

Domestic Appliances and Personal Care

Service Manual

GENERAL

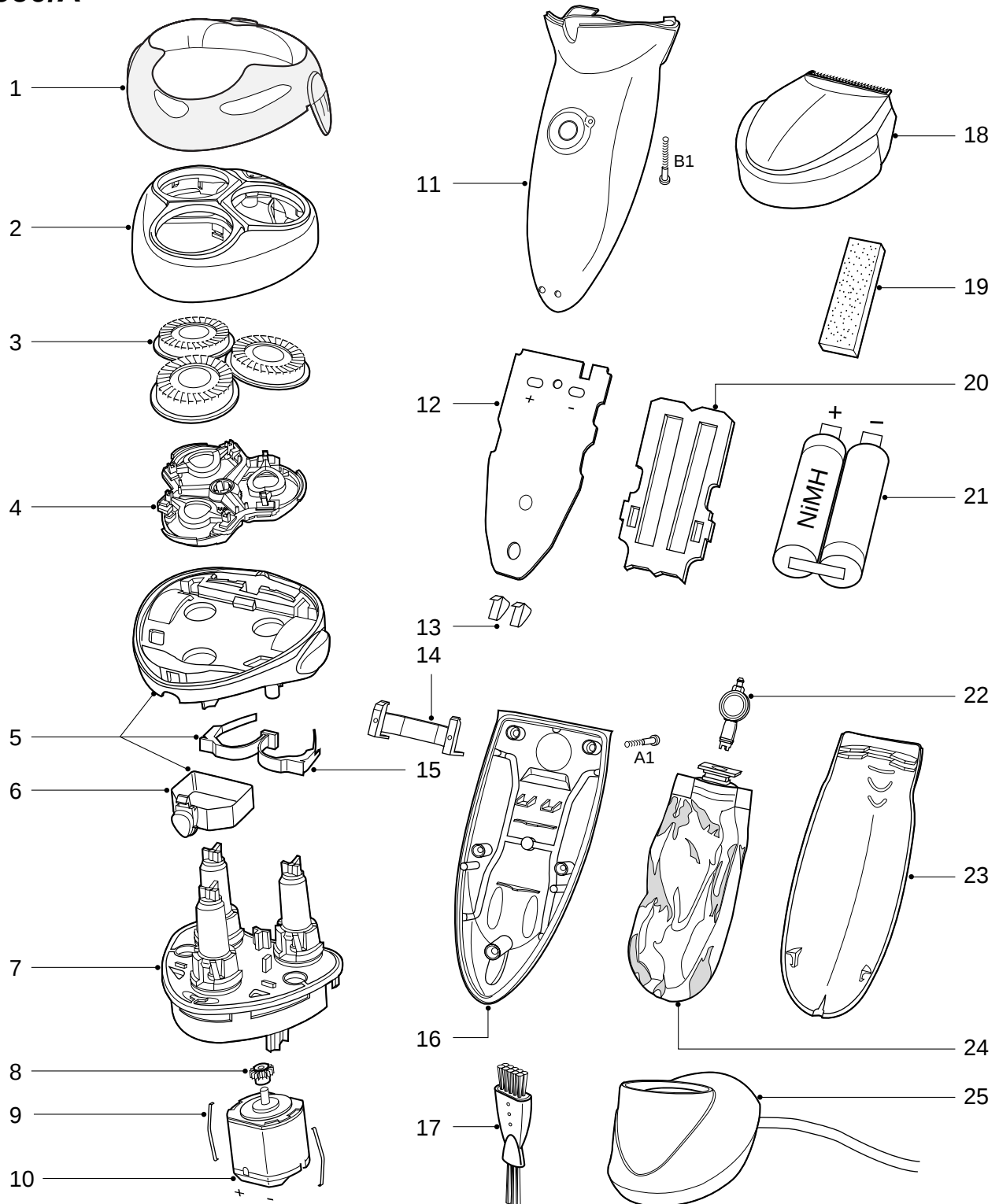
- Cool skin is a new shaving system.
The shaver features a special compartment for cartridges containing Nivea for Men moisturising shaving emulsion.
This emulsion is applied to the skin while shaving.
- The shaving unit can be cleaned under a running hot tap.
The HQ156 shaving heads are made of special stainless steel for corrosion-free cleaning with water.
- The shaver has a separate trimmer for grooming sideburns and moustaches.
The trimmer can be flipped open to enable cleaning of the inside.
- The charging stand of the shaver can be placed on a flat surface or it can be attached to the wall.
The PCB inside is encased in insulating material.
For this reason the mains cord cannot be replaced if it is damaged.

TECHNICAL DATA

Input voltage	: 100-240 V, 50/60Hz
Motor voltage	: 2.4 V $\overline{\text{---}}$
Cell	: 2X 4/5AA NiMH
Cell capacity	: approx. 1000 mAh
Charging indicators	: duoLED red/green
Charging time	: approx. 1 hour
Charging current	: 1000/100/25 mA time-dependent
Charging device	: Switched Mode Power Supply in stand
	in : 100-240 $\sim$
	out : 12-17 V
Comfort control	: fixed setting contour following
Shaving heads	: HQ156 - 4822 690 10152
Shaving emulsion	: HQ150 - 4822 390 10156 W-EU

MSH Coding
8855 660 00000 HQ 5660

HQ 5660/A



1	4822 462 11052	protecting cap
2	4822 441 12218	head housing
3	4822 690 10152	HQ156 shaving head
4	4822 402 11012	retaining bracket
5	4822 442 01484	hairchamber
6	4822 492 11663	unlock spring
7	4822 522 10694	gearwheel unit
8	4822 522 33605	pinion
9	4822 492 71735	motor clamp
10	4822 361 21783	motor 2.4V
11	4822 441 12221	housing
12	4822 214 12791	power module
13	4822 492 11614	contact spring
14	4822 256 10454	holder
15	4822 463 11187	pump slide

16	4822 442 01482	cover
17	4822 479 20198	cleaning brush
18	4822 690 10176	trimmer complete
19	4822 466 91312	foam plate
20	4822 256 10455	battery holder
21	4822 138 10672	NiMH pack 4/5AA
22	4822 360 10389	pump
23	4822 442 01481	slide cover
24	4822 390 10156	shaving emulsion W-EU
25	4822 219 10543	stand EU
-	4822 219 10545	stand GB
A1	4822 502 14544	s.t.screw spec.
B1	4822 502 14545	s.t.screw spec.

HQ 5660/A

TROUBLESHOOTING

- **Shaving heads do not move smoothly over the skin.**
Cause: not enough Nivea for Men shaving emulsion.
- **Shaving performance has decreased.**
Cause:
 1. Clogged shaving heads.
The shaver has not been cleaned immediately after use and/or has not been rinsed with hot water or has not been rinsed long enough.
 2. Long hairs in the shaving head.
Clean the cutters and combs individually, since they are all matching sets.
If the cutters and combs have accidentally become mixed up, it may take several weeks before optimal shaving performance is restored.
 3. Shaving heads are damaged or worn.
Check the combs for broken or indented lamellae.
Only HQ156 stainless steel Cool Skin shaving heads may be used as replacements.
- **Compartment cover (item 23) cannot be closed.**
Cause:
 1. The cartridge has not been positioned correctly.
 2. The cartridge has not been pushed far enough into the shaver.
- **Shaver does not work when the on/off button is pressed.**
Cause:
Batteries are empty.
- **Shaving emulsion has lost its colour or has become watery.**
Cause:
The Nivea for Men emulsion has not been kept at the right temperature.

TIPS FOR REPAIR

- Remove the shaving unit to prevent damage during repair.
- To guarantee that the shaver is completely watertight, only the original screws may be used.
- After the cover (item 16) has been removed, it must be checked if its sealing has not been damaged.
- The cover (item 16) contains a sticker that is permeable to gas yet impermeable to water.
This sticker may not be removed under any circumstances.
- To replace the motor (item 10) or the driving unit (item 7), screws B1 must be removed first.
Then push the entire unit out of the housing (item 11) and check if its sealing is damaged.
- The entire driving unit is supplied as a single part to guarantee optimal sealing of the gear shafts.

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CIRCUIT DESCRIPTION

The power module incorporates 4 basic functions:

- a. controlling the charging currents**
- b. electronic on/off switch**
- c. Battery Low Indicator (BLI)**
- d. protection circuits**

a. Charging currents

During the first 1 hour, quick charging takes place at 1000 mA.

During this period, the green LED is on continuously. During the first 6 minutes the red LED is on too, to indicate that there is not yet enough capacity available for one shave.

After 1 hour, the green LED starts blinking and the charging current is reduced to 100 mA.

It is kept at this level during the next 2 hours.

Then charging continues at 25mA.

The cells are charged at fixed currents via switching transistor TS1.

The current is detected by sense resistor R9.

The timers in IC1 adjust the current level via the enable signal at pin 2 by regulating the conductive time of TS1.

b. Electronic on/off switch.

The motor is switched on via MOSFET TS4.

If a pulse is generated via on/off switch SK1, the interface IC2 will supply a voltage higher than the cell voltage, causing TS4 to become conductive.

The next pulse will stop the motor.

IC2 and the surrounding components have been defined in such a way that humid conditions do not influence proper functioning.

c. Battery Low Indication.

The red LED of duoLED D5 will start to blink when 70 % of the cell capacity has been used up.

During shaving, the cells are discharged by the motor current.

This current is measured via sense resistor R9.

d. Protection circuits.

In case of short-circuited components, C9 and C10 will separate the contact pins of the stand from the mains voltage.

R14 and R16 create a small pre-load for the SMPS converter to prevent an excessive rise of the output voltage when the shaver is not placed in the stand.

Diode D4 prevents the cells from being shorted by TS1 and protects them against a short-circuit due to a piece of metal being placed across the contact pins of the shaver. R20 protects enable pin 2 against excessive currents when the charging voltage has the wrong polarity (e.g. when the shaver has been placed in a HQ5615/HQ5620 stand, which has AC output voltage).

NTC resistor R18 protects the NiMH cells against overheating. If the temperature rises too high, the charging unit will switch over from quick charging to trickle charging. The Zener diode D7 suppresses high voltage peaks during shaving. Normally, this diode is placed between the motor solder tags to suppress radio interference (RIF) in the mains too. TS5 makes it impossible to switch on the motor when the shaver has been put in the stand.

To ensure proper functioning of the electronics under humid conditions, the entire PCB and the components have been shielded with insulating lacquer.

This coating prevents migration of silver from SMD resistors to the PCB, thus preventing low-ohmic connections between print tracks.

