



LCIE

TEST REPORT
IEC 62841-1
Electric Motor-Operated Hand-Held Tools,
Transportable Tools and Lawn and Garden Machinery
– Safety

Report Number..... : NZG-19SE1429TTSHC

Date of issue..... : July 19, 2019

Total number of pages : 16

Testing Laboratory: LCIE CHINA COMPANY LIMITED

Testing location/ address..... : Building 4, No. 518, Xin Zhuan Road, CaoHejing Songjiang High-Tech Park, Shanghai P.R.C (201612)

Tested by (name + signature)..... : Project Engineer:
Guiren LIU

Approved by (name + signature).... : Product Line Manager:
David WANG

Applicant's name : Ningbo YongFeiTe Electrical & Science Co., Ltd.

Address..... : Dalin Huangbi'ao Xiangshan Ningbo, Zhejiang, P.R. China

Test specification:

Standard : EN 62841-1: 2015

Test procedure : CE Scheme

Non-standard test method : N/A

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Test item description..... : Lithium-ion battery system (Rechargeable Li-ion Battery Pack and Battery Charger)

Trade Mark..... : NA

Manufacturer : Ningbo YongFeiTe Electrical & Science Co., Ltd.

Model/Type reference : JOB-YFT51-20A, JOB-YFT51-20B

Ratings..... : 18V / 20V $\overline{\text{---}}$, 2000mAh for JOB-YFT51-20A
18V / 20V $\overline{\text{---}}$, 4000mAh for JOB-YFT51-20B

List of Attachments (including a total number of pages in each attachment):

- Attachment 1: Photograph (page 13-16, total 4 pages)

Summary of testing:**Tests performed (name of test and test clause):**

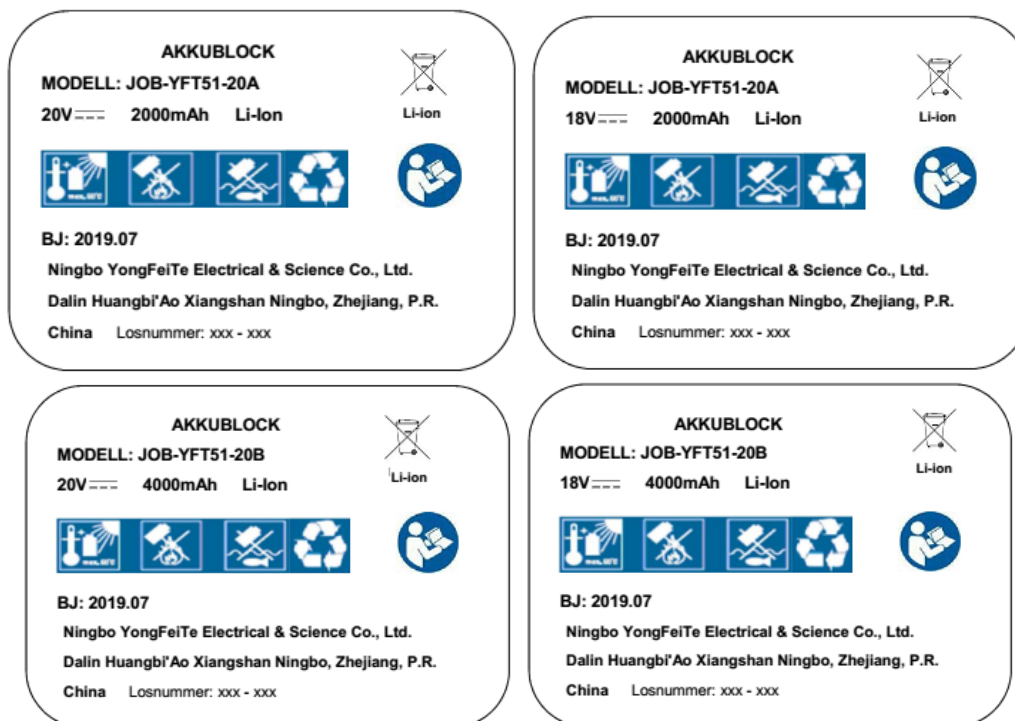
The battery systems were tested according to the following clauses of EN 62841-1:2015.

Clauses of standard have been done:

1. Clause k.8.3 Label check;
2. Clause K.12.201 Normal charging of lithium-ion systems
3. Clause K.13.1, K.13.2 and K.13.2.201 Resistance to heat and fire
4. Clause K.18.1a) Short-circuited test of detachable battery pack terminal
5. Clause K.18.201 Lithium-ion charging systems – abnormal conditions
6. Clause K.18.202 Lithium-ion battery short circuit
7. Clause K.19.202 Lithium-ion enclosure pressure test

Testing location:

Building 4, No. 518, Xin Zhuan Road, CaoHejing Songjiang High-Tech Park, Shanghai P.R.C (201612)

Copy of marking plate:

Test item particulars:		Lithium-ion battery system (Rechargeable Li-ion Battery Pack and Battery Charger)				
Possible test case verdicts:						
- test case does not apply to the test object		N/A or N(Not Applicable)				
- test object does meet the requirement.....:		P (Pass)				
- test object does not meet the requirement		F (Fail)				
Testing						
Date of receipt of test item		Sep. 01, 2019				
Date (s) of performance of tests		Sep. 01, 2019 – Sep. 17, 2019				
General remarks:						
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see table #)" refers to a table appended to the report. Throughout this report a ☒ comma / ☐ point is used as the decimal separator.						
General product information:						
This report is only for partial tests in according to Annex K of EN 62841-1:2015 to evaluate the compliance of BMS (Battery management system).						
Parameters of the battery pack:						
Battery pack Model	Rated voltage	Technical data	End-of-discharge voltage	End charging voltage	Max. charging current	Charging temperature range
JOB-YFT51-20A	18V / 20V	18V d.c, 2,0Ah with 5 Li-ion cells	13,5	21,0	3,0	4-40°C
JOB-YFT51-20B		18V d.c, 4,0Ah with 10 Li-ion cells	13,5	21,0	3,0	4-40°C
Note: Battery No. JOB-YFT51-20A is identical with JOB-YFT51-20B except the rated capacity.						
Parameters of the battery cell:						
Cell manufacturer	Cell model	Rated capacity	Specified operating region for charging			
			End-of-discharge voltage	End charging voltage	Max. charging current	Charging temperature range
Qixin Advanced Power Source Materials Co., Ltd / Ningbo Yongfeite Electrical & science Co., Ltd	ICR18650-2000mAh (ICR19/66)	2000mAh	2,75	4,2V	3A	0-45°C

IEC 62841-1			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX K	BATTERY TOOLS AND BATTERY PACKS		-
K.1	Rated voltage for tools and battery packs ≤ 75 V d.c.		P
K.5.7	Tests to be done at rated voltage were done with a fully charged battery		P
K.5.201	Peak voltage of any superimposed ripple exceeding 10 % of the average value was included		P
K.5.202	Measurements of lithium-ion cell voltages were made using a filter as specified		P
K.5.203	Test area protected against fire and explosion, and well ventilated		P
K.5.204	Discharging and charging as specified		P
K.5.205	Thermocouples for lithium-ion cell temperature measurement located as specified		P
K.5.206	Currents measured during battery charging are average currents		P
K.5.207	Fully charged batteries used, after resting for ≥ 2 h but ≤ 6 h at an ambient temperature of $(20 \pm 5) ^\circ\text{C}$		P
K.5.208	Battery consisting of a single cell not subject to special preparations of a cell in a series configuration		N/A
K.5.209	For series arrangement of parallel clusters of cells, the cluster is treated as single cell for specified tests		N/A
K.5.210	End-of-discharge voltages for common cell chemistries observed		P
K.8.3	Battery tools and detachable or separable battery packs marked with additional information		P
	- Business name and address of the manufacturer and, where applicable, its authorised representative:	See copy of marking plate	—
	- Designation of series or type	See copy of marking plate	—
	Detachable or separable battery packs marked with additional information		P
	- capacity in Ah or mAh	See copy of marking plate	—
	- type of battery.....	See copy of marking plate	—
	No misunderstanding by additional markings		P
K.12.201	Charging of lithium-ion battery under normal conditions did not exceed specified operating region for charging of the cell		P
	Charging procedure as specified		P
	Voltage, temperature and charging current monitored for all individual cells		P
	Test repeated with imbalanced battery		P
K.13.1	Thermoplastic materials of relevant enclosure parts sufficiently resistant to heat		P

IEC 62841-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Ball-pressure test of IEC 60695-10-2:2003	See Table 13.1	P
K.13.2	Glow-wire test applicable only to external enclosure enclosing the current-carrying parts		P
	Non-metallic parts in of detachable or separable battery pack supporting connections that carry $\geq 0,2$ A during charging and those within a distance of 3 mm, subjected to the glow-wire test at 850 °C	See Table 13.2	P
K.13.2.201	Polymeric battery enclosure material around current-carrying parts at least classified V according to IEC 60695-11-10:2013, unless ...		N/A
	... battery pack was tested to K.18.1 a).		P
K.18.1	Risk of fire or electric shock as a result of abnormal operation obviated as far as is practical		N/A
	No charring or burning of gauze or tissue paper resulted when battery tool and battery pack were subjected to any abnormal operations, tests a) to f)	See Table K.18.1 only a) considered	N/A
	No explosion during or after the test		N/A
	Adequate protection against electric shock		N/A
	Component(s) or conductors(s) that interrupt or limit the discharge current that operated operate during the above tests a) to f)	See Table K.18.1	N/A
	Test repeated two more times for devices relied upon to pass the test; devices opened the circuit in the same manner		N/A
	Test repeated with the open-circuited device bridged		N/A
	Protective electronic circuits whose function is relied on to pass a test regarded as providing a SCF and comply with 18.8 with a PL = a	See Table 18.8	N/A
K.18.8	Li-ion charging systems are covered by K.18.201		-
K.18.201	Risk of fire and explosion as a result of abnormal operation during charging of a lithium-ion battery is obviated as far as is practical		P
	No charring or burning of gauze or tissue paper, no explosion resulted when battery tool and battery pack were subjected to any abnormal conditions a) to d)	See Table K.18.201	P
	The cells did not exceed the upper limit charging voltage by more than 150 mV unless...		P
	...charging system permanently was disabled from recharging the battery		P
	No evident damage to the cell vent to impair compliance with Subclause K.21.202.		P
K.18.202	No risk of fire or explosion when main discharge connections of a series configured, integral Li-ion battery, detachable or separable Li-ion battery pack were shorted under extreme imbalance		P

IEC 62841-1			
Clause	Requirement + Test	Result - Remark	Verdict
	All cells fully charged, one cell fully discharged		P
	Main discharge connections of the battery were shorted, resistance $\leq 10 \text{ m}\Omega$		P
	No explosion during or after the test		P
	No charring or burning of the gauze or tissue paper		P
	Component(s) or conductors(s) that interrupt or limit the discharge current that operated operate during the above tests		N/A
	Test repeated two more times for devices relied upon to pass the test; devices opened the circuit in the same manner		N/A
	Test repeated with the open-circuited device bridged		N/A
	Protective electronic circuits whose function is relied on to pass a test regarded as providing a SCF and comply with 18.8 with a PL = a	See Table 18.8	P
K.19.202	Li-ion battery enclosure designed to safely release gases generated as a result of venting		P
	Total area of the openings in the enclosure allowing gases to pass without obstruction is $\geq 20 \text{ mm}^2$; or...		P
	... pressure drop within enclosure was tested , no rupture occurred		N/A

IEC 62841-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Critical components information for battery pack

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Enclosure of battery pack	Ningbo Yongfeite Electrical & science Co., Ltd	--	ABS	EN 62841-1	Test with appliance
Battery cell	Qixin Advanced Power Source Materials Co., Ltd / Ningbo Yongfeite Electrical & science Co., Ltd	ICR18650-2000mAh (ICR19/66)	Li-ion 3,7V 2000mAh	IEC 62133	TUV Rh CB (JPTUV-087420 for CB Main licence, JPTUV-092450 for Co-CB licence)
PCB	GUANGDE YINGFEITE ELECTRONIC CO LTD	YFT2	V-0, 130°C	EN 62841-1	Tested with appliance UL E466867
Alt-	KINGBOARD LAMINATES HOLDINGS LTD	FR-4.0	V-0, 130°C	EN 62841-1	Tested with appliance UL E123995
MOSFET	Jiangsu Donghai Semiconductor Technology Co., Ltd.	30H10K	30V/100A MAX=5.5mR	EN 62841-1	Tested with appliance
Battery charger	Ningbo Yongfeite Electrical & science Co., Ltd	CH-YFT2100-2500	Input: 220-240V~, 50Hz, 0.4A, Output: 21V --- 2500mA	EN 60335-1 EN 60335-2-29	TUV Rh S50395989 BV report No.: NZG-19MY1169TC SHC-A1

¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.

K.12.201A	TABLE: Normal charging of Lithium-ion systems– charging under normal ambient temperature			P
Ambient temperature (°C)	21,8			-
Temperature of product operated (°C)	4-40			-
Battery charger with battery pack	JOB-YFT51-20A with CH-YFT2100-2500			-
	Maximum charging voltage (V)	Maximum charging current (A)	Maximum temperature (°C)	
Specified operating region for charging of cell	4,2	3,0	45	
Cell 1	4,18	2,51	35,7	
Cell 2	4,17	2,51	36,3	
Cell 3	4,17	2,51	36,9	
Cell 4	4,18	2,51	36,7	
Cell 5	4,18	2,51	36,3	
Supplementary Information: None.				
Status of overload protector at end of test [] No change [] Opened during the Test [] N/A				

IEC 62841-1			
Clause	Requirement + Test	Result - Remark	Verdict

K.12.201A	TABLE: Normal charging of Lithium-ion systems– charging under normal ambient temperature			P
Ambient temperature (°C)	:	20,5		-
Temperature of product operated (°C)	:	4-40		-
Battery charger with battery pack	:	JOB-YFT51-20B with CH-YFT2100-2500		-
	Maximum charging voltage (V)	Maximum charging current (A)	Maximum temperature (°C)	
Specified operating region for charging of cell	4,2	3,0	45	
Cell 1	4,18	2,509	34,4	
Cell 2	4,17	2,509	35,8	
Cell 3	4,18	2,509	35,6	
Cell 4	4,18	2,509	35,6	
Cell 5	4,17	2,509	35,1	
Supplementary Information: None.				
Status of overload protector at end of test ☐ No change ☐ Opened during the Test ☐ N/A				

K.12.201B	TABLE: Normal charging of Lithium-ion systems with imbalance battery			P
Ambient temperature (°C)	:	21,0		-
Temperature of product operated (°C)	:	4-40		-
Battery charger with battery pack	:	JOB-YFT51-20A with CH-YFT2100-2500		-
	Maximum charging voltage (V)	Maximum charging current (A)	Maximum temperature (°C)	
Specified operating region for charging of cell	4,2	3,0	45	
Cell 1	3,67	2,51	29,1	
Cell 2	3,66	2,51	29,2	
Cell 3	4,18	2,51	29,1	
Cell 4	3,66	2,51	29,1	
Cell 5	3,67	2,51	29,0	
Supplementary Information: None.				
Status of overload protector at end of test ☐ No change ☐ Opened during the Test ☐ N/A				

IEC 62841-1			
Clause	Requirement + Test	Result - Remark	Verdict

K.18.1	TABLE: Battery Tool Abnormal Operation				N/A
Abnormal conditions		Explosion occurred?	Charring or burning of test materials?	Protector Operated ?	Test repeated 3 more times?
a) Terminals of detachable battery pack with exposed terminals shorted		N/A	N/A	N/A	N/A
b) Motor terminals shorted		N/A	N/A	N/A	N/A
c) Motor rotor locked		N/A	N/A	N/A	N/A
d) Cord between battery tool and separable battery pack shorted		N/A	N/A	N/A	N/A
e) Cord provided the tool and the charger shorted		N/A	N/A	N/A	N/A
f) Any two uninsulated parts of opposite polarity in battery tools shorted		N/A	N/A	N/A	N/A
Supplementary Information:					

K.18.201a)	TABLE: Lithium-ion charging systems – Abnormal Operation						P
Ambient temperature (°C) :				20,5			
Battery charger with battery pack :				Charger CH-YFT2100-2500 with battery pack JOB-YFT51-20A			
Components in the charging system faulted as in 18.6.1 b) to f) :				See below			
Component	Fault Condition	Test duration	Explosion occurred?	Charging or burning of test materials ?	Upper limit charging voltage not exceeded by >150 mV ¹⁾	Charging system permanently Disabled? ²⁾	Cell vent damaged ?
R3, R24, R10, Q2, D2, put imbalance on cell CL1	Open-circuit	Until returns to within 5K of the ambient temperature	NO	NO	Yes	N/A	No
D3, D5, Q12, Q1, Q2, D1, Q8, Q19, Q11, Q16 in battery	Short-circuit		NO	NO	Yes	N/A	No
D9, U2 in charger	Short-circuit		NO	NO	Yes	N/A	No
D9, U2, C9, C12, C12 in charger	Open-circuit		NO	NO	Yes	N/A	No

IEC 62841-1			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary Information: None.

One of conditions ¹⁾ or ²⁾ is sufficient to achieve compliance with this subclause.

Status of overload protector at end of test ☐ No change ☐ Opened during the Test ☐ N/A

K.18.201 b)	TABLE: Lithium-ion charging systems – Abnormal Operation						N/A
Ambient temperature (°C)				-			
Charge a fully discharged battery pack with one cell 50% charged				-			
Battery Charger	Battery pack	Test duration	Explosion occurred?	Charging or burning of test materials ?	Upper limit charging voltage not exceeded by >150 mV ¹⁾	Charging system permanently Disabled? ²⁾	Cell vent damaged?

Supplementary Information: None.

One of conditions ¹⁾ or ²⁾ is sufficient to achieve compliance with this subclause.

Status of overload protector at end of test ☐ No change ☐ Opened during the Test ☐ N/A

K.18.201c)	TABLE: Lithium-ion charging systems – Abnormal Operation						P
Ambient temperature (°C)				20,5			
Charge a battery pack with all cells 50% charged, one cell shorted				-			
Battery Charger	Battery pack	Test duration	Explosion occurred?	Charging or burning of test materials?	Upper limit charging voltage not exceeded by >150 mV ¹⁾	Charging system permanently Disabled? ²⁾	Cell vent damaged?
CH-YFT2100-2500	JOB-YFT51-20A	Until returns to within 5K of the ambient temperature	NO	NO	Yes	N/A	NO

Supplementary Information: None.

One of conditions ¹⁾ or ²⁾ is sufficient to achieve compliance with this subclause.

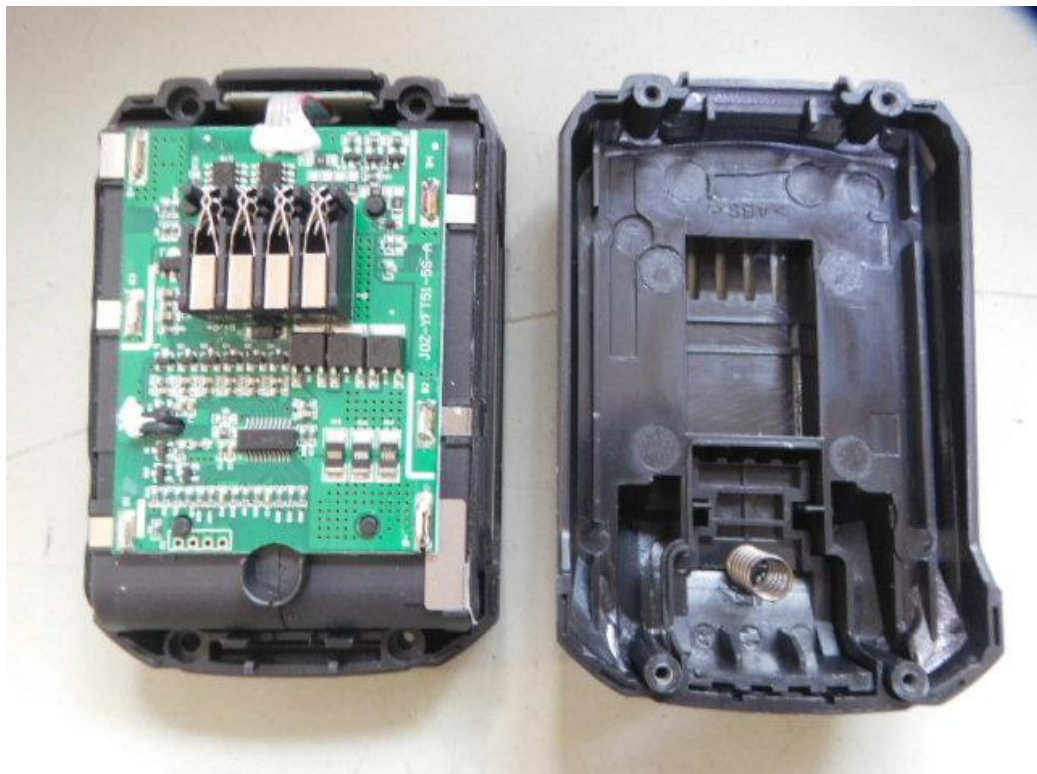
Status of overload protector at end of test ☐ No change ☐ Opened during the Test ☐ N/A

IEC62841_1A - ATTACHMENT

Clause	Requirement + Test	Result - Remark	Verdict
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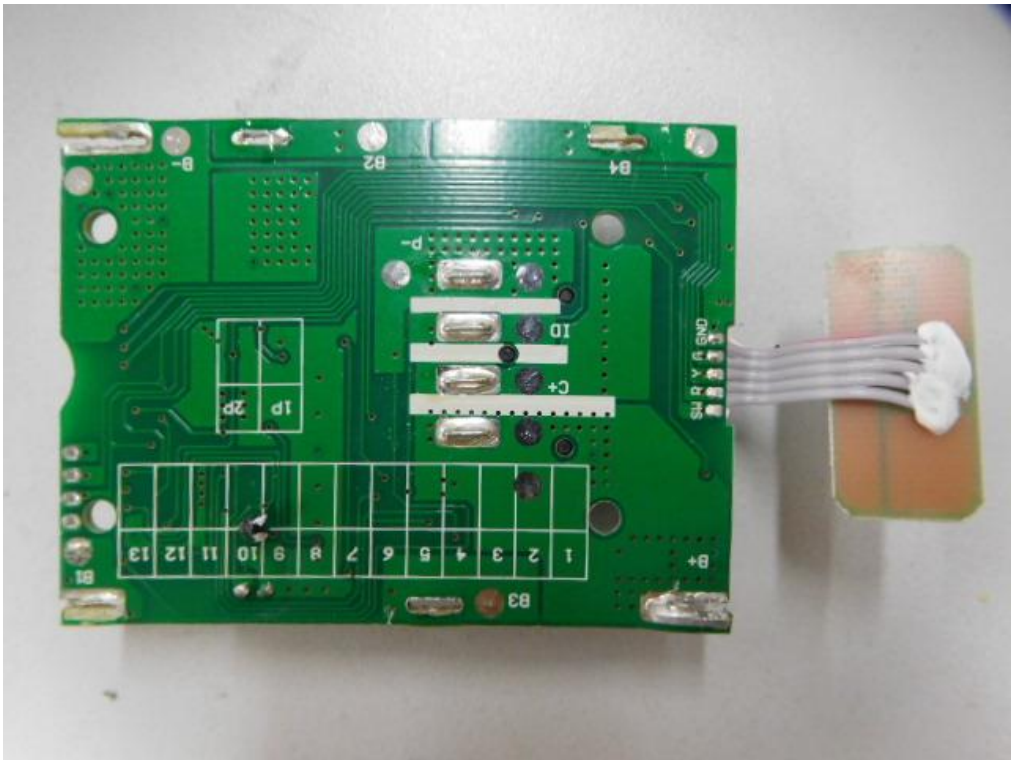
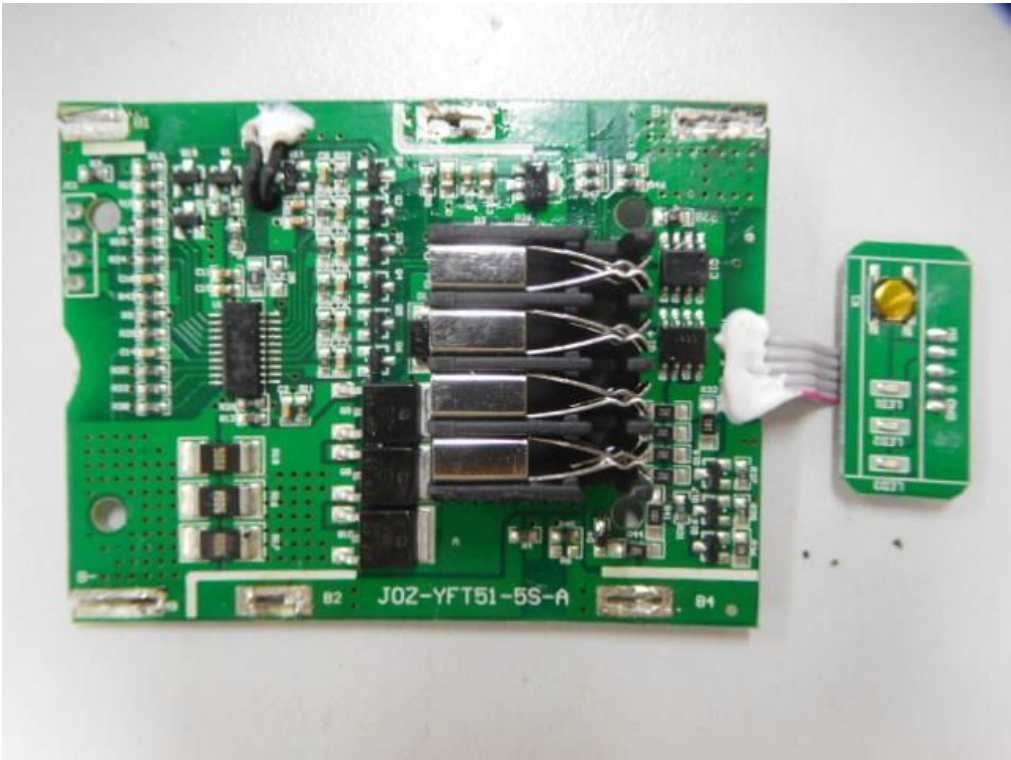
Attachment 1: photograph

JOB-YFT51-20A



IEC62841_1A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

Attachment 1: photograph



IEC62841_1A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

Attachment 1: photograph

JOB-YFT51-20B



IEC62841_1A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

Attachment 1: photograph

Charger

