

MODELS

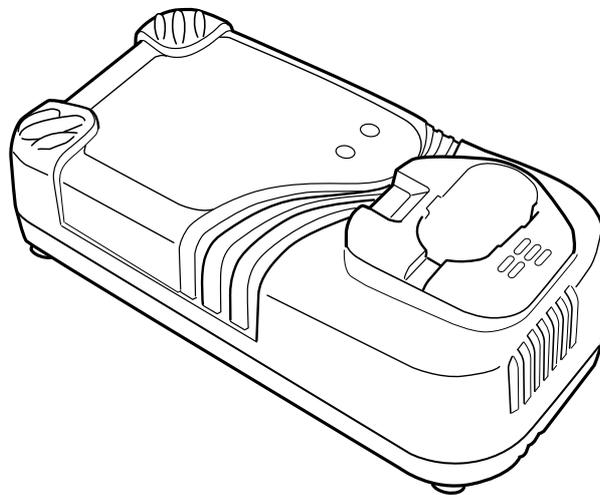
UC 18YRL

UC 18YFL

Hitachi Power Tools

**CHARGER
UC 18YRL/UC 18YFL**

**TECHNICAL DATA
AND
SERVICE MANUAL**



LIST Nos.: UC 18YRL: G845
UC 18YFL: G844

Nov. 2006



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1. PRODUCT NAME

Hitachi Charger, Models UC 18YRL and UC 18YFL

2. MARKETING OBJECTIVE

The new chargers Models UC 18YRL and UC 18YFL are developed to recharge the Hitachi's new lithium-ion batteries. They are also capable of recharging the currently applicable nickel cadmium (Ni-Cd) and nickel metal hydride (Ni-MH) batteries. Thanks to the cooling fan incorporated in the Model UC 18YRL (except the Model UC 18YFL), the time required for recharging a battery and the time required for waiting until a hot battery is cooled down to the allowable temperature are substantially shorter than the Model UC 24YFA.

3. APPLICATIONS

Recharging of Hitachi batteries

Applicable batteries:

Ni-Cd batteries*	EB 712S	[7.2 V, 1.2 Ah]	EB 714S	[7.2 V, 1.4 Ah]	
	EB 912S	[9.6 V, 1.2 Ah]	FEB 7S	[7.2 V, 1.2 Ah]	
	EB 1212S	[12 V, 1.2 Ah]	EB 7B	[7.2 V, 2.0 Ah]	
	EB 1412S	[14.4 V, 1.2 Ah]	EB 914S	[9.6 V, 1.4 Ah]	
	EB 7S	[7.2 V, 1.3 Ah]	FEB 9S	[9.6 V, 1.2 Ah]	
	EB 9S	[9.6 V, 1.3 Ah]	FEB 12S	[12 V, 1.4 Ah]	
	EB 12S	[12 V, 1.3 Ah]	EB 1214S	[12 V, 1.4 Ah]	
	EB 914	[9.6 V, 1.4 Ah]	EB 1214L	[12 V, 1.4 Ah]	
	EB 1414	[14.4 V, 1.4 Ah]	EB 1414S	[14.4 V, 1.4 Ah]	
	EB 9B	[9.6 V, 2.0 Ah]	EB 1812S	[18 V, 1.2 Ah]	
	EB 12B	[12 V, 2.0 Ah]	EB 18B	[18 V, 2.0 Ah]	
	EB 14B	[14.4 V, 2.0 Ah]	EB 1820	[18 V, 2.0 Ah]	
	EB 1220BL	[12 V, 2.0 Ah]	EB 1814SL	[18 V, 1.4 Ah]	
	EB 924	[9.6 V, 2.4 Ah]	EB 1820L	[18 V, 2.0 Ah]	
	EB 1224	[12 V, 2.4 Ah]	EB 1824L	[18 V, 2.4 Ah]	
	EB 1424	[14.4 V, 2.4 Ah]			
	Ni-MH batteries	EB 1222HL	[12 V, 2.2 Ah]	EB 926H	[9.6 V, 2.6 Ah]
		EB 930H	[9.6 V, 3.0 Ah]	EB 1226H	[12 V, 2.6 Ah]
EB 1230H		[12 V, 3.0 Ah]	EB 1426H	[14.4 V, 2.6 Ah]	
EB 1230HL		[12 V, 3.0 Ah]	EB 1826HL		
EB 1430H		[14.4 V, 3.0 Ah]			
Super Ni-MH batteries	EB 933X	[9.6 V, 3.3 Ah]			
	EB 1230X	[12 V, 3.0 Ah]			
	EB 1233X	[12 V, 3.3 Ah]			
	EB 1430X	[14.4 V, 3.0 Ah]			
	EB 1433X	[14.4 V, 3.3 Ah]			
	EB 1830X	[18 V, 3.0 Ah]			
	EB 1833X	[18 V, 3.3 Ah]			
Li-ion batteries	EBL 1430	[14.4 V, 3.0 Ah]			
	EBM 1830	[18 V, 3.0 Ah]			

4. SELLING POINTS

- (1) Accepts both Ni-MH and Ni-Cd batteries
- (2) Rapidly charges all Hitachi EB-series batteries

Charging time:

1.2 Ah..... 18 minutes	2.0 Ah..... 30 minutes	2.6 Ah..... 40 minutes	3.3 Ah..... 50 minutes
1.4 Ah..... 20 minutes	2.4 Ah..... 35 minutes	3.0 Ah..... 45 minutes	

- (3) Hitachi original charge control mechanism for longer battery life

Capable of recharging both nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH), SUPER nickel metal hydride (SUPER Ni-MH) and Lithium ion (Li-ion) batteries

Recharging/discharging cycles of battery
(ambient temperature range between 10°C and 30°C)

- Ni-Cd: about 1,000 times
- Ni-MH: about 500 times
- SUPER Ni-MH: about 1,500 times
- Li-ion: about 1,500 times

Capable of recharging batteries with internal temperatures as high as 60°C (nickel cadmium (Ni-Cd) batteries)



General purpose charger capable of recharging 7.2 V to 18 V batteries

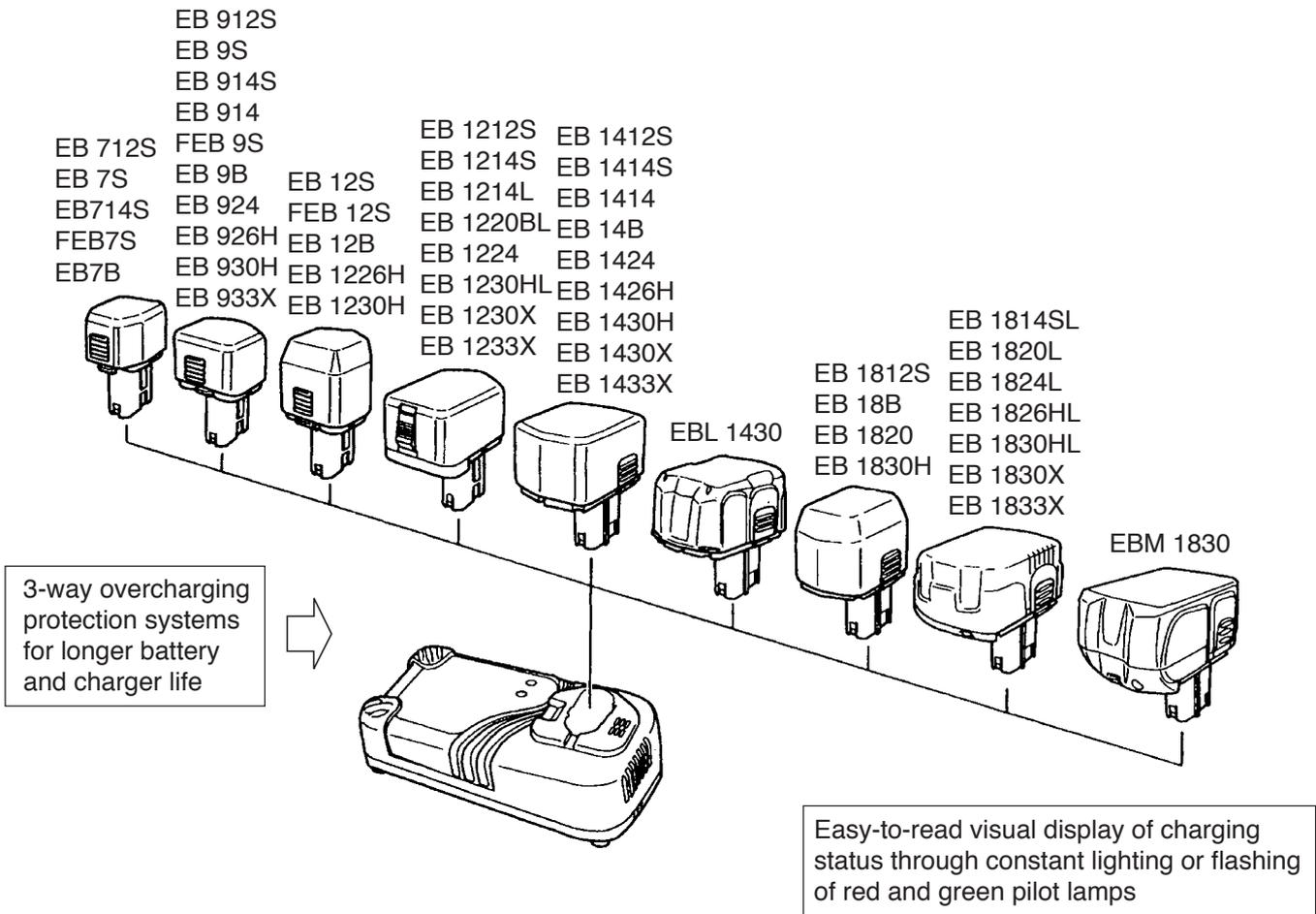


Fig. 1

4-1. Selling Point Descriptions

4-1-1. Capable of handling both nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH), SUPER nickel metal hydride (SUPER Ni-MH) and lithium ion (Li-ion) batteries

Thanks to the application of HITACHI's microcomputer and electronic-circuit control technology, the Model UC 18YRL/UC 18YFL is capable of handling Ni-Cd, Ni-MH, SUPER nickel metal hydride (SUPER Ni-MH) and lithium-ion (Li-ion) batteries.

4-1-2. Recharging/discharging cycles of battery (ambient temperature range between 10°C and 30°C)

- Ni-Cd battery: about 1,000 times
- SUPER Ni-NH: about 1,500 times
- Ni-MH battery: about 500 times
- Li-ion: about 1,500 times

Recharging/discharging cycles of Ni-Cd, Ni-MH and SUPER Ni-MH batteries can be dramatically increased by stopping recharging just before the overcharging range by means of the $-\Delta V$ system or the dT/dt system. (Refer to 4-1-4 for detail.) When recharging a lithium-ion battery, the Model UC 18YRL/UC 18YFL can detect the decrease in charging current (stop current) and stop recharging automatically.

4-1-3. Capable of recharging batteries with internal temperatures as high as 60 °C

Each nickel cadmium (Ni-Cd) battery shown in Figs. 2 and 3 incorporates a thermistor. The Models UC 18YRL and UC 18YFL can continue recharging these batteries until the battery temperature reaches 60 °C.

(Note 1) • Wiring diagrams for batteries are shown below.

- The thermistor is an element to detect the battery temperature.
- The 95 °C thermal protector incorporated in each 14.4 V and 18 V battery interrupts the recharging circuit when the battery temperature reaches 95 °C.
- The discriminating resistor is incorporated to distinguish Ni-Cd batteries from other batteries.
- Because the nickel metal hydride (Ni-MH), SUPER nickel metal hydride (SUPER Ni-MH) and lithium-ion (Li-ion) batteries are heated to high temperatures during recharging, this charger operates within a range of 10°C temperature difference between the maximum battery temperature when starting recharging (45 °C) and the temperature when stopping recharging (55 °C).

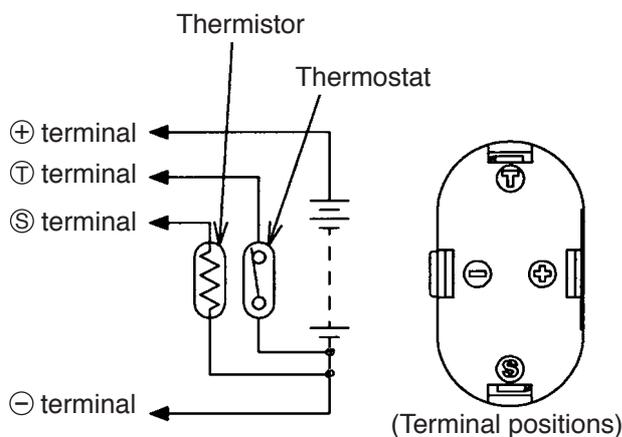


Fig. 2 Ni-Cd batteries (7.2 to 12 V)

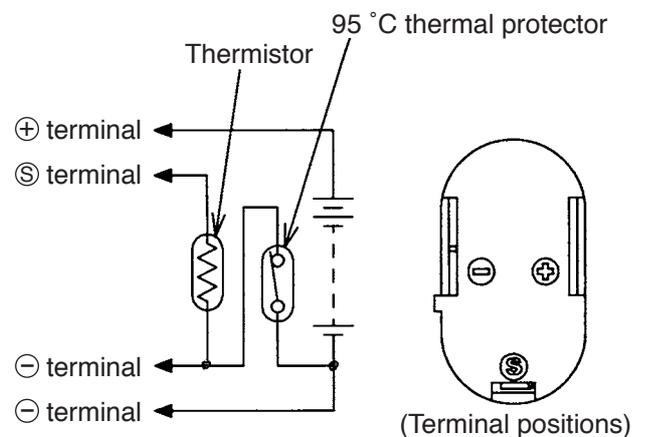


Fig. 3 Ni-Cd batteries (14.4 V, 18 V)

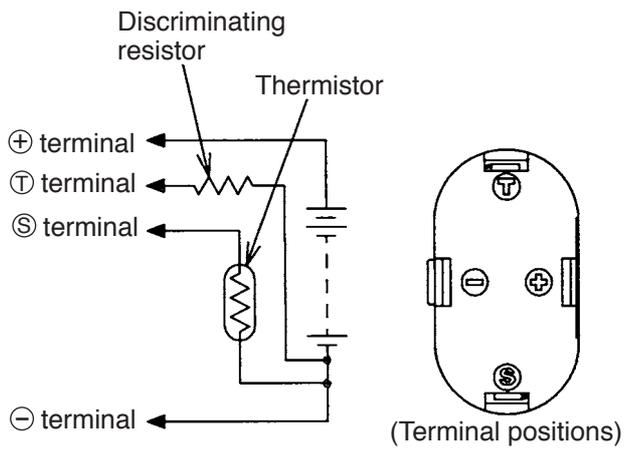


Fig. 4 • Ni-MH batteries (9.6 to 12 V)
• SUPER Ni-MH batteries (9.6 to 12 V)

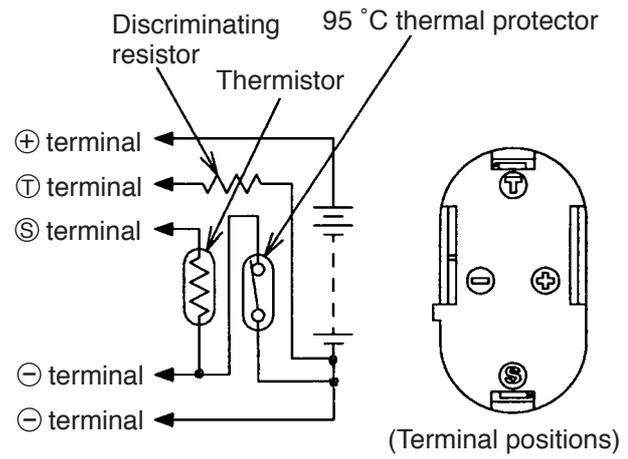


Fig. 5 • Ni-MH batteries (14.4 V, 18 V)
• SUPER Ni-MH batteries (14.4 V, 18 V)

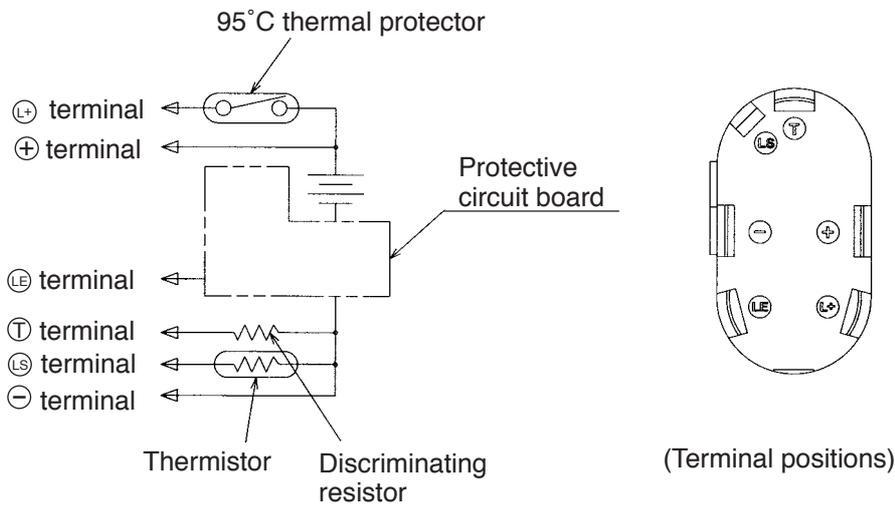


Fig. 6 Li-ion batteries (14.4 V, 18 V)

4-1-4. 3-way overcharge protection system

Overcharge protection is ensured by a (A) Δ^2V system or dT/dt system (for Ni-MH battery), (B) built-in battery temperature sensor (thermistor) and (C) a timer.

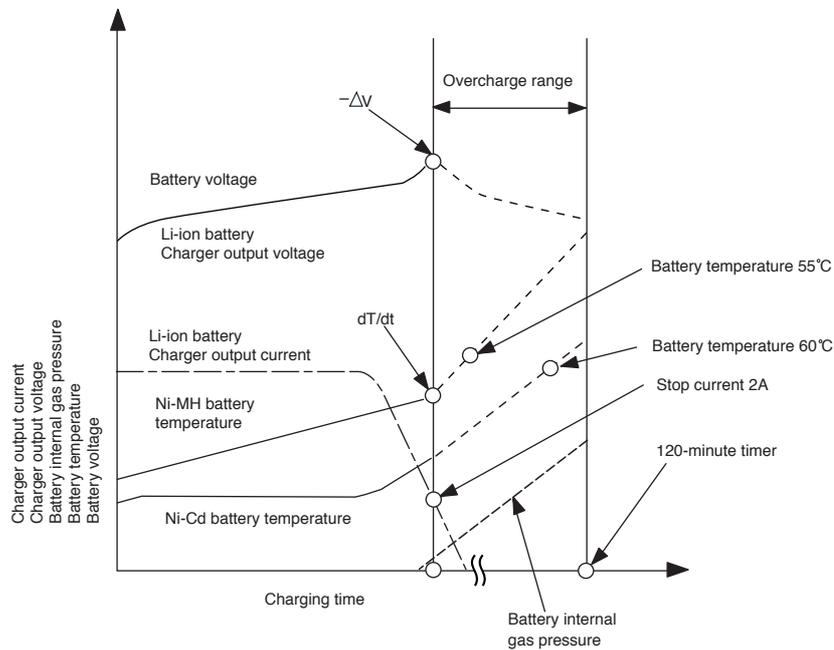


Fig. 7 Relationships of time, voltage, temperature and gas pressure while charging

- (A) • $-\Delta V$: This detects the fall in battery voltage at the end of charging using the value $-\Delta V$ and suspends charging.
- dT/dt : This system is applicable to Ni-MH and SUPER Ni-MH batteries. This detects the variation in temperature of Ni-MH and SUPER Ni-MH batteries by the value dT/dt at the end of charging and suspends charging.
- (B) • Built-in battery temperature sensor : In the event both the $-\Delta V$ system and the dT/dt system fail to detect completion of recharging, recharging is automatically stopped when the battery temperature reaches 60°C in the case of the nickel cadmium (Ni-Cd) batteries or 55°C in the case of the nickel metal hydride (Ni-MH), SUPER nickel metal hydride (SUPER Ni-MH) and lithium-ion (Li-ion) batteries.
- (C) • Timer : Should both the $-\Delta V$ system, dT/dt system and the temperature sensor fail, the timer automatically stops charging within 120 minutes from the beginning of charging.
- (Note 2) The voltage of the battery increases during charging and begins to fall when further charging is not possible. The $-\Delta V$ system detects the point where the voltage begins to fall, and suspends charging to protect the battery from overcharging.
- (Note 3) The temperature rise during charging of a Ni-MH or SUPER Ni-MH battery is higher than a Ni-Cd battery, and a sudden temperature rise occurs just before the battery is fully charged. The dT/dt system detects the point where the temperature rises suddenly and suspends charging to minimize the temperature rise.
- (Note 4) As shown in Fig. 7, the pressure of gas generated after a battery has become fully charged rises rapidly to cause high temperature and high gas pressure that degrade the effectiveness of the battery. If charging is allowed to continue, the pressure of the gas will activate the safety valve in the battery, and the electrolyte will begin leaking.

4-1-5. Easy-to-read visual display of charging status through constant lighting or flashing of red and green pilot lamps

Pilot lamp indication				
Charge status lamp (Red)	Before charging	Blinks (Red)	0.5 sec. ON 0.5 sec. OFF 	/
	During charging	Lights (Red)	Stays ON continuously 	
	Charging completed	Blinks (Red)	0.5 sec. ON 0.5 sec. OFF 	
	Charging impossible	Flickers (Red)	0.1 sec. ON 0.1 sec. OFF 	Battery or charger is faulty.
Overheat lamp (Green)	Overheat standby	Lights (Green)	Stays ON continuously 	Battery is overheated. Unable to charge. (Charging will commence when the battery is cooled.)

NOTE: The Model UC 18YRL cools the overheated battery by the cooling fan during the standby mode.

○ Rechargeable battery temperature range

The rechargeable battery temperature ranges are shown in the table below. Overheated batteries should be cooled to the specified temperature before recharging.

Rechargeable batteries	Rechargeable battery temperature range
EB712S, EB7S, EB714S, FEB7S, EB7B, EB912S, EB9S, EB914S, EB914, FEB9S, EB9B, EB924, EB1212S, EB12S, EB1214S, EB1214L, FEB12S, EB12B, EB1220BL, EB1224, EB1412S, EB1414S, EB1414, EB14B, EB1424, EB1812S, EB1814SL, EB18B, EB1820, EB1820L, EB1824L	23°F to 131°F (-5°C to 55°C)
EB926H, EB930H, EB933X, EB1226H, EB1230H, EB1230HL, EB1230X, EB1233X, EB1426H, EB1430H, EB1430X, EB1433X, EB1826HL, EB1830H, EB1830HL, EB1830X, EB1833X	23°F to 122°F (-5°C to 50°C)
EBL1430, EBM1830	32°F to 122°F (0°C to 50°C)

5. SPECIFICATIONS

5-1. Specifications

Item	Descriptions
Power source	AC single-phase, 50 Hz or 60 Hz
Power input	95 W
Charging system	<ul style="list-style-type: none"> • Constant current charge with feedback control • Constant current and voltage control (Li-ion batteries)
Overcharging protection system	(1) Battery voltage detection ($-\Delta V$ system) Battery temperature detection (dT/dt system) for Ni-MH and SUPER Ni-MH batteries (2) Battery surface temperature detection (thermistor) (3) 120-minute timer (4) Stop current detection (Li-ion batteries)
Charging voltage	7.2 V to 18 V
Charging current	3.3 A
Charging time	Approx. 45 minutes (for 3.0 Ah)
Product weight	0.6 kg
Operating ambient temperature range	0 °C to 40 °C

5-2. Comparisons with Similar Products

		HITACHI	
		UC 18YRL · UC 18YFL	UC 24YFA
Charging time	min.	45 (3.0 Ah)	70 (3.0 Ah)
Charging voltage	V	7.2 to 18	7.2 to 24
Charging current	A	3.3	2.5
Power input	W	95	90
Operating ambient temperature range	°C	0 to 40	0 to 40
Chargeable battery temperature range	°C	(*1) - 5 to 55 (*2) - 5 to 50 (*3) 0 to 50	(*1) - 5 to 60 (*2) 0 to 45
Overcharge protection system	—	$-\Delta V$ system, dT/dt system, battery surface temperature detection, timer, stop current detection	$\Delta^2 V$ system, battery surface, dT/dt system temperature detection, timer
External dimensions (length x width x height)	mm	226 x 110 x 75	226 x 110 x 75
Weight	kg	0.6 (1.3 lbs.)	0.6 (1.3 lbs.)

(*1): Chargeable Ni-Cd battery temperature range

(*2): Chargeable Ni-MH/SUPER Ni-MH battery temperature range

(*3): Chargeable Li-ion battery temperature range

6. PRECAUTIONS IN SALES PROMOTION

6-1. Safety Instructions

In the interest of promoting the safest and most efficient use of the Model UC 18YRL and UC 18YFL Chargers by all of our customers, it is very important that at the time of sale the salesperson carefully ensures that the buyer seriously recognizes the importance of the contents of the Handling Instructions.

6-1-1. Handling instructions

Salespersons must be thoroughly familiar with the contents of the Handling Instructions in order to give pertinent advice to the customer.

(1) Connect the charger to an AC power outlet only.

Use of any other power source (DC outlet, fuel-powered generator, etc.) will cause the charger to overheat and burn out.

(2) Do not use any voltage-increasing equipment (transformer, voltage regulator, etc.) between the power source and the charger.

If the charger is used with voltage over and above that indicated on the unit, it will not function properly.

(3) Conduct battery charging in an ambient temperature range of 0°C to 40°C.

If charging is attempted when the ambient temperature is below 0°C, charging is not possible or overcharging occurs because the recharging control circuit does not function properly. If charging is attempted when the ambient temperature is above 40°C, charging is stopped before the battery is fully charged due to temperature rise during charging because the difference between the upper limit of the rechargeable battery temperature (Ni-Cd batteries: 60°C, Ni-MH batteries: 55°C, SUPER Ni-MH batteries: 50°C, Li-ion batteries: 55°C) and the ambient temperature is small.

(4) Do not use the charger for successive charging.

In very hot locations, if two or more batteries are charged successively, the temperature of the charger will rise excessively and might cause the charger to fail. Instruct the customer to wait at least 5 minutes before commencing next charging. Particular care is necessary in summer or tropical countries when the power source voltage is low.

(5) Do not insert foreign objects into the air vent on the charger.

The charger case is equipped with air vents to protect the internal electronic components from overheating. Caution the customer not to allow foreign materials, such as metallic or inflammable objects, to be dropped or inserted into the air vents. This could cause electrical shock, fire or other serious hazards.

(6) Do not attempt to disassemble the charger.

Incorrect parts replacement and/or wiring will cause malfunctions which could result in fire or other hazards. Instruct the customer to bring the charger to an authorized service center in the event repair or replacement is necessary.

6-2. Extra Precautions in Sales Promotion

The following points must be given during sales promotion.

6-2-1. Charging may not be possible when the battery temperature is high

Charging may not be possible if the temperature of the battery is high after it has been exposed to direct sunlight for a long time or immediately after it has been used.

The customer should be advised in such a case to place the battery in a shaded area with good airflow, and allow sufficient cooling before recharging. This phenomenon is common to all existing batteries and chargers which employ temperature sensitive overcharge protection devices. The cooling time required before recharging varies from a few minutes to about 30 minutes, depending on the load, duration of use and ambient temperature.

6-2-2. Inserting a battery into a charger in reverse direction can cause serious damage to the battery and the charger

Inadvertently inserting a battery into the charger in the reverse direction will not only make it impossible to charge the battery but also decrease the service life of the battery and cause damage to the charger. Customers should be advised to correctly insert the battery into the charger.

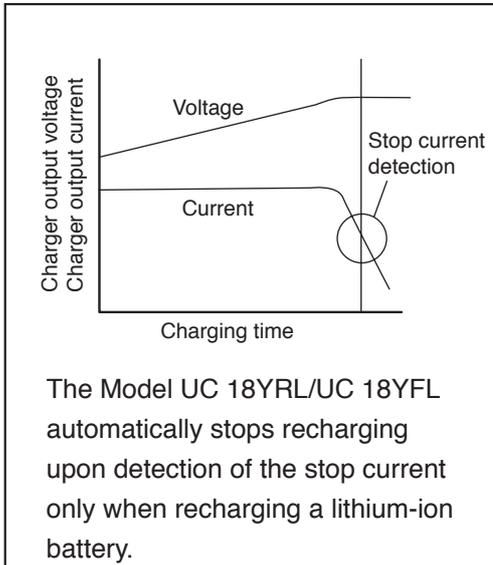
7. QUESTIONS AND ANSWERS ON MODELS UC 18YRL AND UC 18YFL

Q1 What are typical charging methods?

A1 The most recent electronic charging methods are outlined below.

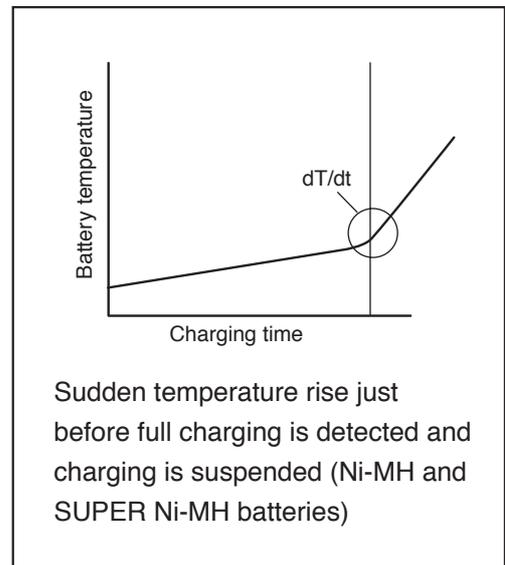
Method A

UC 18YRL
UC 18YFL



Method B

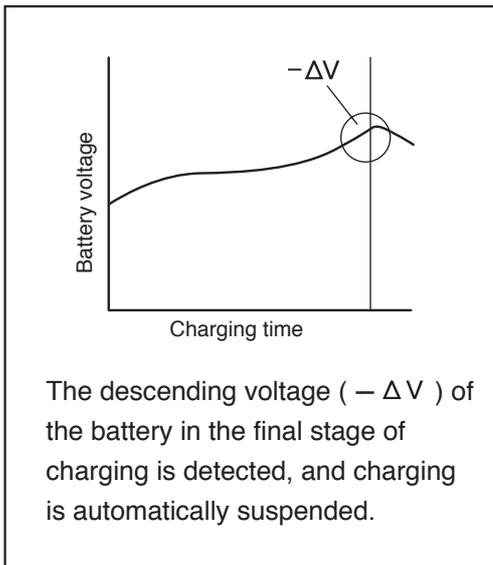
UC 14YFA
UC 24YFA
UC 24YFB
UC 24YC
UC 18YRL
UC 18YFL



dT/dt charging method

Method C

UC 18YRL
UC 18YFL

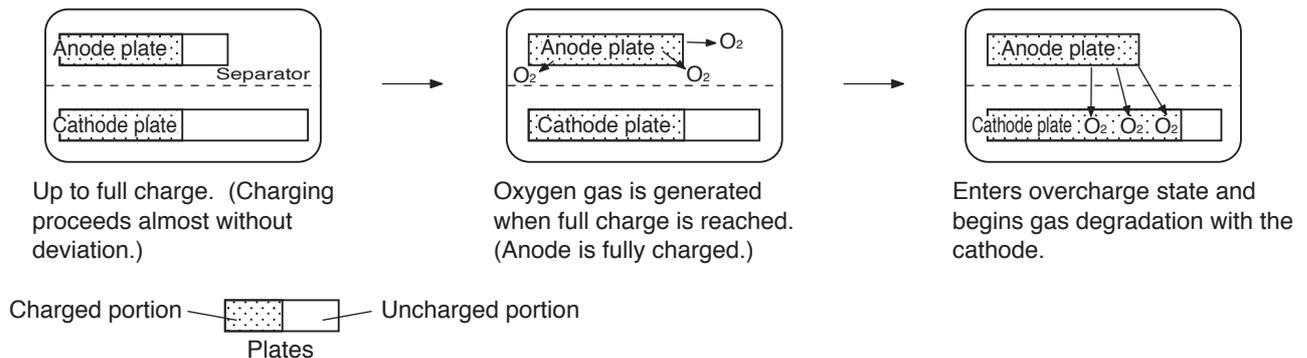


$-\Delta V$ charging method

Q2 Why was the $-\Delta V$ microcomputer control system adopted for the Models UC 18YRL and UC 18YFL?

A2 If charging is continued after the battery has been fully charged, it will cause a large amount of oxygen gas (O_2) to be generated in a short period of time as shown below. This proportionately accelerates degradation of the plates.

The $-\Delta V$ microcomputer control system was adopted for the Model UC 18YRL and UC 18YFL chargers in order to stop charging immediately before the battery is fully charged, thereby avoiding the generation of oxygen gas. This charging method applies no stress to the batteries.



Q3 What is the difference between the $-\Delta V$ microcomputer control system and the dT/dt system?

A3 Both systems cut off charging at almost the same point before the battery becomes fully charged.

The $-\Delta V$ microcomputer control system detects a sudden voltage change which occurs just before the battery is fully charged and then suspends charging. The dT/dt system detects a sudden temperature rise which occurs just before the battery is fully charged and then suspends charging.

Q4 Is there any difference in the amount of work possible per charge between the batteries charged with the $-\Delta V$ microcomputer control system and the batteries charged with dT/dt microcomputer control system?

A4 The dT/dt microcomputer control system may have a slightly shorter charging capacity (approx. 3 to 5 %). However, the amount of work possible per charge varies widely depending on the ambient temperature, the efficiency with which the battery charger is used, etc., so that there is essentially no difference between batteries charged with either system.

Q5 The battery charger is supposed to be used within the ambient temperature range of 0 to 40 °C. What happens if the charger is used at under 0 °C or above 40 °C?

A5 If charging is attempted when the ambient temperature is below 0 °C, charging is not possible or overcharging occurs because the recharging control circuit does not function properly. If charging is attempted when the ambient temperature is above 40 °C, charging is stopped before the battery is fully charged due to temperature rise during charging because the difference between the upper limit of the rechargeable battery temperature (Ni-Cd batteries: 60 °C, Ni-MH batteries: 55 °C, SUPER Ni-MH batteries: 55 °C, Li-ion batteries: 55 °C) and the ambient temperature is small.

Q6 What is the relationship between the chargeable battery temperature range when starting charging and the upper limit of the chargeable battery temperature?

A6 The relationship is indicated in the following tables.

Charger	Chargeable battery temperature range when starting charging			
	Ni-Cd battery	Ni-MH battery	SUPER-Ni-MH battery	Li-ion battery
UC 14YFA	- 5°C to 55°C	0°C to 45°C	0°C to 45°C	—
UC 24YFA	- 5°C to 55°C	0°C to 45°C	0°C to 45°C	—
UC 24YC	- 5°C to 55°C	0°C to 45°C	0°C to 45°C	—
UC 14YF2	- 5°C to 60°C	0°C to 45°C	0°C to 45°C	—
UC 18YFL UC 18YRL	- 5 °C to 55°C	0°C to 45°C	0°C to 45°C	0°C to 45°C

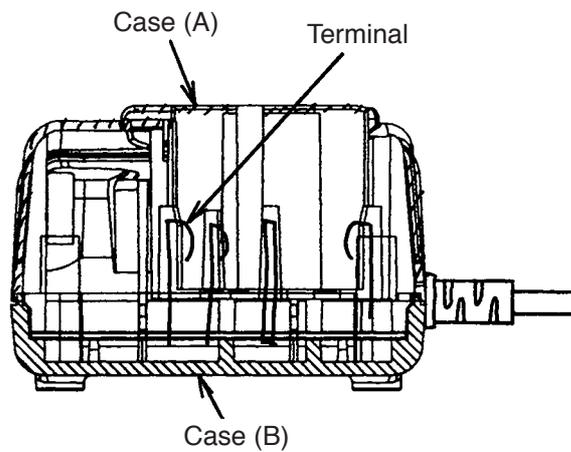
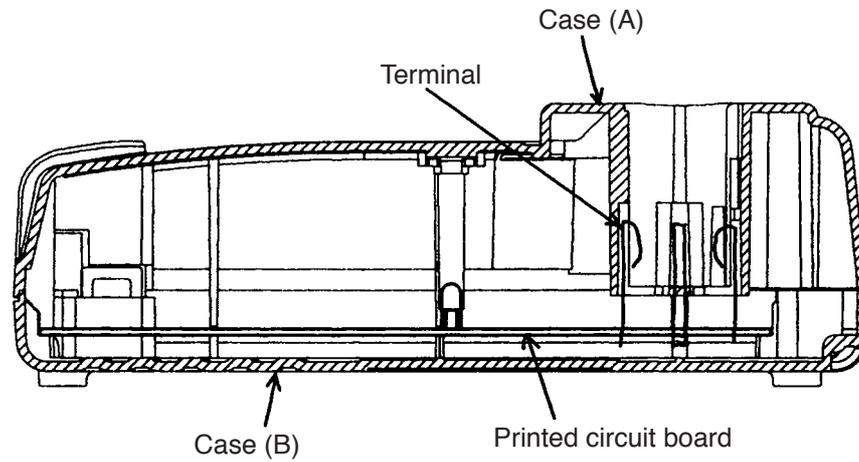
Charger	*Upper limit of the chargeable battery temperature			
	Ni-Cd battery	Ni-MH battery	SUPER-Ni-MH battery	Li-ion battery
UC 14YFA	60°C	55°C	55°C	—
UC 24YFA	60°C	55°C	55°C	—
UC 24YC	60°C	55°C	55°C	—
UC 14YF2	60°C	55°C	55°C	—
UC 18YFL UC 18YRL	60°C	55°C	55°C	55°C

* Charging is automatically stopped when the $-\Delta V$ system or the dT/dt system detects completion of recharging even if the battery temperature does not reach the above limit.

8. GENERAL PRECAUTIONS

8-1. Models UC 18YRL and UC 18YFL

- (1) The outer frame consists of case (A) and case (B). Inside the frame, there is the printed circuit board.
- (2) The printed circuit board consists of the high-frequency power transformer, microcomputer and other electronic devices to permit rapid charging and to protect against overcharging.



8-2. Pilot Lamp Indications

Refer to 4-1-5.

9. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

The **[Bold]** numbers in the descriptions below correspond to the item numbers in the Parts List and exploded assembly diagram for the Model UC 18YRL .

9-1. Disassembly

(1) Remove the four Tapping Screws (W/Flange) D3 x 20 **[10]** and take off Case (A) **[3]**.

The Printed Circuit Board Ass'y **[8]** and the Cord **[4]** can then be taken out in an assembled body.

(2) To separate the Print Circuit Board Ass'y **[8]** and the Cord **[4]**, melt the soldered portions with a soldering iron.

(NOTE) Ideally, the soldered portions should be freed with a solder absorber. If a soldering iron must be used, use one with a rated power of 35 W.

9-2. Reassembly

Reassembly can be accomplished by following the disassembly procedures in reverse; however, special attention should be given to ensure that lamps, cord armor and charging terminals are properly installed in their prescribed grooves.

9-3. Confirmation after Reassembly

(1) Confirm the following after reassembly. The red pilot lamp on the charger lights up when charging is started.

- When charging an EB 1830X battery, confirm that the red pilot lamp flashes at 1 second intervals approx. 45 minutes from commencing charging.

(2) Measure the insulation resistance and conduct a dielectric strength test.

- Insulation resistance: 10 M Ω or more between the plug blade of cord and the name plate or case fastening screws, with a DC 500 V megohm tester.
- Dielectric strength test:
 - (a) Between the plug blade of cord and the charging terminal blade.
 - (b) Between the plug blade of cord and the name plate or fastening screws on the case.

Based on the voltage listed on the Name Plate, dielectric strength test should be conducted.

Voltage on the name plate	Test voltage
120 V	AC 1,240 V (1 minute)
220 V to 240 V	AC 3,750 V (1 minute)

CAUTION: Without fail, insulation resistance must be measured between the plug blade of the cord and the name plate or the fastening screws, and dielectric strength test must be conducted between the plug blade of the cord and the charging terminal blade or between the plug blade of the cord and the name plate or the fastening screws on the case. Under no circumstances should testing be conducted between both blades of the plug, or both blades of the charging terminal, which may cause burn-out of the charger.

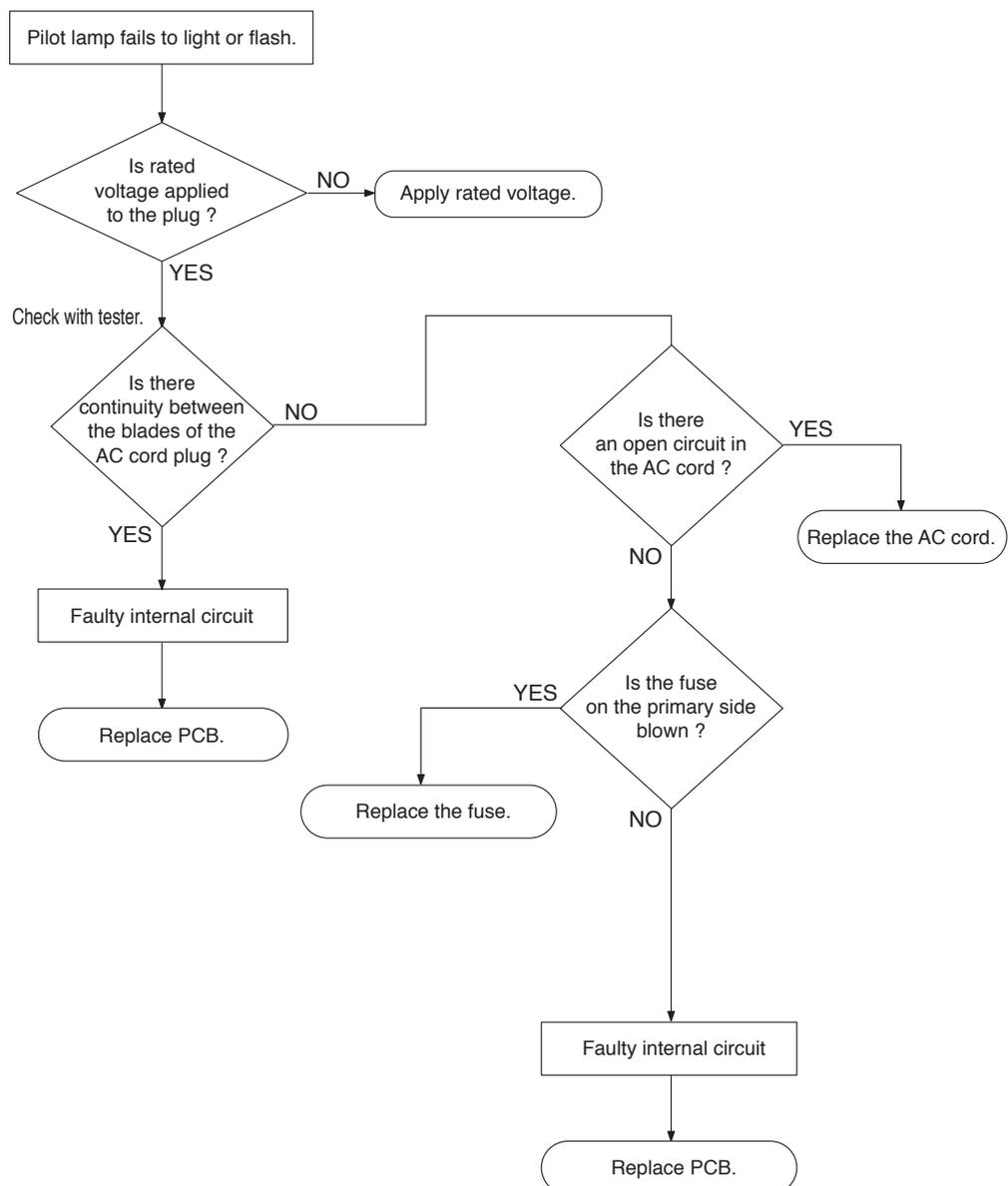
10. TROUBLESHOOTING GUIDE

10-1. Troubleshooting Based on Pilot Lamp Indications

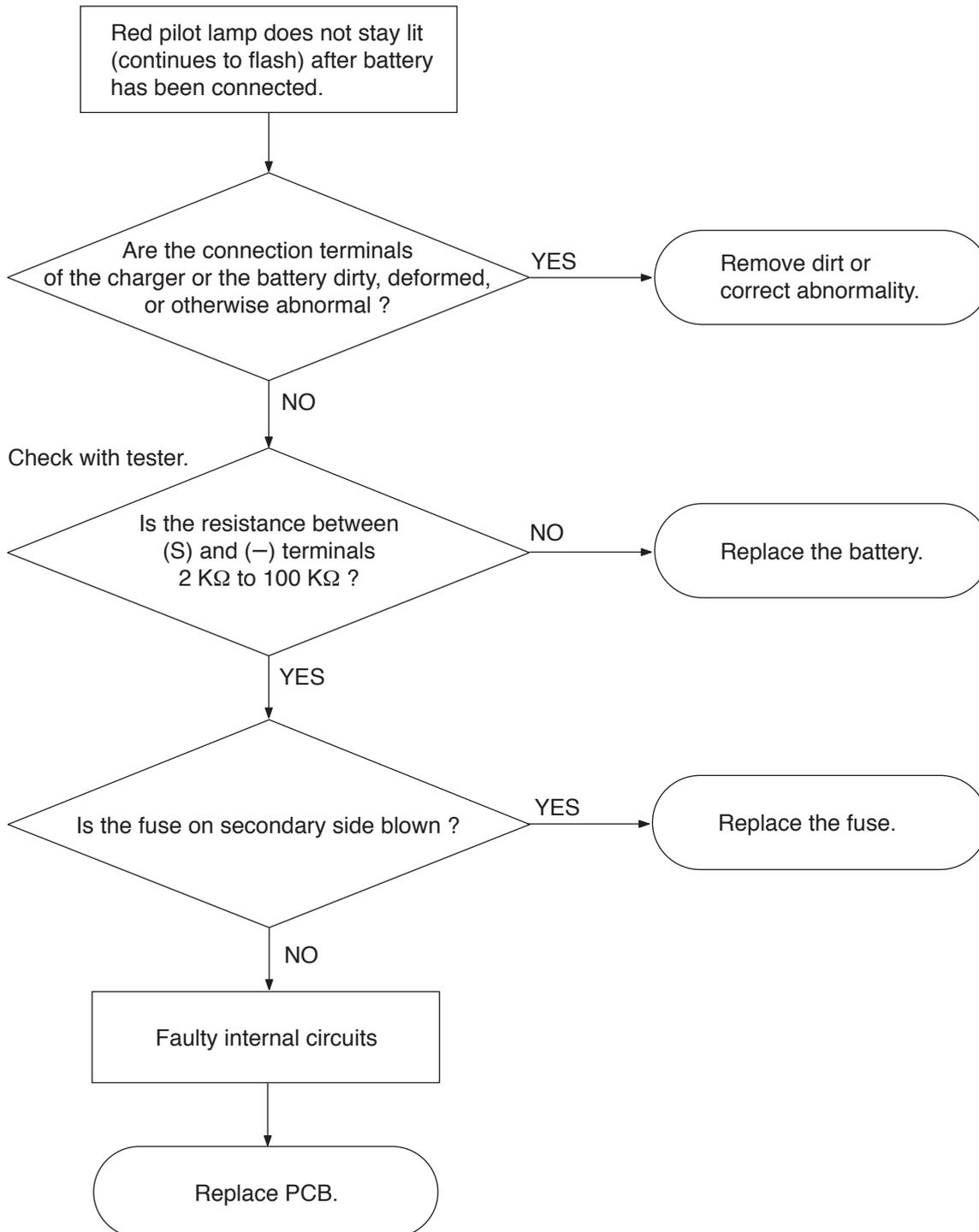
Phenomenon	Typical causes	Check procedures
Pilot lamp fails to light or flash.	(1) Faulty AC cord (2) Blown fuse (3.15 A) on primary side	Refer to trouble mode (A).
Red pilot lamp does not stay lit (continues to flicker) after battery has been connected.	(1) Poor connection of (T) or (S) terminal (2) Faulty battery (open circuit) (3) Faulty PCB	Refer to trouble mode (B).
Pilot lamp remains green (red fails to light) after battery has been connected.	(1) Poor connection of (T) or (S) terminal (2) Faulty PCB	Refer to trouble mode (C).
Pilot lamp indicates abnormality by flashing red rapidly (at 0.2 second intervals.)	(1) Battery connected in reverse direction (2) Faulty battery (short-circuit, or open circuit) (3) Faulty PCB	Refer to trouble mode (D).

10-2. Troubleshooting and Repair Procedures

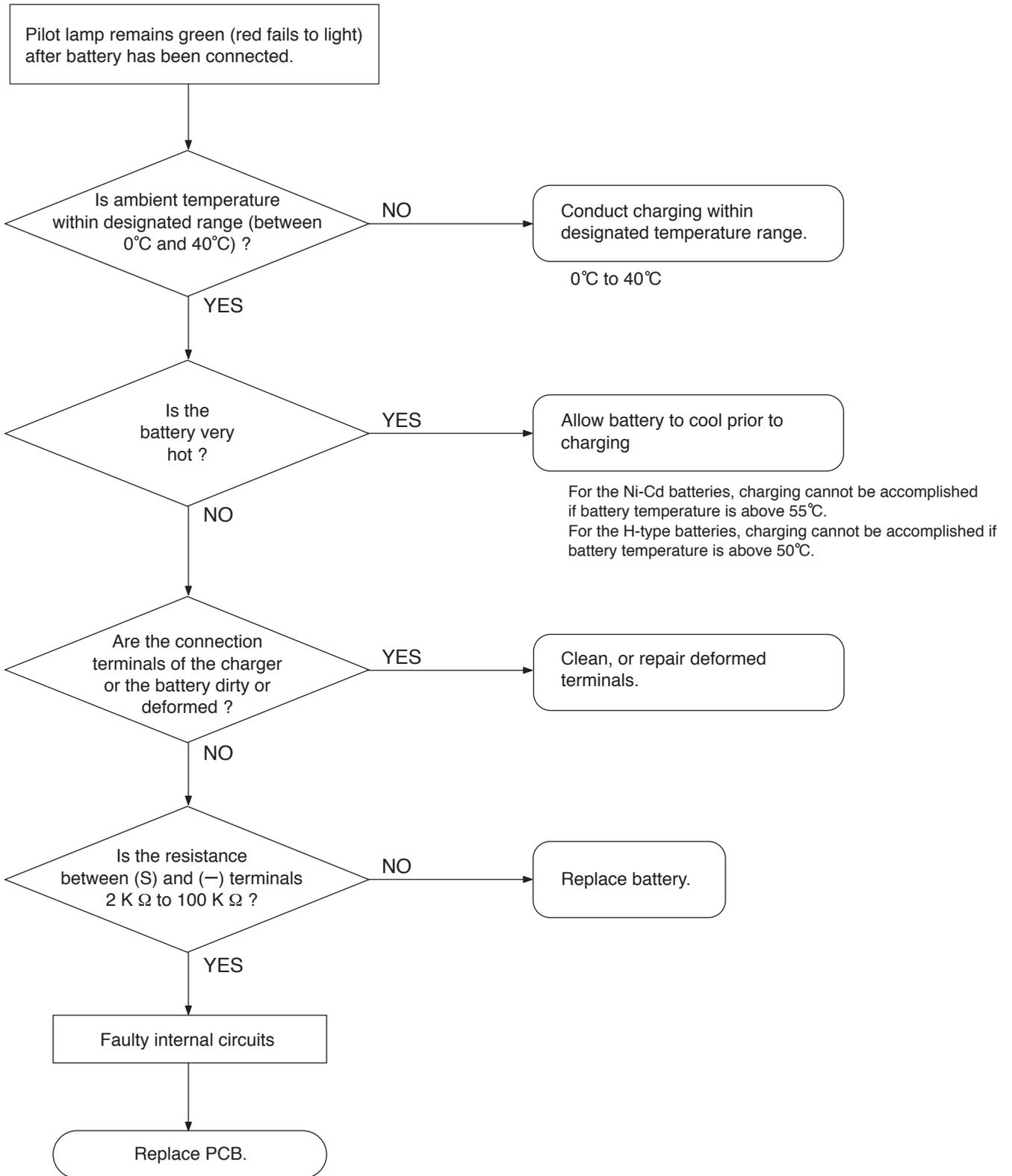
(1) Trouble mode (A)



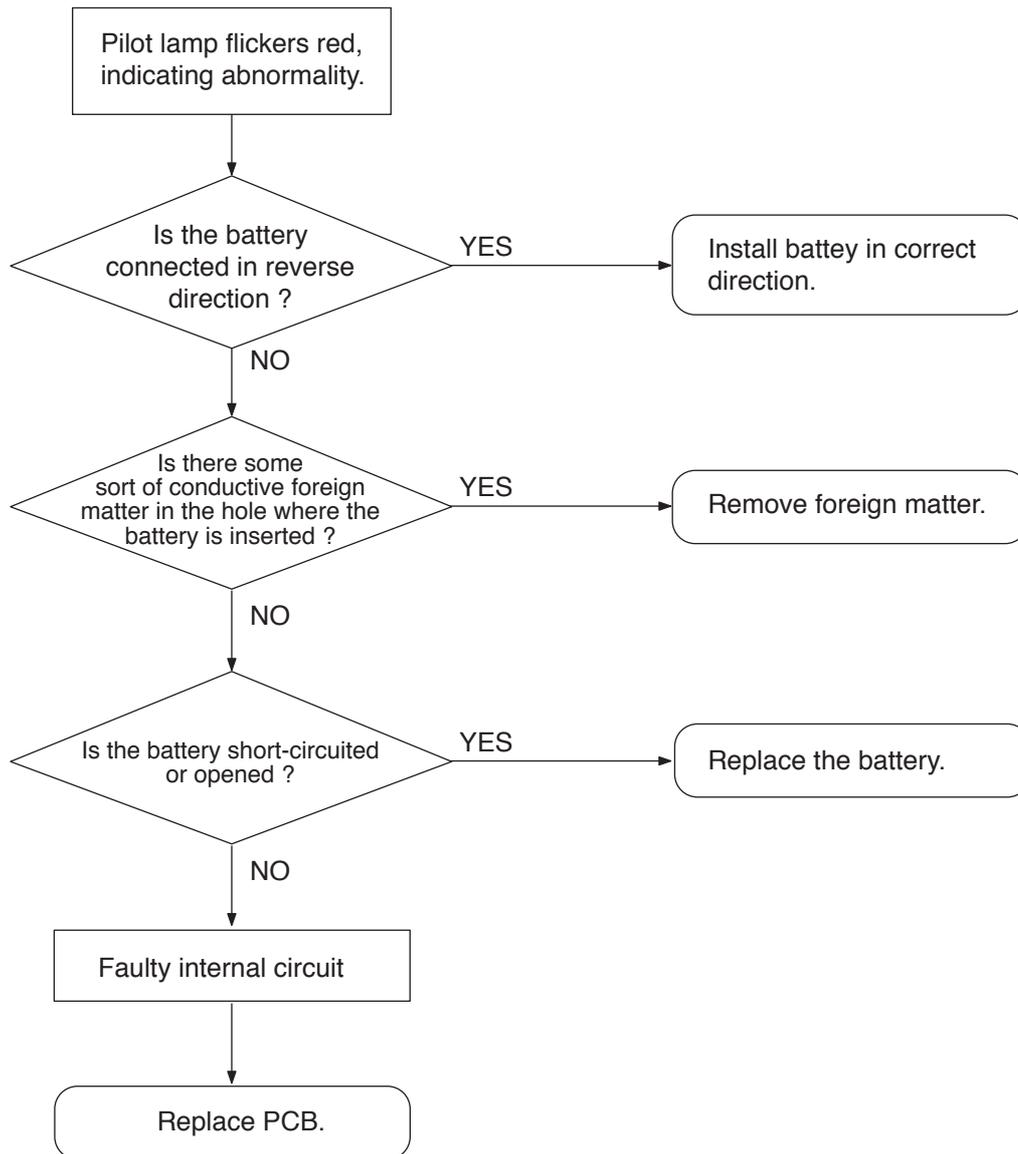
(2) Trouble mode (B)



(3) Trouble mode (C)



(4) Trouble mode (D)



11. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
			Work Flow					
UC 18YRL	General Assembly	Prism Fan Fuse		Case (A).(B) Set Cord Terminal (A) Printed Circuit Board Assy				
UC 18YFL	General Assembly	Prism Fuse		Case (A).(B) Set Cord Terminal (A) Printed Circuit Board Assy				

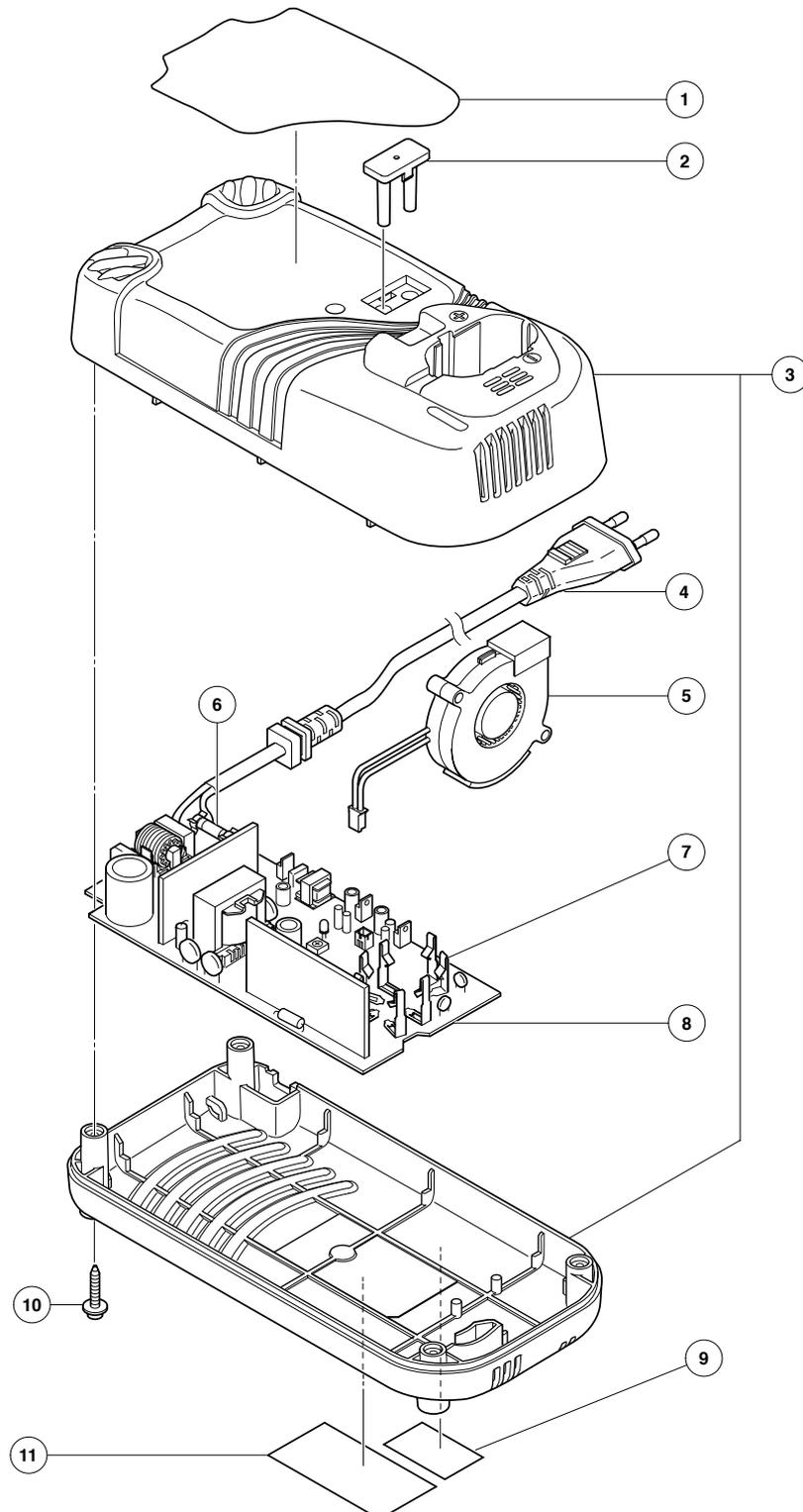
ELECTRIC TOOL PARTS LIST

■ CHARGER

2006 · 6 · 22

Model UC 18YRL

(E1)



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(E1)

