6 TIMED APPARATUS

In the following section, the functional characteristics of the Timed apparatus are examined.
The Timed apparatus (**Fig. 6.0.1**) incorporates many interesting features into its construction. It provides a stable high-frequency current which is unaffected by prolonged use or fluctuating mains supply (see section 4.6). The full power may be delivered continuously and the unit is resistant to short-circuiting. The power control has a series of discrete settings, which enables the required power to be selected rapidly.

The Timed TD 50 micropulse has twelve pre-set positions, arrayed in geometric progression (Tab. 6.1), so that each step increases the power by the same ratio (about 1:4).
The set power is shown on the front panel and the emitted power is indicated.
The apparatus may be used in the direct or timed mode.
In the timed mode, the Timed apparatus allows emission time to be set between 1 and 99 hundredths of a second. The increments in emission time are on an arithmetic scale,

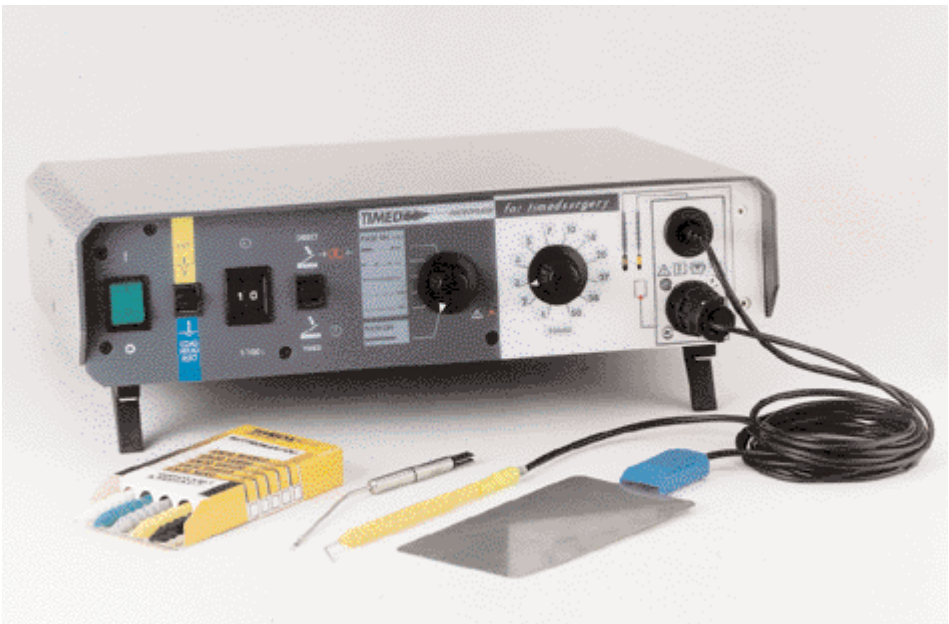


Fig. 6.0.1. Timed TD 50 micropulse.

having discrete and equal graduations of 1 hundredth of a second.
A safety circuit checks that all circuits are operating correctly and alerts the user to any faults which may arise (Tab. 6.2). If any malfunction occurs which could be harmful to the patient (e.g. if the power control or the time control become unreliable) the emission is inhibited.
This is a necessity chiefly when using high power and short times, as human intervention in the case of malfunction is too slow.
In the direct mode, the Timed apparatus can be used as a traditional diathermocautery. In addition to the standard set of electromaniples designed specifically for timed surgery (see sect. 7), the apparatus can be equipped with ordinary electrosurgical maniples.
The power system is the heart of the Timed apparatus; it generates the current.
Different types of current produce different clinical effects. For instance, de-epithelialisation of the skin at 1 Watt using a traditional generator would be unthinkable.
The intrinsic features of the current also influence tissue healing.
The currents generated by the Timed apparatus are specifically designed for use in timedsurgery procedures.

Tab. 6.1 Power scale of the Timed TD 50 micropulse

Set Value (Watts)	Actual Value (Watts)
1	1.45
2	2.02
3	2.80
4	3.87
5	5.36
7	7.42
10	10.28
14	14.22
20	19.69
27	27.25
38	37.71
50	52.20

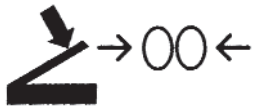
Tab. 6.2 Safety and Monitoring Circuits of the Timed TD 50 micropulse

Machine self-tests when switched on
Internal failure and power indicator *
Alarms for faults in patient return electrode **

* The circuit indicates internal failure and checks that the power generated is that which has been set.

** Timed has a functional - type circuit to control the neutral electrode.

Tab. 6.3- Symbols of the Timed TD 50 micropulse controls

 CUT	 DIRECT
 COAG MICRO ELECT	 TIMED
Cutting or coagulation with microelectrodes	Emission duration directly controlled by the pedal or timed

6.1 **Pulsed emissions**

The Timed TD 50 micropulse can generate 5 types of pulsed current to facilitate specific operations. The pulsed functions are used in the direct mode (Tab. 6.3).
The shortest pulsed emission is used in timedsurgical resurfacing and rapid pulsed cutting; one is specifically suited to de-epithelialisation for the repigmentation of vitiligo and for eliminating wrinkles on the eyelids and patches on the hands, while the other pulsed emissions make certain procedures more rapid (Tab. 6.4).

Tab. 6.4 Types of pulsed emission of the Timed TD 50 micropulse apparatus

(1/100s)	Main application
25/67	Epilation
5/29	Telangiectasias, small neoformations
4/9	De-epithelialisation for repigmentation of vitiligo and elimination of wrinkles on the eyelids. Pulsed superficial timedsurgical coagulation for patches on the hands.
0.5/24.5	Slow pulsed cutting
0.3/5.3	Timedsurgical resurfacing for levelling scars (Cut) and eliminating tattoos (Coag microelectrodes) Rapid pulsed cutting

Tab. 6.5 Principal features of the Timed TD 50 micropulse

High efficiency with solid-state power system *
Insulated floating power system
Discrete power and emission time control
Power scale designed for timedsurgery
High-frequency current designed for timedsurgery
Output power indicated in Watts
Output short circuit protected (no time limit)
Output protected against short-circuiting
Immune to electromagnetic disturbance
Operating frequency 921 KHz
Coagulation function matched to electromaniple dimensions
Safety and monitoring circuits (see table 6.2)
Completely enclosed case

* High efficiency in terms of the amount of energy delivered by the machine as high-frequency current compared with its energy consumption from the electrical supply. High efficiency leads to minimum heat production within the apparatus; this is preferable as, even after prolonged use, the apparatus will not become unpleasantly hot to touch. Moreover, as the characteristics of the electrical components are not modified by changes in their temperature, the power ouput remains stable.