



TEST REPORT

Report No. : WTD19F08056767A2C

Applicant : Barebones Living

Address : 1215 East Wilmington Avenue – Ste. 140, Salt Lake City, UT 84106, USA

Manufacturer : DONGGUAN PROTRONIC ELECTRONICS LTD.

Address : Protronic Building, Xiangxi Village, Shipai Town, Dongguan City, Guangdong Province, P.R. China

Sample Name : RailRoad Lantern

Model No. : LIV-280, LIV-281, LIV-28xxxxx ("x" may be "0-9", "a-z" or omitted)

Sample Receiving Date : 2019-09-09 & 2019-10-10 & 2019-10-21

Testing Period : 2019-09-09 to 2019-10-23

Date of Issue : 2019-10-29

Test Result : Please refer to next page (s)

Remarks:

The results shown in this test report refer only to the sample(s) tested; this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.
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Compiled by:

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Approved by:



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Test Requested..... : In accordance with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863.

Test Method..... : 1) With Reference to IEC 62321-2:2013, disassembly, disjunction and mechanical sample preparation
2) With Reference to IEC 62321-3-1:2013, screening - Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry
3) With reference to IEC 62321-4:2013+AMD1:2017 CSV, determination of Mercury by ICP-OES
4) With reference to IEC 62321-5:2013, determination of Lead and Cadmium by ICP-OES
5) With reference to IEC 62321-7-2: 2017 and IEC 62321-7-1: 2015, determination of Hexavalent Chromium by UV-Vis
6) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS
7) With reference to IEC 62321-8:2017, determination of Phthalates content by GC-MS.

Test Conclusion..... : **Pass** (Based on the performed tests on the submitted samples, the results comply with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863)



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**Test Results:****1. Lead, Mercury, Cadmium, Hexavalent Chromium, PBBs and PBDEs**

Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
1	Silvery-coppery metal holder	BL	BL	BL	BL	BL	NA
2	Black plastic holder	BL	BL	BL	BL	BL	NA
3	Transparent glass shell	BL	BL	BL	BL	BL	NA
4	Black plastic adhesive tape	BL	BL	BL	BL	BL	NA
5	Yellow body of LED	BL	BL	BL	IN	BL	Cr ⁶⁺ : ND
6	Silvery metal pin of LED	BL	BL	BL	BL	BL	NA
7	Silvery metal strip	BL	BL	BL	BL	BL	NA
8	Solder	BL	BL	BL	BL	BL	NA
9	Blue PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
10	Silvery metal strip with black plating	BL	BL	BL	IN	BL	Cr ⁶⁺ : Negative
11	Silvery meta sleeve	BL	BL	BL	BL	BL	NA
12	Semi-transparent glue	BL	BL	BL	BL	BL	NA
13	White glue	BL	BL	BL	BL	BL	NA
14	Black plastic sheet	BL	BL	BL	BL	BL	NA
15	Black plastic nut	BL	BL	BL	BL	BL	NA
16	Black soft plastic washer	BL	BL	BL	BL	BL	NA
17	Silvery metal screw with black plating	BL	BL	BL	IN	BL	Cr ⁶⁺ : Negative
18	Silvery metal screw with black plating	BL	BL	BL	BL	BL	NA
19	Silvery metal screw with black plating	BL	BL	BL	BL	BL	NA
20	Silvery metal screw	BL	BL	BL	BL	BL	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
21	Red plastic wire covering	BL	BL	BL	BL	BL	NA
22	Black plastic wire covering	BL	BL	BL	BL	BL	NA
23	Silvery metal wire	BL	BL	BL	BL	BL	NA
24	Black plastic wire covering	BL	BL	BL	BL	BL	NA
25	Red plastic wire covering	BL	BL	BL	BL	BL	NA
26	Silvery metal wire	BL	BL	BL	BL	BL	NA
27	Black plastic wire jacket	BL	BL	BL	BL	BL	NA
28	Red plastic wire covering	BL	BL	BL	BL	BL	NA
29	Black plastic wire covering	BL	BL	BL	BL	BL	NA
30	Black plastic jacket of USB plug	BL	BL	BL	BL	BL	NA
31	Grey plastic sheet of USB plug	BL	BL	BL	BL	BL	NA
32	White plastic core of USB plug	BL	BL	BL	BL	BL	NA
33	Golden metal pin of USB plug	BL	BL	BL	BL	BL	NA
34	Solder of USB plug	BL	BL	BL	BL	BL	NA
35	Black plastic jacket of plug	BL	BL	BL	BL	BL	NA
36	Semi-transparent glue of plug	BL	BL	BL	BL	BL	NA
37	Silvery metal shell of plug	BL	BL	BL	BL	BL	NA
38	Green PCB of plug	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
39	Solder of plug	BL	IN	BL	BL	BL	Pb : 267
40	Silvery metal pin of plug	BL	BL	BL	BL	BL	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
41	Black plastic holder of plug	BL	BL	BL	BL	BL	NA
42	Black sponge adhesive tape	BL	BL	BL	BL	BL	NA
43	Red paper sheet	BL	BL	BL	BL	BL	NA
44	Green paper sheet	BL	BL	BL	BL	BL	NA
45	Black plastic sheet	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
46	White plastic adhesive gasket	BL	BL	BL	BL	BL	NA
47	Blue plastic film	BL	BL	BL	BL	BL	NA
48	White plastic film with red printing	BL	BL	BL	BL	BL	NA
49	Silvery metal sheet	BL	BL	BL	BL	BL	NA
50	Chip IC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
51	Chip IC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
52	Chip capacitor	BL	BL	BL	BL	BL	NA
53	Black PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
54	Chip resistor	BL	BL	BL	BL	BL	NA
55	Golden metal shaft of knob	IN	OL	BL	BL	BL	Cd :22 #Pb :2.50×10 ⁴
56	Silvery metal sheet of knob	BL	BL	BL	BL	BL	NA
57	Golden metal sheet of knob	BL	BL	BL	BL	BL	NA
58	Black plastic holder of knob	BL	BL	BL	BL	BL	NA
59	Silvery metal pin of knob	BL	BL	BL	BL	BL	NA
60	Silvery metal rivet of knob	BL	BL	BL	BL	BL	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
61	Coppery metal rivet of knob	BL	BL	BL	BL	BL	NA
62	Black-brown plastic sheet of knob	BL	BL	BL	BL	BL	NA
63	Red plastic sheet of knob	BL	BL	BL	BL	BL	NA
64	White plastic sheet	BL	BL	BL	BL	BL	NA
65	Silvery metal spring	BL	BL	BL	BL	BL	NA
66	Yellow-transparent plastic sheet	BL	BL	BL	BL	BL	NA
67	Silvery metal strip with golden plating	BL	BL	BL	BL	BL	NA
68	Silvery metal spring	BL	BL	BL	BL	BL	NA
69	Solder	BL	BL	BL	BL	BL	NA
70	Blue PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
71	Solder	BL	BL	BL	BL	BL	NA
72	Green body of LED	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
73	Semi-transparent plastic sleeve of LED	BL	BL	BL	BL	BL	NA
74	Black plastic core of socket	BL	BL	BL	BL	BL	NA
75	Silvery metal pin of socket	BL	BL	BL	BL	BL	NA
76	Silvery metal shell of socket	BL	BL	BL	BL	BL	NA
77	Solder	BL	BL	BL	BL	BL	NA
78	Chip capacitor	BL	BL	BL	BL	BL	NA
79	Chip audion	BL	BL	BL	BL	BL	NA
80	Chip IC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
81	Chip inductor	BL	BL	BL	BL	BL	NA
82	Chip audion	BL	BL	BL	BL	BL	NA
83	Chip diode	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
84	Chip resistor	BL	BL	BL	BL	BL	NA
85	Chip glass diode	BL	*OL	BL	BL	BL	NA
86	Black-silvery coating	BL	BL	BL	BL	BL	NA
87	Silvery meal shell without black-silvery coating	BL	BL	BL	BL	BL	NA
88	Silvery metal strip without black coating	BL	BL	BL	BL	BL	NA
89	Black soft plastic sleeve	BL	BL	BL	BL	BL	NA
90	Golden metal rivet	BL	BL	BL	BL	BL	NA
91	Silvery metal sheet with black plating	BL	BL	BL	BL	BL	NA
92	Silvery metal strip	BL	BL	BL	BL	BL	NA
93	Chip audion	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
94	Yellow transparent plastic adhesive tape	BL	BL	BL	BL	BL	NA
95	Silvery metal shell of socket	BL	BL	BL	BL	BL	NA
96	Silvery metal pin of socket	BL	BL	BL	BL	BL	NA
97	Black plastic core of socket	BL	BL	BL	BL	BL	NA

**Remark:**

- (1) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr^{6+}) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1: 2013 (unit: mg/kg)

Element	Polymer	Metal	Composite Materials
Cd	$\text{BL} \leq (70-3\sigma) < \text{IN} < (130+3\sigma) \leq \text{OL}$	$\text{BL} \leq (70-3\sigma) < \text{IN} < (130+3\sigma) \leq \text{OL}$	$\text{LOD} < \text{IN} < (150+3\sigma) \leq \text{OL}$
Pb	$\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$	$\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$	$\text{BL} \leq (500-3\sigma) < \text{IN} < (1500+3\sigma) \leq \text{OL}$
Hg	$\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$	$\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$	$\text{BL} \leq (500-3\sigma) < \text{IN} < (1500+3\sigma) \leq \text{OL}$
Cr	$\text{BL} \leq (700-3\sigma) < \text{IN}$	$\text{BL} \leq (700-3\sigma) < \text{IN}$	$\text{BL} \leq (500-3\sigma) < \text{IN}$
Br	$\text{BL} \leq (300-3\sigma) < \text{IN}$	--	$\text{BL} \leq (250-3\sigma) < \text{IN}$

BL= Below Limit

OL= Over Limit

LOD = Limit of Detection

-- = Not Regulated

- (2) "IN" expresses the inconclusive region, and further chemical testing to confirm whether it complies with the requirement of RoHS Directive.
- (3) The XRF screening test for RoHS elements – the reading may be different to the actual content in the sample be of non-uniformity composition.
- (4) mg / kg =milligram per kilogram=ppm, $\mu\text{g}/\text{cm}^2$ = Micrograms per square centimetre.
- (5) ND = Not Detected, less than the value of Method Detection Limit.
- (6) NA = Not Applicable, as the XRF screening test result was below the limit or as the XRF screening directly determine that test result was over the limit, it was not need to conduct the wet chemical testing.
- (7) MDL= Method Detection Limit in wet chemical test.

Test Items	Pb	Cd	Hg	Cr^{6+}		PBB	PBDE
Units	mg/kg	mg/kg	mg/kg	mg/kg	$\mu\text{g}/\text{cm}^2$	mg/kg	mg/kg
MDL	2	2	2	2	0.1	5	5

The MDL for single compound of PBBs and PBDEs is 5mg/kg, MDL of Cr^{6+} for polymer and composite sample is 2mg/kg and MDL of Cr^{6+} for metal sample is $0.1\mu\text{g}/\text{cm}^2$.

- (8) RoHS Requirement

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr^{6+})	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

- (9) According to IEC 62321-7-1:2015, determined of Cr^{6+} on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.

Boiling water extraction:

Negative = Absence of Cr^{6+} coating, the detected concentration in boiling water extraction solution is less than $0.10\mu\text{g}/\text{cm}^2$.

Positive = Presence of Cr^{6+} coating, the detected concentration in boiling water extraction solution is greater than $0.13\mu\text{g}/\text{cm}^2$.

Information on storage conditions and production date of the tested sample is unavailable and thus Cr^{6+} results represent status of the sample at the time of testing.



(10) Abbreviation:

“Pb” denotes Lead, “Cd” denotes Cadmium, “Hg” denotes Mercury, “Cr” denotes Chromium, “Cr (VI)” denotes Hexavalent Chromium, “Br” denotes Bromine, “PBBs” denotes Total Polybrominated Biphenyls, “PBDEs” denotes Total Polybrominated Diphenyl Ethers.

(11)* = According to the declaration from client, the source of lead in test sample is from the glass or ceramic material of that electronic component which is exempted by Directive 2011/65/EU.

(12)# = According to the declaration from client, the source of lead in test sample is from copper alloy while lead as copper alloy containing up to 4% lead by weight is exempted by Directive 2011/65/EU.

2. Phthalates:

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	2+14+15+32 [△]	<50	<50	<50	<50
T02	3+9+38+50+51 [△]	<50	<50	<50	<50
T03	4	83	<50	<50	<50
T04	5	<50	<50	<50	<50
T05	12	<50	<50	<50	<50
T06	13	<50	<50	<50	<50
T07	16	<50	<50	<50	<50
T08	21	<50	<50	<50	<50
T09	22	72	<50	<50	<50
T10	24	392	<50	<50	<50
T11	25	231	<50	<50	<50
T12	27	182	<50	<50	<50
T13	28	<50	<50	<50	<50
T14	29	76	<50	<50	<50
T15	30	<50	<50	<50	<50
T16	31	<50	<50	320	<50
T17	35	<50	<50	<50	<50
T18	36	<50	<50	<50	<50
T19	41	<50	<50	<50	<50
T20	42	<50	<50	<50	<50
T21	43+44+45+46+47 [△]	93	<50	249	<50
T22	48	<50	<50	<50	<50
T23	58	<50	<50	<50	<50
T24	72	<50	<50	<50	<50
T25	73	<50	<50	<50	<50
T26	74	<50	<50	<50	<50
T27	52+53+54+70+78 [△]	<50	<50	<50	<50
T28	79+80+81+82+83 [△]	<50	<50	<50	<50
T29	62	<50	<50	<50	<50
T30	63	137	<50	<50	<50
T31	64	76	<50	<50	<50
T32	66	<50	<50	<50	<50
T33	84+85 [△]	<50	<50	<50	<50
T34	86	<50	<50	<50	<50
T35	89	<50	<50	<50	<50



Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T36	94	<50	<50	<50	<50
T37	97	<50	<50	<50	<50

Note:

(1) "<" = less than

(2) mg/kg = milligram per kilogram= ppm

(3) Abbreviation:

"DBP" denotes Dibutyl phthalate, "BBP" denotes Benzyl butyl phthalate (BBP), "DEHP" denotes Bis(2-ethylhexyl)-phthalate, "DIBP" denotes Diisobutyl phthalate, "PHT" denotes Phthalates.

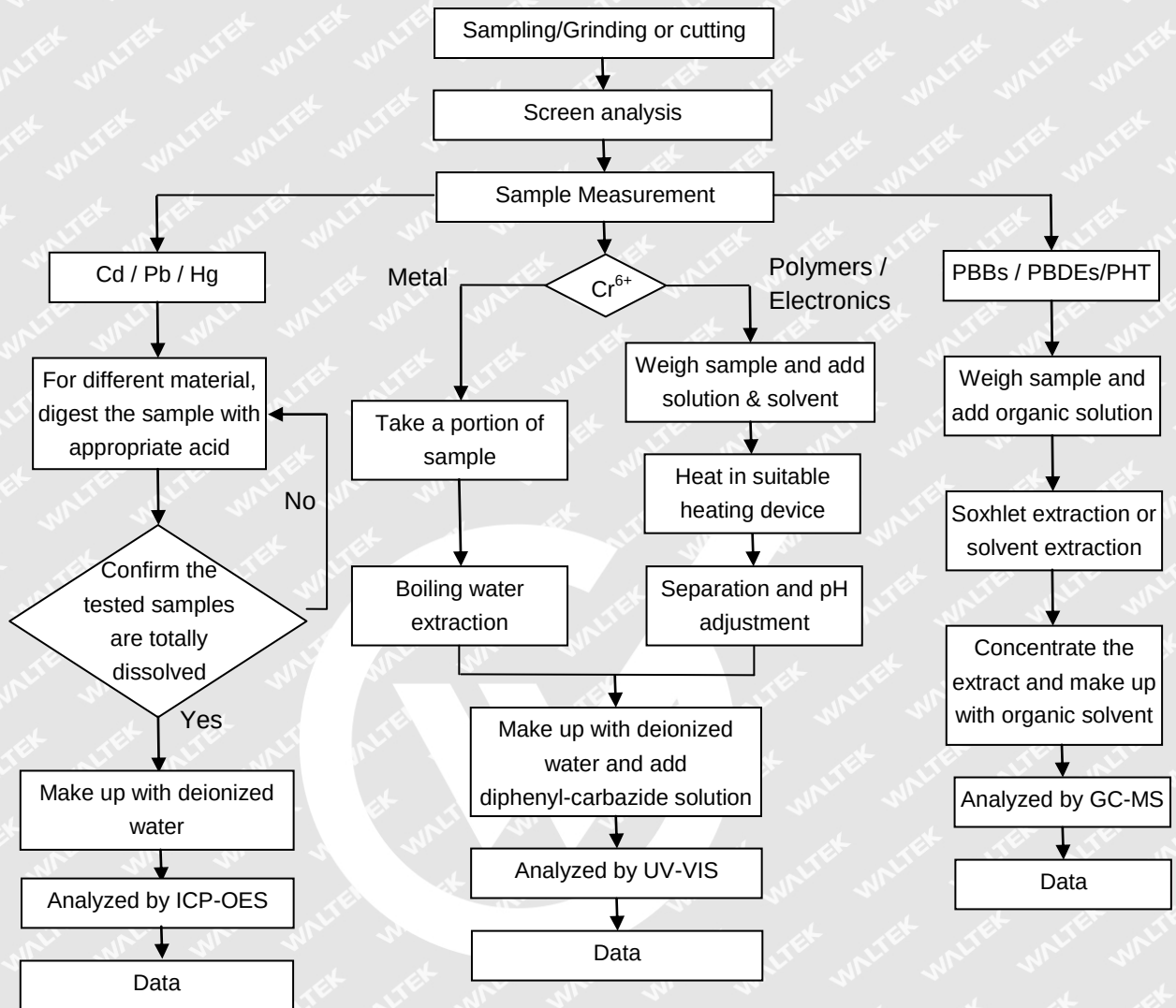
(4) RoHS requirement

Restricted Substances	Limits
Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
Di(2-ethylhexyl) phthalate (DEHP)	0.1% (1000 mg/kg)
Di-iso-butyl phthalate (DIBP)	0.1% (1000 mg/kg)

(5) "△" = As client's requirement, the testing was conducted based on mixed components. Results are calculated by the minimum weight of mixed components.

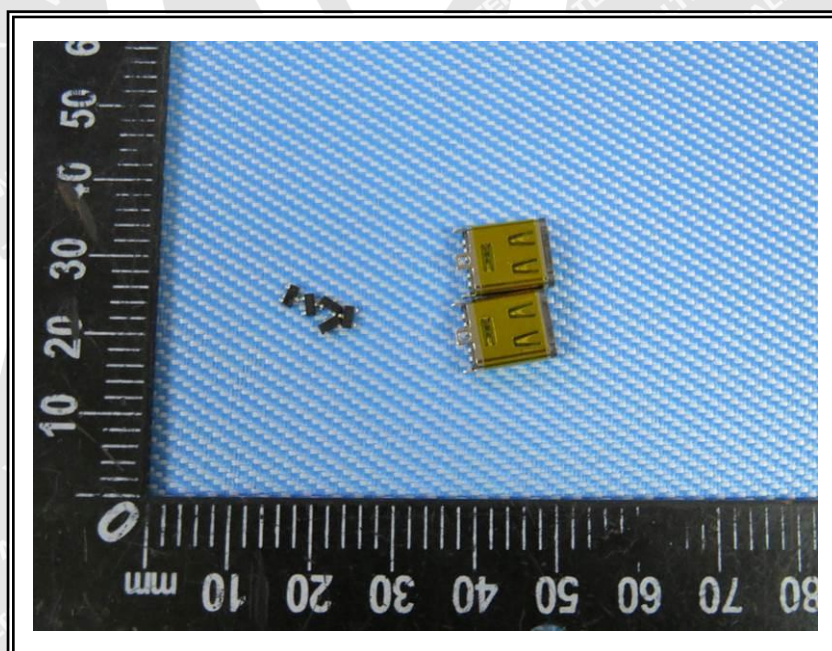


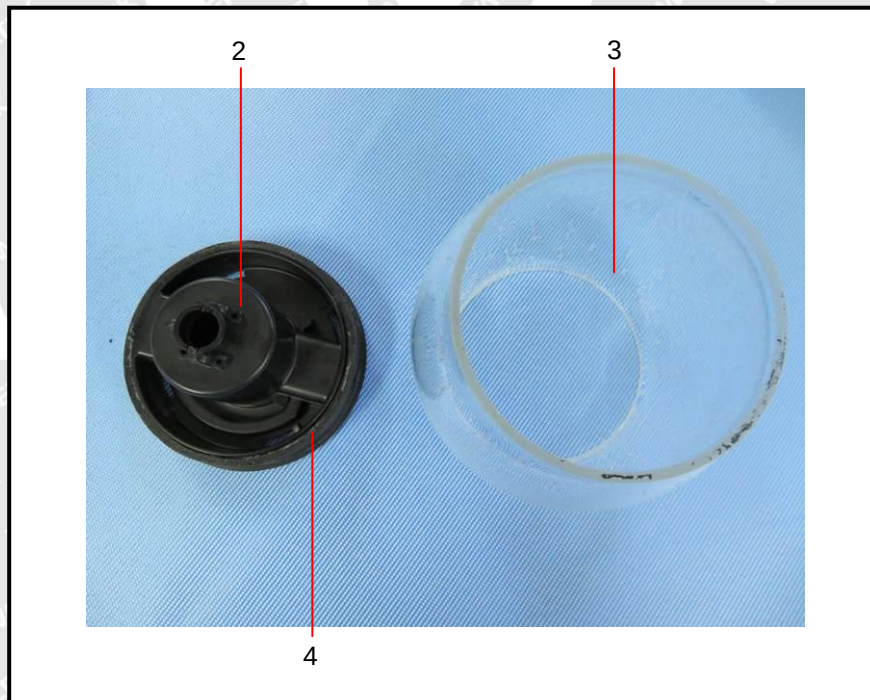
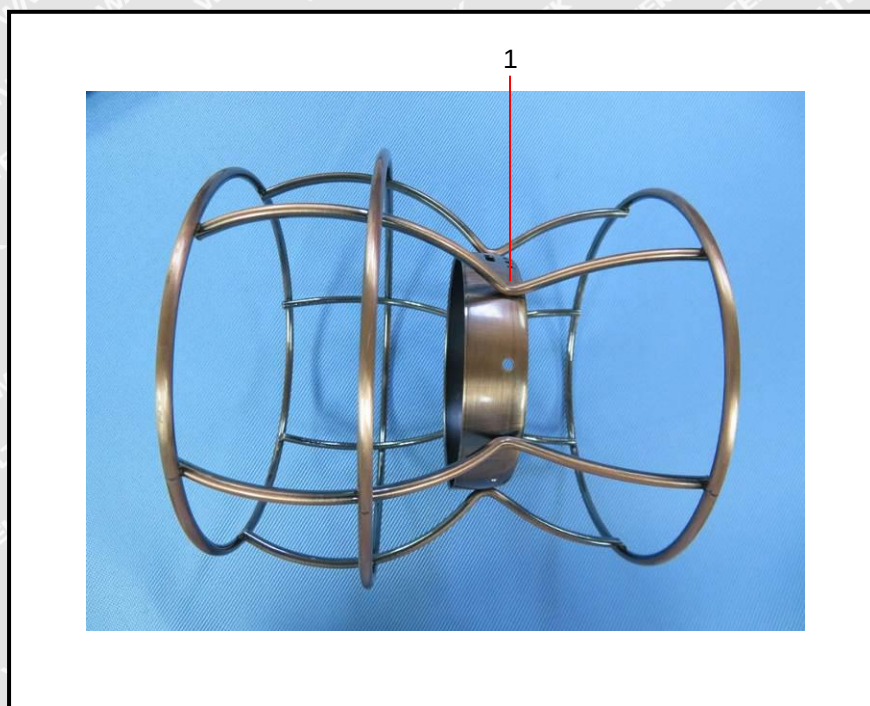
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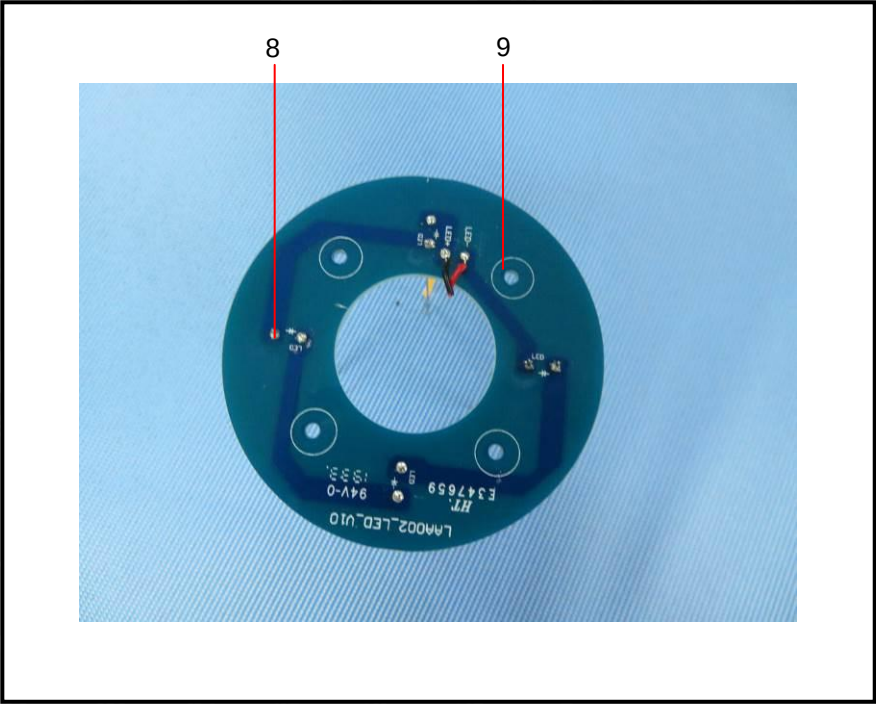
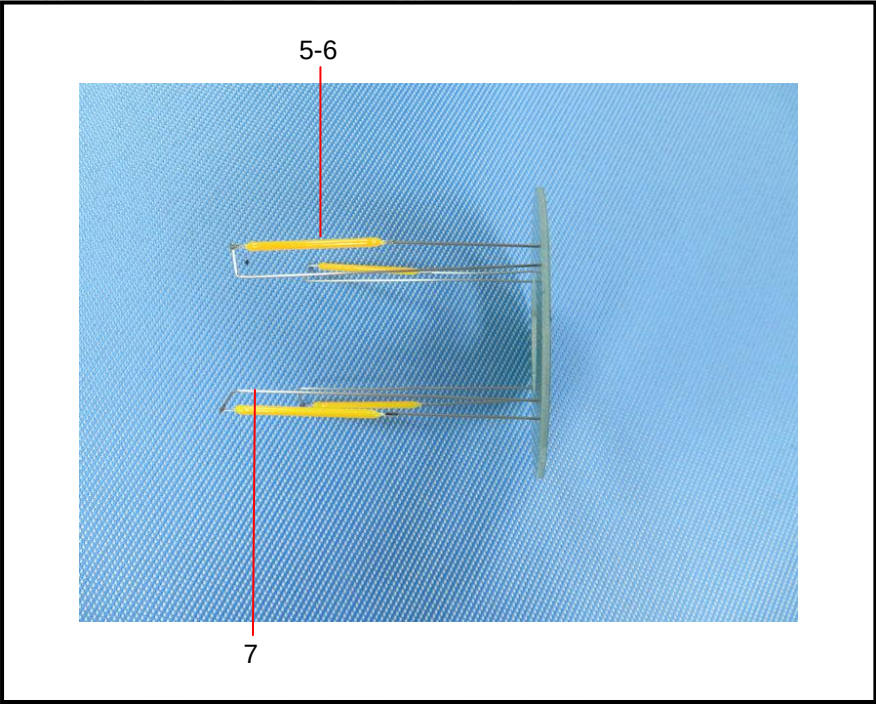
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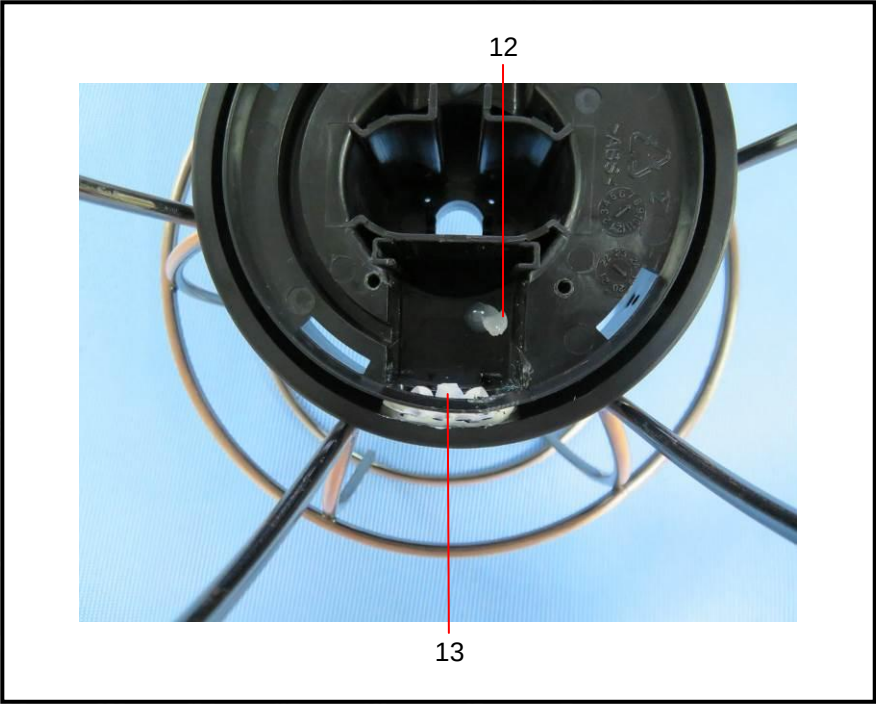
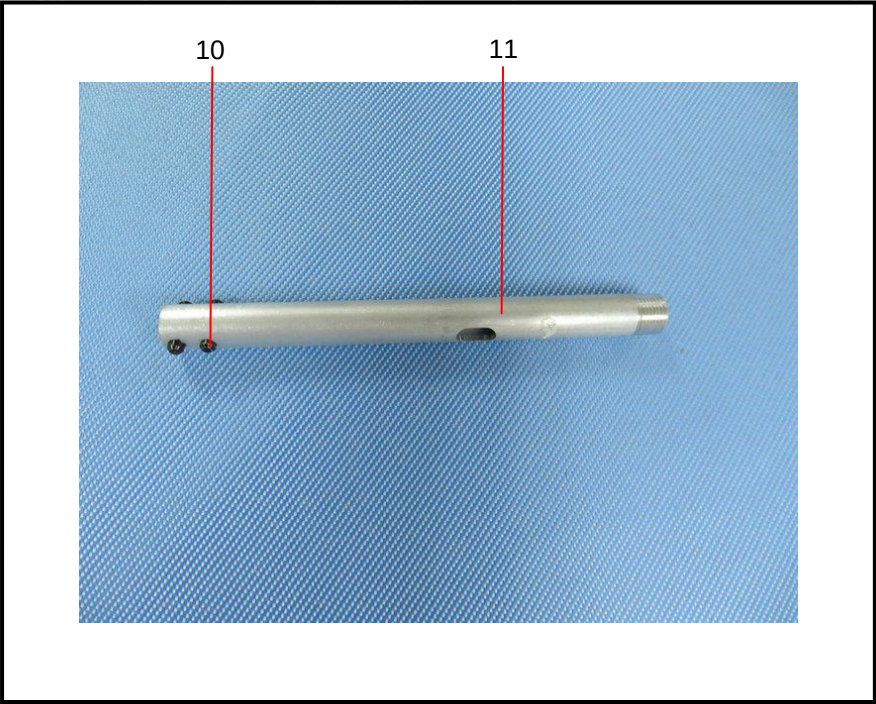


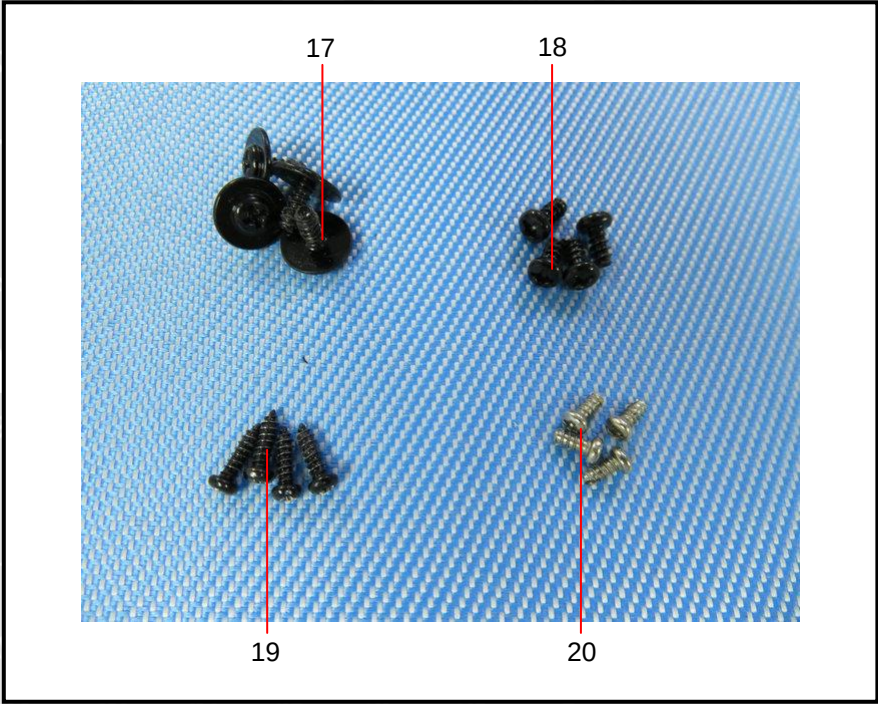
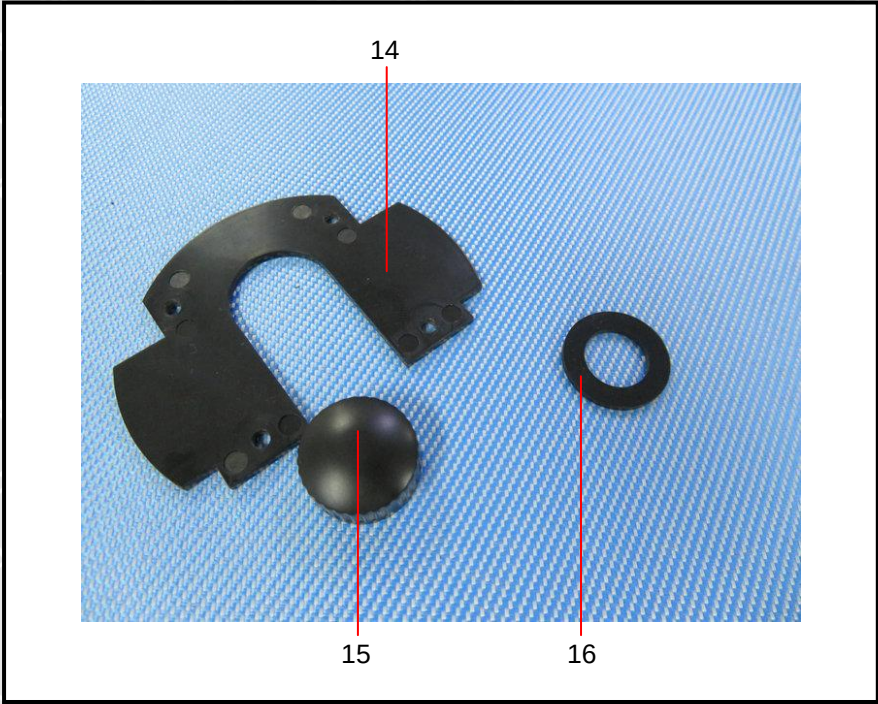
Sample Photo(s):

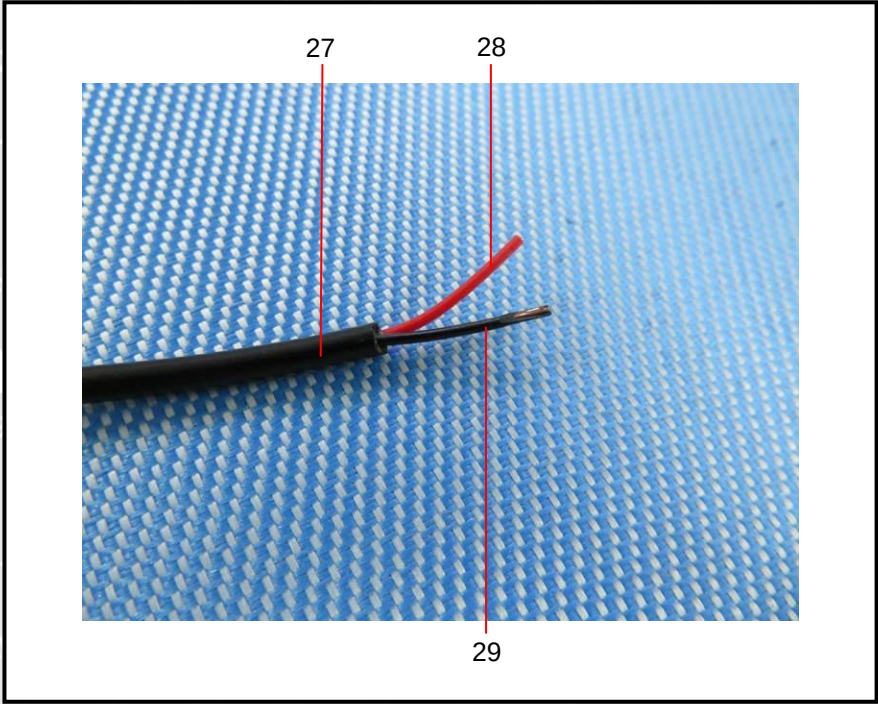
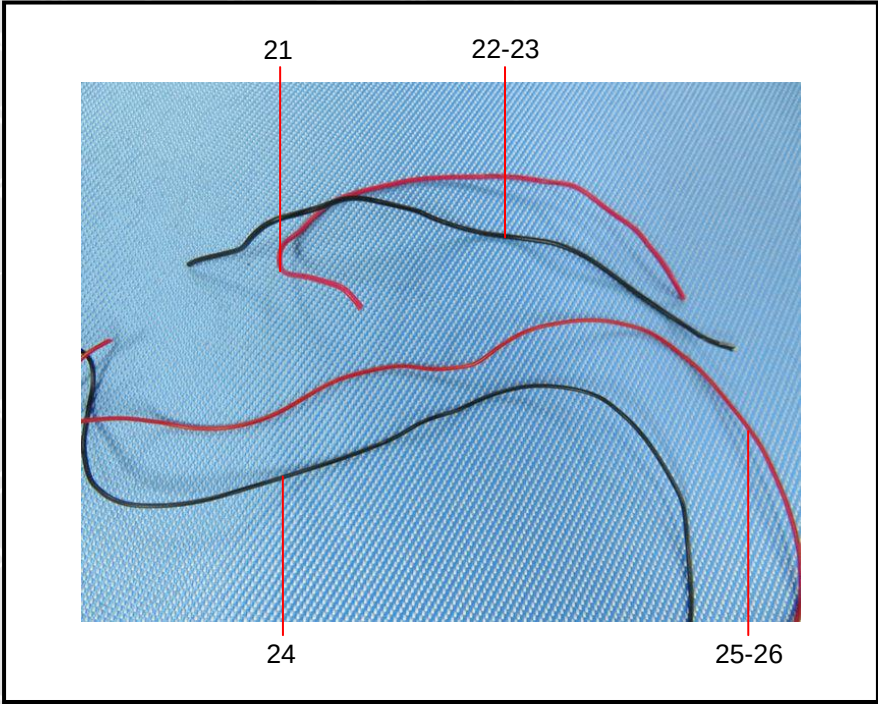


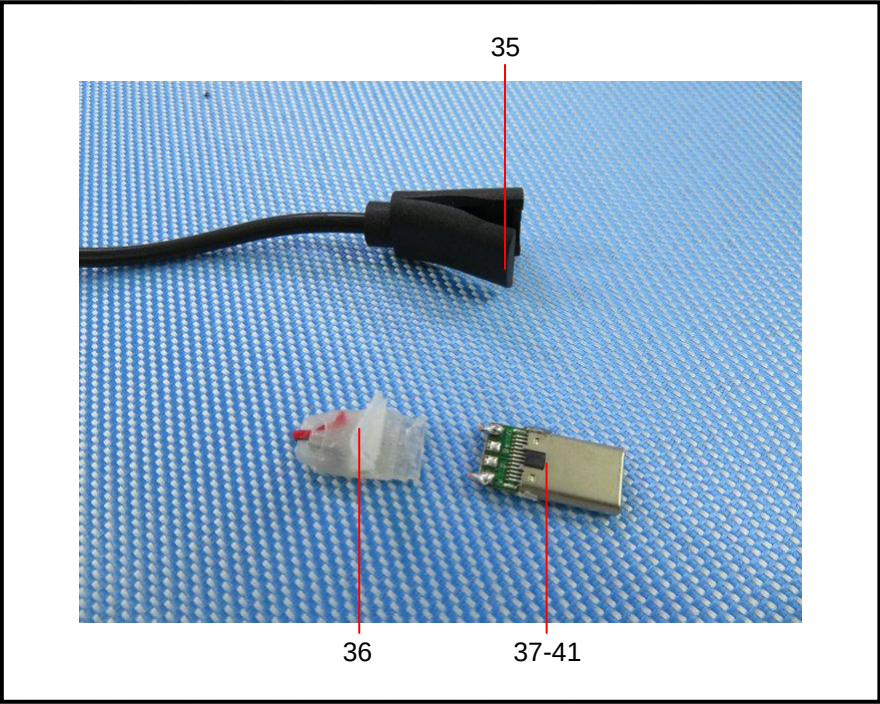
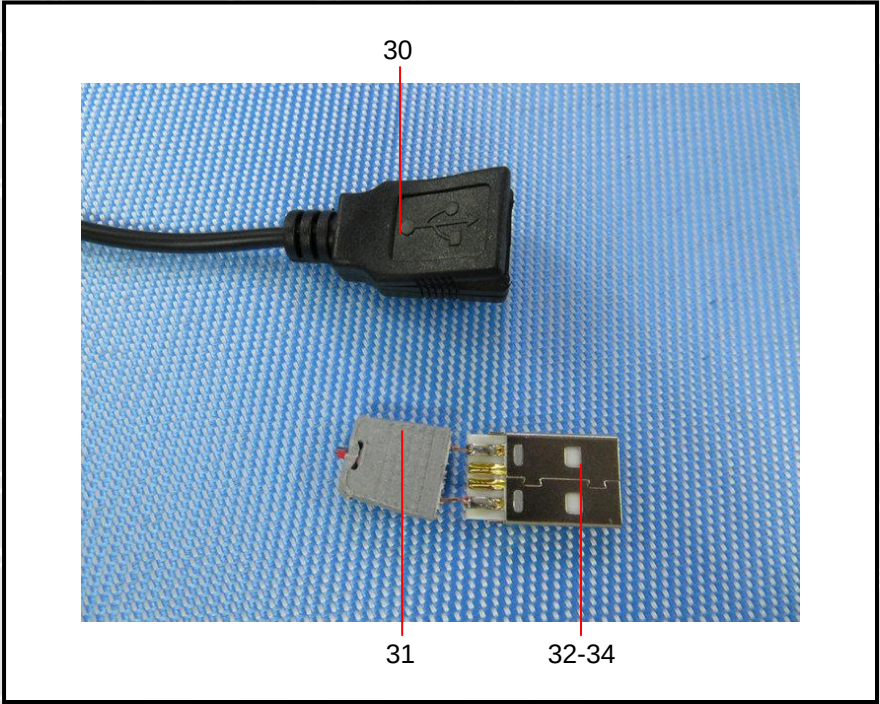
**Photograph(s) of parts tested:**

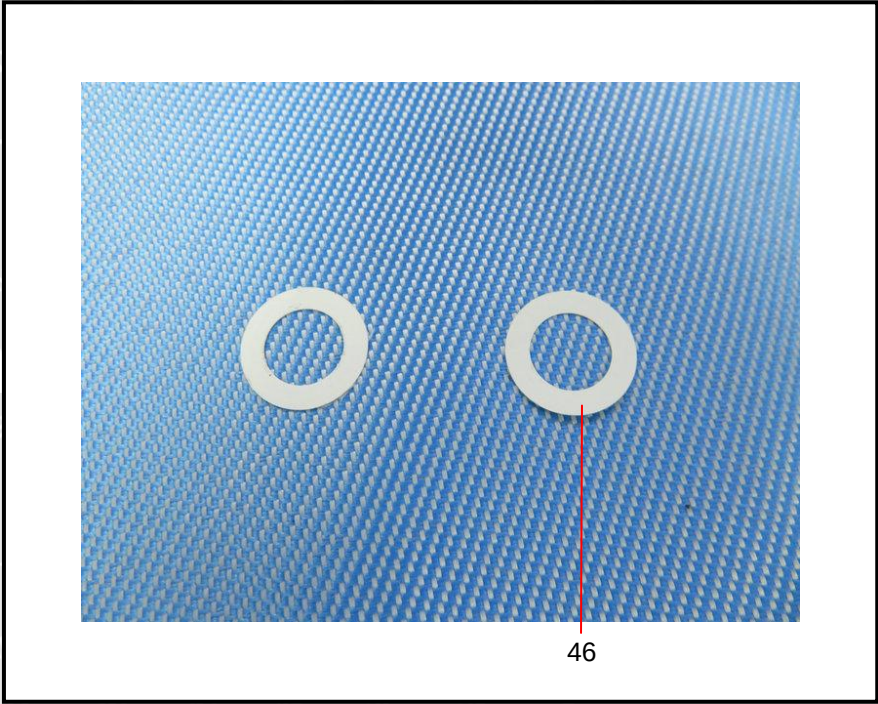
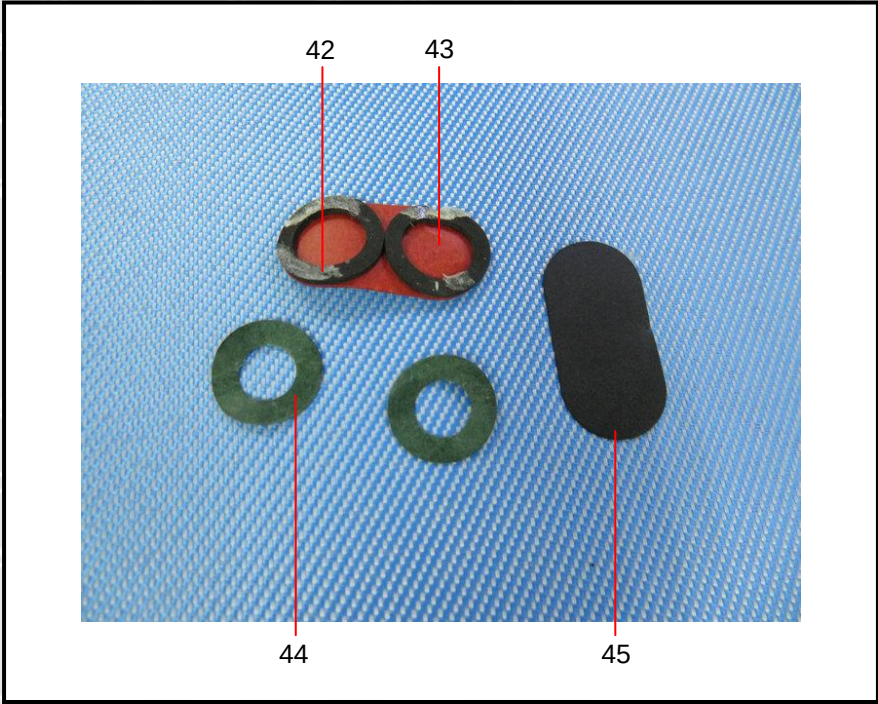


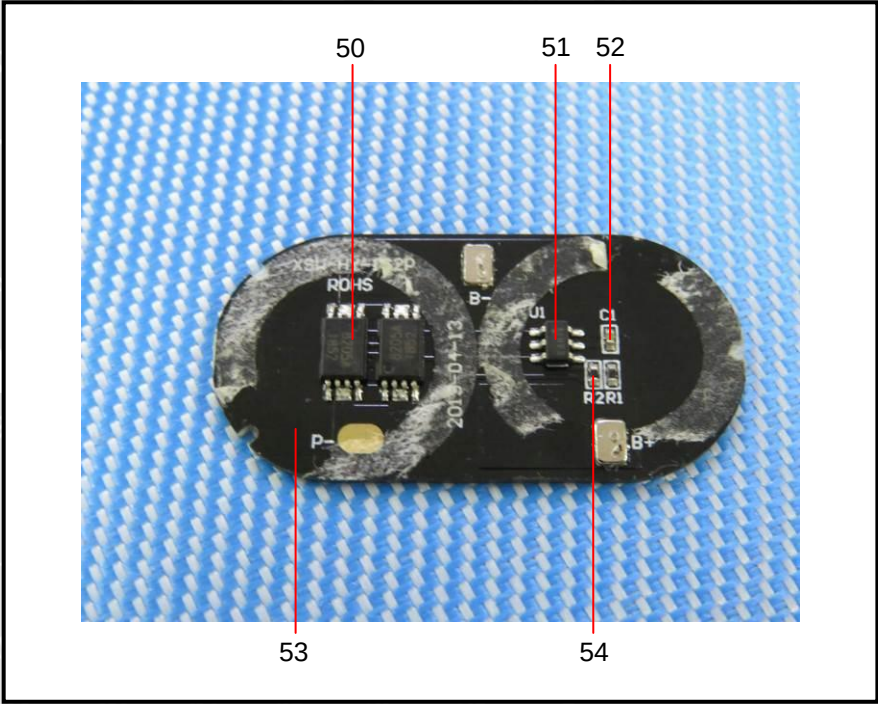
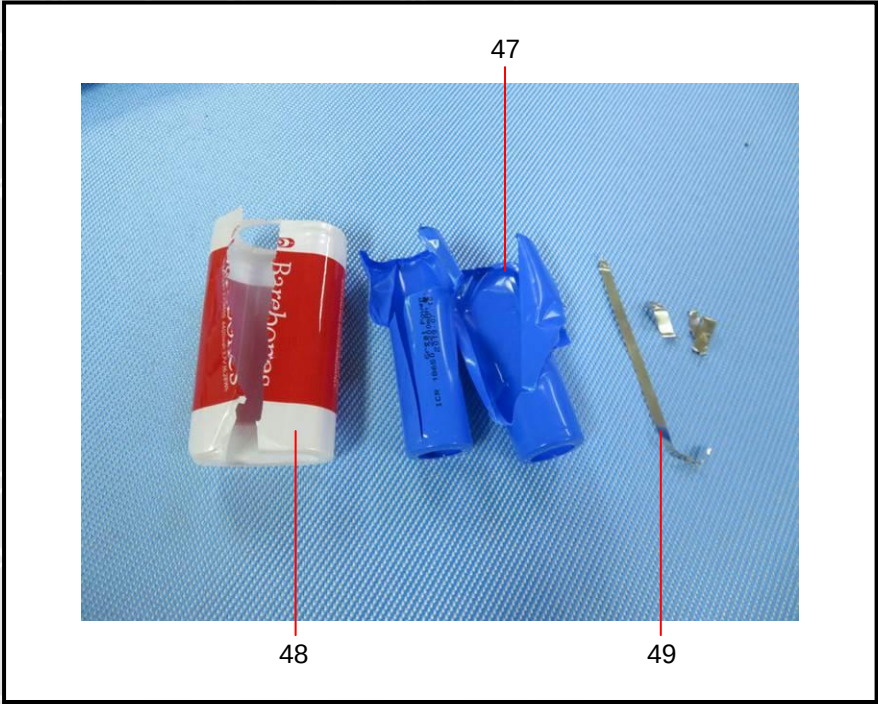


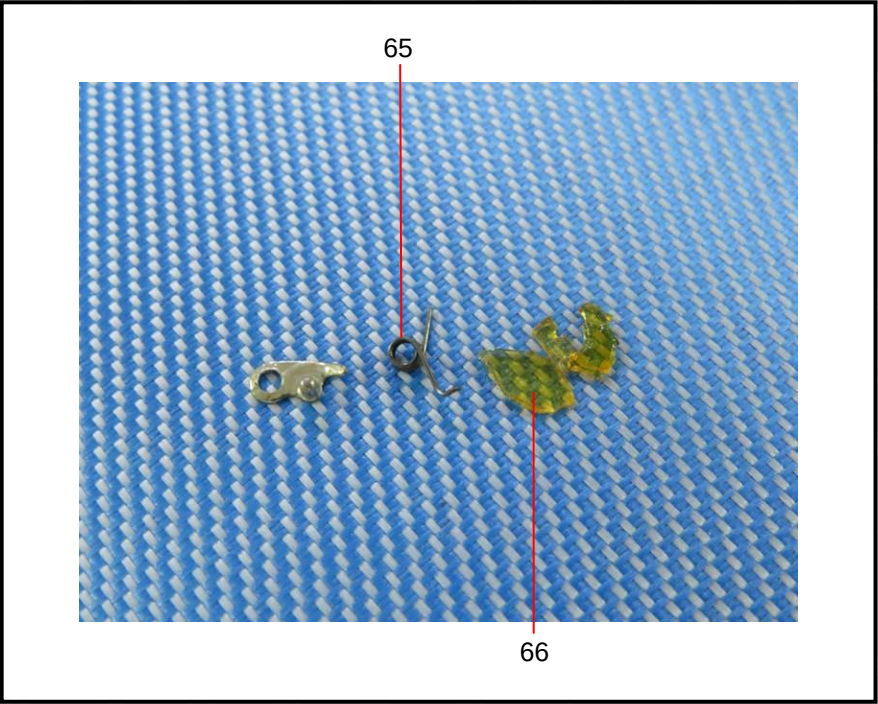
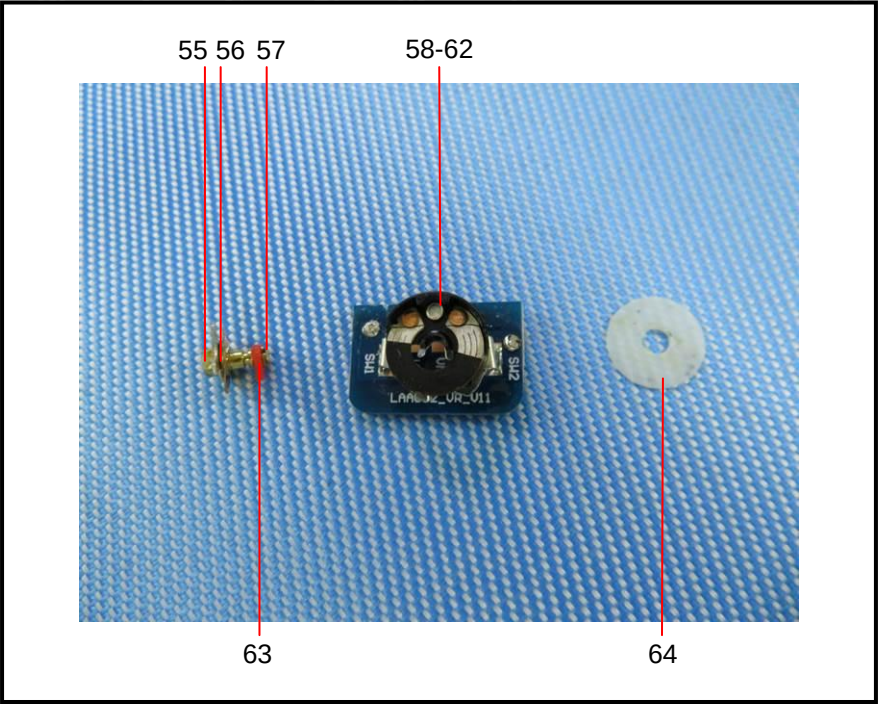


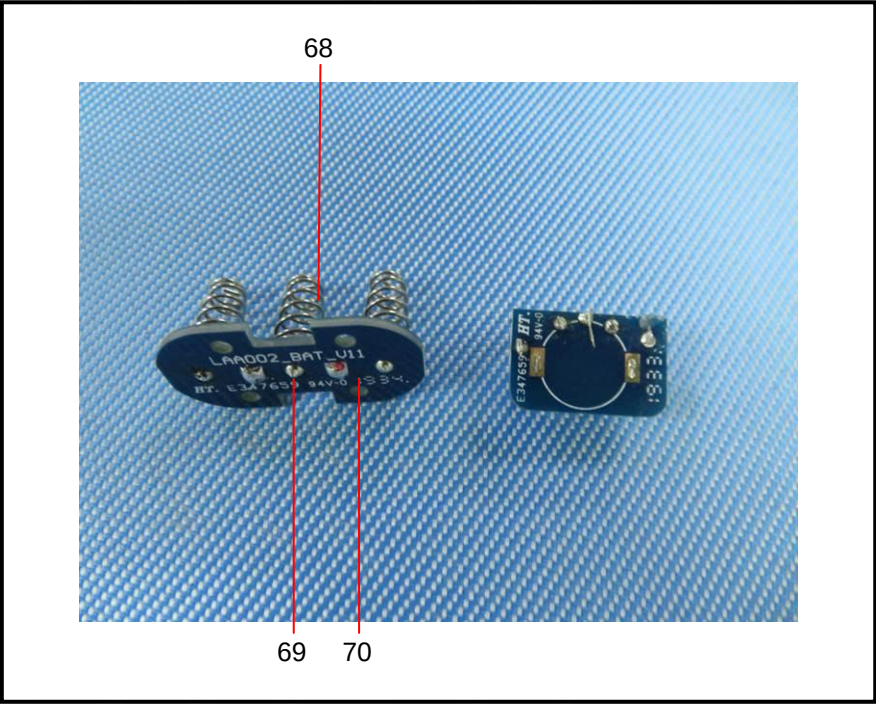
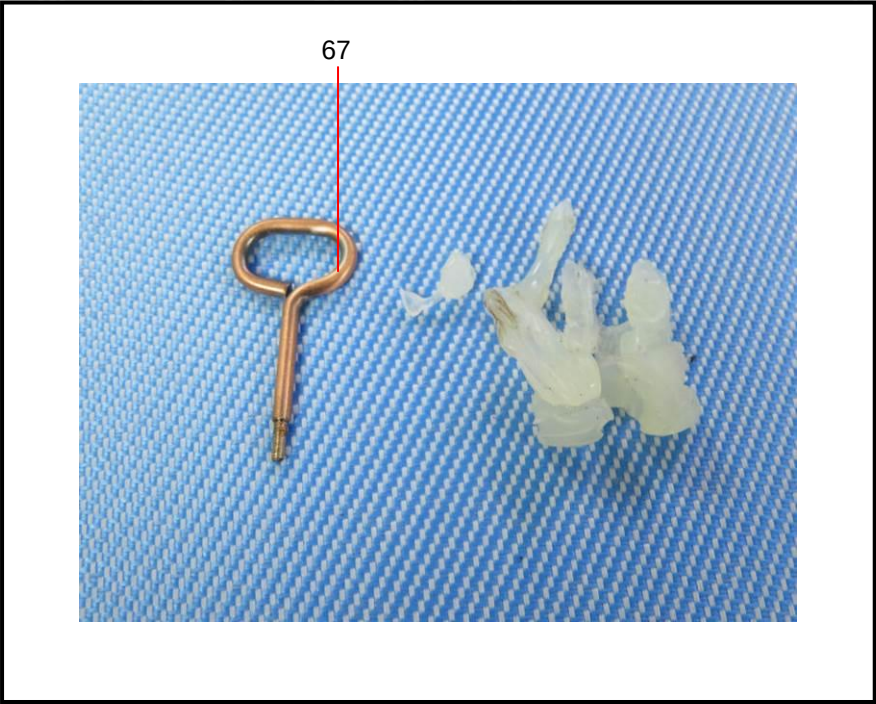


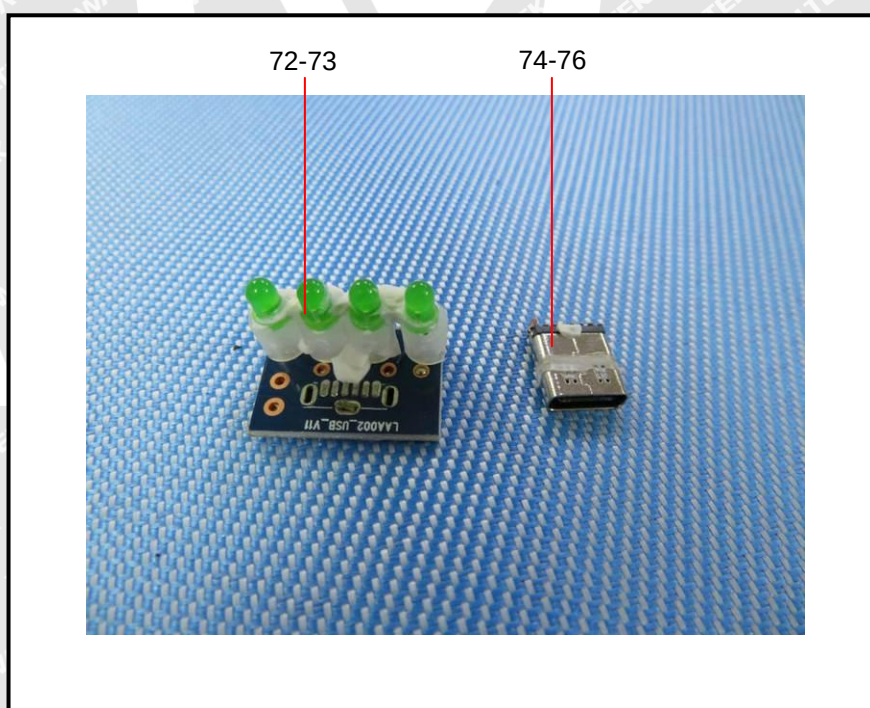
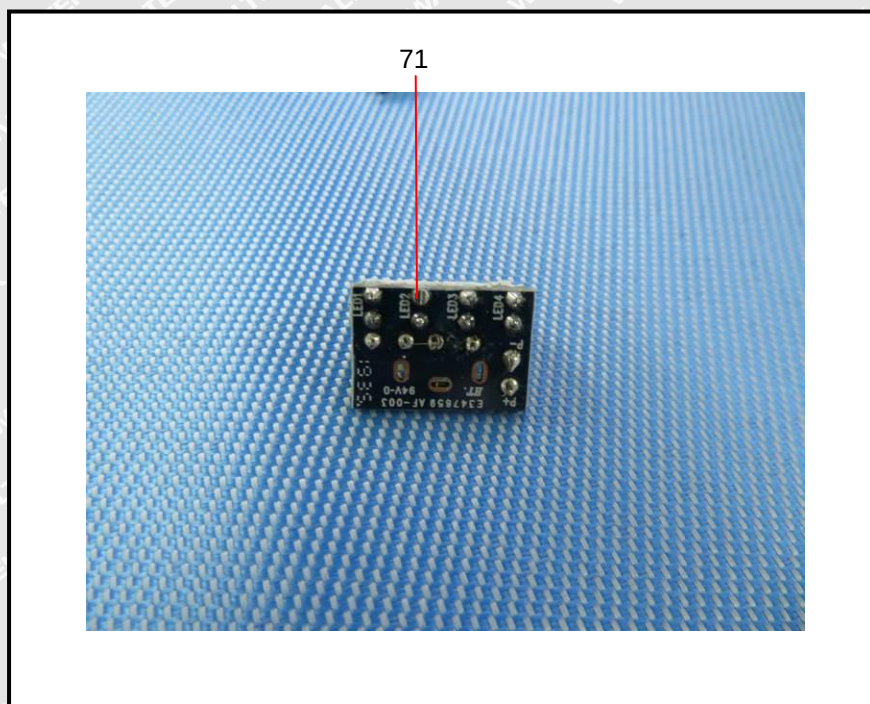


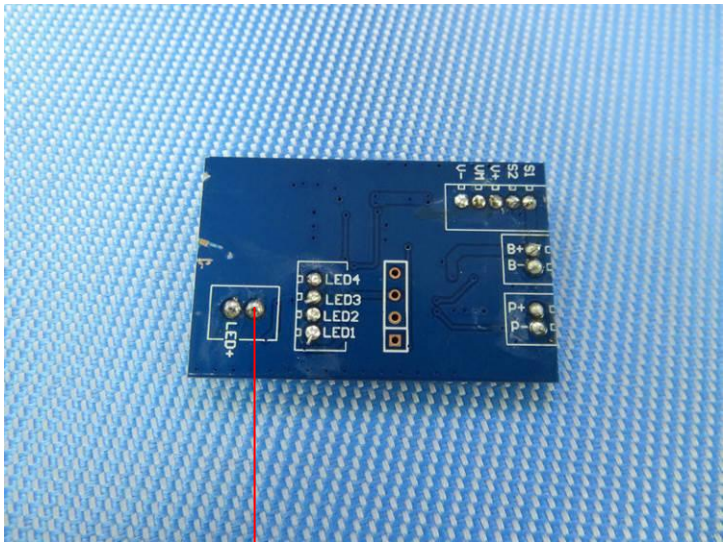




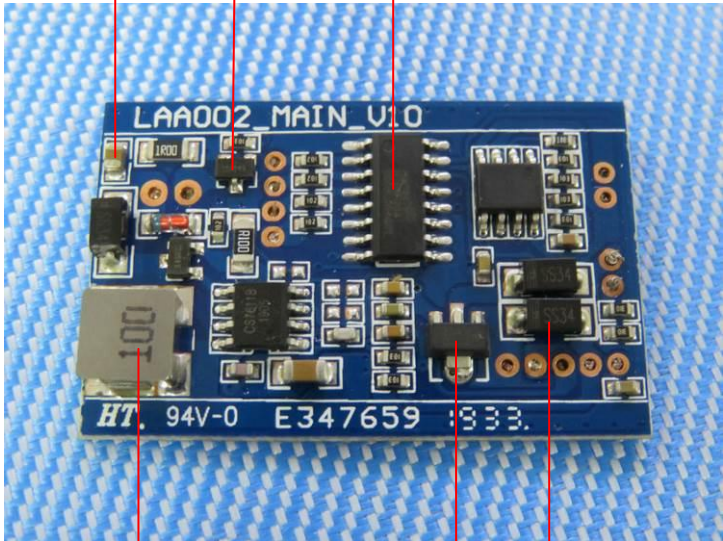








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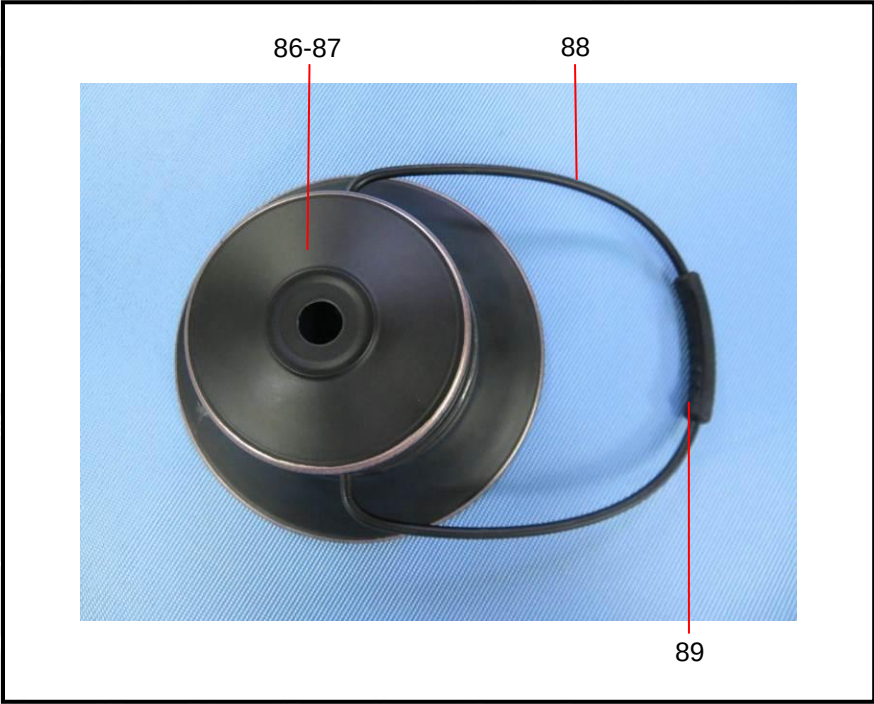
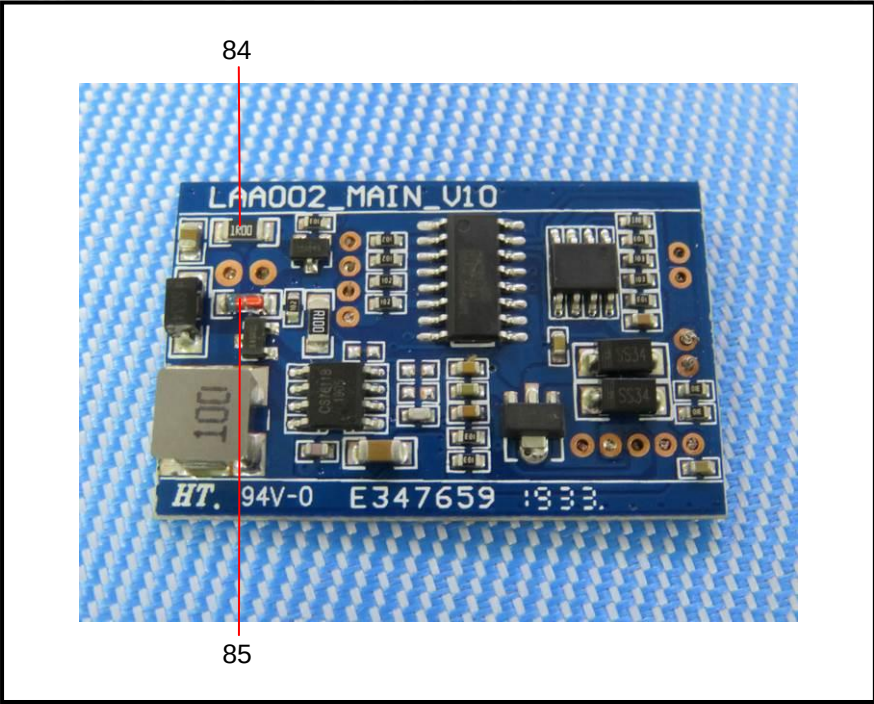
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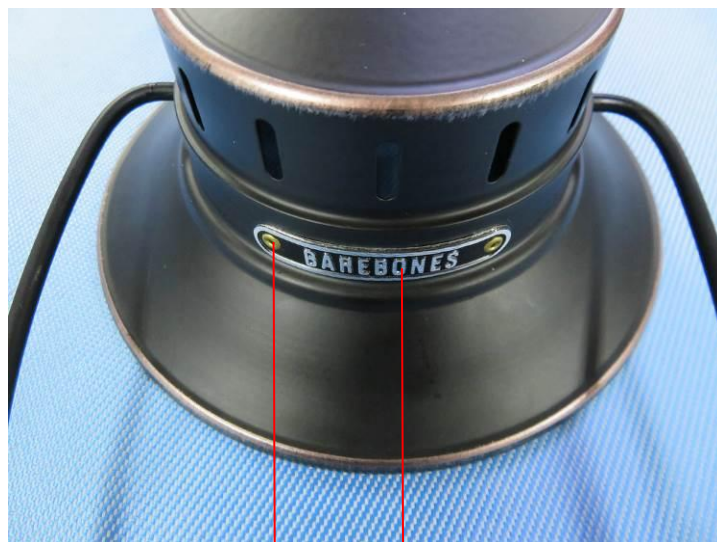
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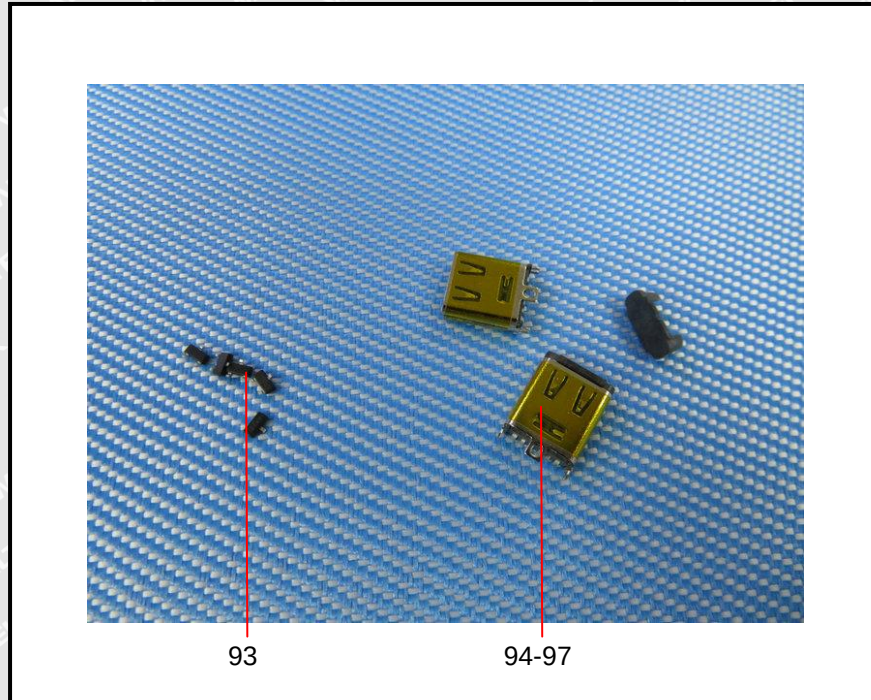


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===== End of Report =====

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