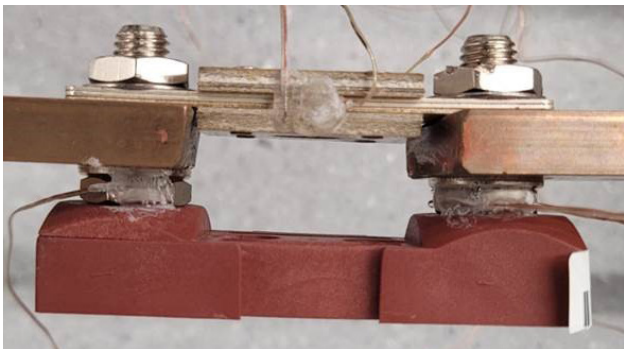
ELEKTRO ŠTUMPFL D.O.O.

Test results for ANL fuse holder

Lenght	88 mm
Width	30 mm
Height	47 mm



Testing method

Applicants requirements:
EN 60947-3:2009 + A1:2012 + A2:2015 (Clause 8. 1. 2 and 9. 3. 4)
Terminals were submitted to temperature-rise test and test of dielectric properties according to the stated testing methods. Temperature rise test was carried out 23 °C accordance with EN 60947-3:2009 + A1:2012 + A2:2015 Clause 9.3.4., Glow wire test was performed at 960 °C. Test were performed on end samples. The original report can be found on page 3.

Possible test case verdicts:
- test case does not apply to the test object.....: N/A
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

IEC 60947-3			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
9.3.4	Test sequence I: General performance characteristics		P
9.3.4.2	Temperature rise		P
	ambient temperature 10-40 °C.....:	23	P
	Main circuits, test conditions:		
	-cable/busbar cross-section (mm^2) /lenght (mm).....:	40 x 10 mm; 2 m	P
	-rated current (A) .....:	SIBA 9005805.500 (500A) Bussmann ANL-750 (750A)	P

IEC 60947-3			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	-power loss (W).....:	SIBA 9005805.500 (approx. 41W) Bussmann ANL-750 (no information)	
9.3.4.3 9.3.3.4 part 1	Test of dielectric properties		P
2)	Verification of impulse withstand voltage		P
	Rated impulse withstand voltage (kV).....:	3 kV	P
	The 1,2/50µs impulse voltage applied five times for each polarity at intervals of 1s minimum		P
	-test Uimp main circuits (kV).....:	3,5 kV	P
	Parts made of insulating material necessary to retain current-carrying parts in position:		
	-Main current carrying parts: 960 °C		P

Table 1: Measured data				
Current [A]	**Fuse**	**Terminal**	**Temp.- rise [K]**	**Busbar cross-section**
562	ANL 750 (rated 750 A)	1.	65,9	40x10
568	ANL 750 (rated 750 A)	2.	66,7	40x10
480	SIBA 9005805 (rated 500A)	2.	66,1	40x10

Note: used busbar cross-section 40 x 10 mm (copper)
Limit for temperature rise of terminals based on requirement of Table 2 of EN IEC 60947-1:2021 is 70 K for nickel plated copper or brass; Limit for temperature rise of terminals based on requirement of Table 12 of EN EN 60947-2:2009 is 80 K.

Test report

Number	**T211-0695/23**	Project file: C20231405 Date: 2023-09-12 Pages: 11

Product:	**Fuse holder**
Type reference:	**Fuse holder for ANL fuse**
Ratings:	Max. 568 A (see Table 1 for details)
Trademark:	ELEKTRO ŠTUMPFL
Applicant:	**ELEKTRO ŠTUMPFL d.o.o.** **Pameče 175, SI-2380 Slovenj Gradec, Slovenia**
Manufacturer:	ELEKTRO ŠTUMPFL d.o.o. Pameče 175, SI-2380 Slovenj Gradec, Slovenia
Place of manufacture:	ELEKTRO ŠTUMPFL d.o.o. Pameče 175, SI-2380 Slovenj Gradec, Slovenia

Summary of testing

Testing method:	Applicant's requirements: EN 60947-3:2009 + A1:2012 + A2:2015 (Clause 8.1.2 and 9.3.4)
Testing location:	SIQ Ljubljana Mašera-Spasićeva ulica 10, SI-1000 Ljubljana, Slovenia
Remarks:	Date of receipt of test items: 2023-04-13 Number of items tested: 3 Date of performance of tests: from 2023-04-13 to 2023-08-02 The test results presented in this report relate only to the items tested. The test items were tested in the condition as received. The product complies with the requirements of the testing methods. Click or tap here to enter text.

Tested by: Tibor Kokelj

Approved by: Tomaž Knez

SIQ Ljubljana, Mašera-Spasićeva ulica 10, SI-1000 Ljubljana, Slovenia
T +386 1 4778 100, F +386 1 4778 444, info@siq.si, www.siq.si

1. Testing Method
Terminals were submitted to temperature-rise test and test of dielectric properties according to the stated testing methods. Temperature-rise test was carried out at 23 °C accordance with EN 60947-3:2009 +A1:2012 + A2:2015 Clause 9.3.4., Glow wire test was performed at 960ºC.

2. Samples
Tests were performed on end samples (see photo documentation).

3. Test results:

Possible test case verdicts:

- test case does not apply to the test object.....: N/A
- test object does meet the requirement.....: P(Pass)
- test object does not meet the requirement.....: F(Fail)

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
9.3.4	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS**		P
9.3.4.2	Temperature-rise		P
	ambient temperature 10-40 °C .....:	23 °C	P
	test enclosure W x H x D (mm x mm x mm) .....:		N/A
	material of enclosure .....:		N/A
	Main circuits, test conditions:		P
	- rated operational current Ie (A) .....:	See Table 1	P
	- cable/busbar cross-section (mm²) / length (mm) .:	40 x 10 mm; 2 m	P
	Fuse-link details (fuse-combination units only):	Used fuses for test: SIBA 9005805.500 Bussmann ANL-750	P
	- manufacturer's name, trademark or identification mark .....:		N/A
	- manufacturer's model or type reference .....:		N/A
	- rated current (A) .....:	SIBA 9005805.500 (500 A) Bussmann ANL-750 (750 A)	P
	- power loss (W) .....:	SIBA 9005805.500 (approx. 41 W) Bussmann ANL-750 (no information)	P
	- rated breaking capacity (kA) .....:	No information	N/A
	Measured temperature-rise.....:	see appended Table 1	P
	Auxiliary circuits, test conditions:	No AUX circuits	N/A
	- rated operation current (A) .....:		N/A
	- cable cross-section (mm²).....:		N/A
	Measured temperature-rise.....:	see appended table 9.3.4.2	N/A
9.3.4.3 9.3.3.4part1	Test of dielectric properties		P

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
2)	Verification of impulse withstand voltage		P
	Rated impulse withstand voltage (kV) ..... :	3 kV	P
	- sea level of the laboratory..... :	Approx. 200 m	P
b)	Test voltage		P
	The 1,2/50µs impulse voltage applied five times for each polarity at intervals of 1s minimum		P
	- test Uimp main circuits (kV) ..... :	3,5 kV	P
	- test Uimp auxiliary circuits (kV) ..... :		N/A
	- test Uimp control circuits (kV) ..... ::		N/A
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) ..... :		N/A
c)	Application of test voltage		P
	i) between all the terminals of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation;		P
	ii) between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation;		N/A
	iii) between each control and auxiliary circuit not normally connected to the main circuit and: – the main circuit,		N/A
	- the other circuits		N/A
	- the exposed conductive parts		N/A
	- enclosure of mounting plate		N/A
	iv) for equipment suitable for isolation, across the poles of the main circuit, the line terminals being connected together and the load terminals connected together		N/A
d)	Acceptance criteria		P
	There shall be no unintentional disruptive discharge during the tests		P
3)	Power-frequency or DC withstand verification		P
	- rated insulation voltage (V) ..... :	Not declared	N/A
b)	Test voltage		-
	-main circuits, test voltage for 1 min. (V) :	3 kV AC used	P
	- auxiliary circuits, test voltage for 1 min (V)		N/A
	- control circuits, test voltage for 1 min (V) :		N/A
c)	Application of test voltage		P
	i) between all the terminals of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation;		P

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	ii) between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation;		N/A
	iii) between each control and auxiliary circuit not normally connected to the main circuit and: – the main circuit,		N/A
	- the other circuits		N/A
	- the exposed conductive parts		N/A
	- enclosure of mounting plate		N/A
d)	Acceptance criteria		P
	During the test, no flashover, breakdown of insulation either internally (puncture) or externally (tracking) or any other manifestation of disruptive discharge shall occur		P
	Equipment suitable for isolation, leakage current not exceed 0,5 mA		N/A
	Test voltage 1,1 Ue (V) ..... :		N/A
	Measured leakage current (mA) ..... :		N/A
8.1.2 part1	**Materials**		P
8.1.2.2	Glow wire Testing		P
	The requirements of 8.1.2.2 of IEC 60947-1:2020 do not apply to parts with a mass lower than 2 g (insignificant mass as defined in 3.14 of IEC 60695-2-11:2014). For products containing a plurality of small parts, the total mass of non-tested parts located in close proximity to each other shall not exceed 10 g. Proximity shall be based on engineering judgment considering the risk of propagation of fire.		P
	The suitability of materials used is verified by :		P
	a) making tests on the equipment;		P
	b) making tests on sections taken from the equipment;		N/A
	c) making tests on any parts of identical material having representative thickness;		N/A
	d) providing data from the insulating material supplier fulfilling the requirements according to IEC 60695-2-12.		N/A
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11		P
	Parts made of insulating material necessary to retain current-carrying parts in position:		P
	-Main current carrying parts: 960 °C.		P
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		P
	No ignition of the tissue paper		P
	-Auxiliary current carrying parts: 850 °C.		N/A

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		N/A
	No ignition of the tissue paper		N/A

Table 1: Measured data

Current [A]	Fuse	Terminal	Temperature-rise [K]	Busbar cross-section
562	ANL 750 (rated 750 A)	1.	65,9	40x100
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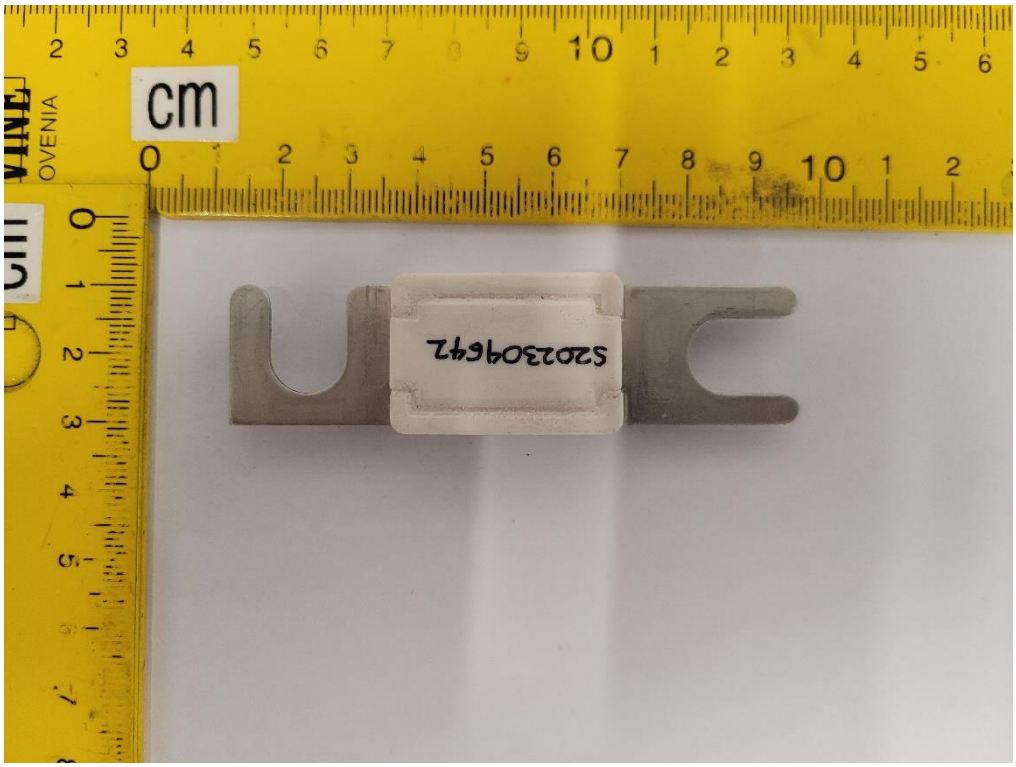
480	SIBA 9005805 (rated 500 A)	2.	66,1	40x100

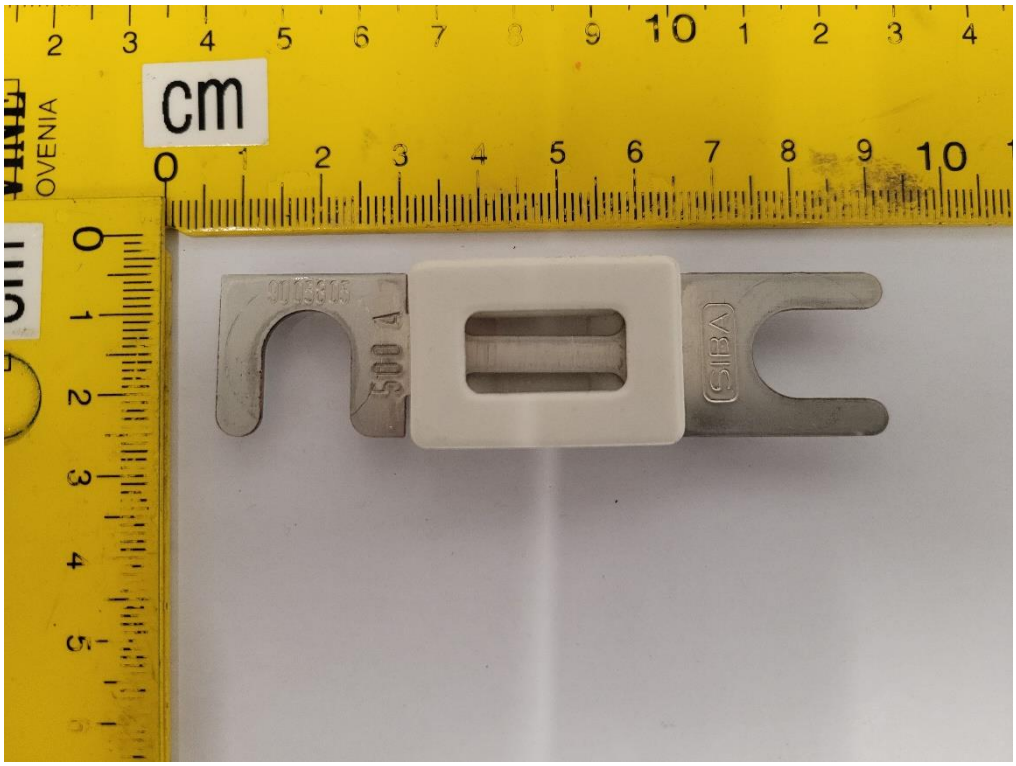
Note: used busbar cross-section 40 x 10 mm (copper)
Limit for temperature rise of teminals based on requirement of Table 2 of EN IEC 60947-1:2021 is 70 K for nickel plated copper or brass; Limit for temperature rise of teminals based on requirement of Table 12 of EN EN 60947-2:2009 is 80 K.

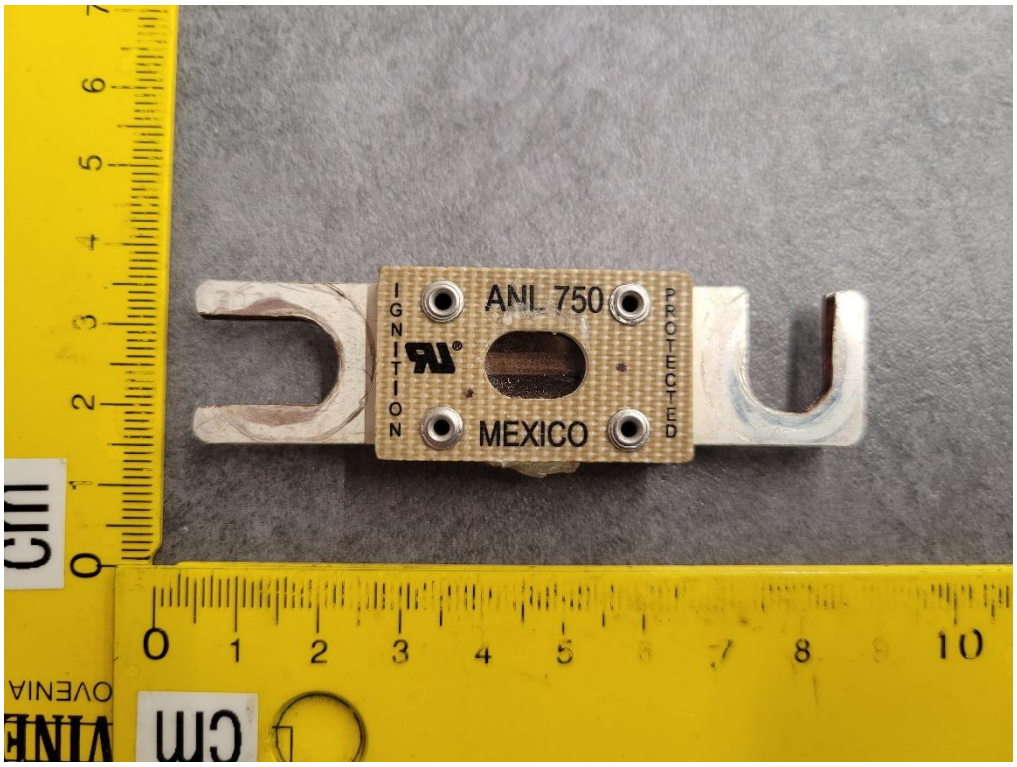
4. List of measuring equipment

Type of test equipment	Model or type number	Manufacturer	SIQ reg. Num.	Characteristic	Calibration due date
DC clamp	337	Fluke	ID0477	-	2023-09-01
DAQ system	2700	Keithley	ID0425	-	2023-10-28
Glow wire	-	PTL	ID0950	Range: max.: 960°C	2023-09-16

5. Photo documentation



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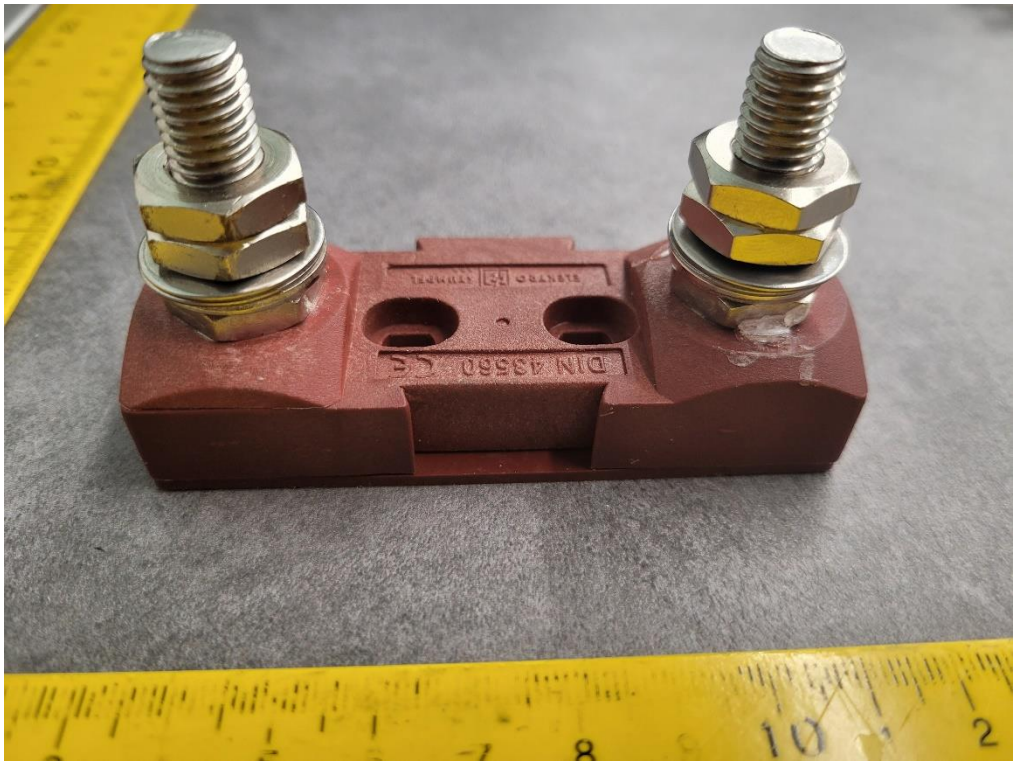
PROTECTED
MEXICO


IGNITION
ANL 750
PROTECTED
MEXICO


DIN 43560
ELEKTRO STUMPFL

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DIN 43560
ELEKTRO STÜMPFL
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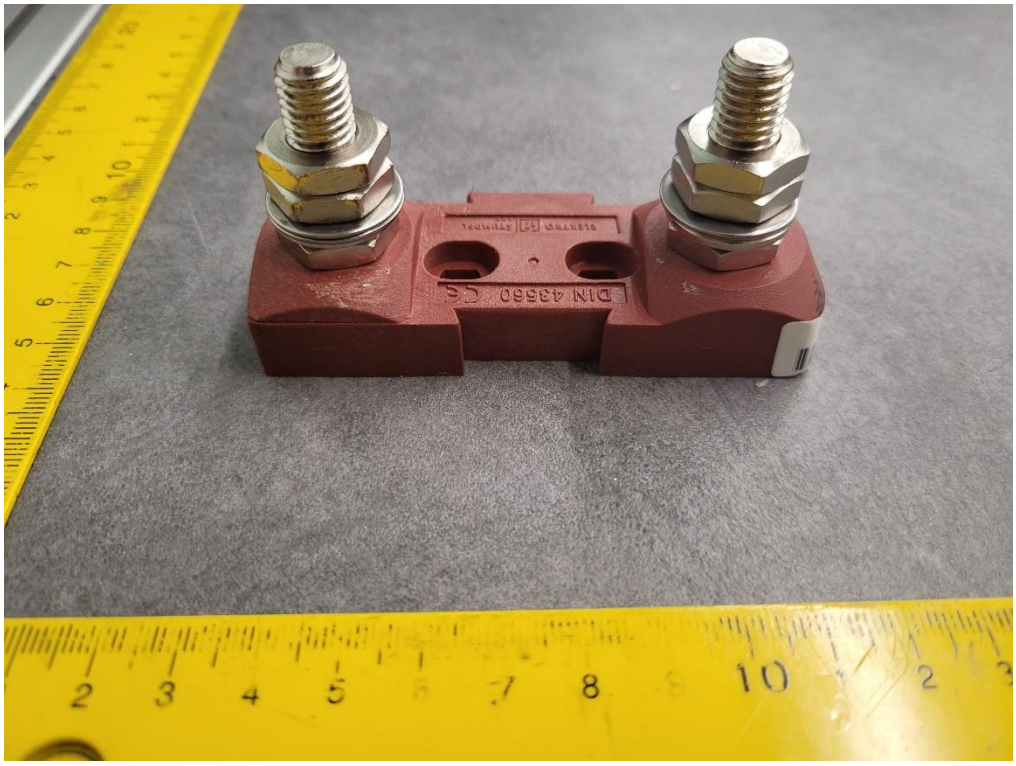
MADE IN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