110037

Document:

Performance Level Subsystem

PL determination:	Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)		
PL:	d		

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures:	The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.		
Reached PL:	d	PFH [1/h]:	8E-8
Documentation:			
Mission time [a]:	20	Shortest mission time [a]:	20

Category Subsystem

Cat.:	3
Category requirements:	fulfilled



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status: green

Subsystems (2 / 4)

SB Name: CS M•308 Multifunction module

Reference designator: 16A1

Inventory number:

Device details Subsystem

Device Manufacturer: Pizzato Elettrica S.r.l.

Device Identifier: Multifunction module

Device group: CS

Part number: CS MP308M0

Revision:

Function:

☐ Input

☐ Output

☒ Logic

☐ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

CS M• multifunction safety module with 16 safety inputs, 4PNP semiconductor safety output circuits (OSx), 4 semiconductor output circuits (Ox)

For more specific data please consult our catalog.

Document:

Performance Level Subsystem

PL determination: Enter PL/PFH directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Reached PL:	e	PFH [1/h]:	1,32E-9
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Documentation:

Mission time [a]:	20	Shortest mission time [a]:	20
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Category Subsystem

Cat.:	4
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Category requirements:	fulfilled
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Requirements for the category:

Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem

Status:	green
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Subsystems (3 / 4)**SB Name: PAIR OF POWER CONTACTORS**

Reference designator:	17.CR1 + 17.CR2
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Inventory number:

Device details Subsystem

Device Manufacturer:

Device Identifier:

Device group:

Part number:

Revision:

Function:	☐ Input	☐ Logic
	☐ Output	☒ unknown

Use case:

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

PL determination: Determine PL/PFH from Category, MTTFD and DCavg

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects (section 6.1.1):

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e **PFH [1/h]:** 9,06E-10

Documentation:

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements for the category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tries safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- Accumulation of faults does not lead to a loss of the safety function. [fulfilled]
- MTTFD is at least High. [fulfilled]
- Requirement fulfilled because of the assumed limit value accuracy of 5 percentage points. [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 2500 (High)

Mission time [a]: 20 **Shortest mission time [a]:** 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 80 (fulfilled)

CCF Measures:

- 15 Points | Separation/segregation | Separation/segregation (section F.3.1)
- 15 Points | Protection against over-voltage, over-pressure, over-current, over-temperature |



Project name: MORELLO 2769

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SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Design/application/experience (section F.3.3)

- 5 Points | Components used are well-tried | Design/application/experience (section F.3.3)

- 5 Points | Assessment/analysis | Assessment/analysis (section F.3.4)

- 5 Points | Training | Training (section F.3.5)

- 25 Points | Prevention of EMI or impurity of fluidic medium | Environmental (section F.3.6)

- 10 Points | Other influences | Environmental (section F.3.6)

Documentation:**Document:***Status / Messages Subsystem***Status:** green**Channels / Test channels (1 / 2)****CH** Name: Channel 1

MTTFD [a]: 2500

Blocks (1 / 1)**BL** Name: SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Reference designator:****Inventory number:***Device details Block***Device Manufacturer:** SIEMENS AG**Device Identifier:** SIRIUS Schütze / Motorstarter | Leistungsschutz 3RT | 3RT20***Device group:** SIRIUS Schütze / Motorstarter**Part number:** 3RT20***Revision:****Function:**☐ Input☒ Output☐ Logic☐ unknown**Technology:** unknown**Category:**

-

Use case: Standard caso d'uso**Description of the use case:***Documentation Block***Documentation:**SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)**Document:**



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365
Documentation:			

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
Documentation:	

Document:

Status / Messages Block

Status:	green
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Channels / Test channels (2 / 2)

CH Name: Channel 2

MTTFD [a]: 2500

Blocks (1 / 1)

BL Name: SIRIUS Schütze / Motorstarter | Leistungsschütz 3RT | 3RT20*

Reference designator:

Inventory number:

Device details Block

Device Manufacturer:	SIEMENS AG
Device Identifier:	SIRIUS Schütze / Motorstarter Leistungsschütz 3RT 3RT20*
Device group:	SIRIUS Schütze / Motorstarter
Part number:	3RT20*
Revision:	
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	unknown
Category:	-
Use case:	Standard caso d'uso
Description of the use case:	



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Documentation Block

Documentation:

SIRIUS LEISTUNGSSCHUETZ 3RT, (Der B10-Wert wurde bei 66 % des Strom-Bemessungswerts I_e und AC-3/400 V ermittelt. Weitere Werte auf Anfrage.)

Document:

MTTFD and Mission time Block

MTTFD [a]:	37530,4 (High)		
Mission time [a]:	20	Shortest mission time [a]:	20
B10 [cycles]:	1000000	RDF [%]:	73
B10D [cycles]:	1369863	nop [cycles/a]:	365

Documentation:

Document:

Diagnostic coverage Block

DC [%]:	99 (High)
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Documentation:

Document:

Status / Messages Block

Status:	green
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Subsystems (4 / 4)

SB Name: CONTROLLER TRACTION - UNCOMMANDED POWER MOVEMENT

Reference designator: 6.GF1

Inventory number: 1232SE-6321 48-80V 250A

Device details Subsystem

Device Manufacturer: CURTIS modello 1232SE-6321 48-80V 250A

Device Identifier: 6GF1 - 7GF1 - 8GF1 - 9GF1 - 10GF1 - 11GF1 - 12GF1 - 13GF1

Device group:

Part number:

Revision:

Function: ☐ Input ☐ Logic ☒ Output ☐ unknown

Use case: Arresto per UNCOMMANDED POWER MOVEMENT agli inverter di trazione e sterzata



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT

Description of the use case:

Documentation Subsystem

Documentation:

Document:

Performance Level Subsystem

PL determination: Determine PL/PFH from Category and DCavg (Alternative procedure according to section 6.1.9)

Electromagnetic immunity, EMI (Annex L) Subsystem

Route for fulfilment of EMI measures: The fulfilment of the measures for electromagnetic immunity (EMI) was documented in the associated safety function.

PL requirements: fulfilled

Function: Input/Output

The PL shall be determined by estimating the following aspects using the alternative procedure in section 6

- Behaviour of the safety function under fault conditions [fulfilled]
- Safety-related software according to clause 7 and Annex J or no software included [fulfilled]
- Systematic failure (see clause 6.1.7 and Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]
- Subsystem consists of mechanical, hydraulic, pneumatic, electro-hydraulic or electropneumatic components (or a mixture of these technologies) (6.1.9) [fulfilled]
- no application-specific reliability data (MTTFD, B10D or similar) are available for the components (6.1.9) [fulfilled]
- The good engineering practice method given in C.2 cannot be applied for the components (6.1.9) [fulfilled]
- The subsystem is defined as an input (I), output (O) or logic (L) (Section 6.1.9) [fulfilled]

Reached PL: c **PFH [1/h]:** 1,7E-6

Documentation:

Category Subsystem

Cat.: 1

Category requirements: fulfilled

Requirements for the category (alternativ procedure to dertermine the PL according to section 6.1.9) (Inputs

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried components (clause 6.1.11) are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]

Documentation:

Source (e.g. standard) Category:

File:

Status / Messages Subsystem



Project name: MORELLO 2769

File date: 22/09/2026 22:53:12 Report date: 22/09/2026 Checksum: 430e2b1517cb6c0fa98c4840c5970f12

SF Safety function: REAR LASER SCANNER - DRIVE TRACTION MOTOR RIGHT - UNCOMMANDED POWER MOVEMENT**Status:** green**Message [Status of Message]:**

- For safety-related components the machine manufacturer shall determine the T10D values based on data for the components to be proven in use. This applies where failure of the components is not evident in the process. [green]
- For determining the PFH value the alternative procedure according to ISO 13849-1:2023 section 6.1.9 was used. (Input/Output) [green]

Channels / Test channels (1 / 1)**CH** Name: Channel 1**Blocks (1 / 1)****BL** Name: INGRESSO DI SICUREZZA**Reference designator:****Inventory number:***Device details Block***Device Manufacturer:****Device Identifier:****Device group:****Part number:****Revision:****Function:**☒ Input
☐ Output☐ Logic
☐ unknown**Technology:**

electronic

Category:

2

Use case:**Description of the use case:***Documentation Block***Documentation:****Document:***Status / Messages Block***Status:** green



EXCLUSION OF LIABILITY

Care has been taken in production of the software SISTEMA, which corresponds to the state of the art. It is made available to users free of charge.

Die Haftung des Institut für Arbeitsschutz der DGUV (IFA) ist damit auf Vorsatz und grobe Fahrlässigkeit (§ 521 BGB) bzw. bei Sach- und Rechtsmängel auf arglistig verschwiegene Fehler beschränkt (523, 524 BGB).

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NOTE

This document is not a complete technical documentation according to EN ISO 13849-1:2023, clause 12.

CONTACT

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Date, signature

Authors

Authors

Inspectors

Inspectors
