

Model No. ▶ ADP03

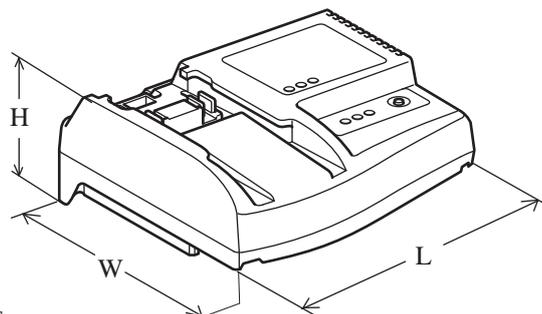
Description ▶ Automatic Refreshing Adapter

CONCEPT AND MAIN APPLICATIONS

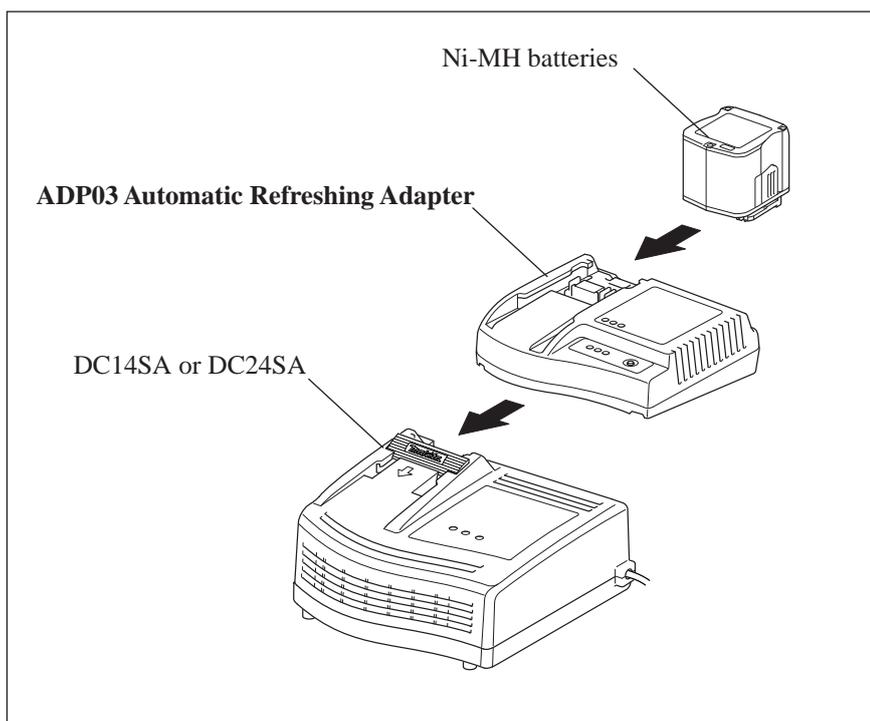
Model ADP03 Automatic Refreshing Adapter has been developed as an up-graded version of the existing Makita model ADP02, and features reduced refreshing time and user troubles.

Because of the the computerized digital communication with the battery, it takes only 50 minutes to finish refreshing a battery while 6 hours with ADP02, and automatic refreshing makes users free from control of the condition of batteries; when charging a battery, ADP03 automatically starts refreshing treatment if the battery needs refreshing.

Having these innovative advantages, ADP03 is ideal for refreshing batteries suffering from memory effect caused by the battery fuel sensitive automatic motor stop system of automotive cordless tools, or batteries which have been made inactive by overdischarging or long-term storing.



Dimensions : mm (")	
Length (L)	170 (6-11/16)
Width (W)	147 (5-13/16)
Height (H)	72 (2-7/8)



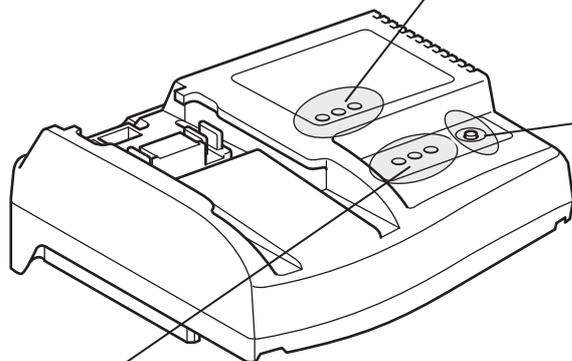
▶ Specification

Refreshing time					
Battery		Charger to be combined with ADP03		DC14SA	DC24SA
2.0Ah	9.6V	BH9020	BH9020A	Approx. 30 - 140 min.	Approx. 20 - 130 min.
	12V	BH1220			
	14.4V	BH1420			
3.0Ah	9.6V	BH9033	BH9033A	Approx. 50 - 230 min.	Approx. 30 - 210 min.
	12V	BH1233			
	14.4V	BH1433			
	24V	B2430			
1.7Ah	24V	B2417		—	Approx. 60 - 220 min.
				—	Approx. 30 - 120 min.

► Features and benefits

Automatic Refreshing

When charging a battery, ADP03 automatically refreshes the battery as follows if the battery needs to be refreshed: Carrying on computerized digital communication with the battery, detects the history of each battery by reviewing the charging and discharging patterns. And then, depending on the result of the detection, automatically conditions and optimizes each battery just at the time when refreshing treatment is necessary.



Charging Lamps

- One red lamp on.
= In process of refreshing
- Two green lamps on.
= Finished refreshing and stands by for charging
- Red and green lamps flashing alternately.
= Impossible to charge because the capacity of the battery is less than 40% of a new battery, which means its service life is over.

Button for Manual Refreshing

- Push this button to start forced (manual) refreshing when you need to;
- Condition a seriously inactive battery that has been stored for a long time.
 - Remove serious memory effect caused by repeated incomplete discharging.
 - Do *battery check. (*See the next page for what is battery check.)

Indication Lamps for Refreshing

Automatic refreshing

- During automatic refreshing, the left lamp flashes quickly.
- The battery capacity is not displayed by indication lamps after refreshing is finished.

Manual refreshing

- During manual refreshing, the left lamp flashes slowly.
- After refreshing is finished, ADP03 starts *battery check and displays the battery capacity by indication lamps. (*See the next page for what is battery check.)

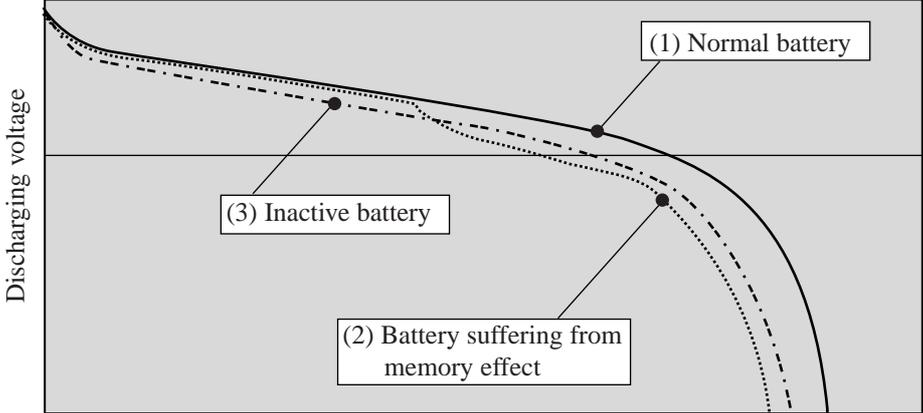
Battery capacity displays by indication lamps in manual refreshing

	One lamp flashing. = In process of refreshing
	Three lamps on. = The battery's capacity is more than 80% of a new battery.
	Two lamps on. = The battery's capacity is 60% - 80% of a new battery.
	One lamp on. = The battery's capacity is only 40% - 60% of a new battery. It means that the battery's service life is nearly over.

Comparison of Specifications

Model Specifications	Makita	
	ADP03	ADP02
Refreshing system	Automatic Users are free from control of the condition of batteries because when charging a battery, automatically starts refreshing if refreshing is necessary for the battery. (See the top column of this page for details of this system.) Manual refreshing is also possible.	Manual The condition of batteries is controlled by users. The inactive battery which users have found is refreshed by pushing the button for manual refreshing.
How often refreshing is necessary	One refreshing treatment per 16 cycles of charging and discharging (on automatic refreshing)	Recommended for reduced user troubles is one refreshing treatment per 80 to 100 cycles of charging and discharging.
Refreshing process	It requires only a single cycle of discharging and charging to refresh a battery because of a little memory effect brought by frequent refreshing treatments.	For removing serious memory effect brought by rather rare refreshing treatments, the following refreshing cycle is done; Charging--> Discharging --> Charging--> Pause--> Discharging--> Charging
Time required for refreshing (when refreshing a battery BH9020 with charger DC14SA)	A battery whose fuel is 20% full: approx. 50 min. A fully charged battery: approx. 2 h. and 20 min. Note: It takes 6 h. by manual refreshing.	Approx. 6 hours

► Glossary

Memory Effect	<p>If incomplete discharging and charging are repeated, a battery will come to discharge abnormally as illustrated in the graph below; from the difference between the curve (1) and the curve (2), you may see that the battery is suffering from reductions both in discharging voltage and time. This abnormal condition of batteries is referred to as memory effect.</p>
Inactivity	<p>A little reduction in discharging voltage and time can be found in batteries stored for a long time. [See the curve (3) on the graph below.] This abnormal condition of batteries is referred to as inactivity. The reduction has no effect on general cordless tools. However, it is very inconvenient for tools equipped with automatic motor stop system because it makes the system work earlier than preset timing.</p>
	<div style="text-align: center;">  <p style="text-align: center;">Discharging time</p> <p style="text-align: center;">Note: In most cases of practical use of batteries, memory effect and inactivity occur simultaneously.</p> </div>
Refresh	<p>To refresh (a battery) is to remove memory effect and inactivity from a battery by repeating complete discharging and full-charging. The more serious memory effect and inactivity are, the more difficult it is to remove them by a single cycle of discharging and charging.</p>
Battery Check	<p>Battery check is to check whether or not the service life of a battery is over, and you can do it with either ADP02 or ADP03. By pushing the button for manual refreshing, battery check starts automatically after refreshing treatment has been finished. The indication lamps for refreshing inform you of the result of battery check by showing the capacity of a battery in proportion to a new battery.</p>

► Comparison of refreshing time

Battery		Charger and refreshing adapter		DC14SA		DC24SA	
				ADP03	ADP02	ADP03	ADP02
2.0Ah	9.6V	BH9020	BH9020A	Approx. 30 - 140 min.	Approx. 6 h.	Approx. 20 - 130 min.	Approx. 6 h.
	12V	BH1220					
	14.4V	BH1420					
3.0Ah	9.6V	BH9033	BH9033A	Approx. 50 - 230 min.	Approx. 10 h.	Approx. 30 - 210 min.	Approx. 9 h.
	12V	BH1233					
	14.4V	BH1433					
	24V	B2430		—	—	Approx. 60 - 220 min.	
1.7Ah	24V	B2417		—	—	Approx. 30 - 120 min.	Approx. 6 h.

▶ Sample of the recommendable system

For example, the following systems can be recommended for your efficient work by extending the battery's service life as long as possible.

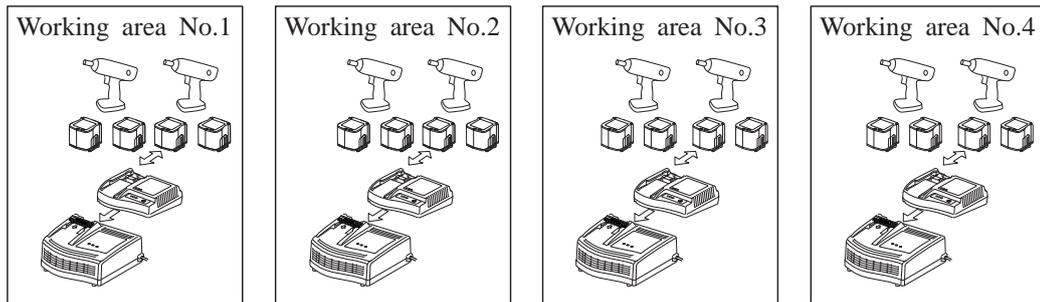
1. One for one setting

In case of setting one charger for one working area, it is recommended to employ in the ratio of one ADP03 to one charger. In this case the batteries are always controlled by ADP03 to be refreshed automatically and timely, when they are inserted into ADP03 on the charger.

Sample of employment

- * 2 units of cordless tools for one working area
- * 1 unit of charger for one working area
- * 1 unit of ADP03 for one working area
- * 4 pcs. of batteries for one working area

(In other words 2 batteries for one cordless tool)



2. Concentrated setting in a special area

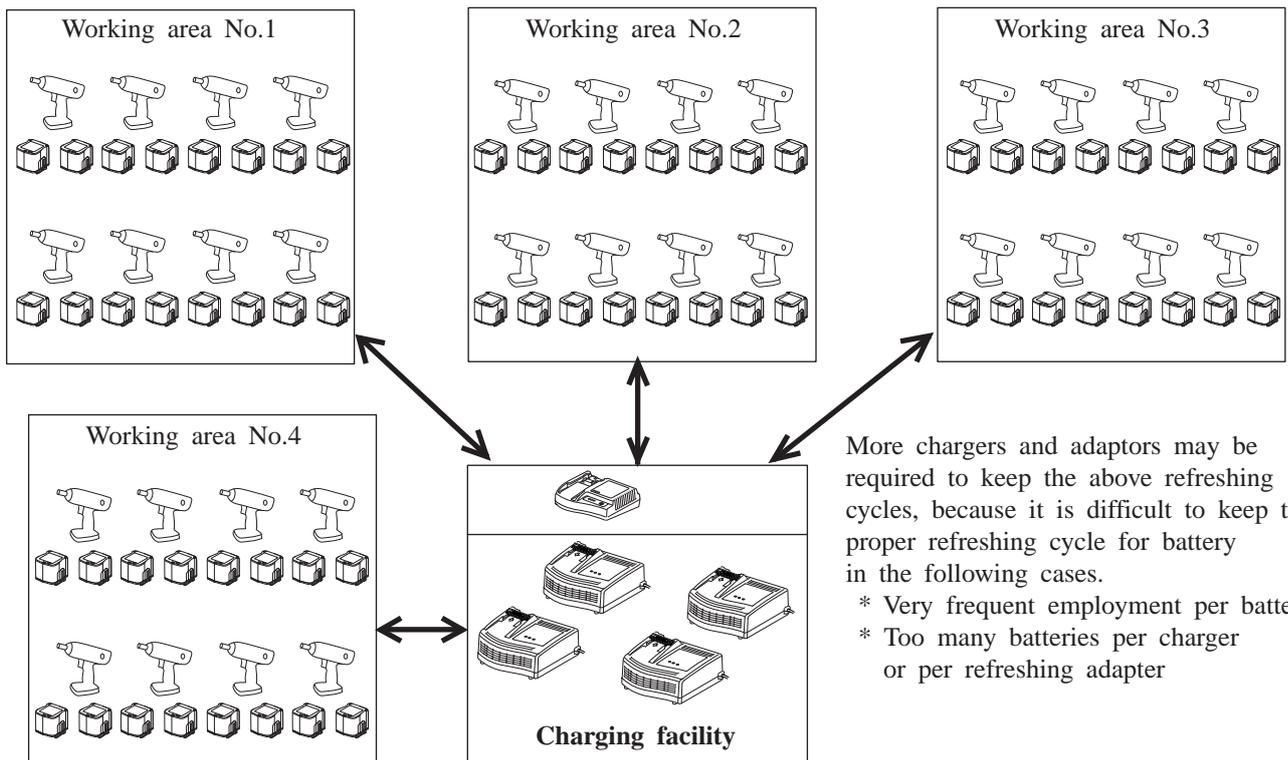
In case of concentrated setting of several chargers in a special area, it is recommended to employ in the ratio of one ADP03 to at the most 4 chargers.

In this case, the batteries have to be refreshed about every 16 cycles by ADP03.

Sample of employment

- * 8 units of cordless tools for one working area
- * 4 units of chargers for one working area
- * 1 unit of ADP03 for one working area
- * 16 pcs. of batteries for one working area

(In other words 2 batteries for one cordless tool)

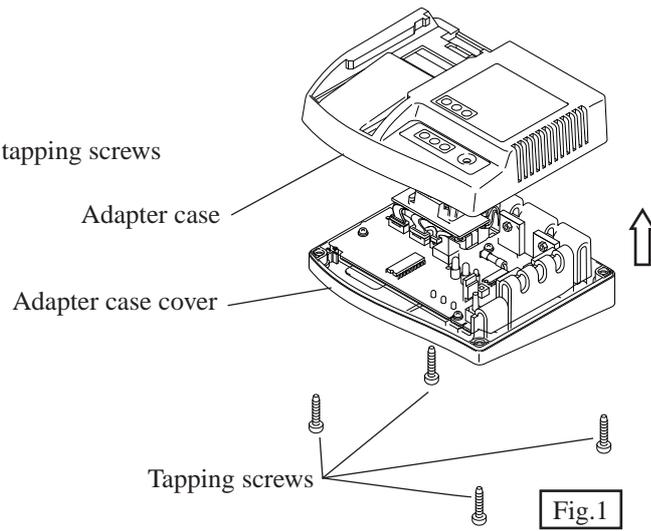


More chargers and adaptors may be required to keep the above refreshing cycles, because it is difficult to keep the proper refreshing cycle for battery in the following cases.

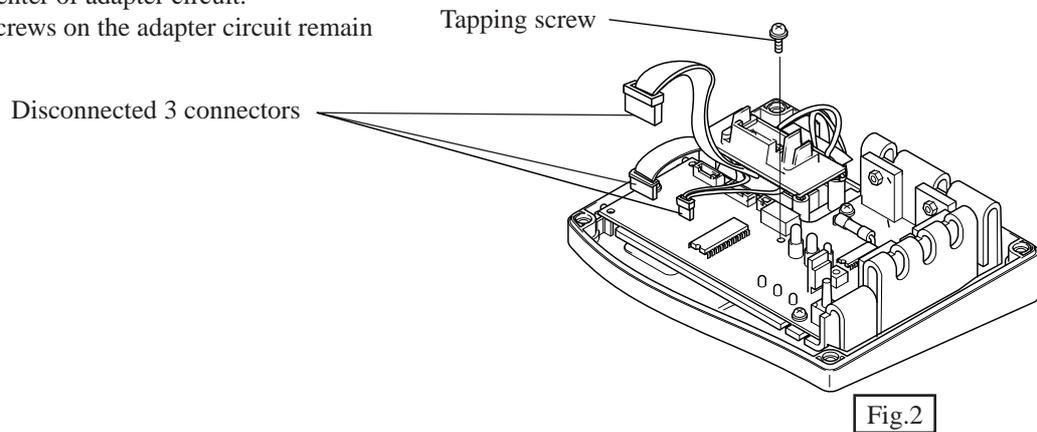
- * Very frequent employment per battery
- * Too many batteries per charger or per refreshing adaptor

< 1 > Removing adapter circuit

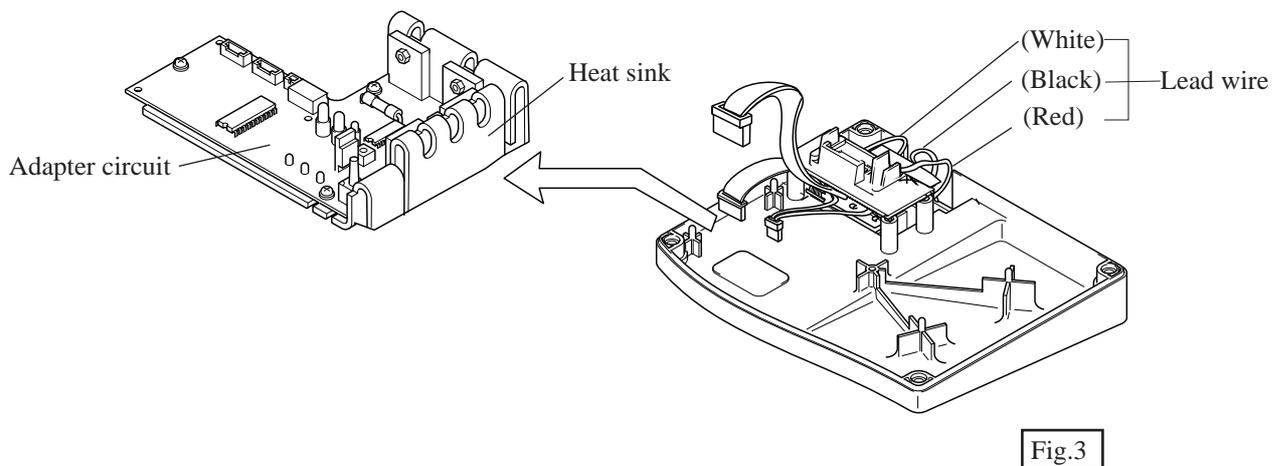
(1) Remove adapter case by taking off 4 tapping screws as illustrated in Fig.1.



(2) Disconnect the 3 connectors. And take off a tapping screw in the center of adapter circuit. Other screws on the adapter circuit remain as is.



(3) Remove adapter circuit together with heat sink, and replace it with the new one.



< 2 > Removing terminal unit and terminal board

- (1) Take off tapping screw holding terminal board, after disconnecting 3 connectors. Be careful, not to lose compression spring and spring holder. in this process.

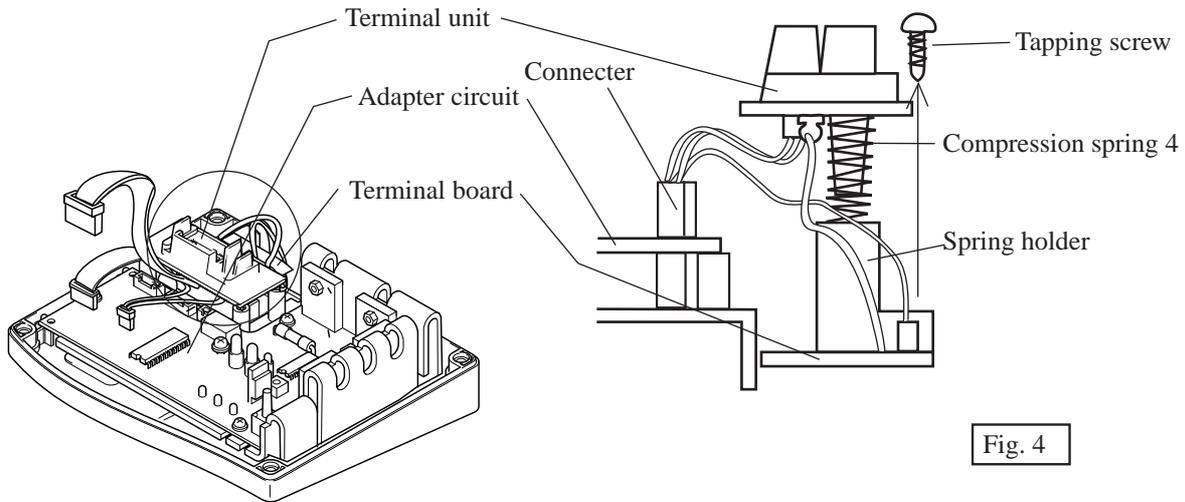
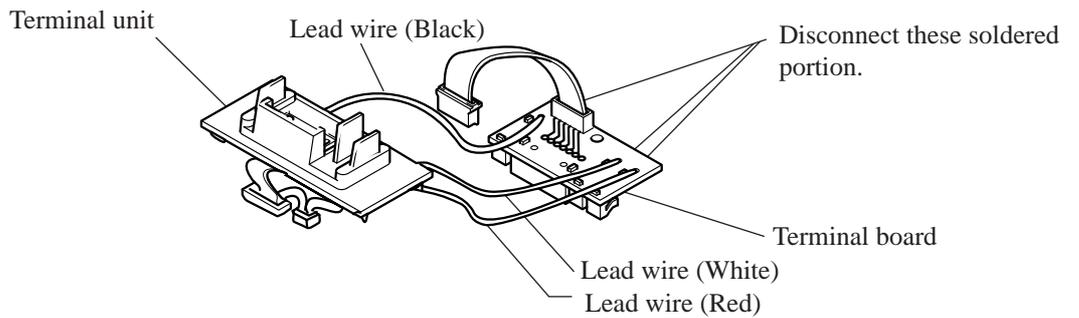


Fig. 4

- (2) Disconnect 3 soldered lead wires which are connecting terminal board with terminal unit. They have to be disconnected at the terminal board side, as illustrated in Fig. 5. And remove terminal unit from terminal board.



Pay attention to the color of lead wires in order to avoid mis-connection, when assembling terminal board and terminal unit.

Fig. 5

< 2 > Assembling

- (1) Connect 3 lead wires of terminal unit with terminal board as illustrated in Fig. 5. Fix terminal board and spring holder with tapping screw on adapter case cover. And insert compression spring 4 into spring holder as illustrated in Fig 6.

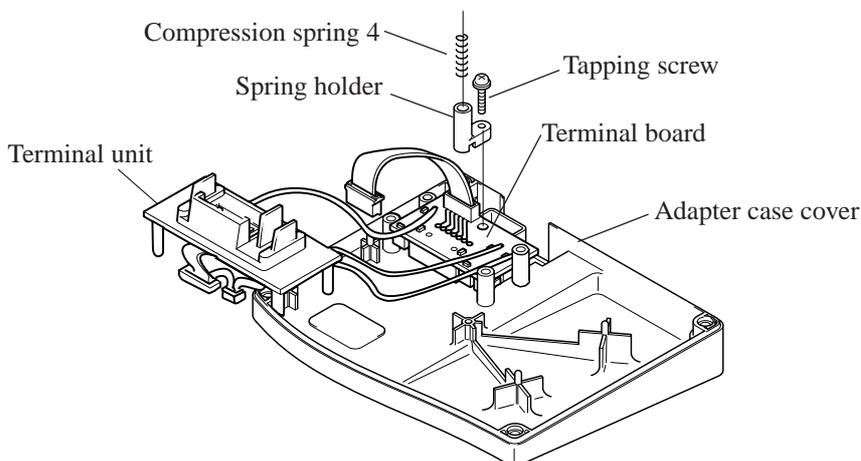


Fig. 6

(2) The 3 connectors have to be connected with adapter circuit as follows.

Connectors of terminal unit	Connectors of terminal board	Connectors of adapter circuit
	Connector (Black) 6 wires	→ Connector (Black)
Connector (White) 2 wires		→ Connector (White)
Connector (Light gray) 6 wires		→ Connector (White)

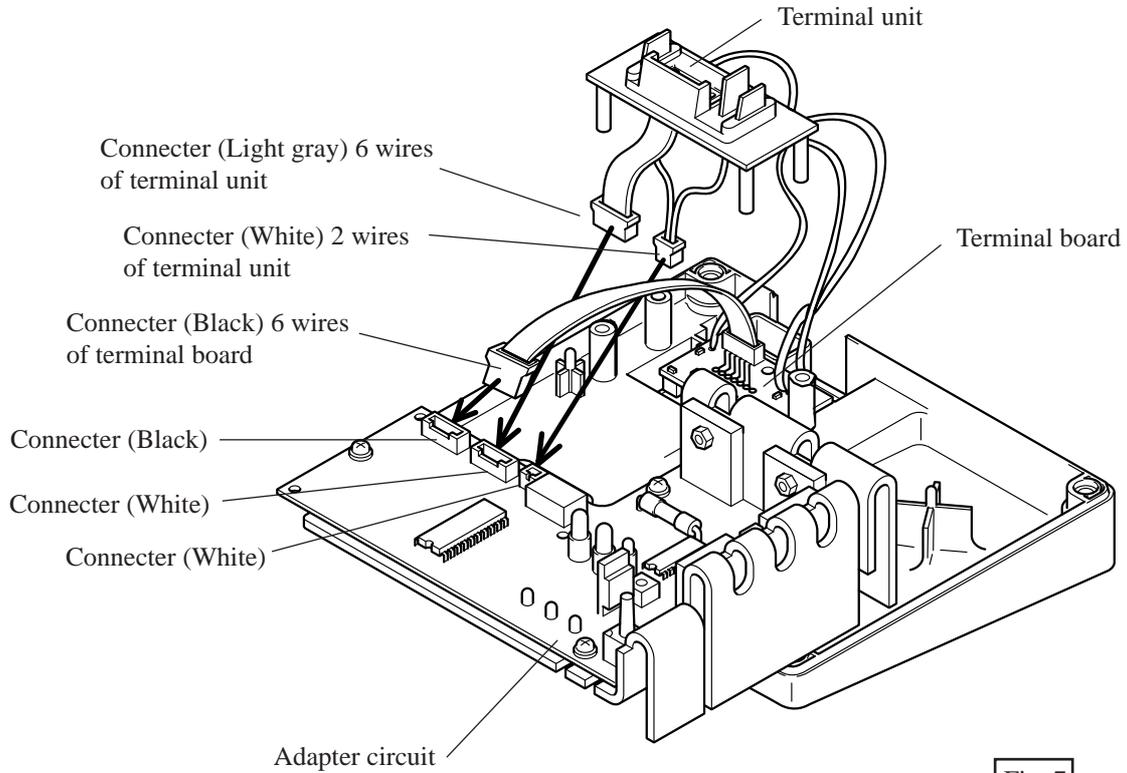


Fig. 7

(3) Mount terminal unit as illustrated in Fig. 8.

Be careful, not to pinch the lead wires in this process.

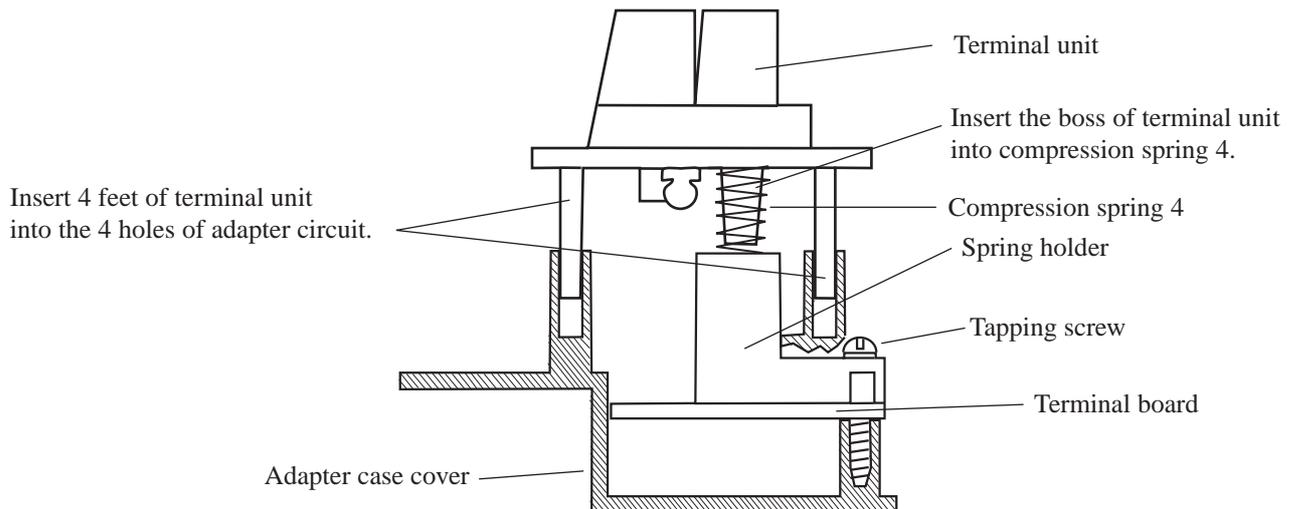
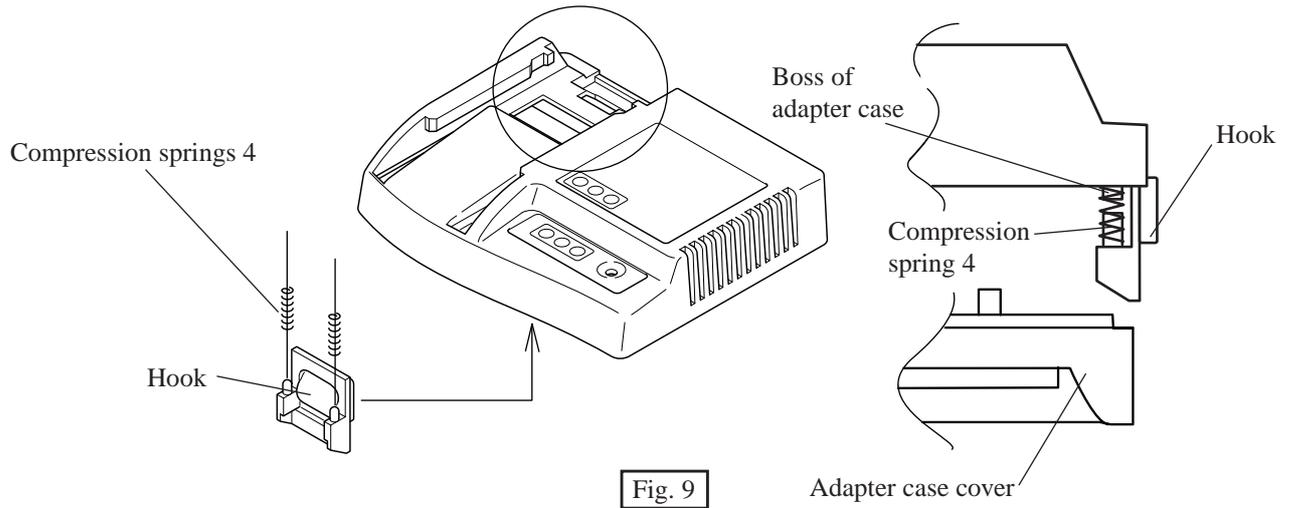


Fig. 8

- (4) After assembling 2 compression springs 4 to hook, install them into adapter case with aligning the 2 compression springs to the 2 bosses in the adapter case.



- (5) With holding hook with your finger, put adapter case on adapter case cover. And fasten it on adapter case cover with 4 tapping screws. Be careful, not to pinch lead wires, or not to deform spring terminals, in this process.

