

LABORATORY MICROMOTOR HP50T



USER AND MAINTENANCE MANUAL



1. DESCRIPTION

HP50T is a reliable, noiseless and very powerful brushless micromotor expressly designed to accomplish the daily work in the Dental, Gold and Jewellery laboratory.

The speed of the motor can range from 1.000 to 50.000 rpm. The highest speed can be adjusted by means of the potentiometer knob on the control panel. Starting-up of the motor is gradually activated through a foot- or knee-controlled rheostat.

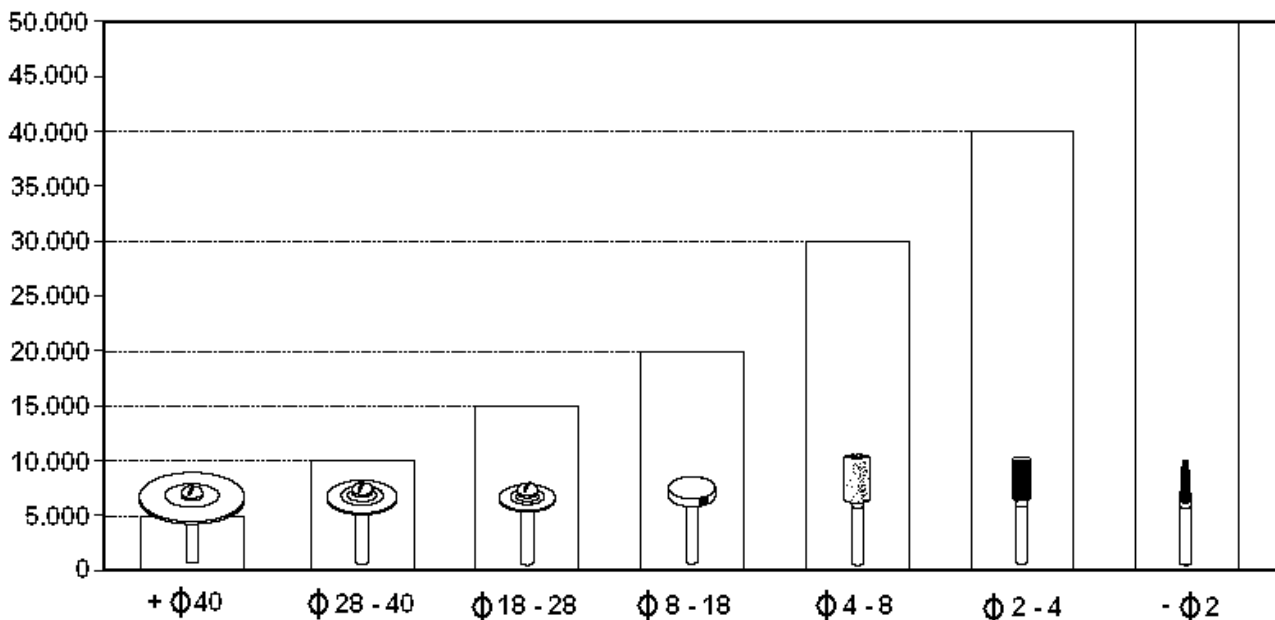
The electronic power circuit is incorporated and protected in a solid and sturdy control unit which can be either positioned on the working bench (foot-control to be placed on the floor) or on the right side of the bench for knee operation.

The handpiece is ergonomic, very light and perfectly balanced. The spindle pliers support $\varnothing$ 2.35mm bur and additional pliers for $\varnothing$ 3.00mm burs are also available upon request.

2. GENERAL PRECAUTIONS

- Read carefully the present manual before carrying out any starting, operating or maintenance operation on the machine
- Safety of the User depends on the skill ability, on the good sense and on the caution when using the machine; for this reason, it is of utmost importance to know in detail the allocation and the function of all the controls
- The final User of the machine is a skilled and well trained professional and not merely an occasional worker
- Check regularly the parts which tend to wear out due to the specific working conditions
- Do not tamper the electrical wiring system of the machine
- The built-in safety mechanisms shall in no way be removed or modified
- Do not allow unauthorised persons to try to repair the machine
- Do not utilise petrol, solvents or any other inflammable fluids to clean some parts of the machine – use exclusively non-toxic and non-inflammable products available on the market for this specific purposes
- Always use high-quality, well balanced pliers and tips
- Do not exceed the recommended maximum speed according to the size of the tool in use, in order to prevent vibrations and potential damages
- Carefully handle the handpiece, protecting it from shocks and accidental drops. When not in use, place the handpiece on its support
- When not in use, always leave a bur inserted and locked in the pliers
- Clean the pliers every time an instrument is replaced

MAXIMUM RECOMMENDED SPEED ACCORDING TO THE TOOL SIZE



3. INSTALLATION INSTRUCTIONS

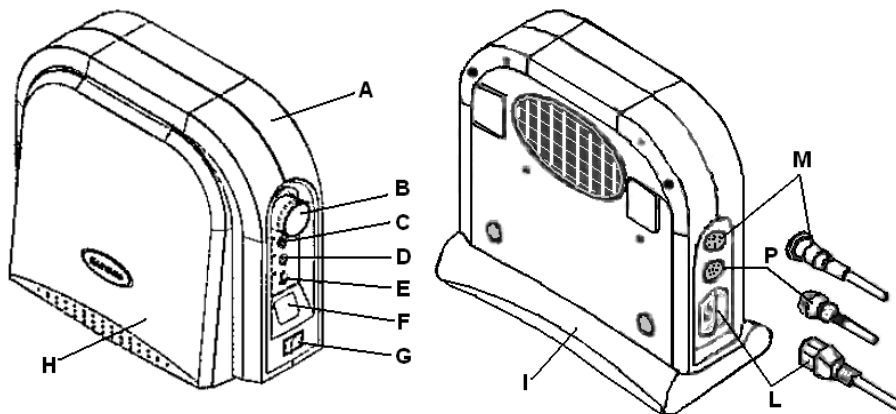
Find a proper location for the control unit according to the usual working habits. Should you opt for operation through foot-control, the control unit will have to be positioned on the working bench, if on the contrary you prefer to operate it with the knee control, then the unit must be arranged in order to be fixed to the right side of the bench.

⇒ **Installation on the working bench:**

connect the electrical supply cable to the L socket

connect the foot-control cable to the P round connector

connect the handpiece cord to the M connector and tighten the ring-nut



⇒ **Installation under the working bench:**

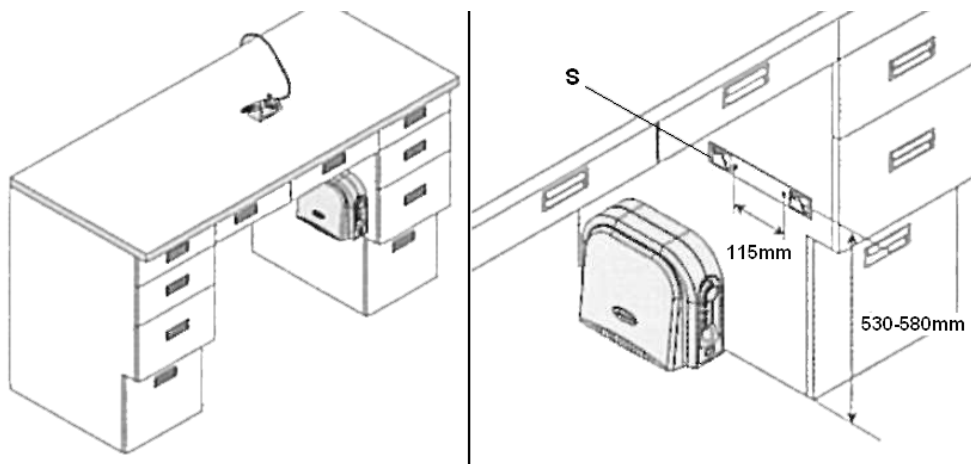
unscrew the 2 screws under the control unit to remove the I base and release the H left side shell

connect the electrical supply cable to the L socket

DO NOT connect the foot-control cable

connect the handpiece cord to the M connector and tighten the ring-nut

use the S adjusting plate (part of standard supply, packed inside) as drilling jig and hang the control unit at the most suitable height allowing to work with your knee



After the installation, position the handpiece on its rubber support and wire in the electrical supply fitted with ground connection.

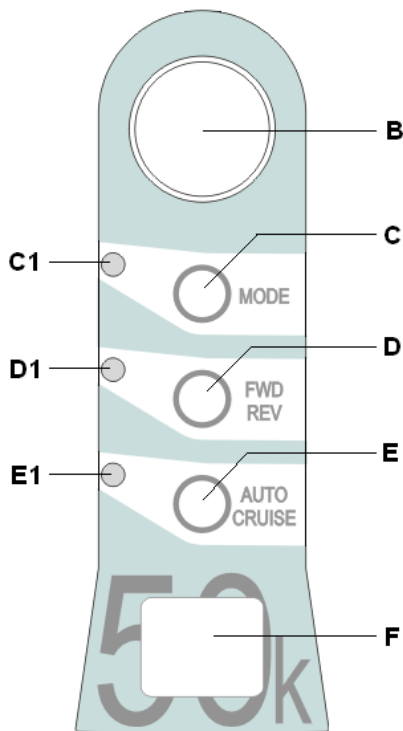
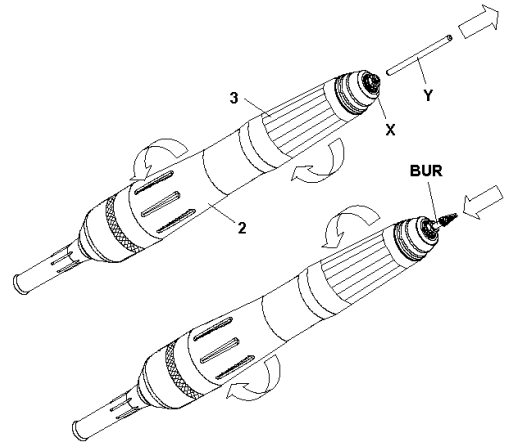
4. INSTRUCTIONS FOR USE

By switching on the main switch (G), the display (I) will light up.

The micromotor will start working only provided a tool has been properly inserted and locked in the pliers:
Turn the handpiece rear part (A) leftwards up to the second click

Insert the tool shank (C) up to the allowed depth

Turn the ring-nut back up to the initial position (second click).



Set the highest speed – turn the B knob (the display will show the figure in thousands)

Select the operating mode – press the MODE (C) key, as the C1 indicator is lit up, it means that operation can follow either by the foot or knee rheostat.

Set the rotating direction – press the FWD/REV (D) key, as the D1 indicator is lit up, it means the selected direction of rotation is reverse.

Set the automatic data input – press the AUTO CRUISE (E) key, when the indicator E1 becomes red it means that the function is on, therefore if the rheostat is kept in place for at least 3 seconds, the speed will remain steady even when releasing the foot-control (this option is quite useful in case of very long trimming procedures, to relieve working pressure for more comfort).

The possibility to work without using the foot-control, therefore in manual mode, is available, too. Reset the speed to zero (turn the potentiometer knob up to the lowest limit), the C1 light indicator must be off and the E1 indicator has turned to green. At this step grasp the handpiece and turn the knob until the desired speed is attained.

!! ATTENTION

Ensure that the tools you are working with are carefully and deeply inserted in the pliers. The shank should be well inside the pliers, and should not come out of the handpiece too much which could cause the tool to be unbalanced, tending to excessive vibrations and susceptible to become dangerous.

!! ATTENTION

Do not touch rotating tips.
Use goggles and other protective devices to prevent small particles from getting into your eyes or from being inhaled.

5. PECULIAR FEATURES AND PROTECTION SYSTEMS

The electronic control unit features an efficient torque compensation device which allows to operate under the most suitable power even at low speed, this device is automatically activated as the motor detects an effort in excess.

With the aim to protect the motor, its maximum absorption is electronically limited: when this limit is attained and kept for some seconds, the power supply blocks automatically by cutting off tension (an error message will be shown on display consisting of one number + E).

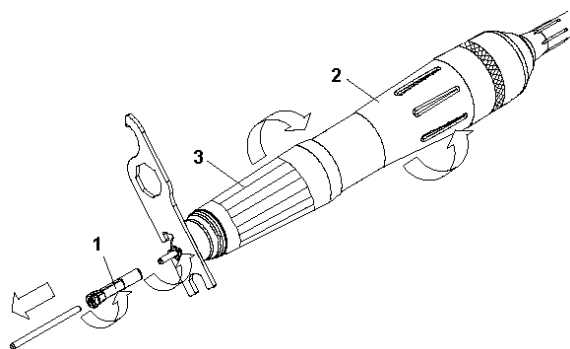
6. MAINTENANCE

 WARNING	Before carrying out any maintenance operation inside the machine or any technical service to the connections, disconnect the electric cable from the socket; in such a way the machine will be completely insulated from the electric wiring system. If you still have any doubts, difficulties or any possibility of mistake, contact our Technical Service to avoid any risks or damages.
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Cleaning the pliers and the front part of the handpiece

We recommend to keep the front part of the handpiece clean from dust particles. Unlock the pliers opening nut and blow in with compressed air. If necessary, uncover internal part as explained in the following paragraphs.

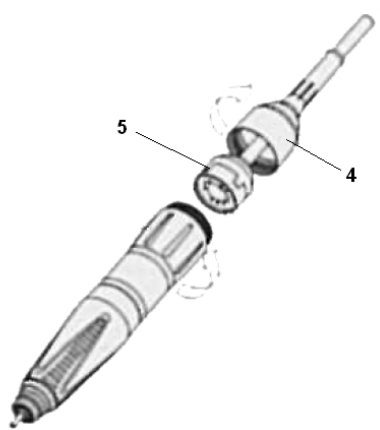
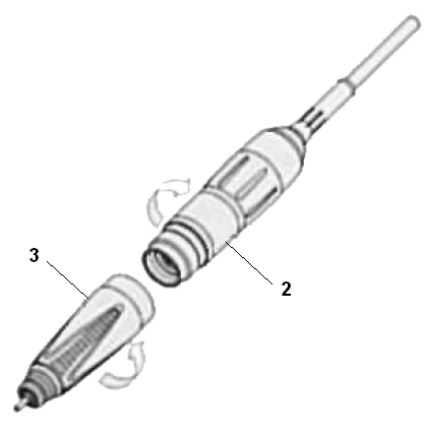
Replacing or removing the pliers



To remove or replace the pliers (1) follow meticulously the procedure stated below, referring to the picture aside.

1. Turn the pliers opening mechanism (rear part 2 until the second click)
2. use the multifunction key to loosen the pliers
3. unscrew the pliers completely, clean accurately its seat and assemble a new one by following the same procedure in reverse sequence.

Checking and cleaning the internal components



It may be necessary to open periodically the motor at the inside in order to perform ordinary maintenance operations or to inspect the internal components.

The handpiece is made up by two distinct sections: 3, the front part where the mechanical motion transmission is located and 2, the rear part where the electrical motor is assembled.

These two parts are screwed together and they can be separated by unscrewing (this operation requires a bigger effort than the simple rotation necessary to open and close the pliers). As you have access inside, use extreme care in order to avoid loosing or mixing up any component, for this reason we highly recommend to rely on skilled and duly trained technicians.

Should it be necessary to unplug the motor supply cable, unscrew the contacts protection cap (4) and unfasten the connector. When reconnecting, carefully check the orientation positioning of the eight contacts which must not be condused or forced in their seat.

7. ERROR MESSAGES

In case of serious inconveniences, the software will block the motor operation by warning the User on the display through a specific sequence of error messages allowing to detect the source of the problem.

Code	Problem	Possible cause
1E	Motor sensor error	One or more Hall sensors are damaged The motor cable is not properly connected The motor cable is damaged
2E	Motor block error	The pliers are open The handpiece does not turn, due to mechanical damages The handpiece does not turn, due to electric damages
E3	Overload error	The control detects a stress in excess following to an extended use, under overload conditions The motor cable is short-circuted
4E	Overtension error	The electrical supply system is not properly working The motor feeding circuit is damaged
5E	Overheating error	The control unit has been exposed to an excessive high temperature Motor air intakes are clogged Temperature sensor is damaged
6E	Overdrive error	The motor is vibrating or stops working right after start-up
7E	Self-detect error	Problem to the control unit interface Problem to the control unit memory
8E	Error inside the circuit	A problem to the control board has been detected

8. FUNCTION CHECK PROCEDURE

The electronic control unit features a specific check/maintenance mode. To avail of this feature, it will be necessary to switch on the micromotor by pressing simultaneously both switches FWD/REV and AUTO CRUISE. A dual warning horn will be emitted to confirm transition to this specific mode. By turning the potentiometer knob, the display will show the following check codes of the components susceptible to occur.

Code	Function check	Test
Sc	Keys / LED	By pressing the different keys, the corresponding light indicators must light up
dc	Display	Press the key FWD/REV, the various segments on the display will ignite in sequence
Hc	Motor sensor	Press the key FWD/REV to light up 2 lines on the display; turn with your hand the tool inserted in the pliers, if the lines change their position, it means that the sensor is working
Fc	Foot-control	Press the foot-control from idle position to allowed end: the figures from 0 to 9 and the letters from A to F will light up; if this occurs regularly, it means that the rheostat is working
nc	Knee-control	Press the side panel from idle position to allowed end: the figures from 0 to 9 and the letters from A to F will light up; if this occurs regularly, it means that the rheostat is working
rc	Exit	Press the FWD/REV key to exit from the check procedure

9. GUIDE TO PROBLEM SOLVING

Problem: THE LAMP INSIDE THE SWITCH IS NOT ON	
Possible cause	Remedy
The cable is not duly plugged in	Remove and plug in again the electric cable
The fuse is discontinued	Replace the fusible with another one of the same type and value, if it burns again contact the technical service
The switch is faulty	Contact the technical service for replacement

Problem: THE DISPLAY SHOWS 1E MESSAGE	
Possible cause	Remedy
The motor cord is not duly connected	Remove and plug in again the cord in its seat. If the inconvenience is not solved, replace the cord
The position sensor is not working	Enter the check mode and test (HC function), if some inconvenience is detected, contact the technical service
The switch is faulty	Contact the technical service for replacement

Problem: THE DISPLAY SHOWS 2E MESSAGE	
Possible cause	Remedy
The pliers are open	Check and eventually close and tighten

Problem: THE DISPLAY SHOWS 3E MESSAGE	
Possible cause	Remedy
The unit has detected an extreme extended stress	Let the unit cool for at least 10-15 minutes and restart. Should the inconvenience repeat, call the technical service

Problem: THE DISPLAY SHOWS 4E MESSAGE	
Possible cause	Remedy
The feeding tension is not correct	Check the electrical supply, if everything is correct, contact the technical service

Problem: THE DISPLAY SHOWS 5E MESSAGE	
Possible cause	Remedy
The unit has detected an extreme extended stress	Let the unit cool for at least 10-15 minutes and restart. Should the inconvenience repeat, call the technical service
The room temperature is too high	The highest admitted temperature is of 40°C
The temperature sensor is faulty	Contact the technical service for replacement

Problem: THE DISPLAY SHOWS 6E MESSAGE	
Possible cause	Remedy
The pliers are open	Check and eventually close and tighten
The rotor is blocked	Try to turn the tool manually, if it is locked contact the technical service

Problem: THE DISPLAY SHOWS 7E MESSAGE	
Possible cause	Remedy
The unit has detected an inconvenience.	Switch the unit off and on, if the inconvenience is not solved, call the technical service

Problem: THE DISPLAY SHOWS 8E MESSAGE	
Possible cause	Remedy
The unit has detected an inconvenience and can not control	Switch the unit off and on, if the inconvenience is not solved, call the technical service

Problem: IHE FOOT-CONTROL IS NOT WORKING PROPERLY	
Possible cause	Remedy
The foot-control connector has not been duly inserted	Remove and then insert again the connector in its seat up to the allowed extent
A specific working mode is excluding it	Check the selected working mode according to the keys and light indicators
The inner rheostat is not working	Enter the check mode and verify (Fc function); if any working inconvenience is detected, contact the technical service

Problem: THE KNEE CONTROL IS NOT WORKING PROPERLY	
Possible cause	Remedy
A specific working mode is excluding it	Check the selected working mode according to the keys and light indicators
The inner rheostat is not working	Enter the check mode and verify (no function), if any working inconvenience is detected, contact the technical service

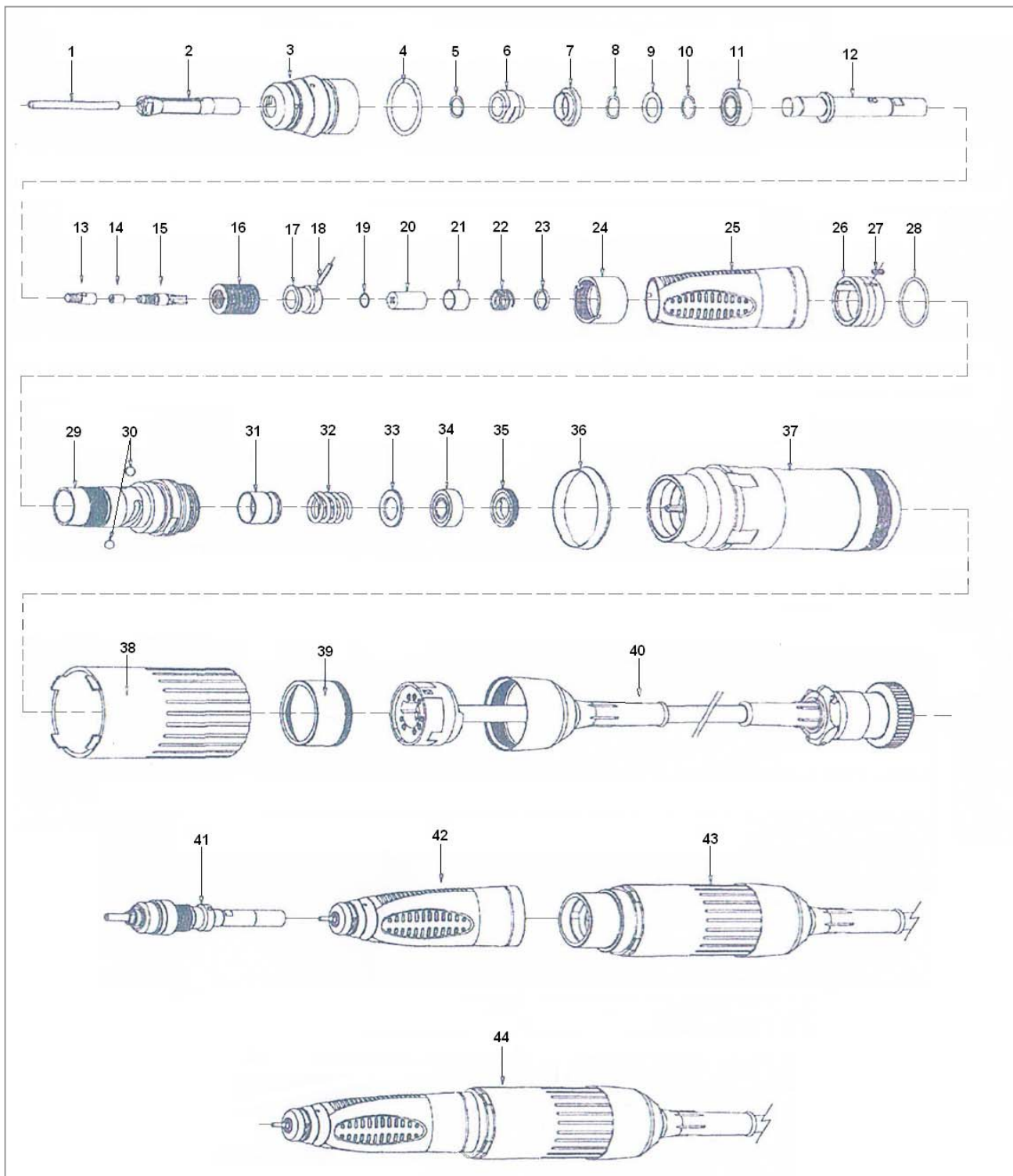
Problem: THE HANDPIECE IS OVERHEATING	
Possible cause	Remedy
The bearings are worn out	Contact the technical service for replacement

Problem THE HANDPIECE IS VIBRATING AND MAKES NOISE	
Possible cause	Remedy
The pliers are dirty	Clean accurately
The fitted tool is not suitable to the procedure or to the speed or it is damaged	We recommend to use only high quality burs whose size is compatible with the preset speed
The bearings are worn out	Contact the technical service for replacement

Problem: THE TOOL IS NOT LOCKED INT HE PLIERS	
Possible cause	Remedy
The pliers are loosen or worn out	Check and eventually replace

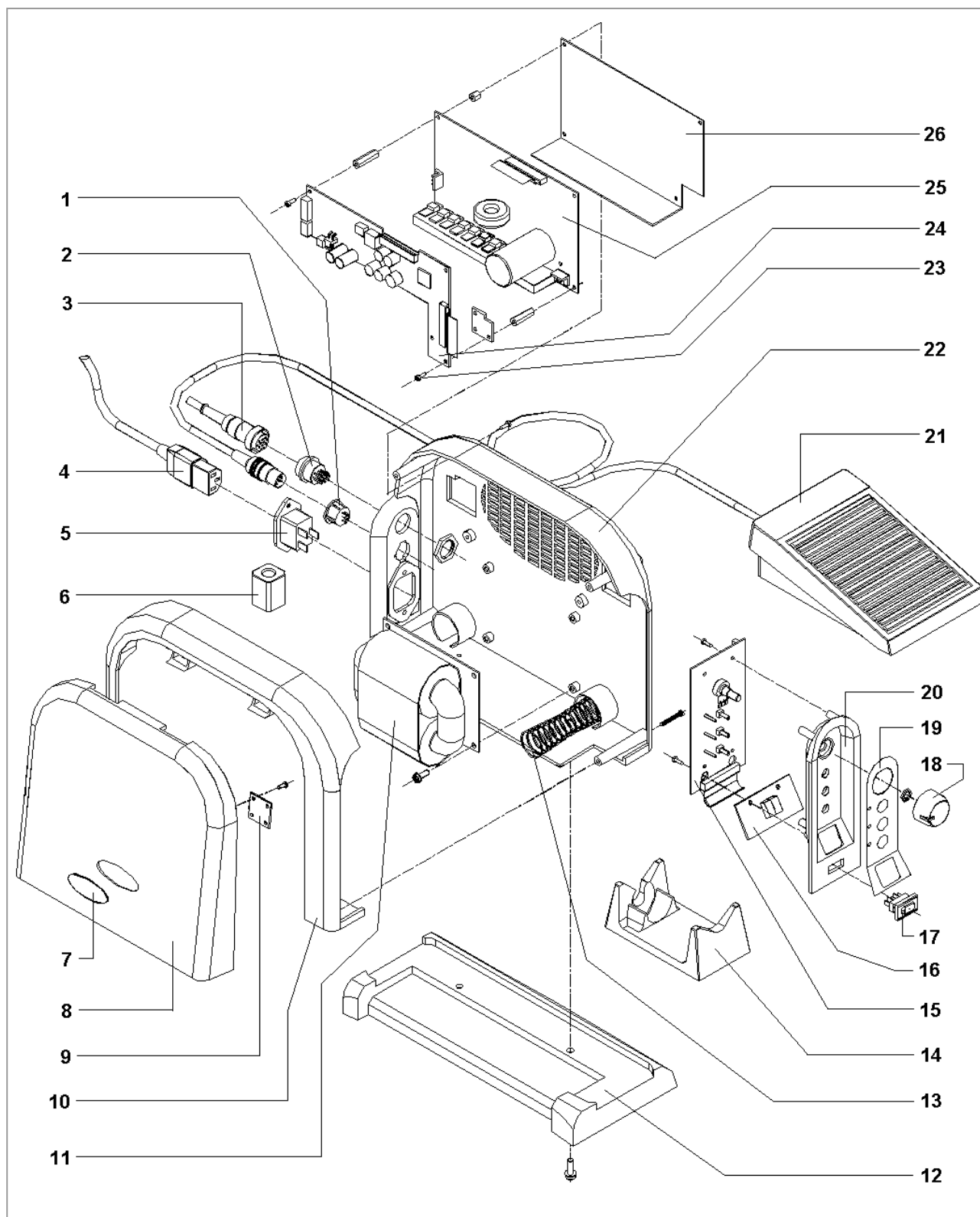
10. EXPLODED DRAWING – SPARE-PART LIST HANDPIECE 50.000rpm BL

No	CODE	DESCRIPTION
1	5050T001	TESTING TIP
2	5050T002	PLIERS FOR TIPS Ø2.35
3	5050T003	FRONT COVER
4	5050T004	OR JOINT ON CAP
5	5050T005	OR JOINT ON CHUCK
6	5050T006	COLLAR
7	5050T007	COLAR STOP
8	5050T008	CORRUGATED WASHER
9	5050T009	2 B14 WASHER
10	5050T010	1 B14 WASHER
11	5050T011	FRONT BEARING
12	5050T012	PLIERS HOUSING
13	5050T013	PLUG CONNECTION
14	5050T014	ROD SPACER
15	5050T015	ROD CONNECTION COUPLING
16	5050T016	CHUCK SPRING
17	5050T017	SPRING GUIDE
18	5050T018	SPRING PIN
19	5050T019	OR JOINT ON CONNECTOR
20	5050T020	CONNECTOR
21	5050T021	SPACER ON SPRNG
22	5050T022	SPRING ON COUPLING
23	5050T023	SPRING GUIDE
24	5050T024	FRONT HOUSING LOCKING RING-NUT
25	5050T025	FRONT HOUSING
26	5050T026	RING SET
27	5050T027	WRENCH SET
28	5050T028	OR SEAL ON CAM
29	5050T029	CAM
30	5050T030	BALL
31	5050T031	MOBILE SEAT
32	5050T032	SPRING
33	5050T033	SPACER RING
34	5050T034	REAR BEARING
35	5050T035	STOP RING
36	5050T036	RING ON MOTOR HOUSING
37	5050T037	BRUSHLESS MOTOR COMPLETE
38	5050T038	MOTOR SHELL
39	5050T039	MOTOR SHELL LOCKING RINGNUT
40	5050T040	BRUSHLESS HANDPIECE CABLE COMPLETE
41	5050T100	MOTION TRANSMISSION GROUP
42	5050T101	FRONT PART COMPLETE
43	5050T102	REAR PART COMPLETE
44	A5050TM	50.000PRM BRUSHLESS HANDPECE COMPLETE

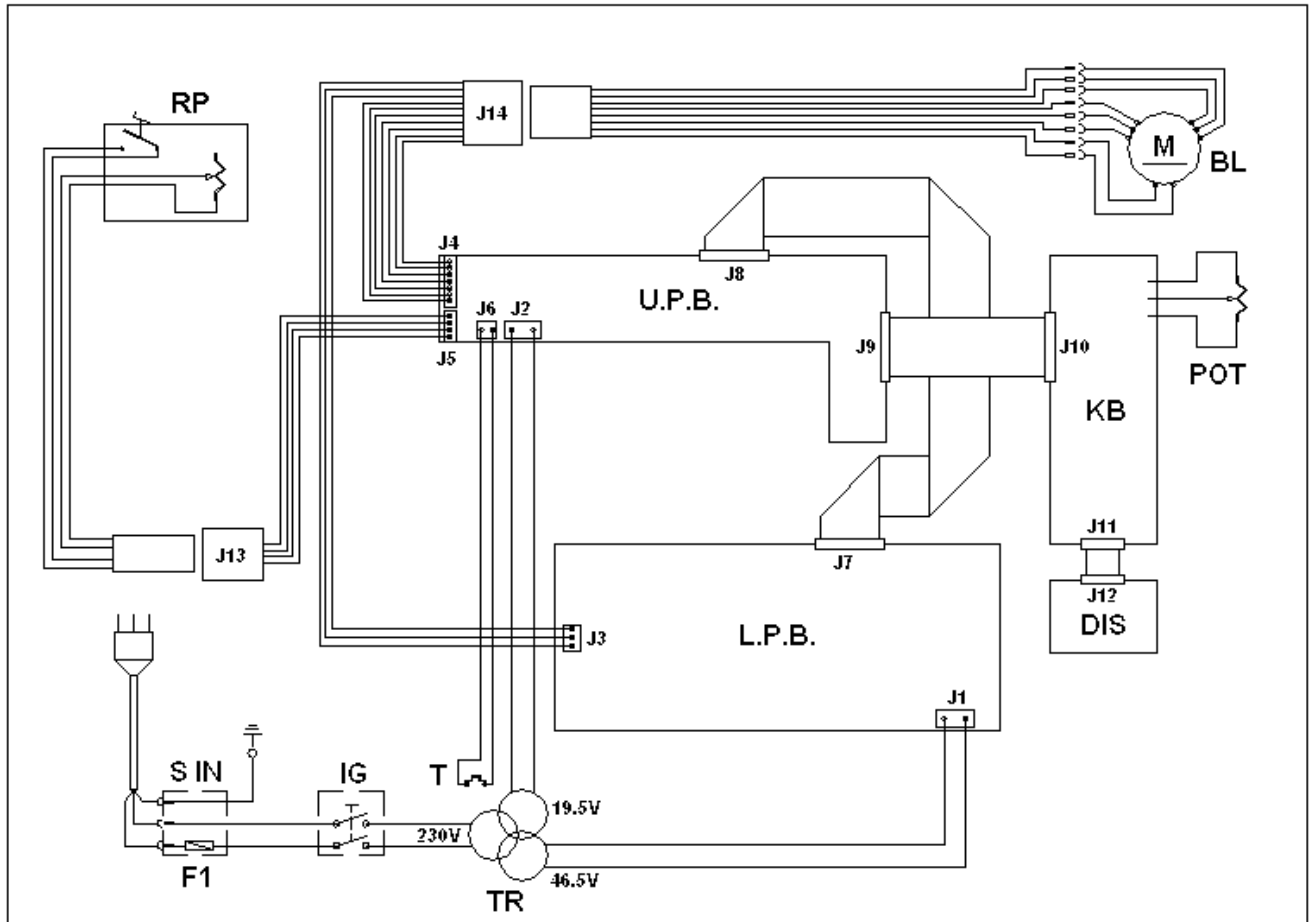


11. EXPLODED DRAWING AND SPARE-PART LIST – control unit

No.	CODE	DESCRIPTION
1	5051025	FOOT-CONTROL CONNECTOR
2	5051024	BRUSHLESS HANDPIECE CONNECTOR
3	---	BRUSHLESS HANDPIECE CORD
4	NEV013	FEEDING CABLE WITH PLUG AND SOCKET
5	NEA043	FEMALE FLUSH SOCKET
6	5051026	FERRITE
7	5051002	LOGO LABEL
8	5051013	SIDE PANEL (KNEE CONTROL)
9	5051021	MAGNET
10	5051012	LEFT SIDE SHELL
11	5051020	TRANSFORMER
12	5051010	BASE
13	5051027	SPRING
14	5051028	RUBBER HANDPIECE SUPPORT
15	5051017	CONTROL BOARD
16	5051018	DISPLAY BOARD
17	5051023	MAIN SWITCH
18	5030008	POTENTIOMETER KNOB
19	5051002	BRAND LABEL
20	5051014	CONTROL SUPPORT
21	5035026	VARIABLE SPEED FOOT CONTROL
22	5051011	RIGHT SIDE SHELL
23	5051022	PLASTIC SCREW
24	5015016	UPPER POWER BOARD
25	5051015	LOWER POWER BOARD
26	5051019	DISSIPATOR PLATE



12. WIRING DIAGRAM



POS.	DESCRIPTION
S IN	Feeding cable connector
F1	Fuse
IG	Main switch
TR	Transformer
T	Temperature sensor
L.P.B.	Lower power board
U.P.B.	Upper power board
KB	Keyboard
POT	Potentiometer - speed regulation
DIS	Display board
BL M	Brushless motor
J14	Motor cable connector
RP	Variable speed foot control
J13	Foot control cable connector

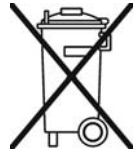
13. TECHNICAL REFERENCE REGULATIONS AND TEST PROCEDURES

Dentalfarm HP micromotors (35.000-50.000 RPM) are mass-manufactured by Dentalfarm in compliance with technical and safety rules in force, as provided for by the 2006/42 EEC Community Directive on machinery.

Careful inspection and full testing is carried out singularly on each machine which is furtherly tested by an automatic test installation.

14. DEMOLITION AND WASTE DISPOSAL

According to International regulations, this unit has been classified as AEE (electric and electronic device, whose correct operation depends on electric currents and electromagnetic fields) and as a consequence, at the end of its lifetime, it can not be treated as normal waste material but it must be disposed separately, complying with the Directive 2002/96/EEC.



15. TECHNICAL SPECIFICATIONS

Description	
Power supply unit length	95 mm
Power supply unit width	270 mm
Power supply unit height	230 mm
Net and gross weight	4,5 kg – 5,8 kg
Voltage	230 v AC – 50/60 Hz
Fuses	2.0 A
Absorption	160 W
Motor type	DC brushless motor
Motor tension	Low voltage (0-25v DC)
Rotating speed	1.000 – 50.000 rpm
Rotation	Reversible
Motor power	140W
Max torque	68 mNm
Handpiece size	Ø 26 mm (MAX) – length 163 mm
Chuck pliers	Ø 2.35 mm – (Ø 3.00 mm optional)

DENTalfarm s.r.l.

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