Project name: SHUN HU E-stop function EN ISO 13849-1

File date: 103/11/18   Report date: 103/11/18   Checksum: 08525a349c40429fc6efee8589c982ce

PR Project name: SHUN HU E-stop function EN ISO 13849-1

Author:	Christo
Dangerous point/machine:	Industrial radio remote control systems
Documentation:	- Electrical circuit diagrams - Components manufacturer MTTFd/B10d data, certificate
Document:	
File name:	F:\MCiT\Report\SISTEMA File\SHUN HU E-Stop function EN ISO 13849-1.ssm
Version of software:	1.1.6
Version of standard:	ISO 13849-1:2006, ISO 13849-1/Cor1:2009, EN ISO 13849-1:2006, EN ISO 13849-1:2008
Checksum:	08525a349c40429fc6efee8589c982ce
Options:	☑ Use DC intermediate levels for calculation of PFH (more precise) ☐ Raise the MTTFd-capping for Category 4 from 100 to 2500 years
Status:	green
Note:	There are no warnings listed for this project (or it's subordinate basic elements).

Contained safety functions

SF Name: SF1 - Emergency stop control for safe stop of all motors

Required: PLr d	Reached: PL e	PFH [1/h]: 9.22E-8	Status: green

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

Safety function type:	Emergency stop function
Triggering event:	Emergency stop function, STO - safe torque off by actuation of an emergency stop device
Reaction:	This assessment evaluates the E-stop control on the equipment (the control pendant has a E-stop control switch. The E-stop control switch stops radio transmission from the pendant. This loss of radio communication causes the receiver to de-energize the stop relays and to therefore switch off the output within 500 milliseconds).
Safe state:	Basic safety principles and well-tried safety principles are being used. The emergency stop device is switching devices with direct opening contactors in accordance with IEC 60947-5-1. EMS is standard emergency stop device to EN ISO 13850.
Documentation:	- Electrical circuit diagrams/Block diagram - Components manufacturer MTTFd/B10d data, certificate
Document:	
Reached PL:	e PFH [1/h]: 9.22E-8
PLr (by risk graph):	d
Severity of injury (S):	Serious (normally irreversible) injury or death
Frequency / exposure times to hazard (F):	Frequent to continuous / exposure time is long
Possibility of avoiding (P):	Possible under specific conditions

Risk graph:

Status:	green

Subsystems:

SB Name: SRP/CS - Input

PL: e	PFH [1/h]: 2.47E-8
Cat.: 3	Mission time [a]: 20
DCavg [%]: 99 (High)	CCF Points: 75 (fulfilled)
MTTFd [a]: 100 (High)	

Documentation Subsystem

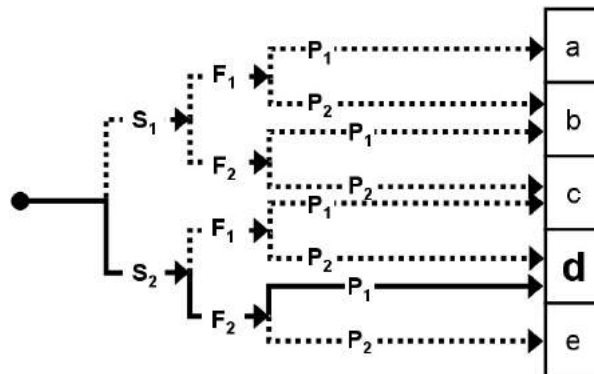|	
Documentation:	Emergency stop button

Project name: SHUNHUE-stopfunctionENISO13849-1

File date: 103/11/18   Report date: 103/11/18   Checksum: 08525a349c40429fc6efee8589c982ce

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

---

Document:

Category Subsystem

Documentation/reasoning:

Source (e.g. standard) Category:

File:

Requirements of the Category:	Basic safety principles are being used. [fulfilled]
	Well-tried safety principles are being used. [fulfilled]
	A single fault tolerance is given. [fulfilled]
	MTTFd is Low or Medium or High. [fulfilled]
	DCavg is Low or Medium. [fulfilled]
	The achieved score of the CCF-rating is at least 65. [fulfilled]

Status / Messages Subsystem

Status:	green

Channels / Test channels:

CH Name: Channel 1

MTTFd [a]: 416.67

Blocks:

BL Name: **SRP/CS**

MTTFd [a]: 416.67 (High)	DC [%]: 99 (High)
	Mission time [a]: 20

Documentation Block

Documentation:

Document:

Status / Messages Block

Status:	green

Elements:

EL Name: **EMS**

B10d [cycles]: 100000	nop [cycles/a]: 2400
T10d [a]: 41.67	MTTFd [a] (from B10d): 416.67 (High)
Mission time [a]: 20	

Project name: SHUNHUE-stopfunctionENISO13849-1

File date: 103/11/18   Report date: 103/11/18   Checksum: 08525a349c40429fc6efee8589c982ce

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

	DC [%]: 99 (High)

Documentation Element

Technology:	electromechanic
Documentation:	Emergency stop button
Document:	

Diagnostic coverage Element

Documentation/reasoning:	Direct opening type in accordance with IEC/EN 60947-5-1.

Status / Messages Element

Status:	green
Message [Status of Message]:	

Channels / Test channels:

CH Name: Channel 2

MTTFd [a]: 416.67

Blocks:

BL Name: **SRP/CS**

MTTFd [a]: 416.67 (High)	DC [%]: 99 (High)
	Mission time [a]: 20

Documentation Block

Documentation:	
Document:	

Status / Messages Block

Status:	green

Elements:

EL Name: **EMS**

B10d [cycles]: 100000	nop [cycles/a]: 2400
T10d [a]: 41.67	MTTFd [a] (from B10d): 416.67 (High)
Mission time [a]: 20	
	DC [%]: 99 (High)

Documentation Element

Technology:	electromechanic

Project name: SHUNHUE-stopfunctionENISO13849-1

File date: 103/11/18   Report date: 103/11/18   Checksum: 08525a349c40429fc6efee8589c982ce

---

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

Documentation:	Emergency stop button
Document:	

Diagnostic coverage Element

Documentation/reasoning:	Direct opening type in accordance with IEC/EN 60947-5-1.

Status / Messages Element

Status:	green
Message [Status of Message]:	

Subsystems:

SB Name: SRP/CS - Logic

PL: e	PFH [1/h]: 4.29E-8
Cat.: 3	Mission time [a]: 20
DCavg [%]: 90 (Medium)	CCF Points: 75 (fulfilled)
MTTFd [a]: 100 (High)	

Documentation Subsystem

Documentation:	Micro Controller: Primary and Secondary
Document:	

Category Subsystem

Documentation/reasoning:	
Source (e.g. standard) Category:	
File:	
Requirements of the Category:	Basic safety principles are being used. [fulfilled]
	Well-tried safety principles are being used. [fulfilled]
	A single fault tolerance is given. [fulfilled]
	MTTFd is Low or Medium or High. [fulfilled]
	DCavg is Low or Medium. [fulfilled]
	The achieved score of the CCF-rating is at least 65. [fulfilled]

Status / Messages Subsystem

Status:	green

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

Channels / Test channels:

CH Name: Channel 1

MTTFd [a]: 1216.5

Blocks:

BL Name: **SRP/CS**

MTTFd [a]: 1216.5 (High)   DC [%]: 90 (Medium)

Mission time [a]: 20

Documentation Block

Documentation:

Document:

Status / Messages Block

Status: green

Elements:

EL Name: **Master MCU**

MTTFd [a]: 2433 (High)   Rate of dangerous failure [FIT]: 46.92

Mission time [a]: 20

DC [%]: 90 (Medium)

Documentation Element

Technology: electronic

Documentation:

Document:

Diagnostic coverage Element

Documentation/reasoning: according to manufacturer data

Status / Messages Element

Status: green

Message [Status of Message]:

Elements:

EL Name: **Master MCU**

MTTFd [a]: 2433 (High)   Rate of dangerous failure [FIT]: 46.92

Mission time [a]: 20

File date: 103/11/18   Report date: 103/11/18   Checksum: 08525a349c40429fc6efee8589c982ce

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

	DC [%]: 90 (Medium)

Documentation Element

Technology:	electronic

Documentation:	

Document:	

Diagnostic coverage Element

Documentation/reasoning:	according to manufacturer data

Status / Messages Element

Status:	green

Message [Status of Message]:	

Channels / Test channels:

CH Name: Channel 2

MTTFd [a]: 1216.5

Blocks:

BL Name: **SRP/CS**

MTTFd [a]: 1216.5 (High)	DC [%]: 90 (Medium)
	Mission time [a]: 20

Documentation Block

Documentation:	

Document:	

Status / Messages Block

Status:	green

Elements:

EL Name: **Slave MCU**

MTTFd [a]: 2433 (High)	Rate of dangerous failure [FIT]: 46.92
Mission time [a]: 20	
	DC [%]: 90 (Medium)

Documentation Element

Technology:	electronic

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

Documentation:

Document:

Diagnostic coverage Element

Documentation/reasoning: according to manufacturer data

Status / Messages Element

Status: green

Message [Status of Message]:

Elements:

EL Name: **Slave MCU**

MTTFd [a]: 2433 (High)   Rate of dangerous failure [FIT]: 46.92

Mission time [a]: 20

DC [%]: 90 (Medium)

Documentation Element

Technology: electronic

Documentation:

Document:

Diagnostic coverage Element

Documentation/reasoning: according to manufacturer data

Status / Messages Element

Status: green

Message [Status of Message]:

Subsystems:

SB Name: SRP/CS - Output

PL: e   PFH [1/h]: 2.47E-8

Cat.: 3   Mission time [a]: 20

DCavg [%]: 99 (High)   CCF Points: 75 (fulfilled)

MTTFd [a]: 100 (High)

Documentation Subsystem

Documentation: Control Relay

Project name: SHUNHUE-stopfunctionENISO13849-1

File date: 103/11/18   Report date: 103/11/18   Checksum: 08525a349c40429fc6efee8589c982ce

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

Document:

Category Subsystem

Documentation/reasoning:

Source (e.g. standard) Category:

File:

Requirements of the Category:	Basic safety principles are being used. [fulfilled]
	Well-tried safety principles are being used. [fulfilled]
	A single fault tolerance is given. [fulfilled]
	MTTFd is Low or Medium or High. [fulfilled]
	DCavg is Low or Medium. [fulfilled]
	The achieved score of the CCF-rating is at least 65. [fulfilled]

Status / Messages Subsystem

Status: green

Channels / Test channels:

CH Name: Channel 1

MTTFd [a]: 4166.67

Blocks:

BL Name: **Output 1**

| MTTFd [a]: 4166.67 (High) | DC [%]: 99 (High) |
| | Mission time [a]: 20 |

Documentation Block

Documentation: Control relay

Document:

Status / Messages Block

Status: green

Elements:

EL Name: **Relay A**

B10d [cycles]: 1000000	nop [cycles/a]: 2400
T10d [a]: 416.67	MTTFd [a] (from B10d): 4166.67 (High)
Mission time [a]: 20	

Project name: SHUNHUE-stopfunctionENISO13849-1

File date: 103/11/18   Report date: 103/11/18   Checksum: 08525a349c40429fc6efee8589c982ce

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

	DC [%]: 99 (High)

Documentation Element

Technology:	electromechanic
Documentation:	Control relay
Document:	

Diagnostic coverage Element

Documentation/reasoning:	Monitoring by Micro Controller Master MCU and Slave MCU

Status / Messages Element

Status:	green
Message [Status of Message]:	

Channels / Test channels:

CH Name: Channel 2

MTTFd [a]: 4166.67

Blocks:

BL Name: **Output 2**

MTTFd [a]: 4166.67 (High)	DC [%]: 99 (High)
	Mission time [a]: 20

Documentation Block

Documentation:	
Document:	

Status / Messages Block

Status:	green

Elements:

EL Name: **Relay B**

B10d [cycles]: 1000000	nop [cycles/a]: 2400
T10d [a]: 416.67	MTTFd [a] (from B10d): 4166.67 (High)
Mission time [a]: 20	
	DC [%]: 99 (High)

Documentation Element

Technology:	electromechanic

SF Safety function: SF1 - Emergency stop control for safe stop of all motors

Documentation:	Control relay

Document:

Diagnostic coverage Element

Documentation/reasoning:	Monitoring by Micro Controller Master MCU and Slave MCU

Status / Messages Element

Status:	green

Message [Status of Message]:

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.

Use of the software is at the user's own risk. To the extent permissible by law, no liability will be accepted for the software on any legal basis. In particular, no liability will be accepted for material defects or defects in title, whether in the software or in the associated documentation and information, particularly with regard to their correctness, freedom from errors, freedom from property rights and copyright of third parties, up-to-dateness, completeness and/or fitness for purpose, except in cases of malicious or wrongful intent.

The IFA undertakes to keep its website free of viruses; nevertheless, no guarantee can be given that the software and information provided are virus-free. The user is therefore advised to take appropriate security precautions and to use a virus scanner prior to downloading software, documentation or information.

CONTACT

Institute for Occupational Health and Safety of German Social Accident Insurance (IFA)

Division 5: Accident Prevention / Product Safety

Alte Heerstr. 111, 53757 Sankt Augustin

E-mail: sistema@dguv.de

www.dguv.de/ifa (Webcode e20543)

Date, signature of the revisor	Date, signature of the author