custo·med

Operating Instructions ▪ Ergometer ec3000

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State: September 2008

Table of Contents

1. Subject of the document

This document is part of the documents for the user of the ergometer family ec3000.

This document is including:

- Explanations for the understanding of essential functions of the ergometer and
- A detailed description of the surface, particularly of the ergometer head.

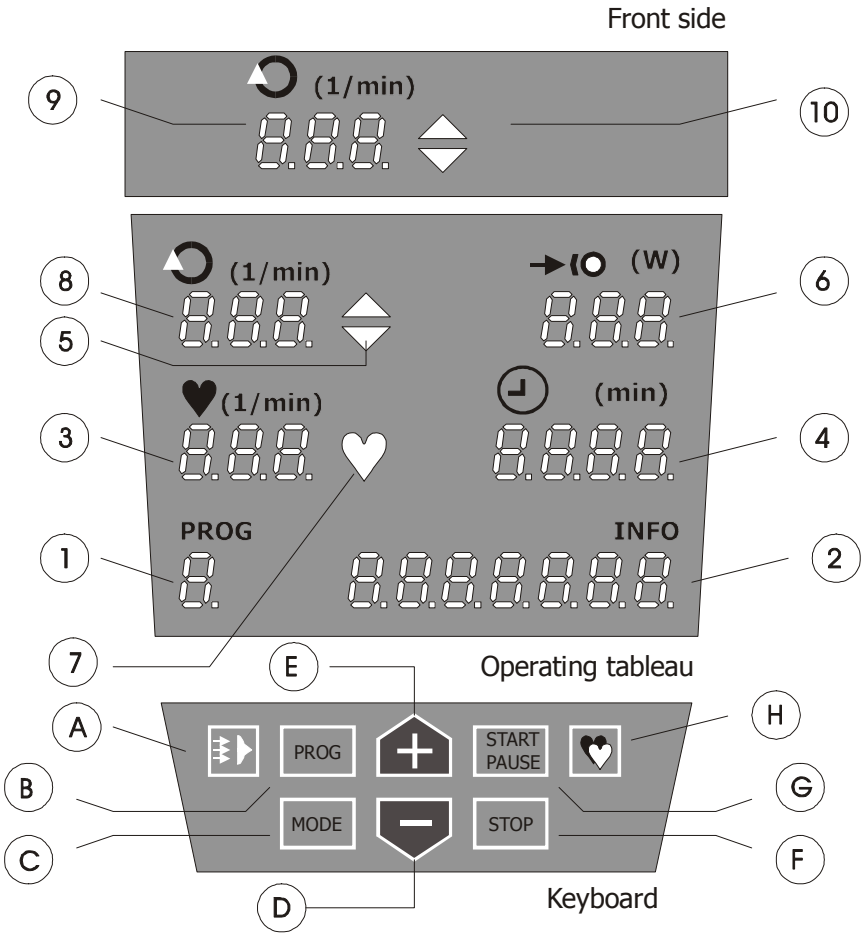
General instructions for the use of the ergometer are included in the document „Technical reference ec3000", which is also part of the customer`s documents.

Notes:

2. Description of the ergometer head

2.1. Functional elements

A display and a keypad for the easy operation of the ergometer are placed on the head side of the ergometer. The following diagram shows the arrangement of these operating elements.



Legend:

(1) Single-digit display of the number of the active program

(2) Seven-digit display of information texts

(3) Three-digit display of the pulse rate [1/min]

(4) Four-digit display of program run-times [mm.ss]

(5) Directional note for the optimal pedal frequency (identical with (10))

(6) Three-digit display of the current capacity [W]

(7) Display of the heart activity

(8) Three-digit display of the current speed [1/min] (identical with (9))

(9) Three-digit display of the current speed [1/min] (identical with (8))

(10) Directional note for the optimal pedal frequency (identical with (5))

Legend (continued):

(A)	Activation of the setting of the suction system
(B)	Activation of the programming environment
(C)	Activation of the configuration setting
(D)	Decreasing of selected values
(E)	Increasing of selected values
(F)	Termination / completion of operational / functional processes Confirmation of entries
(G)	Start / interruption of functional processes
(H)	Start / Stop blood pressure measuring

2.2. Operating states

The complete prompt is divided into different operating states respective to the desired operating mode. These operating states are an image of the logical operating process. There is a distinction in principle between

- functions, which can be carried out any time
  (parallel operating functions)

  Included are e.g.

  - operation of the blood pressure measuring system
  - control of the capacity of the suction system

  and

- functions, which require a particular operating sequence
  (sequential operating functions).

  Included are e.g.

  - program environment,
  - manual operation
  - remote operation
    (external computer control)
    or
  - configuration of the system
    (device setting)

The individual operating conditions/states are described in the following with an overview. The functionality of the operating states is described in detail as part of the following chapters.

The following diagram shows the operating states and the required events, which are required for the transition between the individual states.

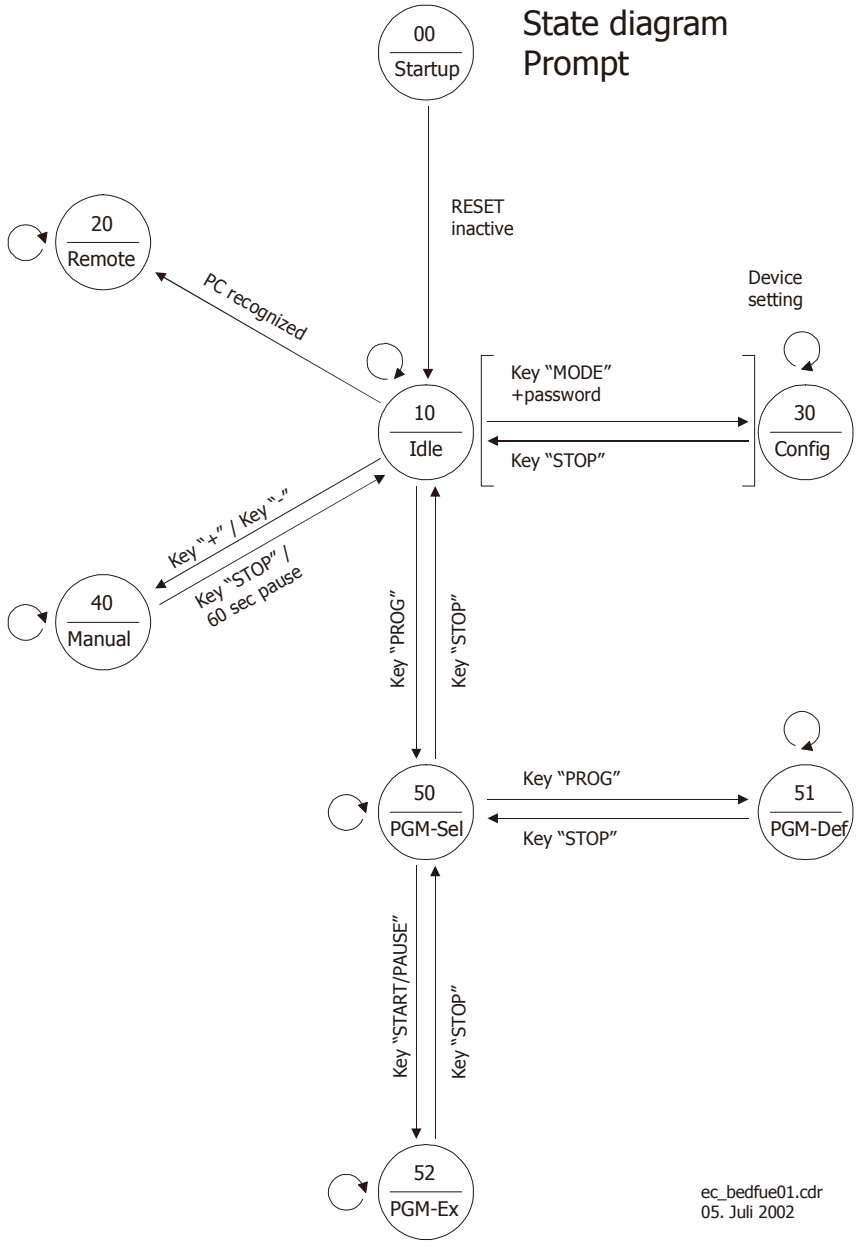
The starting sequence is cycled through at first after the ergometer has been switched on. This starting sequence includes all internal processes, which are required to accomplish an operational state.

The state „IDLE" indicates the so-called main menu. The ergometer is in this state, if it is not operated. Arising from this state all operational functions can be accomplished – the ergometer also returns again to this state after the operational functions have been finished.

This functions include:

- Manual operation
  (Manual)
- Remote operation
  (Remote)
- Program environment
  - Program selection
    (PGM-Sel)
  - Program execution
    (PGM-Ex – program runs)
    PGM-Sus – program interrupted)
  - Programming
    (PGM-Def)
- Device settings
  (Service)

The diagram also displays particularly the actions, which are required for the carrying out of operational functions.


State diagram
Prompt
00
Startup
RESET
inactive
20
Remote
PC recognized
Device
setting
Key "MODE"
+password
Key "STOP"
10
Idle
30
Config
Key "+" / Key "-"
Key "STOP" /
60 sec pause
40
Manual
Key "PROG"
Key "STOP"
Key "PROG"
Key "STOP"
50
PGM-Sel
51
PGM-Def
Key "START/PAUSE"
Key "STOP"
52
PGM-Ex
ec_bedfue01.cdr
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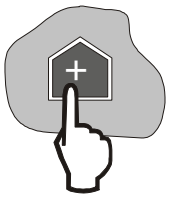
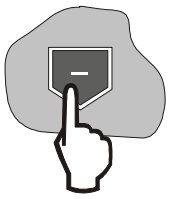
3. Manual operation

3.1. Selection of the manual operation

The operating mode „manual operation" is accomplished by pressing the keys



or



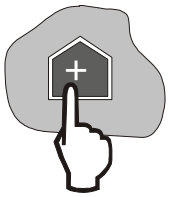
in the main menu. In this operating mode the letter „P" is displayed followed by the value of the currently set load setpoint on the display „INFO".

When changing into this operating mode the predefined load setpoint is 20 W.

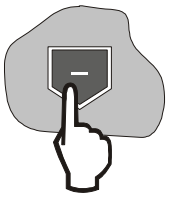
3.2. Selection of the load setpoint

The manual input of the load setpoint can only be executed with the operating mode „manual". It is indicated by the letter „P" followed by the value of the current load setpoint (in W).

By pressing the key



or



the load setpoint is increased by 5 W.

the load setpoint is decreased by 5 W.

The input area lies between 5 W and 995 W.

Notes:

1. The current load is being regulated to the target value by a gradient of 10 W / sec. The current load is displayed in the display field „CAPACITY".

2. The increment decreases from 5 W to 1 W per each step in the load range below 20 W.

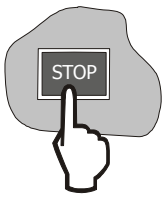
3.3. Display of the operating time

With the display field „time indication"

the exercise time is displayed, which has been passed since the entry into the operating mode „manual operation".

3.4. Exit of the manual operation

By pressing the key



the system returns to the main menu.

If an exercise break takes more than 3 minutes (speed is zero), the manual operating mode is finished automatically. The system returns to the operating mode „IDLE"
(main menu).

Note:

The current load is regulated to zero with a negative gradient of –10 W / sec.

Notes:

4. Remote operation

4.1. Selection of the remote operation

The operation mode „Remote" is entered when the correct transmission of telegrams is detected with the remote interface.

The ergometer has the following remote interfaces:

- Serial interface
- CAN-Bus

The localization and configuration of the interfaces is described in the Technical Manual of the ergometer.

The remote operating state can be accomplished from the main menu. The accomplishing of this operating state can be recognized by the word „PC" in the „INFO" field of the ergometer.

The number indicates the target capacity set by the PC.

4.2. Exit of the remote operation mode

It is not possible to exit the remote operation mode by an entry with the keys on the ergometer head.

The normal operating mode can only be continued by switching on the ergometer again.

5. Training programs

5.1. Overview

The ergometer is operated by remote control with an external computer or with an intelligent ECG device.

In addition the ergometer is able to execute training programs independently.

To carry out this function the ergometer has an appropriate user interface with the following functions:

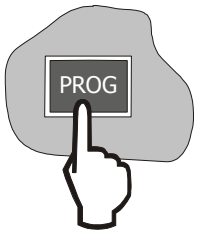
- Program selection
- Program definition
- Program execution

The following paragraphs describe the operating functions one by one.

5.2. Program selection

5.2.1. Start of the program selection

The operating state „program selection" can be achieved from the main menu by pressing the key



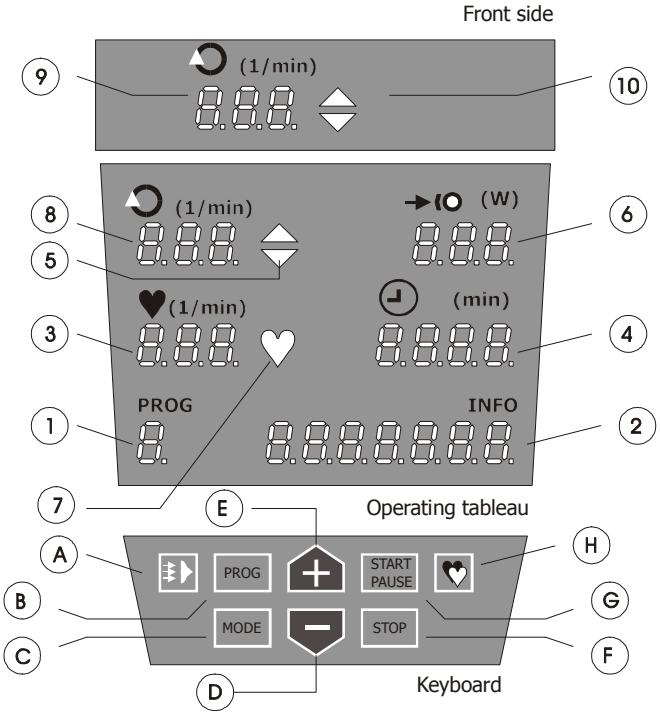
The last program being selected is displayed. The selected program (here: program no. 8) can be recognized with a flashing number in the display field „PROG".

Display flashes

The program parameters are displayed in other display fields. The diagram in the following figure describes the associated display functions.

5.2.2. Display of the program parameters

This figure shows the displays of the operating tableau and the front side of the ergometer head:



Note:

The displays 1 .. 4 and 6 show the parameters of the selected program. The displays 5 and 7 .. 10 have no functions in the program mode – the displays are dark (off).

A detailed explanation of the program parameters can be found in the chapter „program definition" of this operating manual.

Legend:

(1) Single-digit display of the number of the active program

(2) Seven-digit display of information texts

(3) Three-digit display of the pulse rate [1/min]

(4) Four-digit display of the program runtimes [mm.ss]

(5) Directional note for the optimal pedal frequency (identical with (10))

(6) Three-digit display of the current capacity [W]

(7) Display of the heart activity

(8) Three-digit display of the current speed [1/min] (identical with (9))

(9) Three-digit display of the current speed [1/min] (identical with (8))

(10) Directional note for the optimal pedal frequency (identical with (5))

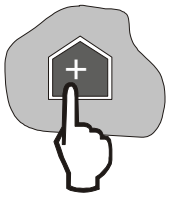
Legend (continued):

A	Activation of the settings of the suction system
B	Activation of the program environment
C	Activation of the configuration setting
D	Decrease of selected values
E	Increase of selected values
F	Termination / completion of operational / functional processes Confirmation of entries
G	Start / interruption of functional processes
H	Start / Stop blood pressure measuring

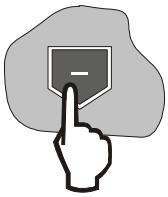
5.2.3. Selection of the program

The display „PROG" must be flashing as a basic requirement for the selection of the program.

By pressing the key



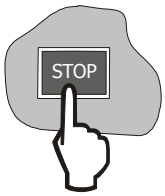
or



the next program or the previous program can be selected.

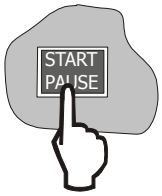
5.2.4. Exit of the program selection

By pressing the key



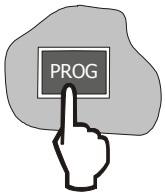
the system returns to the main menu.

By pressing the key



the program is executed. The ergometer changes to the operating state „program execution".

By pressing the key

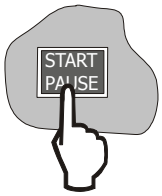


the operating sequence for the changing of the program parameters is started (programming).

5.3. Execution of the program

5.3.1. Start of the training program

By pressing the key „START/PAUSE" a selected program is being executed in the operating mode „program selection".



The operating state „program execution" of the ergometer can be verified by the following criteria:

- The program number is displayed permanently (no flashing).
- The program type is displayed with „INFO".
- The time indication runs backwards (second cycle).

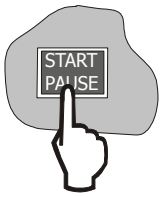
This example shows a pulse steady state program with a heart rate of 120 beats/minute as program no. 3.

Note:

A pulse measuring (ECG or polar belt) is a basic requirement for the use of PSST programs.

5.3.2. Interruption of the program

By pressing the key



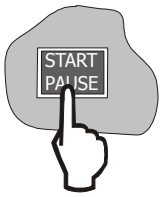
a running program is interrupted. The ergometer is changing to an intrinsically safe state:

- The current load is regulated to the value zero with a negative gradient of –10 W / sec.
- The time indication stops.
- The word „Pause" is displayed in „INFO"
- The program number is displayed.

In this example the running program no. 3 has been interrupted.

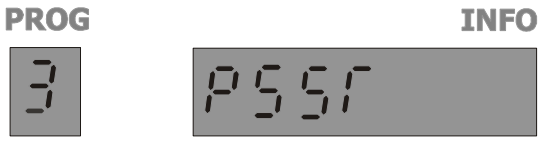
5.3.3. Continuation of the program

By pressing the key



it is possible to continue with a program which has been interrupted before.

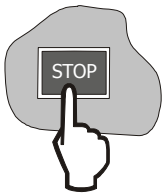
- The load is regulated to the initial value with a gradient of 10 W / sec.
- The time indication decrements with a second cycle.



A pulse steady state program is being continued as program no. 3 in this example.

5.3.4. Termination of the program

By pressing the key



it is possible to terminate a program which has been started before. The system returns to the state „program selection".

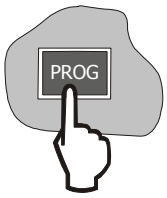
- The load is regulated to the value zero with the negative gradient of – 10 W / sec.

When the program is terminated the ergometer returns to the program selection. The display of the program number flashes again.

5.4. Definition of the program parameters

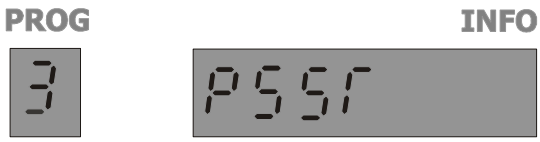
5.4.1. Start of the programming

By pressing the key



the system changes from the state „program selection" to the state „program definition".

The number of the program is permanently displayed now by the flashing display „PROG". The display of the program type flashes („INFO" field).



A pulse steady state program is stored as program no. 3 in this example.

5.4.2. Programming of pulse-steady-state-programs

5.4.2.1. General

The operating principle of pulse-steady-state-programs is to regulate the capacity of the ergometer in such a way that the pulse rate of the patient selected with the ergometer is being set.

The ergometer increases the load at the set limit by a gentle ramp program in 1 W-steps with an increasing speed of 30 W / min, until the set pulse rate is achieved.

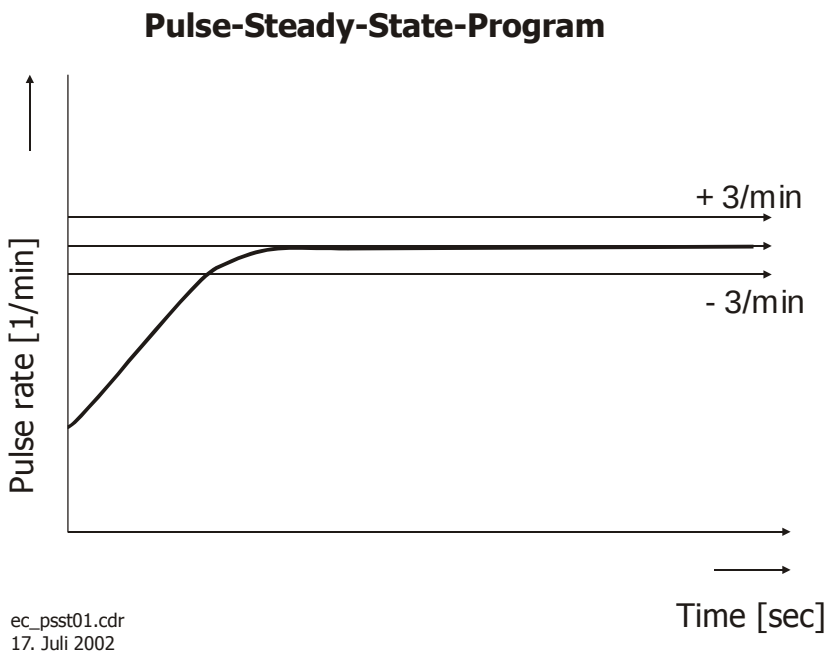
Then the pulse rate of ± 3 heart beats / minute is maintained constantly through the complete traing period by an automatic load modification.

The following diagram shows the major characteristics of pulse steady state programs (PSST).

Note:

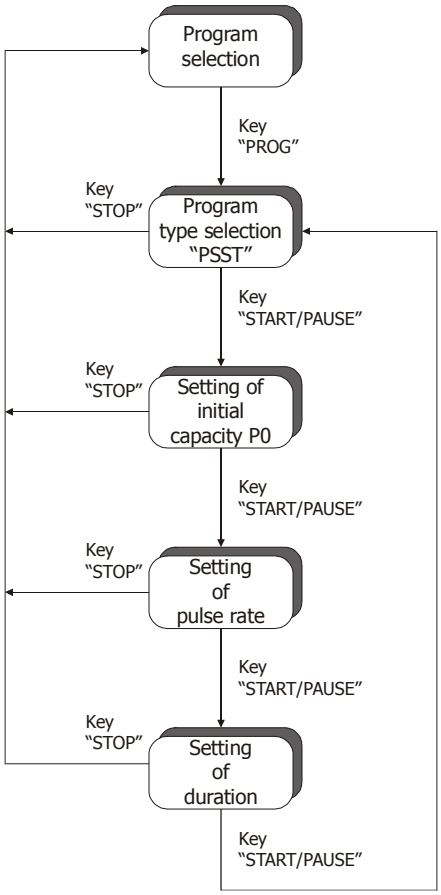
The use of ECG signals or polar receivers for the determination of the current pulse rate is a basic requirement for the use of PSST programs.

The following diagram illustrates the major characteristics of a pulse steady state program:



The training of a patient is regulated in such a way that a constant pulse is being achieved.

Process of programming



ec_psst_seq01.cdr
17. Juli 2002

At first the program is determined by selection of the corresponding program number (cf. chapter 1.2.3).

„PSST" must be selected as program type for „pulse steady state programs" (cf. chapter 1.4.2.2).

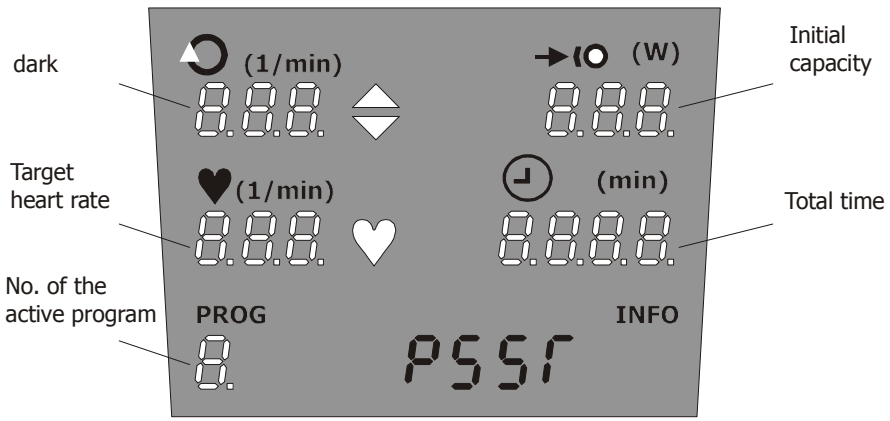
As warm-up the initial capacity for this patient must be set (cf. chapter 1.4.2.3).

Then the setting of the required pulse rate is done (cf. chapter 1.4.2.4).

Lately the duration of the training must be set (cf. chapter 1.4.2.5).

The following diagram shows the allocation of the operating tableau with the entry of PSST programs:

Operating tableau for PSST programming

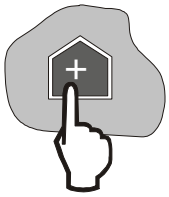


Operating tableau

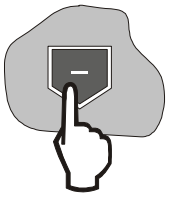
5.4.2.2. Selection of the program type

A requirement for the selection of the program type is that the display „INFO" flashes.

By pressing the key



or

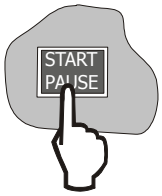


the next program type or the previous program type can be selected.

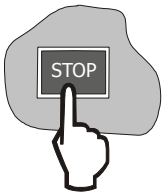
The program type „pulse-steady-state" is selected, if the contraction „PSST" is displayed in the field „INFO".

By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of the initial capacity.

By pressing the key „STOP" the programming is finished.



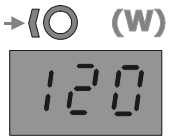
or



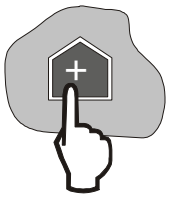
5.4.2.3. Programming of the initial capacity

Each pulse-steady-state-program starts with a two-minute warm-up time and the initial capacity P0.

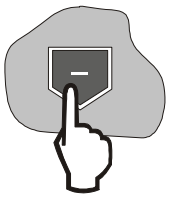
It is required for the entry of the initial capacity that the display field „CAPACITY" is flashing.



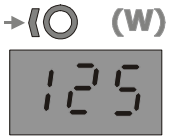
By pressing the key

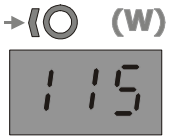


or



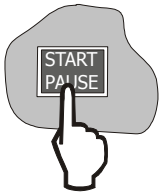
the capacity is increased or it is decreased.



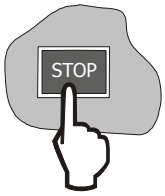


By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of the initial capacity.

By pressing the key „STOP" the programming is finished.



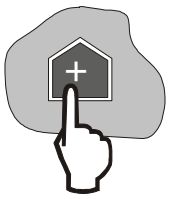
or



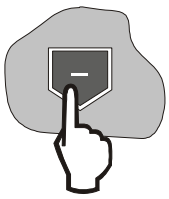
5.4.2.4. Programming of the pulse

It is a basic requirement for the entry of the target pulse rate that the display field „PULSE" is flashing.

By pressing the key



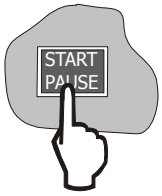
or



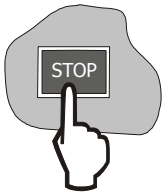
the target pulse rate is increased or it is decreased.

By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of the training time.

By pressing the key „STOP" the set value is taken over and the programming is finished.



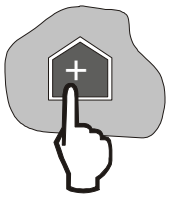
or



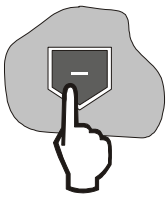
5.4.2.5. Programming of the training time

It is a basic requirement for the entry of the step time that the display field „TIME" is flashing.

By pressing the key



or

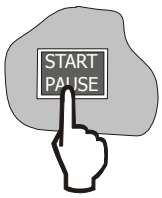


the time is increased or

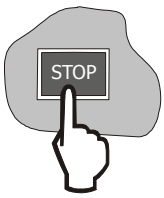
it is decreased.

By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of the program type.

By pressing the key „STOP" the programming is finished. The set value is taken over.



or



Note:

The entry of the time is done with in(de)crements of 10 sec.

5.4.3. Programming of STEP programs

5.4.3.1. General

The operating principle of STEP programs is to subdivide the complete rating profile into particular areas and to program these areas in sections (step-by-step).

Each step there is determined by a load (capacity), which is carried out for a particular period (time).

Capacities are being modified by a defined ramp of ± 5W / sec.

The rating profile exists of up to 31 sections (STEPS).

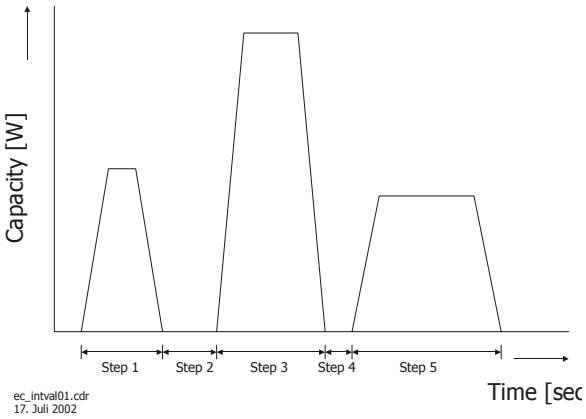
The following diagrams show the function of typical processes of STEP programs:

- The classic interval training
  or
- A step profile with a permanent capacity

Capacity profiles can be compiled arbitrarily.

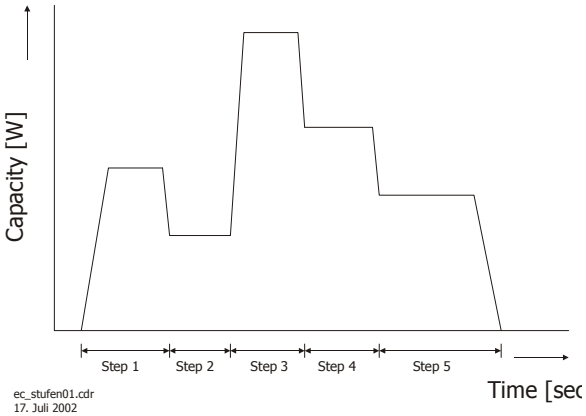
The following diagrams illustrate major characteristics of STEP programs:

Interval training



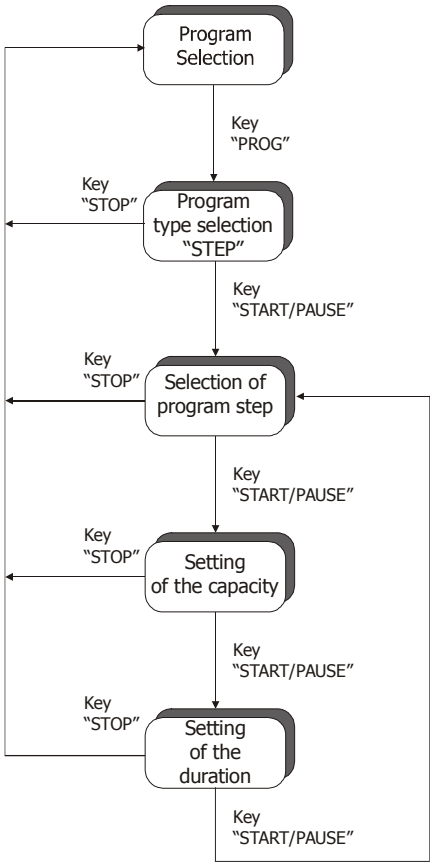
The characteristics of interval training are breaks between the individual exercise phases.

Step training



The step training is characterized by a continuous capacity of different intensity. Of course combined programs or special training profiles are possible.

Process of programming



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At first the program is determined by selection of the corresponding program number (cf. chapter 1.2.3)

„STEP" must be selected as program type for step programs (cf. chapter 1.4.3.2).

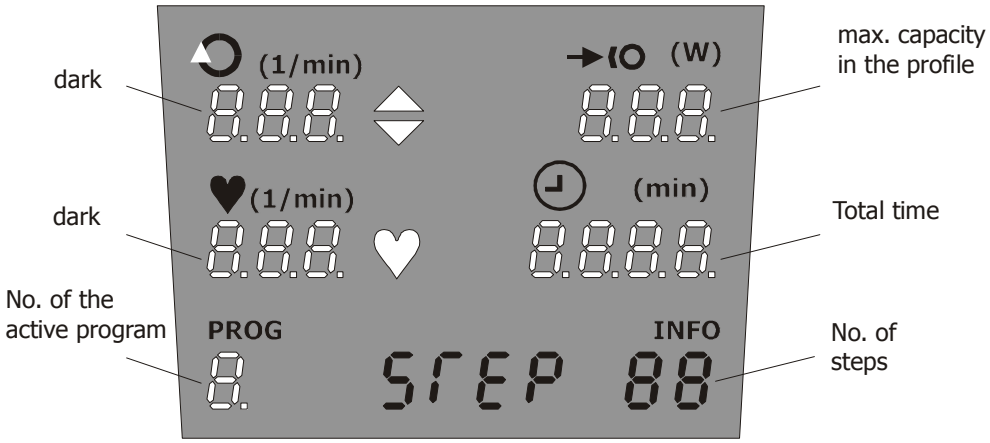
Then the program step is selected with the step number (cf. chapter 1.4.3.4).

The capacity is determined for this program step (cf. chapter 1.4.3.5).

The period of time is determined for this program step (cf. chapter 1.4.3.6).

The following figure shows the allocation of the operating tableau with the entry of STEP programs:

Operating tableau for STEP programming

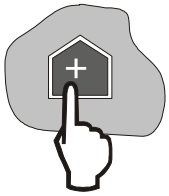


Operating tableau

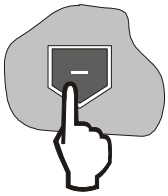
5.4.3.2. Selection of the program type

It is a basic requirement for the selection of the program type that the display field „INFO" is flashing.

By pressing the key



or



the next program type or the previous program type can be selected.

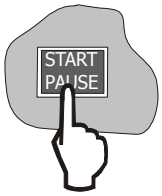
The program type „STEP" has been selected, if the contraction „STEP" is indicated in the display „INFO".

Note:

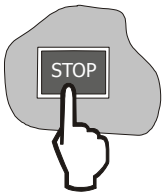
Both the digits describe the number of the programmed steps (14).

By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of the pulse.

By pressing the key „STOP" the programming is finished. The set value is taken over.



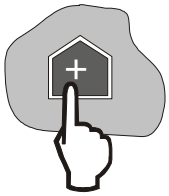
or



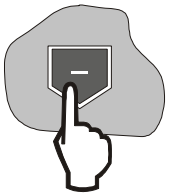
5.4.3.3. Selection of the program step

It is a basic requirement for the selection of the program step that the two last digits in the display „INFO" are flashing.

By pressing the key



or

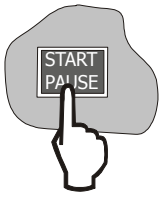


the number of the program step is increased

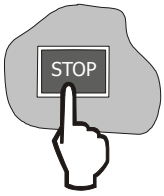
the number of the program step is decreased.

By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of capacity.

By pressing the key „STOP" the the programming is finished.

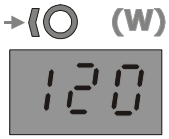


or

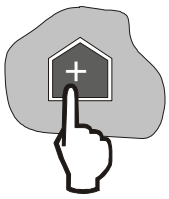


5.4.3.4. Programmig of the capacity

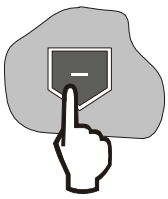
It is a basic requirement for the entry of the capacity that the display „CAPACITY" is flashing.



By pressing the key



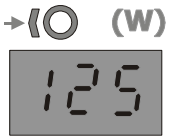
or



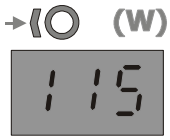
the capacity is increased

or

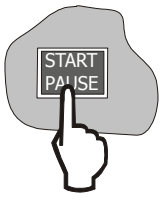
the capacity is decreased.



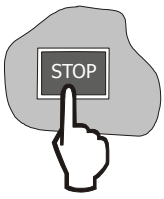
By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of the step time.



By pressing the key „STOP" the programming is finished. The set value is taken over.



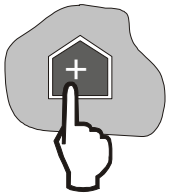
or



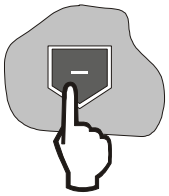
5.4.3.5. Programming of the step time

It is a basic requirement for the entry of the step time that the display „TIME" is flashing.

By pressing the key



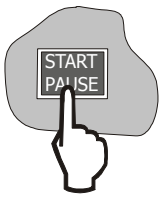
or



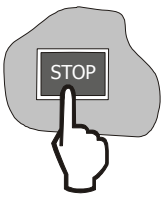
the time is increased or the time is decreased.

By pressing the key „START/PAUSE" the current value is taken over and it is transmitted for the entry of the step number.

By pressing the key „STOP" the programming is finished. The set value is taken over.



or

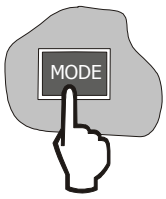


Notes:

6. Configuration

6.1. Selection of the settings

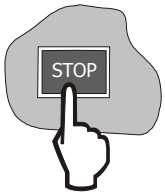
The selection of different operating settings is carried out with the operating mode „configuration". It is selected by pressing the key



This operating function can be recognized by the word „Control" in the „INFO" field.

6.2. Exit of the configuration menu

By pressing the key

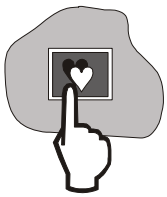


the system returns to the main menu.

7. Control of the blood pressure measuring system

7.1. Start of the blood pressure measuring

The manual measuring of the blood pressure can be carried out at each time. By pressing the key



the blood pressure measuring system is activated.

Observe that the cuff must be applied for the measuring according to the operating instructions.

7.2. Display of the current cuff pressure

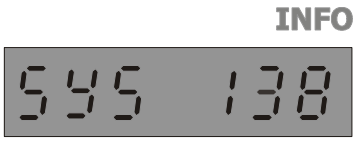
During the measuring process the current pressure in the cuff is displayed in the display field „INFO".

The display can be recognized with the contraction „bPS" followed by the value of the cuff pressure in mmHg.

7.3. Display of the measuring values

After the blood pressure measuring has been carried out the particular measuring values are displayed repeatedly in the display field „INFO".

Systole:



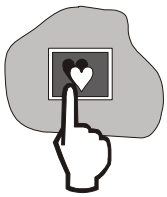
Diastole:

Heart rate (HR - Heart Rate):

The display cycle is repeated three times.

7.4. Termination of the blood pressure measuring

By pressing the key

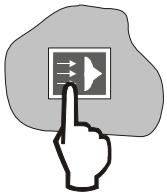


a possibly started blood pressure measuring is terminated. The cuff becomes pressureless after 10 sec at the latest.

8. Operating mode control suction system

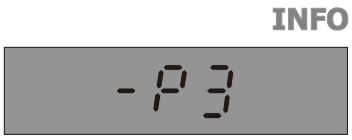
8.1. Selection of the suction system control

The setting of the suction rate can be carried out any time. By pressing the key



the operating function „suction system control" is invoked.

The operating function can be recognized by the word „-P" in the „INFO" field, followed by a number which indicates the current suction rate on a scale from 0 to 5. The number 1 indicates the lowest setting – the number 9 the highest setting.



By invoking this function the previously selected level of the suction rate is displayed. In this example it is an average level (level 3).

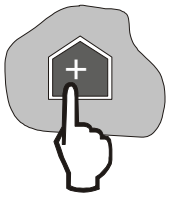
Notes:

- At first the previously set suction rate is set again.
- When the setting of the suction intensity is „-P0", the suction system is switched off.
- If within 10 sec there is no entry made, the system returns to the previous operating level.

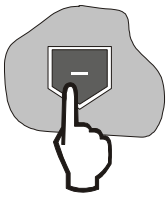
8.2. Selection of the suction rate

A basic requirement for the setting of the suction rate is the previous invoking of the corresponding function. It is indicated by an appropriate display in the „INFO" field.

By pressing the key



or



the suction rate is increased for one level.

the suction rate is decreased for one level.

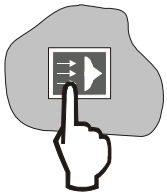
The suction rate is immediately adapted to the new setting.

Note:

The entry of the value „0" means off – e.g. with the use of adhesive electrodes.

8.3. Exit of the suction system control

By pressing the key



the system returns to the previous operating function.

The set suction rate is taken over.

8.4. Automatic interruption of the operation

After a pause of at least 30 min (speed zero) during the operation of the ergometer the suction system is switched off. The latest setting of the suction rate is stored.

With the resumption of the operation of the ergometer the suction system also starts again with the peviously set suction rate.

Notes:

9. Functional matrix

9.1. Interaction of the single functions

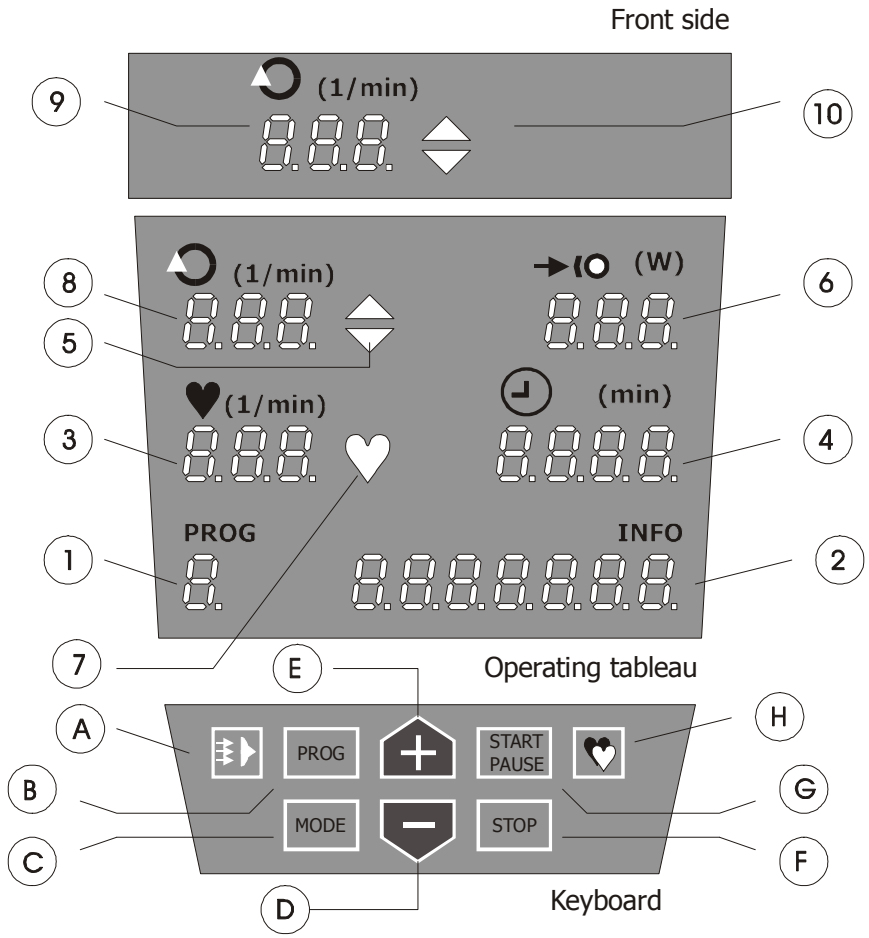
As already described in chapter 2, the complete functionality consists of parallel or sequential processes.

Therefore different functions can be carried out simultaneously – others can only be carried out in succession or either/or.

The following overview shows which functions can be operated simultaneously or not.

9.2. Functional elements

The following schematic drawing of the ergometer head shows the major elements and operating functions:



9.3. Functional matrix

The following functional matrix shows the interaction of parallel and sequential functions with an action table.

Operating state	1 Program number	2 INFO line	3 Pulse display	4 Time display	5 Trend display tableau	6 Capacity display	7 Display cardiac action	8 Speed display tableau	9 Speed display front side	10 Trend display front side
Switch-on sequency (0)	○	●	○	○	○	○	○	○	○	○
Main menu (10)	○	●	○	○	○	○	○	○	○	○
Remote control (20)	○	●	○	○	○	○	○	○	○	○
Device setting (30)	○	●	○	○	○	○	○	○	○	○
Manual operation (40)	○	●	○	○	●	●	●	●	●	●
Program selection (50)	●	●	○	●	○	○	○	○	○	○
Programming (51)	●	●	○	●	○	○	○	○	○	○
Program execution (52)	●	●	○	●	●	●	●	●	●	●
Program interruption (53)	●	●	○	●	○	○	○	○	○	○

Legend: ● in operation ○ Display dark / function not in operation

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Notes:

10. Status / messages

10.1. Display of messages

The ergometer has an elaborated system for autodiagnostics and monitoring of running functions.

Particularly sensor data and entries by the operator are checked for permissible limit values and plausibility, as far as possible.

Recognized errors or unallowable operating states are displayed in the „INFO" field of the ergometer head.

The following figure shows, as an example, the display of a status or an error message:

The message starts with the text „Err" (error, trouble), followed by a three-digit number (here error no. 905). This number describes definitely the reason for the termination of the function.

The display of messages is done automatically, if the carrying out of a function can not be continued. An acoustical warning signal sounds during the display.

After a period of appr. 5 sec the display disappears – the acoustical warning signal is also terminated.

The following chapter contains a list of the implemented error messages.

10.2. List of messages

10.2.1. Messages of the blood pressure measuring system

In the following messages of the blood pressure measuring system are listed. The message is described and notes for the elimination of the cause are given.

Error number	Description	Notes for the elimination
900	Common error message	Different causes (visual inspection)
904	The limit value absolutely exceeds the blood pressure measuring values	Heart rate < 35 1/min Systole < 70 mmHg Diastole < 40 mmHg Systole – Diastole < 15 mmHg
905	Relief rate outside of tolerance	Cuff leaky (defect) Valves leaky
906	Faulty measuring	Too much exercise artefacts
910	Zero point deviation too much	System not without pressure when it is switched on
916	Pressure rise too fast	Cuff tube dejected, cuff defect
917	Pressure rise too slow	Cuff leaky (defect) Valves leaky
918	No diastole pulses up to 150 mmHg	Cuff wrongly applied or oscillations too weak
920	Not enough oscillations recognized	Cuff wrongly applied or oscillations too weak
929	Not enough oscillations after artefact extraction	Cuff wrongly applied or oscillations too weak
930		
936	Sensor error pressure measuring	Service / repair required
937	max. cuff pressure exceeded	Repeat measuring

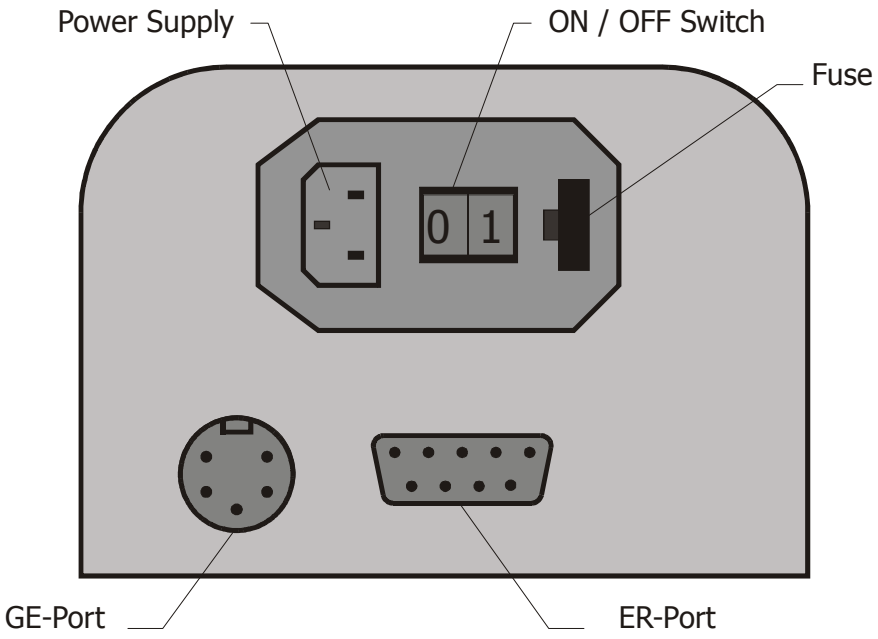
11. Interface description

11.1. Overview

The connections for the power supply and for the integration into computer systems are on the backside below of the ergometer.

The following figure shows the integrated connections:

- Power supply
  including power switch and fuse
- DIN round connector or Subd plug (9 pin socket)
  for the connection of the computer system



11.2. Power supply

The connection of the power supply is done by cold device connection:

Function	Specification	Notes
Input voltage AC	85 V ... 264 V AC 47 Hz ... 440 Hz	
Fuse	2 x 1.6 A slow-blow	

The device is switched on with the power switch. The switched-on state can be recognized by the glowing displays of the ergometer head.

Safety instructions:

- The power supply plug must be pulled out absolutely before the fuse is being replaced.
- Only fuses of this type must be used.

11.3. Remote interface

The device can be connected to an external computer system with a RS 232-C serial interface. The following functions can be carried out:

- Remote
  Execution of pc-supported ergometry programs
- Acknowledgement of ergometry data

The external computer system can be connected as required to a DIN-round connector or a Sub-D-connector. The interface is recognized automatically.

Safety instruction:

- Only one of the two interfaces must be connected.

The following table describes the major characteristics of the system:

Function	Specification	Notes
Baud rate	2400 Bd (Custo Control) 4800 Bd (P10)	
Data format	8 Bit / no parity / 1 Stopbit	
Protocol	Custo Control / P10	cf. interface specification
Isolation	4 kV	cf. DIN EN 60601-1-1

The following table shows the allocation of the DIN-connector:

Pin	Signal	Notes
1	TxD	
2	GND	
3	--	
4	--	
5	RxD	

The following table shows the allocation of the Sub-D-connector:

Pin	Signal	Notes
1	--	
2	RxD	
3	TxD	
4	--	
5	GND	
6	ECG signal	optional
7	ECG-GND	optional
8	Remote Start ECG device	optional, open collector
9	--	

EC – Declaration of Conformity

The following designated product

product: Ergometer, Bicycle

model: ec3000

is in conformity with the European Directive

EC-Directive 93/42/EEC concerning medical products of June, the 14th 1993

To assess the product, the following standards and normative provisions are used in the current version:

Norm	Title
EN 1041	Information supplied by the manufacturer with medical devices
EN 60601-1	Medical electrical equipment Part 1: General requirements for basic safety and essential performance
EN 60601-1-2	Medical electrical equipment Part 2: General requirements for basic safety and essential performance Collateral standard: Electromagnetic compatibility
EN 14971	Application of risk management to medical devices
VDE 0750-238	Medical electrical equipment Part 238: Particular requirements for the safety of crank ergometers
EN 980	Symbols for use in the labelling of medical devices
Optional:	
EN 60601-2-25	Particular requirements for the safety of electrocardiographs
EN 1060	Non-invasive sphygmomanometers

The Quality System of Groz AG comply with
EN 9001, EN 13485 and RL 93/42/EWG Annex II and is certified by
Medical Device Certification GmbH (EU Identifications-Nr. 0483).

Certified Quality System mdc ISO 13485 ISO 9001
RL 93/42/EWG Anhang II

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8.11.2007
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