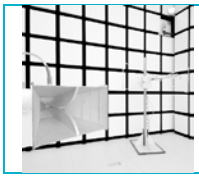
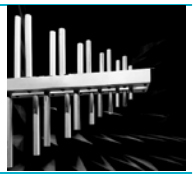
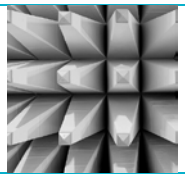

CTC advanced
member of RWTÜV group

TEST REPORT

Test Report No.: 1-8237/19-02-03

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing Laboratory

CTC advanced GmbH
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Accredited Test Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

Applicant

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen/GERMANY

Phone: +49 711 7597-0

Contact: Tobias König
e-mail: tobias.koenig@euchner.de
Phone: +49 711 7597-360

Manufacturer

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen/GERMANY

Test Standard/s

RSS - 102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
RSS - 102 SPR-002 Issue 1	Supplementary Procedure for Assessing Compliance with RSS-102 Nerve Stimulation Exposure Limits

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	Safety Switch
Device type:	fixed device
Model name:	**CTP / MGBS-P**
FCC-ID:	2AJ58-05
IC:	22052-05
S/N serial number:	See DUT list on page 4.
Hardware status:	See DUT list on page 4.
Software status:	See DUT list on page 4.
Frequency:	RFID 125 kHz
Antenna:	Integrated antenna
DC supply:	external 24V
Accessories:	---
Test sample status:	identical prototype
Exposure category:	general population / uncontrolled environment

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test Report authorised:

cn=Alexander Hnatovskiy, o=CTC advanced GmbH, ou=HNA-161129, email=Alexander.Hnatovskiy@ctcadvanced.com, c=DE
2019.06.04 13:38:18 +02'00'

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Test performed:

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2019.06.04 12:53:00 +02'00'

Marco Scigliano
Testing Manager
Radio Communications & EMC

1 Table of contents

2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CTC advanced GmbH.
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In no case this test report can be considered as a Letter of Approval.

2.2 Application details

Date of receipt of order:	2019-05-06
Date of receipt of test item:	2019-05-10
Start of test:	2019-05-10
End of test:	2019-05-10

2.3 Statement of compliance

The EMF values found for the CTP and MGBS-P Safety Switch are below the maximum allowed levels according to the standards listed in section 3.

2.4 Technical details

short description*)	DUT	Type	S/N serial number	HW hardware status	SW software status
DUT A	safety switch	CTP-I-AP-U-HA-ZZ-SA-136732 (CTP-I-AP SERIES)	007469	V3.1.0	V1.2.0
DUT B	safety switch	CTP-L2-AR-U-HA-AZ-SAB-122814 (CTP-L2-AR SERIES)	004983	V3.1.0	V1.2.0
DUT C	safety switch	MGBS-P-L1-AR-U-R-AEE-SH-159086 (MGBS-P-L1-AR SERIES)	000172	V3.1.0	V1.2.0

DUT short description is used to simplify the identification of the DUT in this test report.

Certification Numbers and Labeling Requirements				
FCC ID	**IC**	**HVIN**	**FVIN**	**PMN**
2AJ58-05	22052-05	05	-/-	CTP-I-AR SERIES
				CTP-I1-AR SERIES
				CTP-I2-AR SERIES
				CTP-L1-AR SERIES
				CTP-L2-AR SERIES
				CTP-I-AP SERIES
				CTP-I1-AP SERIES
				CTP-I2-AP SERIES
				CTP-L1-AP SERIES
				CTP-L2-AP SERIES
		06	-/-	MGBS-P-I-AR SERIES
				MGBS-P-I1-AR SERIES
				MGBS-P-I2-AR SERIES
				MGBS-P-L1-AR SERIES
				MGBS-P-L2-AR SERIES
				MGBS-P-I-AP SERIES
				MGBS-P-I1-AP SERIES
				MGBS-P-I2-AP SERIES
				MGBS-P-L1-AP SERIES
				MGBS-P-L2-AP SERIES

3 Test standard/s:

Test Standard	Version	Test Standard Description
RSS - 102 Issue 5	March 2015	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
RSS - 102 SPR-002 Issue 1	September 2016	Supplementary Procedure for Assessing Compliance with RSS-102 Nerve Stimulation Exposure Limits
Safety Code 6 (2015)	01.06.2010	Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz

3.1 RF exposure limits

Reference levels for general public (uncontrolled environment) exposure to time-varying electric and magnetic fields

According to: RSS 102-ISSUE 05		
Frequency Range (MHz)	**Electric Field** (V/m rms)	**Magnetic Field** (A/m rms)
0.003-10	**83**	**90**

4 Summary of Measurement Results

☒	**No deviations from the technical specifications ascertained**
☐	Deviations from the technical specifications ascertained

No relevant emissions out of the cabinet of the DUT are detected.

5 Test Environment

Ambient temperature:	20 – 24 °C
Relative humidity content:	40 – 50 %
Air pressure:	not relevant for this kind of testing
Power supply:	230 V / 50 Hz

6 Test Set-up

6.1 Measurement system

6.1.1 Broadband Electromagnetic Field Test system

A state of the art Broadband Electromagnetic Field Test system was used. The probes of the system are fitted with three sensors which measure the field strength of the X, Y and Z plane directions separately. The field strength is calculated by the instrument's processor by summing the squares of the three measured values.

The frequency range 5 Hz to 60 GHz is covered.
Depending on the used probe type Electric and Magnetic Field or Electric Field only is detectable.

- EHP-50D 5 Hz to 100 kHz Electric and Magnetic Field
- EHP-50F 5 Hz to 400 kHz Electric and Magnetic Field
- HF 3061 300 kHz to 30 MHz Magnetic Field
- EF 0691 100 kHz to 6 GHz Electric Field
- EF 6092 100 MHz to 60 GHz Electric Field

6.1.2 Test equipment list

	Manufacturer	Device	Type	Serial number	Last Calibration
☐	Narda	Electric and Magnetic Field Meter	NBM-550	F-0319	2019-02-06
☐	Narda	Electric and Magnetic Field Meter	NBM-520	D-1234	2017-05-08
☐	Narda	Electric Field Probe (100 kHz - 6 GHz)	EF 0691	G-0027	2019-02-06
☐	Narda	Electric Field Probe (100 MHz - 60 GHz)	EF 6092	A-0071	2017-05-08
☐	Narda	Magnetic Field Probe (300 kHz to 30 MHz)	HF 3061	D-0404	2019-02-06
☐	Narda	Electric and Magnetic Field Analyser (5 Hz – 100 kHz)	EHP-50D	230WX50108	2019-02-12
☒	Narda	Electric and Magnetic Field Analyser (1 Hz – 400 kHz)	EHP-50F	000WX60907	2018-09-04

☒ Devices used during the test ☐ Devices not used during the test

6.1.3 Averaging

For time efficient testing an average of 8 seconds was used. With some spot checks was verified, that caused by the time structure of the measured responses, the results did not change with a 6-minute-averaging.

6.1.4 Uncertainties

The probe uncertainties stated by the manufacturer are considered to be the main relevant and dominant issues.

6.1.4.1 Typical uncertainty of EHP-50F

The uncertainties stated in this document have been determined according to EA-4/2 [4].
They were estimated as expanded uncertainty obtained multiplying the standard by the coverage factor k=2, corresponding to a confidence level of about 95%.
The total uncertainty of the probe derived from typical contributions of linearity, anisotropy, frequency response, temperature, relative humidity and with/without contribution of uncertainty of calibration.

Magnetic probe (1)	Magnetic flux density	Total expanded uncertainty (k=2)	
		Without contribution of uncertainty of calibration U_{EHP50F} (%)	With contribution of uncertainty of calibration U_T (%)
Frequency at 50Hz	0.05µT to < 100µT	2.3	3.0 (2)
	100µT to < 3000µT	2.6	3.8 (3)
Frequency from 5 to 40 Hz	0.05µT to < 10µT	5.3	5.7 (2)
Frequency from 40 to 10kHz	0.05µT to < 10µT	4.9	5.3 (2)

(1) This uncertainty budget is for an ambient temperature of (23 +/- 4) °C, and relative humidity of (50 +/- 5) %
The expanded uncertainty for magnetic flux density for values close to 50 nT is calculated with negligible contribution of noise level.
(2) The uncertainty of calibration used is 2.0%
(3) The uncertainty of calibration used is 2.8%

Electric probe (4)	Electric field range	Total expanded uncertainty (k=2)	
		Without contribution of uncertainty of calibration U_{EHP50F} (%)	With contribution of uncertainty of calibration U_T (%)
Frequency at 50Hz	1 V/m to 1000 V/m	7.1	7.4 (5)
	1 V/m to < 100 kV/m	7.8	8.2 (6)
Frequency from 5 Hz to 100 kHz	1 V/m to <1000 V/m	8.8	9.2 (6)

(4) This uncertainty budget is for an ambient temperature of (23 +/- 4) °C, and relative humidity of (50 +/- 5) %
(5) The uncertainty of calibration used is 2.0%
(6) The uncertainty of calibration used is 2.5%

6.1.5 Validation procedure

Before performing the tests the empty test chamber was checked for system immanent frequency responses. The following background signal level was detected. All levels are small enough to allow accurate proof of the limits to be considered.

Probe	Frequency Range	Magnetic Flux Density (B) in µT	Electrical Field Strength in V/m	Remark
EHP-50F	4 – 400 kHz	0.004	0.235	

6.1.6 Definition of test position and distances

In absence of an equipment specific regulation with given test distances, all not further noted test positions were measured in “touched” mode, the probe radome touching the DUT at the defined test position.
Due to the mechanical concept of the used probe a distance between DUT surface and electrical centre of the probe antennas remains.

Probe type	Maximum distance (cm)	
	Magnetic Field	Electrical Field
EHP-50F	4	4

6.2 Test results

For considering worst-case conditions all measurements were performed at smallest possible distance from the device under test. Limits shown in the tables below are the lowest ones within the wideband frequency range of the field probe applied.

Due to limitations of test equipment the frequency ranges of < 1 Hz and > 400 kHz for E-field and H-field have been omitted.

Test position see photo documentation (Annex A).

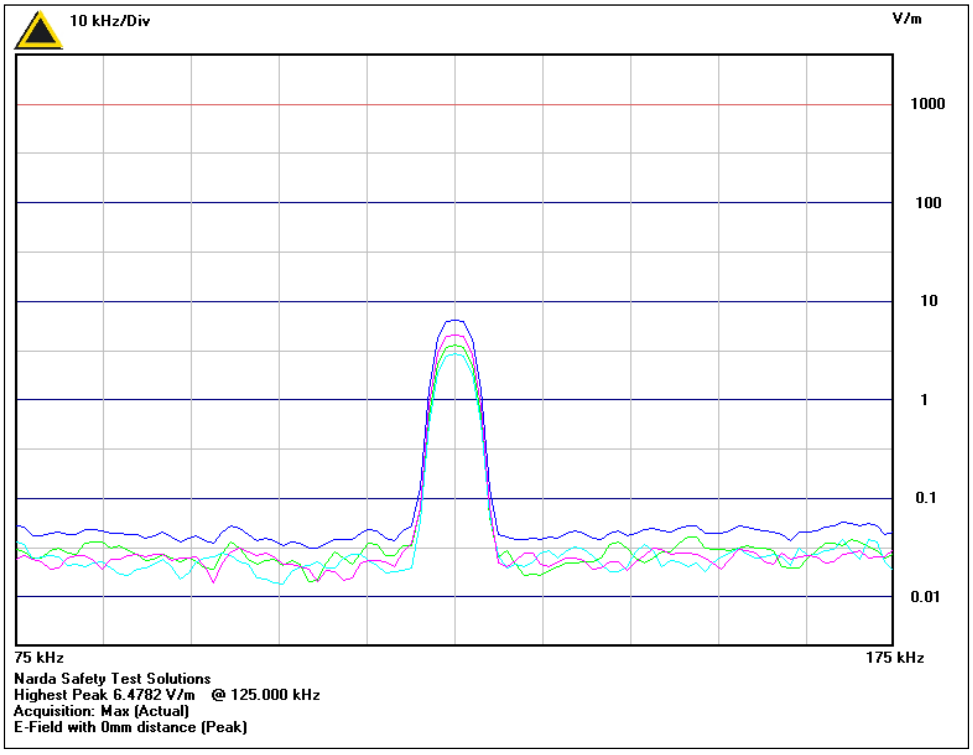
During the measurements the DUT was switched on in normal operating mode.
RFID reading was activated permanently.

RFID frequency 125 kHz – Probe: EHP 50 F					
DUT*	distance (cm)	H (A/m)	Limit (A/m)	E (V/m)	Limit (V/m)
A	0	0.057	**90**	6.0	**83**
B	0	**0.057**	**90**	**6.5**	**83**
C	0	0.014	**90**	3.3	**83**

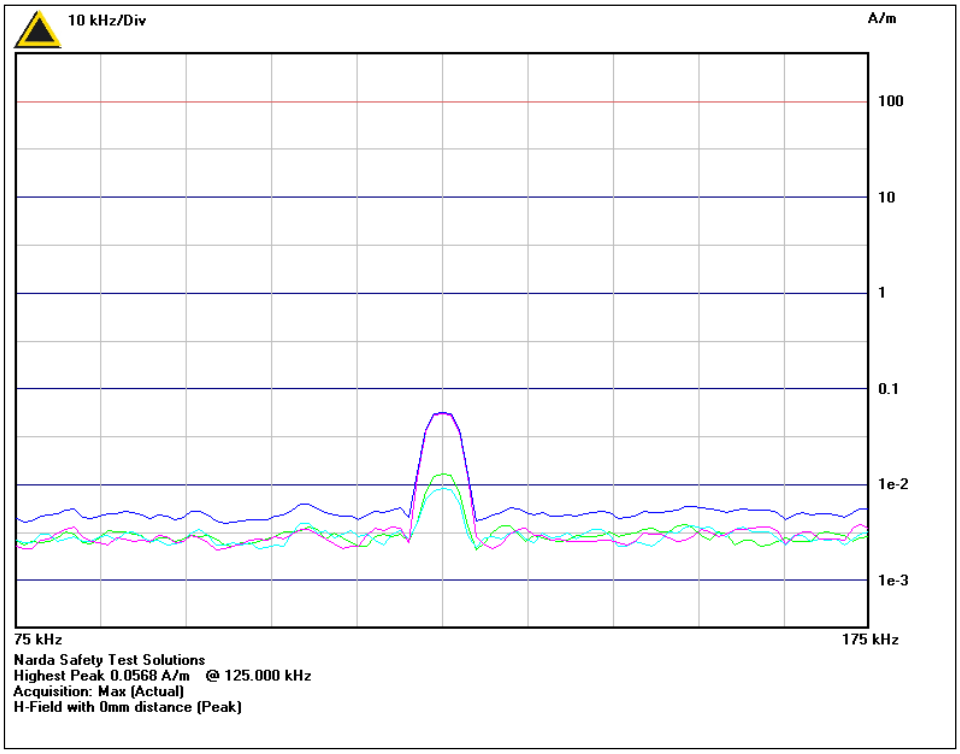
Table 1: Test results E-/ H-f@125 kHz, peak values (max hold)

***) DUT short description is used to simplify the identification of the DUT in this test report.**

PLOT: DUT B
E-Field with 0mm distance:



PLOT: DUT B
E-Field with 0mm distance:



6.3 Final verdict

No relevant emissions out of the cabinet of the DUT are detected.

Annex A: Photo documentation

Photo 1: DUT - Type overview (A / B / C)

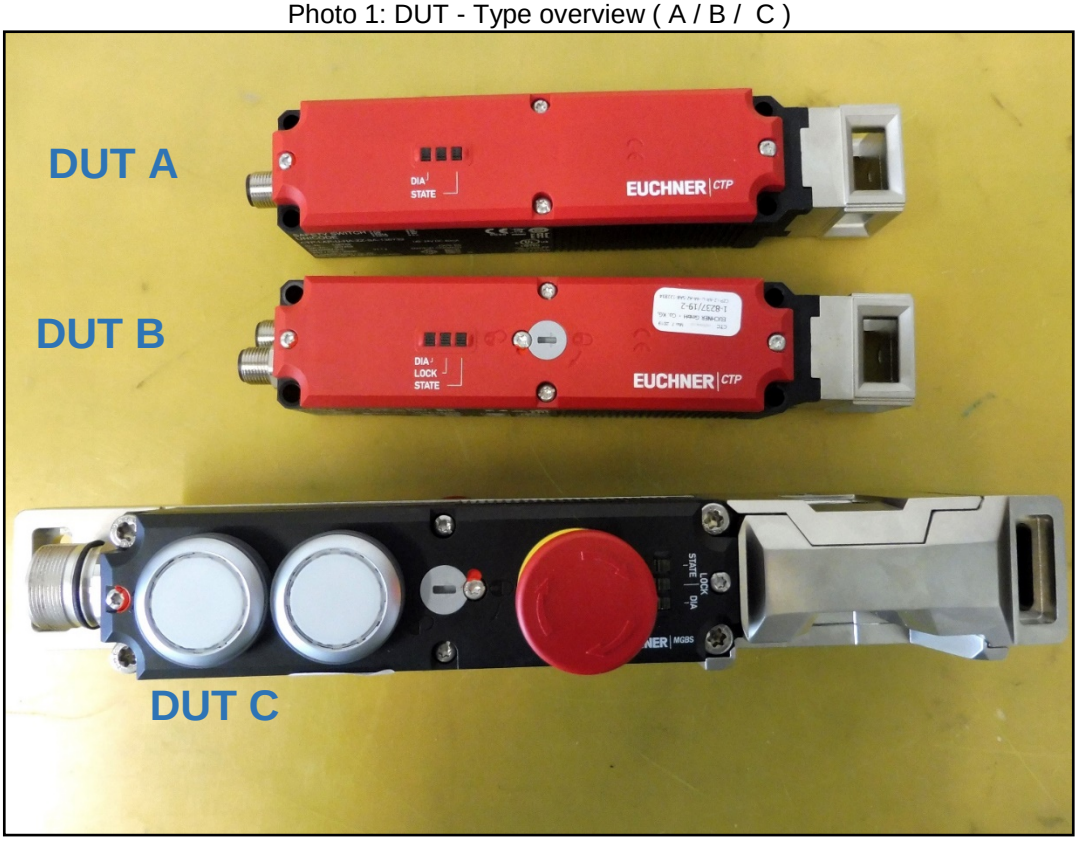


Photo 2: DUT A - Side view

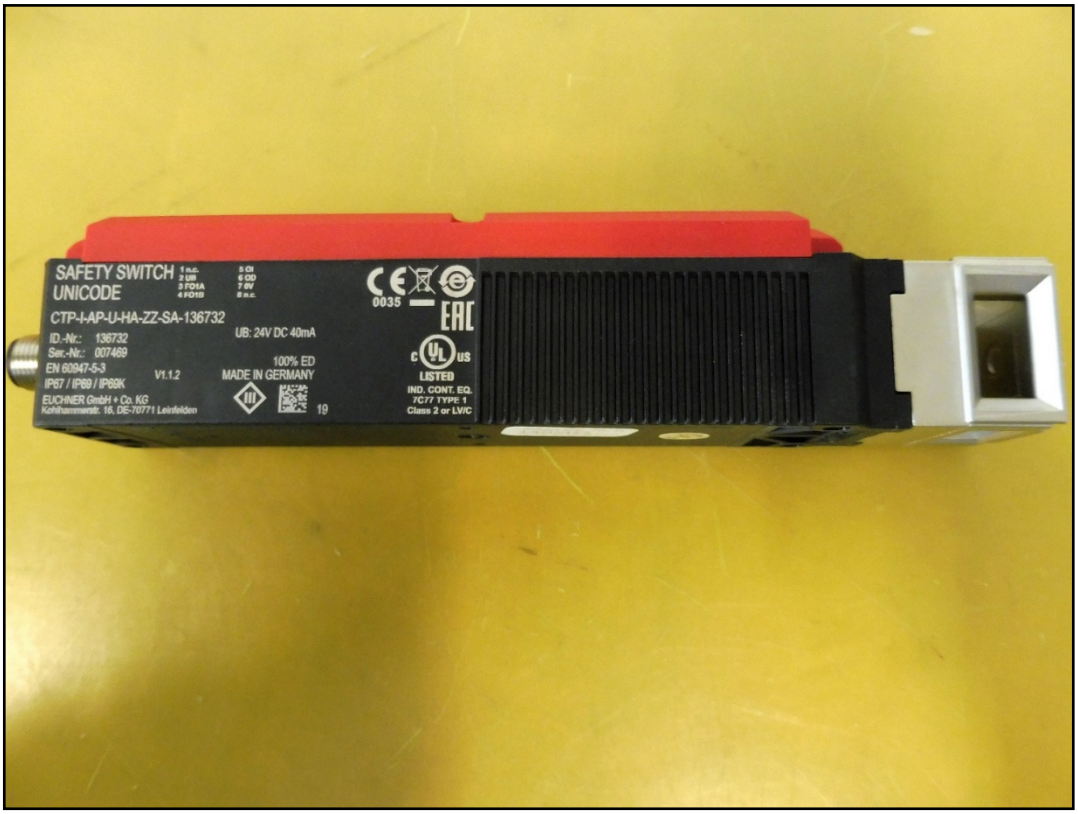


Photo 3: DUT A - Side view (Label)

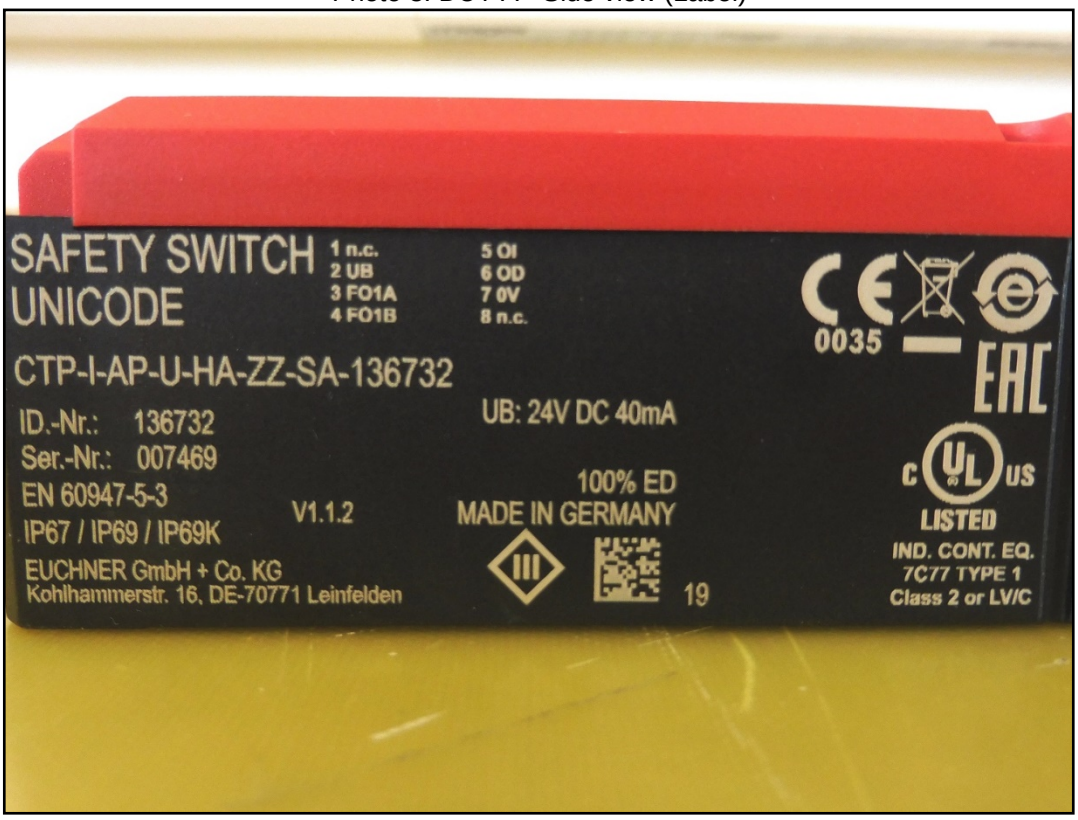


Photo 4: DUT A - Top side view

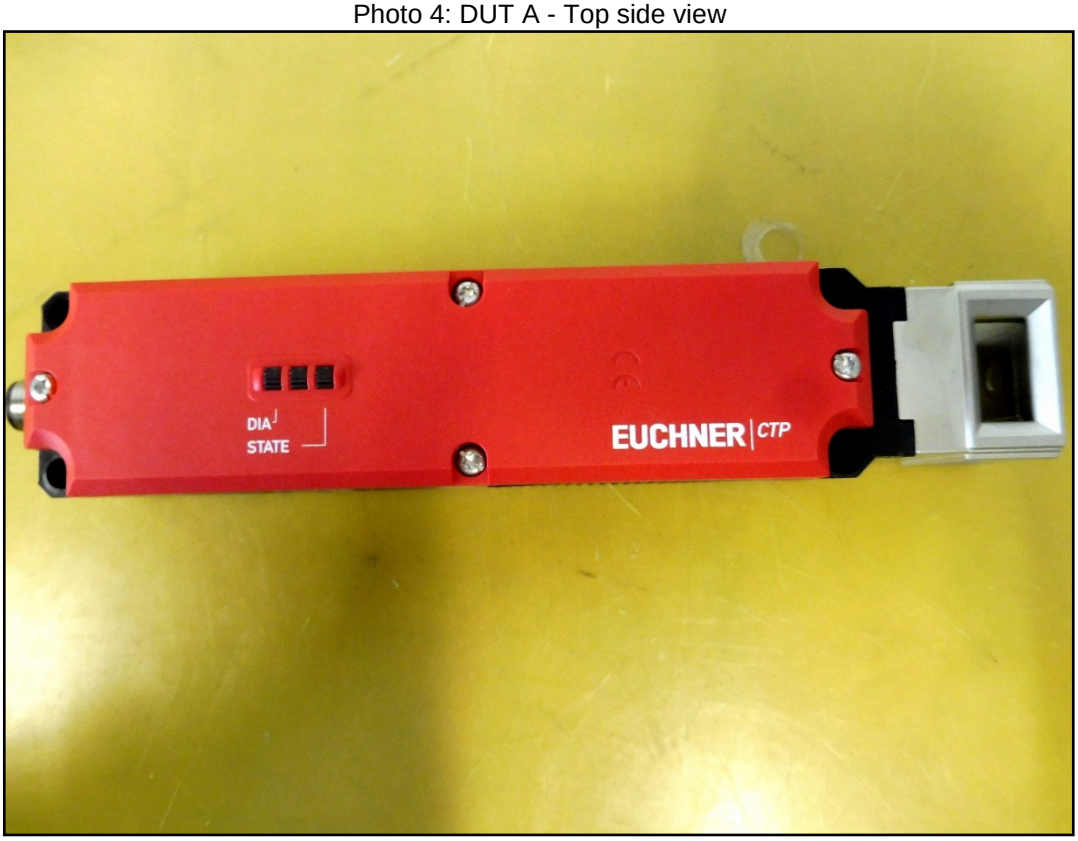


Photo 5: DUT A - Back side view (Plug)

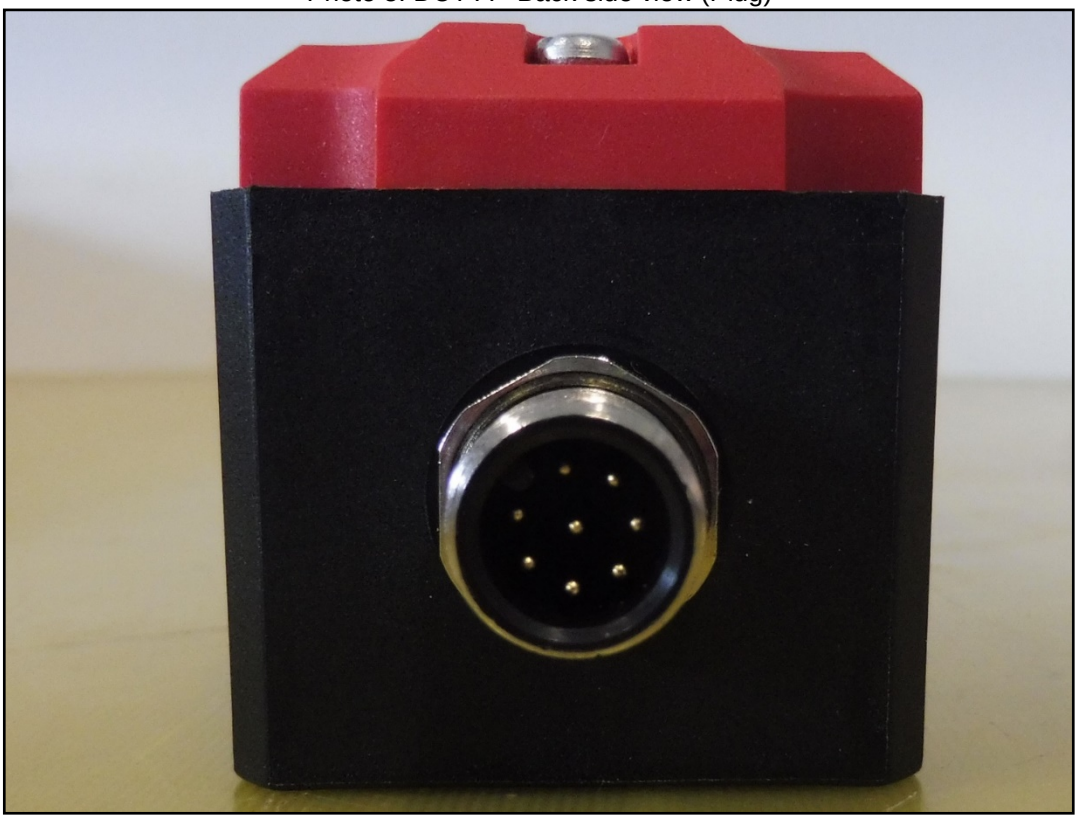


Photo 6: DUT A - Front side view

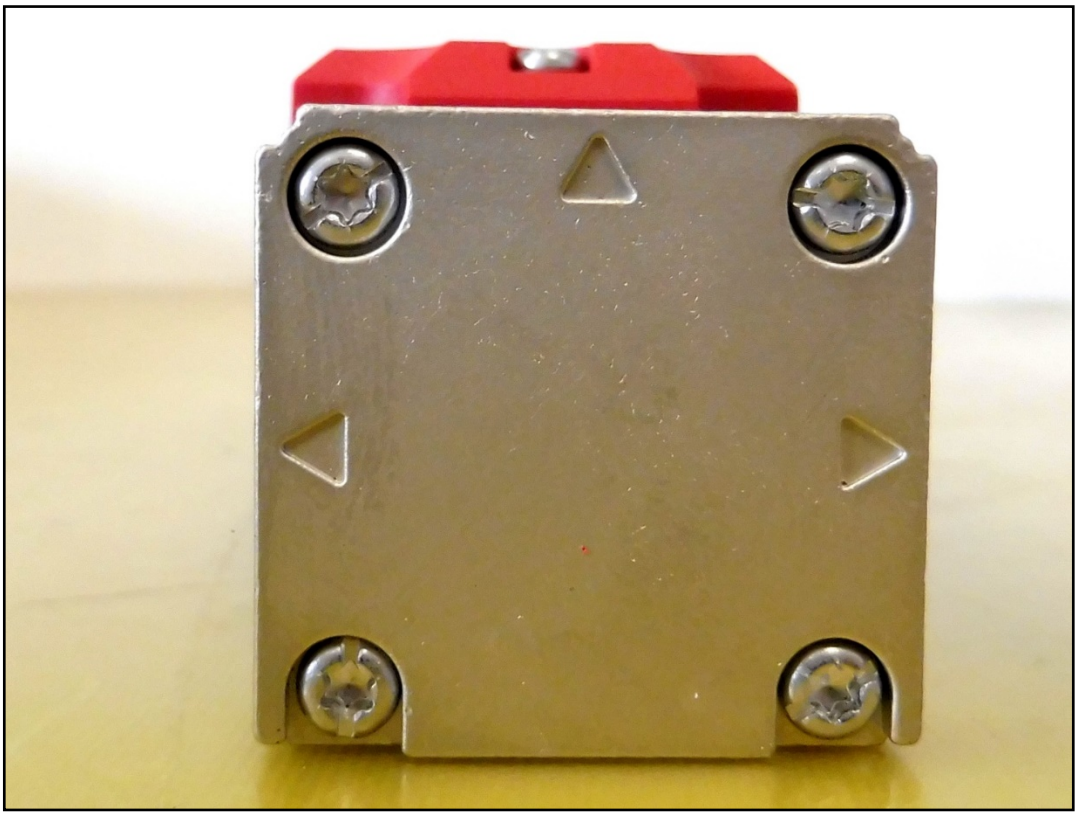


Photo 7: DUT B - Side view

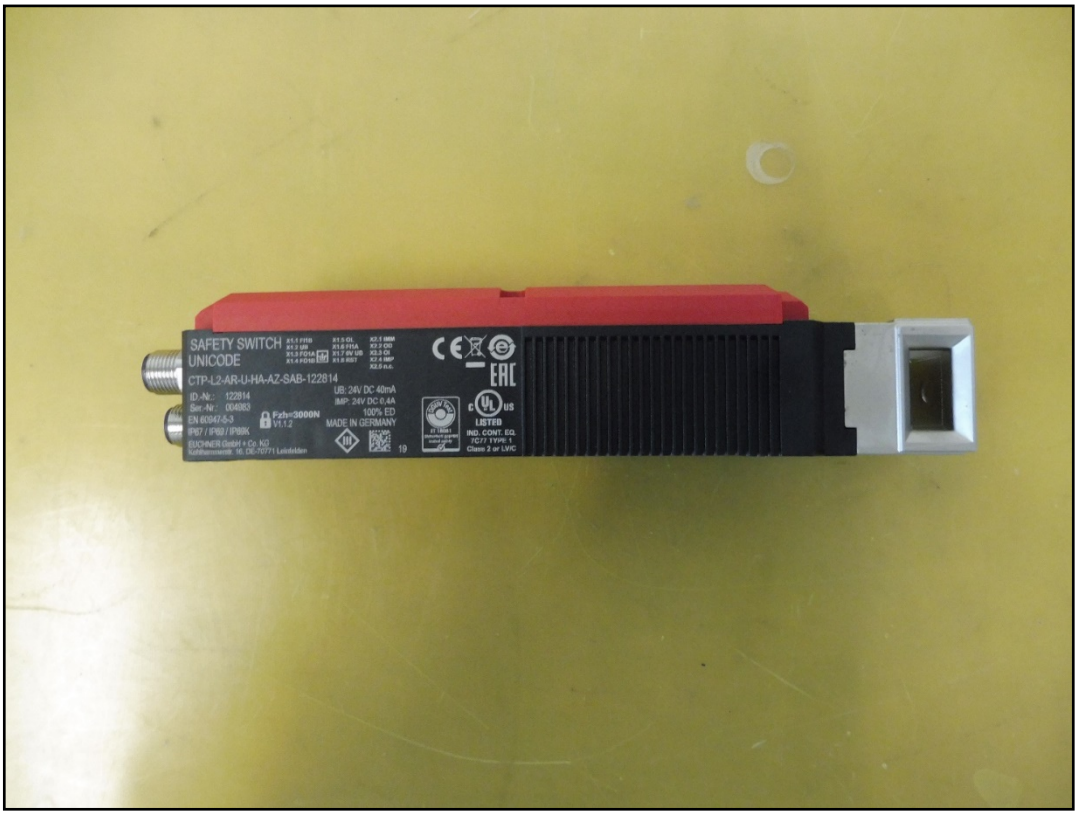


Photo 8: DUT B - Side view (Label)

Photo 9: DUT B - Top side view

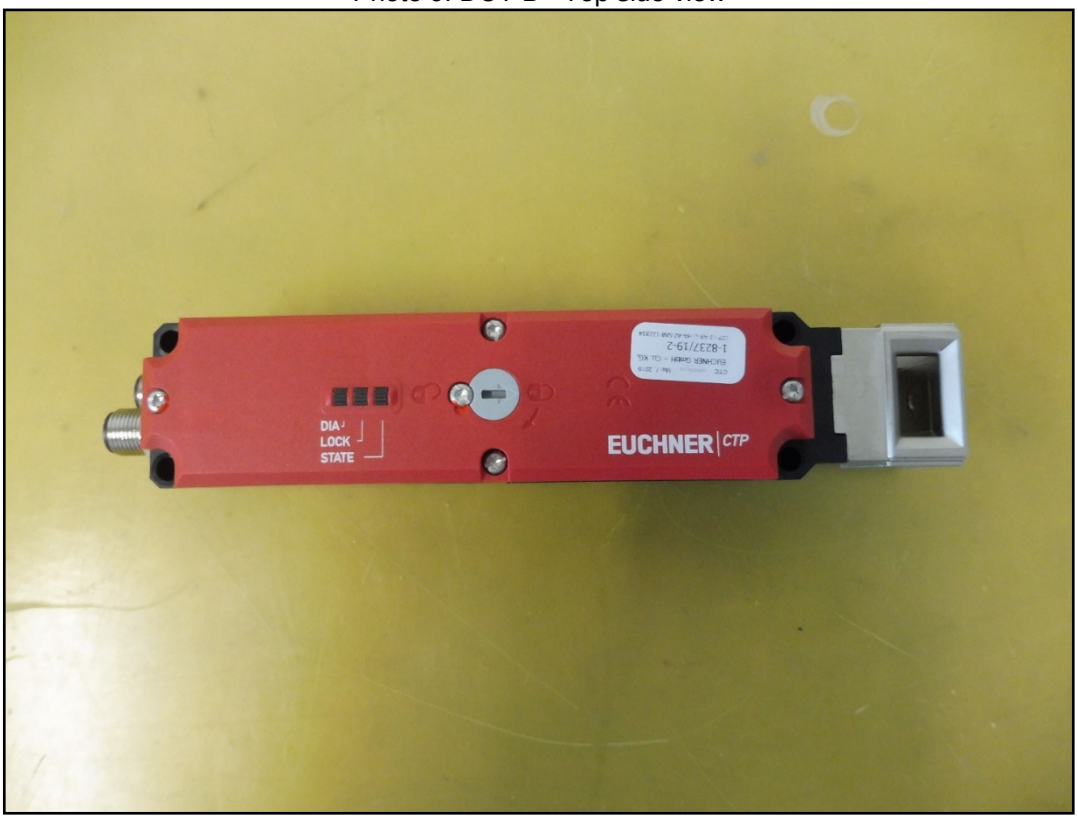


Photo 10: DUT B - Back side view

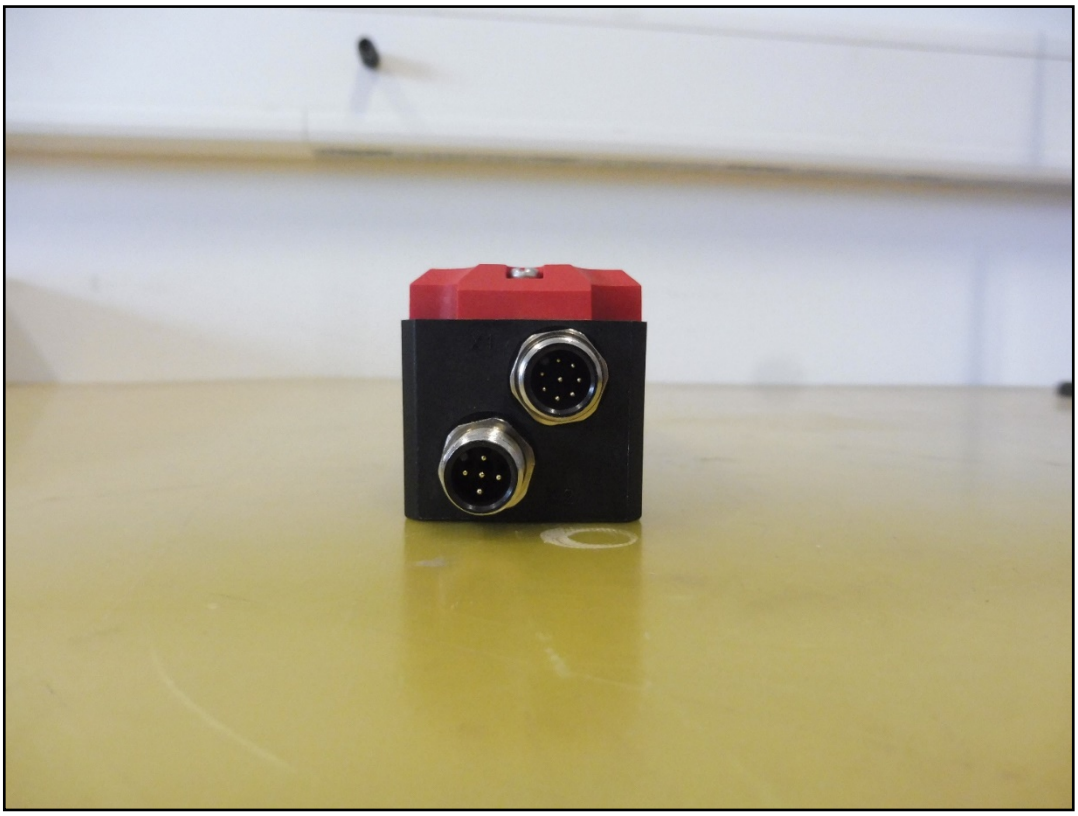


Photo 11: DUT C - Side view

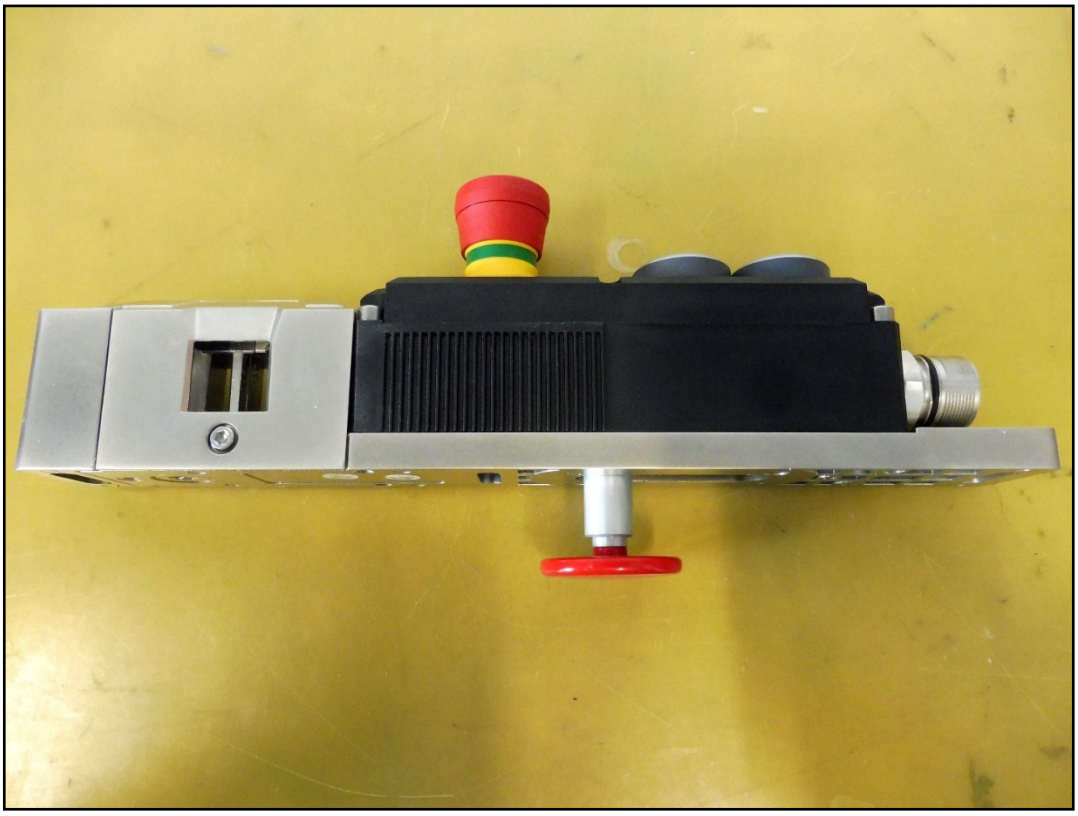


Photo 12: DUT C - Side view (Label)

Photo 13: DUT C - Top side view

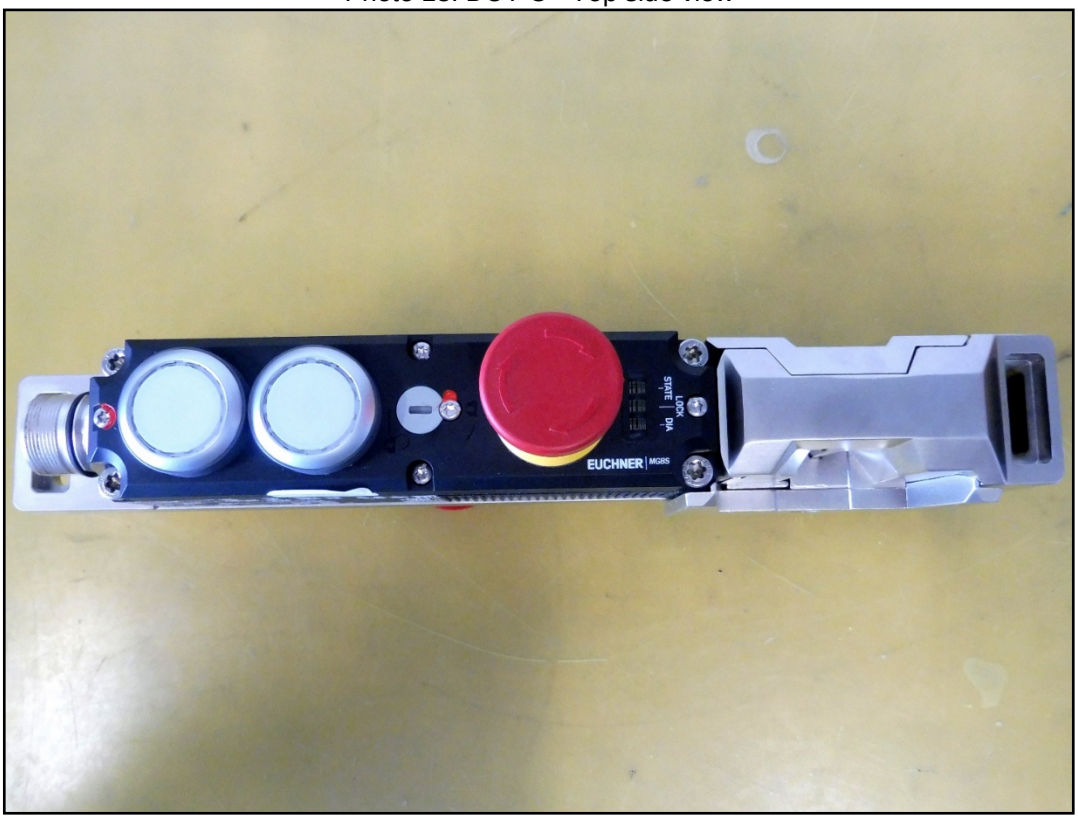


Photo 14: Test position - DUT A with EHP-50 F probe (0mm distance)

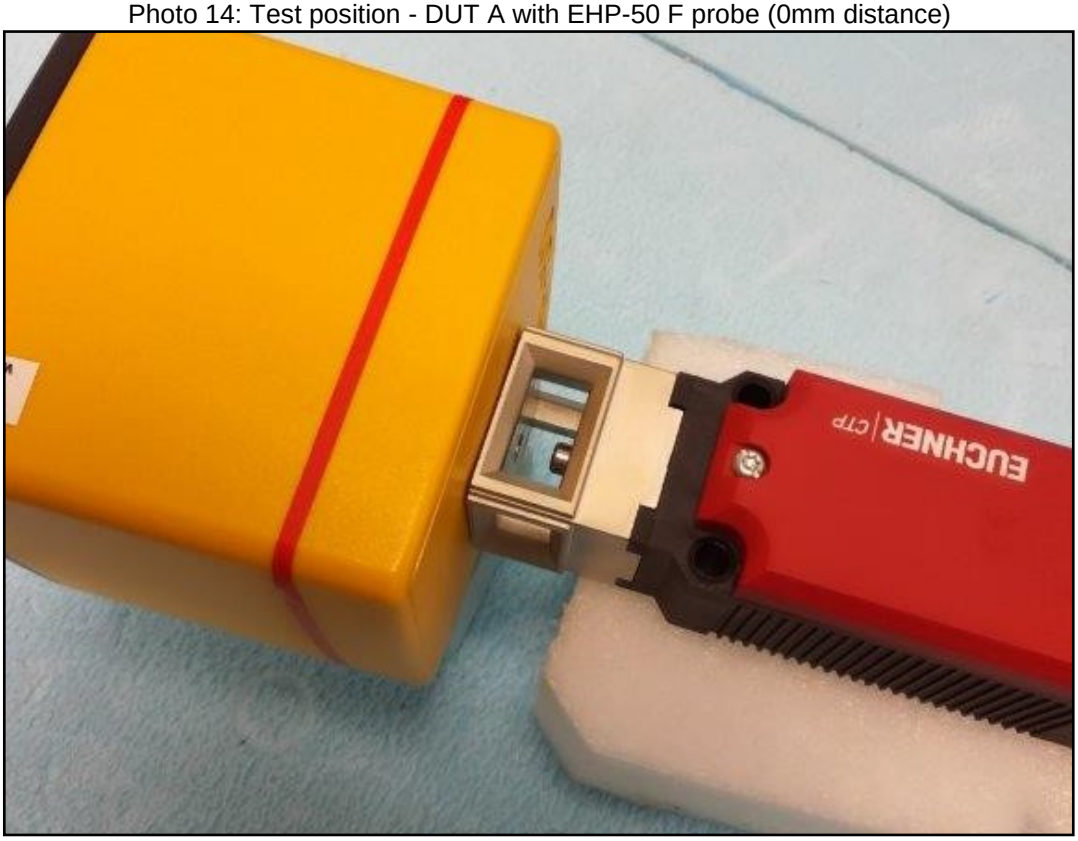


Photo 15: Test position - DUT B with EHP-50 F probe (0mm distance)

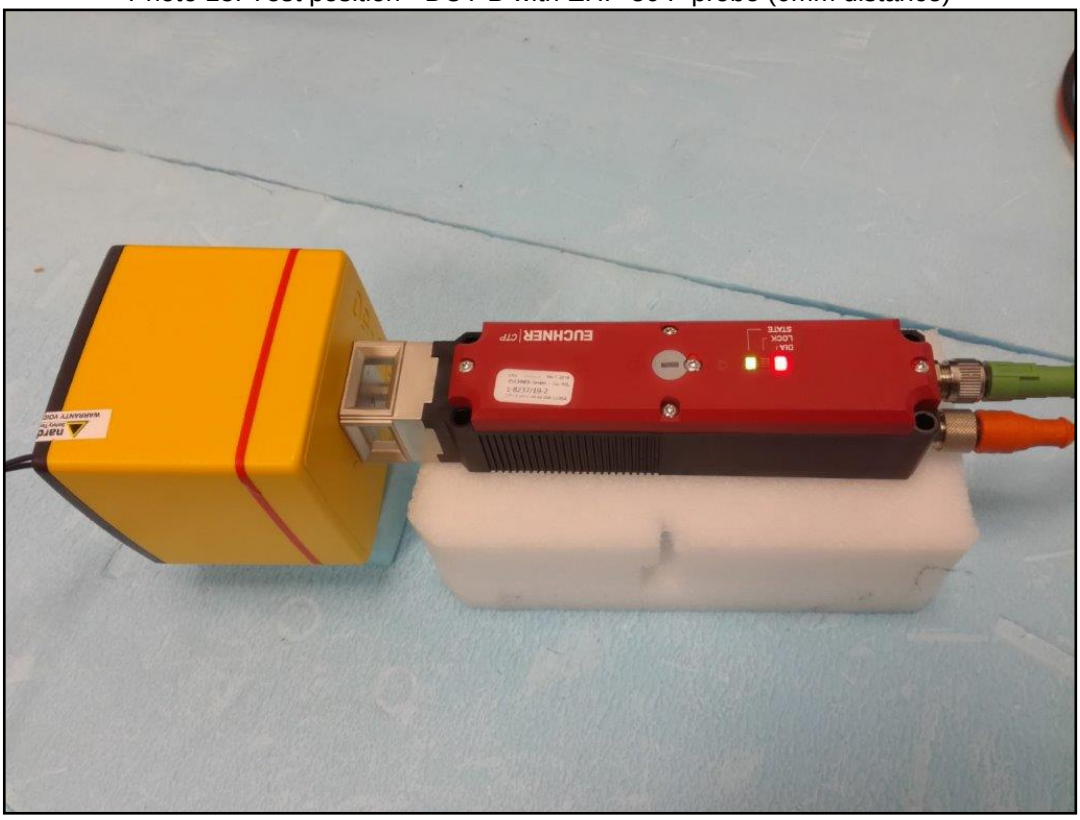
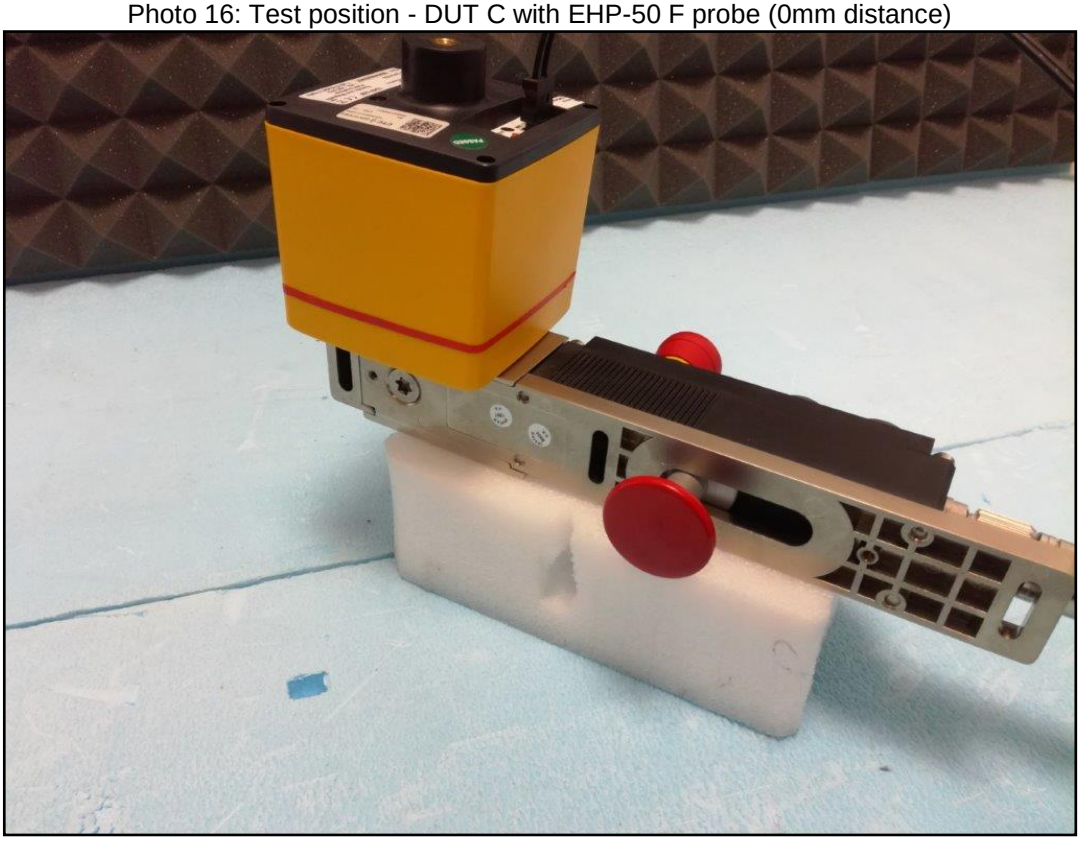


Photo 16: Test position - DUT C with EHP-50 F probe (0mm distance)



Annex B: Document History

Version	Applied Changes	Date of Release
	Initial Release	2019-05-14

Annex C: Further Information

Glossary

DUT	-	Device under Test
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	not applicable
OET	-	Office of Engineering and Technology
S/N	-	Serial Number
SW	-	Software