



## Table of contents

<b>Notes on safety</b>	16	Age	23	• Alarm sound ON/OFF	26
• Service	16	Target pulse selection (FAT/FIT/Man.)	23	<b>General notes</b>	27
• Your safety	16	• Target pulse input	23	• System sounds	27
<b>Short description</b>	17	• Readiness for training	23	• Recovery	27
• Function section / Keys	18	<b>... by pulse defaults</b>		• Arrows up / down	27
• Display section / Display	19-21	• HRC1 - Count-Up	24	• Average value calculation	27
<b>Quick-start (to become acquainted)</b>	21	• HRC2 - Count-Down	24	• Notes on pulse measurement	27
• Start of training	21	<b>Training functions</b>		With ear clip	27
• End of training	21	• Interruption / End of training	24	With cardio pulse set	27
• Snooze mode	21	• Restart of training	24	• Interferences at the computer	27
<b>Training</b>	22	• Recovery (recovery pulse measurement)	25	• Notes on the interface	27
<b>... by power defaults</b>		<b>Pulse event</b>		<b>Training instructions</b>	27
• Count-Up	22	• Table: Pulse events	25	• Stamina training	27
• Count-Down	22	<b>Individual settings</b>	26	• Load intensity	28
• Default section	22	• Deletion of the total kilometers	26	• Scope of load	28
Time	22	• Saving of defaults	26	<b>Glossary</b>	28-29
Energy	22	• Selection: KM/mile display	26		
Distance	22	• Selection: kJoule/kcal display	26		



In the instruction, this sign refers to the glossary. There the respective term is explained.

## Safety Instructions

### Note the following points for your own safety:

- The training apparatus must be set up on a suitable, stable surface.
- Before the first use and also after approx. 6 operating days, the joints are to be checked for firmness.
- In order to avoid injuries as a result of incorrect loading or excessive loading, the training apparatus must only be used in accordance with the instructions.
- It is not recommended that the apparatus be set up in damp spaces, because this will in time lead to rusting.
- At regular intervals, check that the training apparatus is in correct working order and that it is in proper condition.
- The safety / technical checks are among the duties of the operator and must be carried out regularly and properly.
- Defective and damaged parts are to be replaced immediately.

Only use original KETTLER replacement parts.

- The apparatus must not be used until it has been repaired.

- The safety level of the apparatus can only be maintained if it is regularly checked for damage and wear.

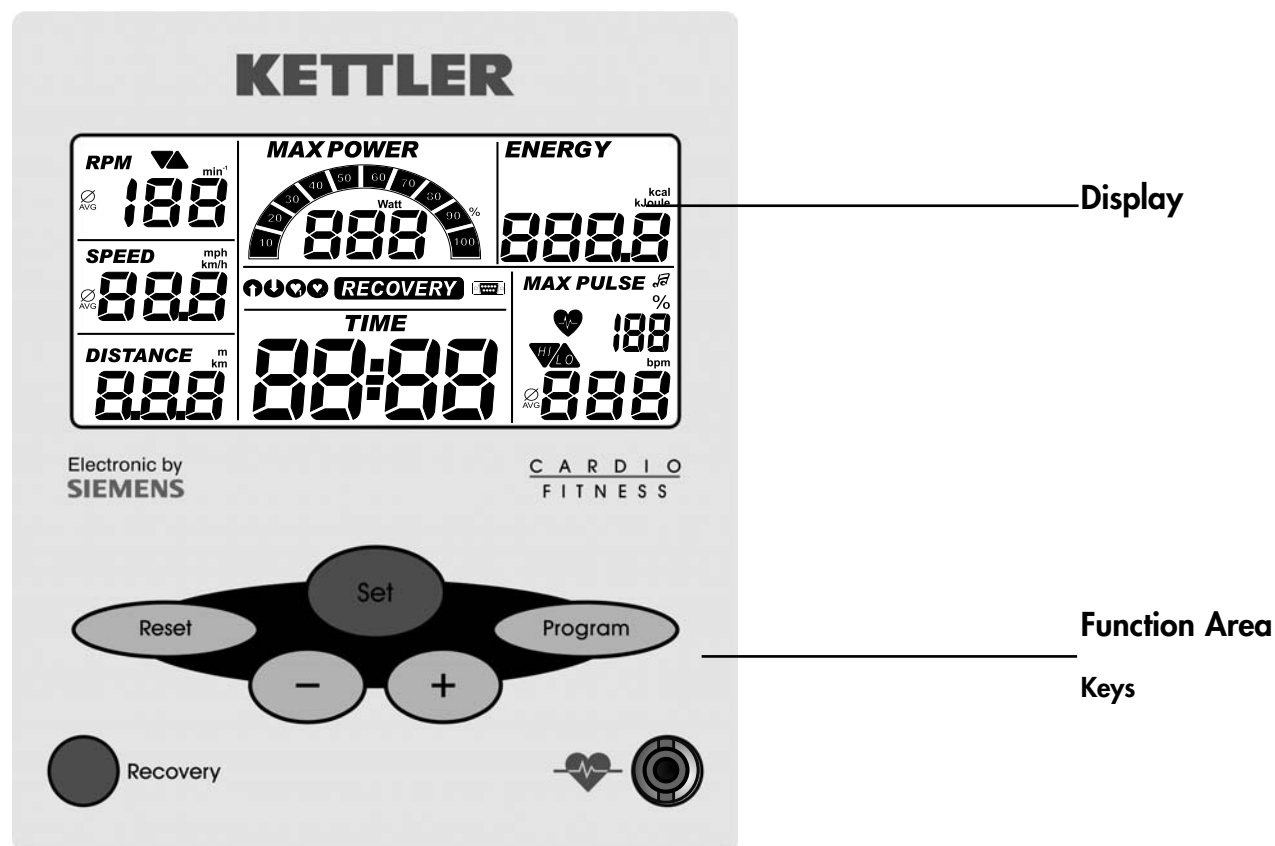
### For your safety:

- **Before taking up training, have your family doctor advise you on whether or not you are in suitable health for training with this apparatus. The medical findings should be the basis for the structuring of your training programme. Incorrect or excessive training can lead to damage to health.**

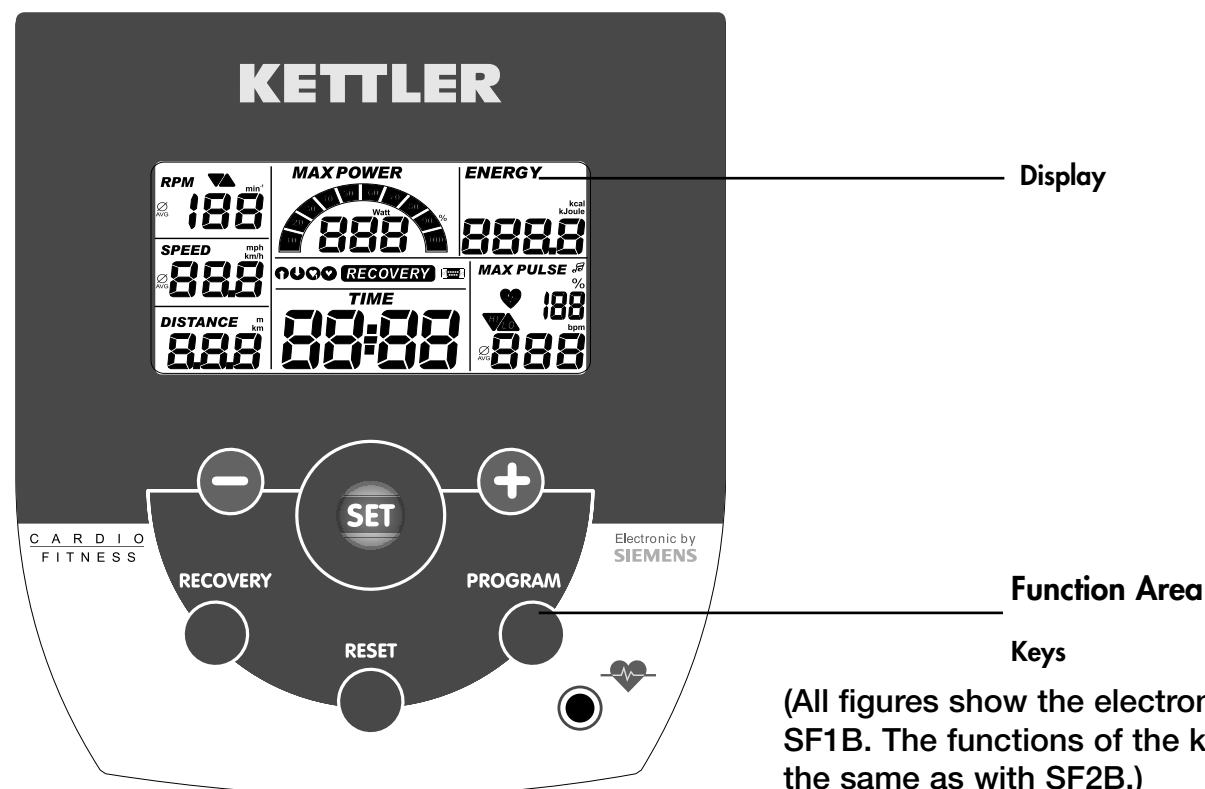
## Short description

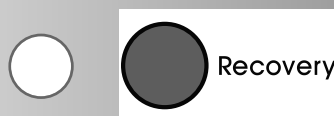
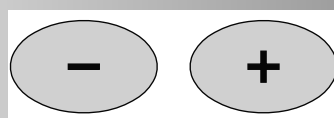
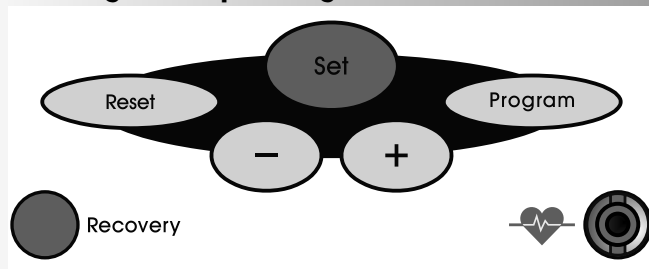
The ergometer has a function section with keys and a display section (display) with variable symbols and graphics.

### SF1B/SF3B



### SF2B





## Short instruction

### Function section

The six keys are shortly explained in the following. The more exact application is explained in the individual chapters. In these descriptions the names of the function keys are also used like here.

#### SET (press shortly)

With this function key, entries are called up. The set data are accepted.

#### SET (press longer)

For display of all segments: call "Individual settings"

#### Reset

With this function key, the current display is deleted for a restart.

#### Program

With this function key, the various programs are selected.

Pressing again > next program

#### Minus – / Plus + keys

With these function keys, values are changed in the various menus before the training and power is changed during the training.

- To continue "Plus"
- Or return "Minus"
- Pressing longer > fast change
- Pressing "Plus" and "Minus" **together**:
- Power jumps to
- Value entry jumps to

**25 Watt**  
**Off**

## RECOVERY

With this function key, the recovery pulse function is started.

### Comment:

Further functions of the keys are explained at the respective position in the operating manual.

### Pulse measurement

Pulse measuring can be carried out in two ways:

1. Ear clip (included in delivery)

The plug is put into the female connector.

2a. SF1B/SF3B: Chest strap + plug-in receiver (plug-in)

2b. SF2B: Chest strap without plug-in. In this electronic unit, the receiver is built in behind the display. A plugged-in ear clip must be removed.

(Chest straps are not included in delivery)

The Cardio-Pulse-Set with Polar chest strap and plug-

in is available as an accessory (item no. 07937-600). If you already have the Polar chest strap, you will only need the plug-in (item no. 07937-650).

## Display section / display

The display section informs about the various functions and respectively selected setting modes.

## Programs: Count up / Count down

### Power via time

The programs are distinguished by their counting mode.

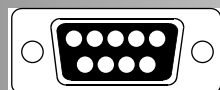
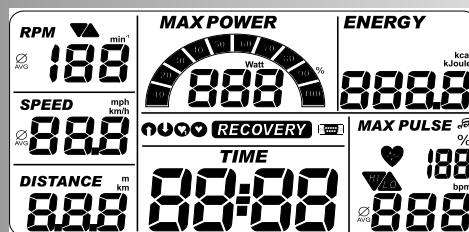
## Pulse-controlled programs: HRC1/HRC2

### Target pulse via time

Two programs, which control power by default pulse value.

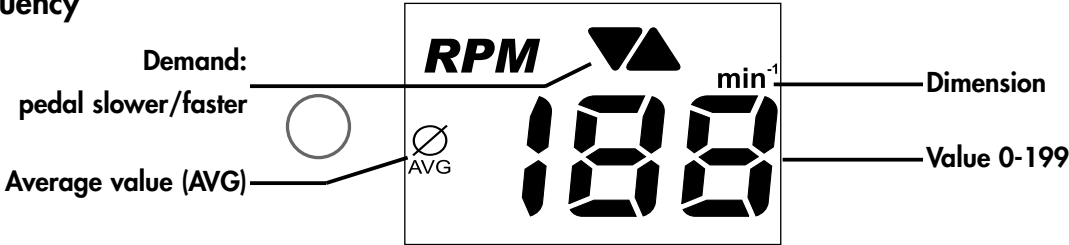
## Interface

The display of this symbol indicates that there is a data connection to a PC.

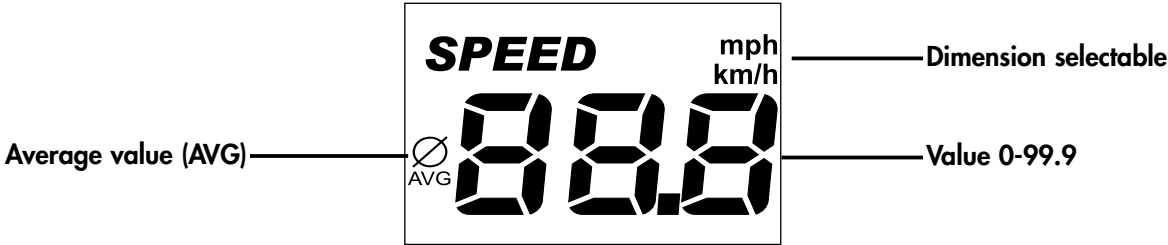


Training and Operating Instructions

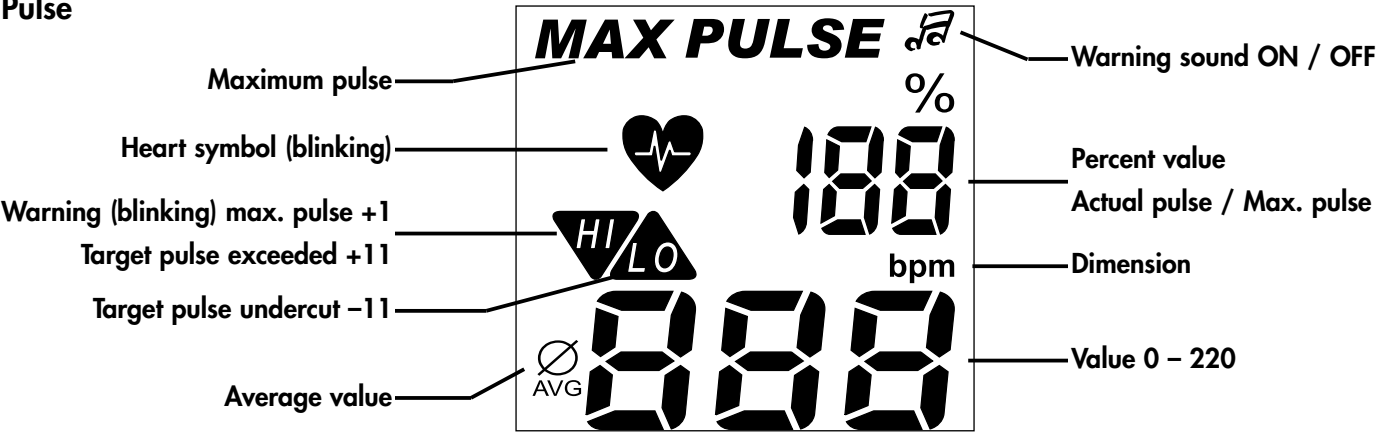
Pedal frequency



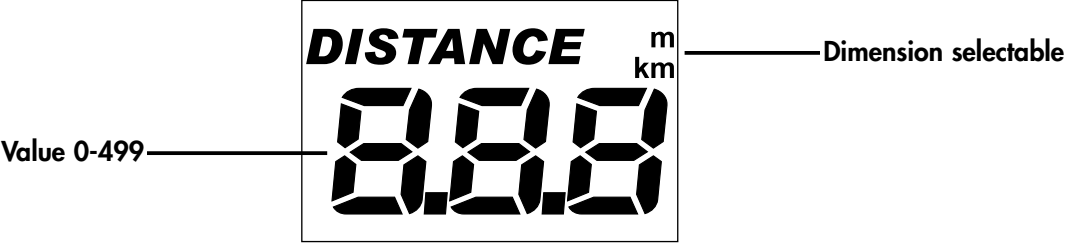
Speed



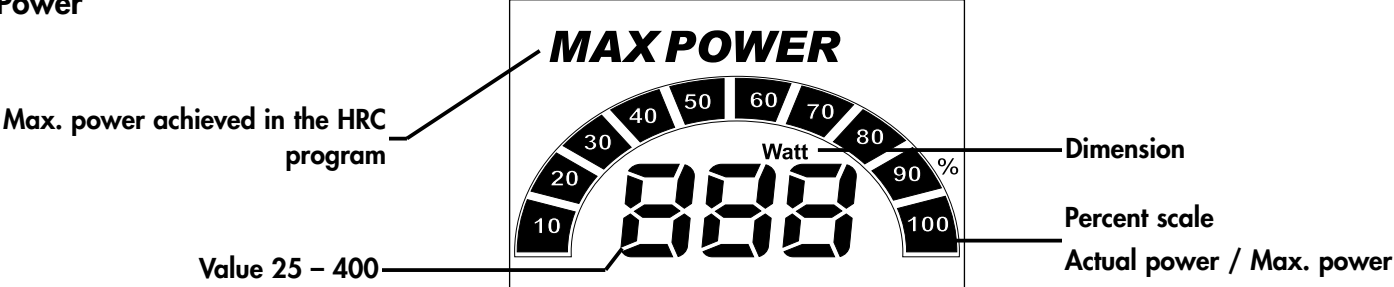
Pulse



Distance



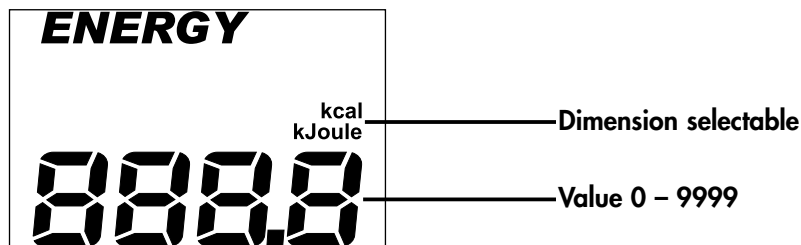
Power



Time



## Energy consumption



## Symbols



## Quick start (to become acquainted)

### Start of training

without special settings

- When switching on, display of all segments, and then display of total kilometers
- After 3 seconds: display "Count Up"; all values indicate 0;  
Power indicates 25 Watts
- Start of training

#### • Display

Revolutions, speed, distance, power, time, energy and pulse (if active)

Alteration of power during the training:

- "Plus": display of value in the window "Power" is increased in steps of 5.
- "Minus" reduces in steps of 5

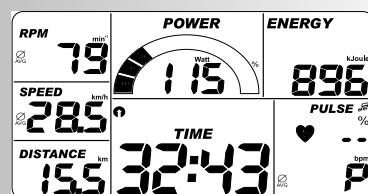
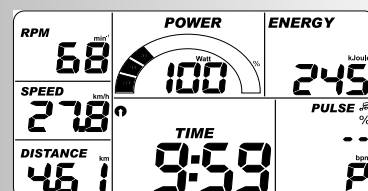
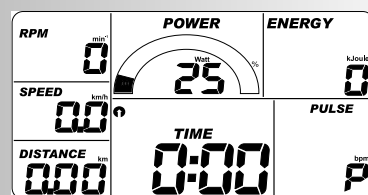
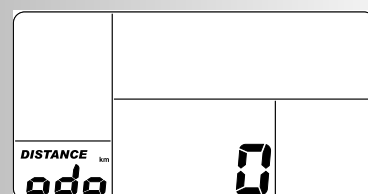
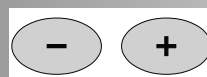
Continuation of training with these settings. In the meantime power alterations are possible any time.

### End of training

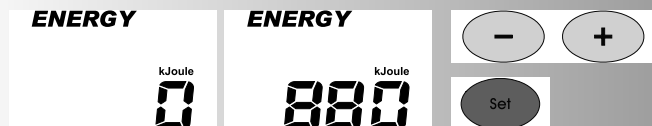
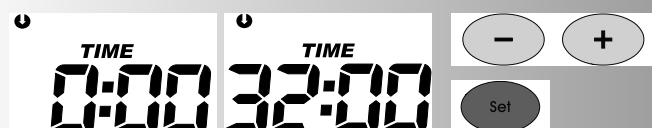
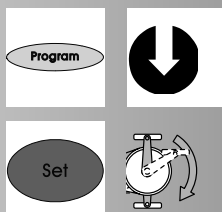
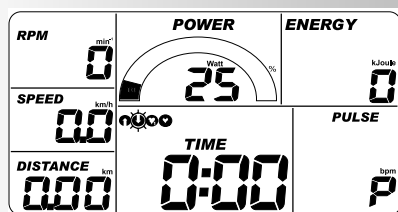
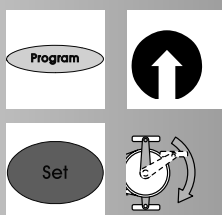
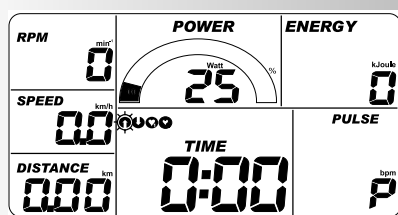
- Average values (Ø): **display**  
Revolutions, speed and pulse (if active)
- Total values  
Distance, energy and time

### Snooze mode

4 minutes after end of training, the device switches into sleeping mode with display: **"POWER"**. Press any key and the display starts with "Count Up" again.



**POWER**



## Training

The computer is equipped with 4 training programs. 2 power and 2 pulse programs.

### 1. Training by power defaults

- (PROGRAM) "Count Up"
- (PROGRAM) "Count Down"

### 2. Training by pulse defaults

- (PROGRAM) "HRC1 Count Up"
- (PROGRAM) "HRC2 Count Down"

### Training by power defaults

(PROGRAM) "Count Up"

- Press "PROGRAM" until **symbol**: "Count Up" flashes.

Start training, all values count up.

or

- Press "SET": default section
- "Plus" or "Minus": change power.

Start of training all values count up.

(PROGRAM) "Count Down"

- Press "PROGRAM" until symbol: "Count Down" flashes.

The program counts from an entered value down > 0. If there is no entry, the training starts in program "Count Up".

For starting the program, at least one entry for time, energy or distance is required.

- Press "SET": default section

### Default section

**Display:** time default "TIME"

### Time default

- Enter values with "Plus" or "Minus" (e.g. 32:00)

Confirm with "SET".

**Display:** next menu energy default "ENERGY"

### Energy default

- Enter values with "Plus" or "Minus" (e.g. 880)

Confirm with "SET".

**Display:** next menu distance default "DISTANCE"

### Distance default

- Enter values with "Plus" or "Minus" (e.g. 14.0)

Confirm with "SET".

**Display:** next menu age entry "Age"

## Age entry

Entry of the age serves determination and monitoring the maximum pulse (symbol HI, warning sound, if activated).

- Enter values with "Plus" or "Minus" (e.g. 34).  
From this entry, the maximum pulse "186" is calculated according to  $(220 - \text{age})$

Confirm with "SET".

**Display:** next menu target pulse selection "FA=65%"

## Target pulse selection

(2 default % values or 1 changeable % value of the maximum pulse can be set)

- Make selection with "Plus" or "Minus"
- Fat burning 65 %, Fitness 75 %, Manual 40 - 90%

Confirm with "SET" (e.g. Manual 40 - 90 %)

- Enter values with "Plus" or "Minus" (e.g. Manual 83)

Confirm with "SET" (end of default mode)

**Display:** Readiness for training with all defaults

or

## Target pulse entry

The entry 40 - 200 serves determination and monitoring of an age-independent training pulse (symbol HI, warning sound, if activated, no maximum pulse monitoring). For that, the age entry must be set to OFF.

- With "Plus" and "Minus" simultaneously de-select the age entry. Display: "AGE OFF"

Confirm with "SET".

**Display:** next default "target pulse" (OFF)

- Enter value with "Plus" or "Minus" (e.g. 130)  
Confirm with "SET" (end of default mode)

**Display:** Readiness for training with all entered default values

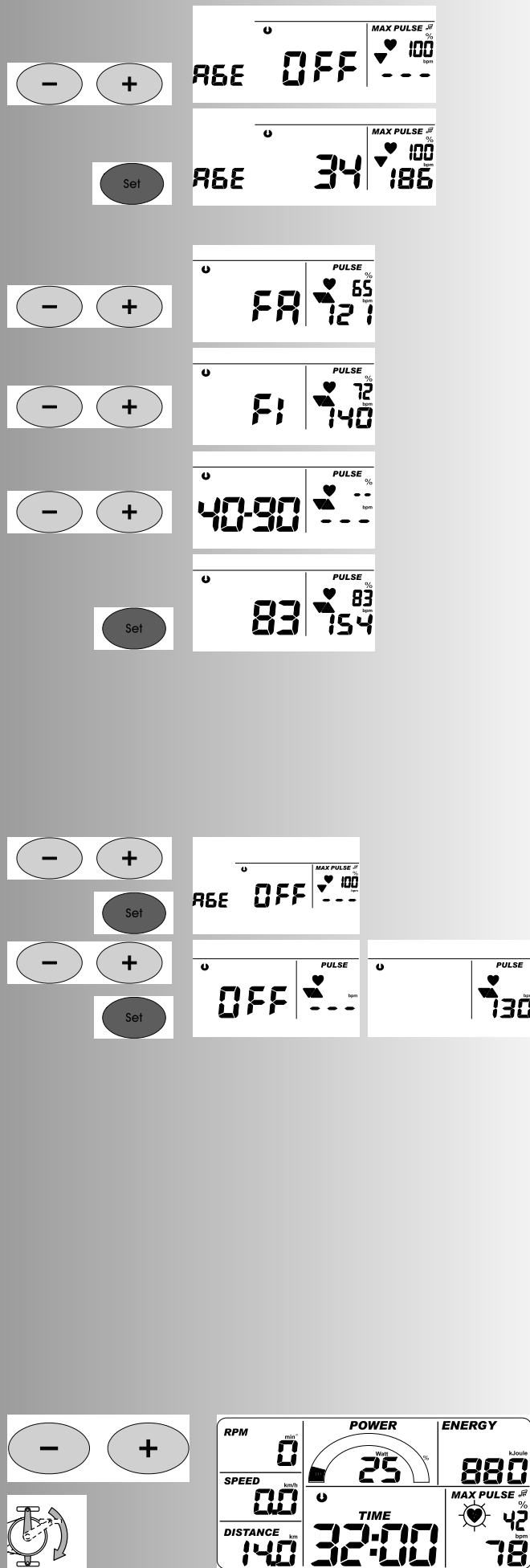
## Comment:

- An overview over all pulse events is summarized in a table on page 25.
- The defaults are lost on "Reset".  
If for individual settings "Storage of defaults" is activated (page 26), the pulse defaults and the set initial power remain stored. With the next selection of Count Up / Count Down, the data are taken over.

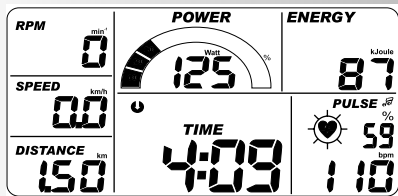
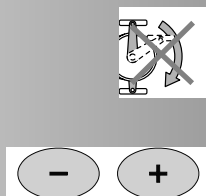
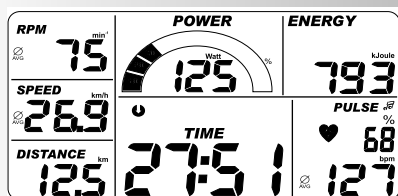
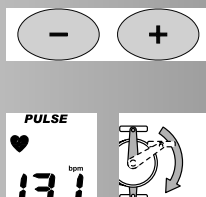
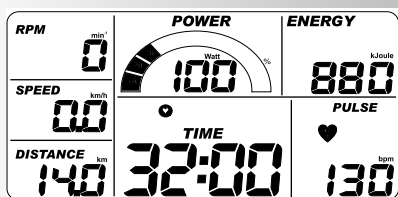
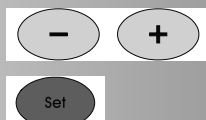
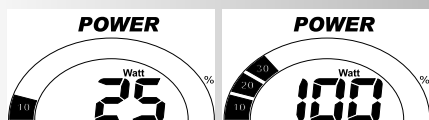
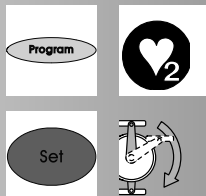
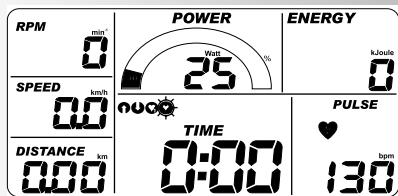
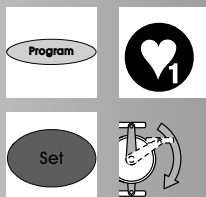
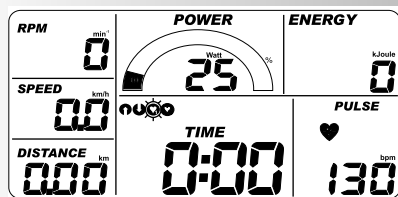
## Readiness for training

### Power

- Alter power with "Plus" or "Minus".  
Start of training by pedaling. The power set before the training is stored.







## Training by pulse defaults

(PROGRAM) "HRC1 Count Up"

- Press "PROGRAM" until symbol: "HRC Count Up" flashes.
- Press "SET": Default range

Or

Start training, all values count up.  
Power is increased automatically, until the target pulse is achieved (e.g. 130)

(PROGRAM) "HRC2 Count Down"

- Press "PROGRAM" until symbol: "HRC Count Down" flashes.
  - Press "SET": Default range
- The entries and possibilities for modifications are analogue to program item "Count Down".

Or

Start of training

### Note:

In the HRC programs the determination of the initial power of 25-100 watts is possible in the default range.

- Enter values with "Plus" or "Minus" (e.g. 100)  
Power is then automatically increased from 100 watts on, until the target pulse is achieved (e.g. 130)

### Pulse

- The pulse value can still be changed at this point (readiness for training) with "Plus" or "Minus", e.g. from 130 to 131.

Start of training by pedaling.

### Comment:

- For HRC programs, KETTLER recommends pulse measurement with the chest strap.
- There is a power adjustment with HRC programs for deviations of  $\pm 6$  heartbeats.

## Interruption or end of training

For less than 10 pedal revolutions/min or pressing "RECOVERY", the electronic equipment recognizes an interruption of the training. The training data achieved are displayed.

### Display.

### Note:

Speed, revolutions and pulse are represented as average values with the Ø symbol.

- In this display, no current pulse is available.

With "Plus" or "Minus" the display changes to the remaining values of defaults (here DISTANCE 15.0, ENERGY 87, TIME 4:09, last set power 125 and current pulse 110).

### Display.

The training data is displayed for 4 minutes. If you do not press any key and do not resume training in this time, the electronic equipment switches into the sleeping mode with POWER display.

### Resume training

For resumption of the training within 4 minutes, the last values are counted up or down.

## RECOVERY – Function

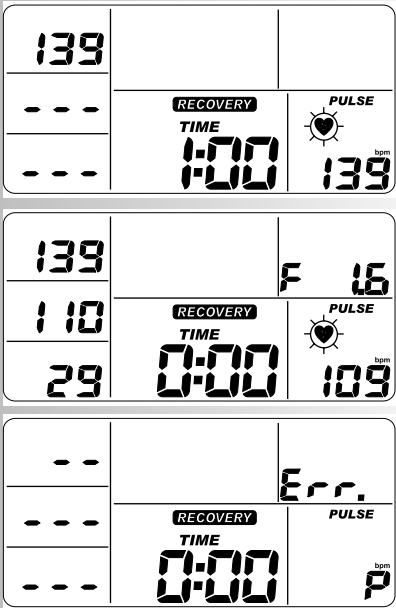
### Recovery pulse measurement

At the end of training press “RECOVERY”.  
The electronic equipment measures your pulse reversing for 60 seconds.  
Under “RPM”, the current pulse value is stored.

After time countdown, the pulse value is stored under “SPEED”. Under “Power”, the difference of both values is shown. From this, a fitness grade (in example F=1.6) is determined. The display is switched off after 20 seconds.

“RECOVERY” or “RESET” interrupts the function. If at the beginning or end of the time rewind no pulse is recorded, an error message is displayed.

## POWER



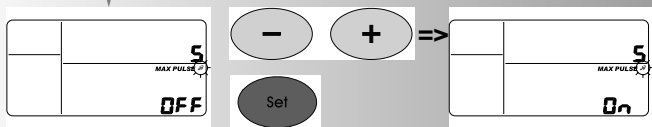
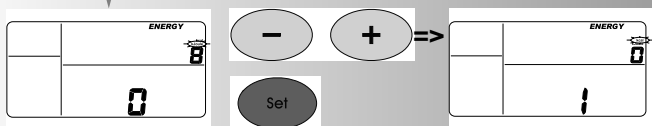
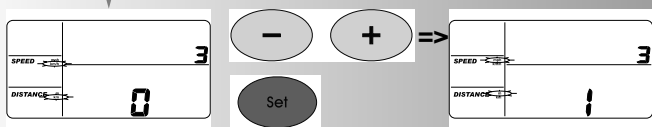
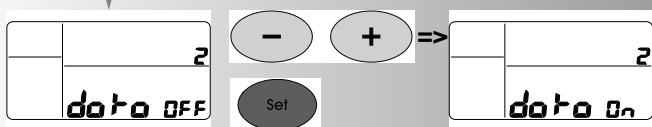
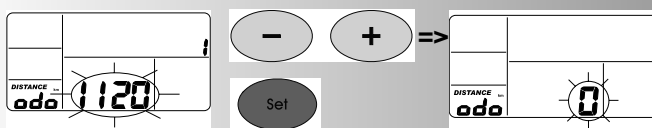
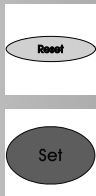
## Display for pulse events

				Exceeding			
		Value / Input	%	HI	LO	MAX	AL
Maximum pulse		121-210	4	+1		+1 +1	
Target pulse	Fat burning	65%	4	+11	-11*		
	oder Fitness	75%					
	oder Manuel	40-90%					
Target pulse		40-200			+11	-11*	

\*Comment: appears only if the target pulse was achieved once

For undercutting the entered target pulse (-11 beats), the symbol "LO" is displayed.  
For exceeding (+11 beats), the symbol "HI" is displayed.  
For exceeding the maximum pulse, the "HI" arrow is blinking and the lettering "MAX" is displayed.  
If for Individual Settings the "Alarm sound for maximum pulse exceeded" is activated (page 26), additional sounds are

## Training and Operating Instructions



## Individual settings

Proceed according to the scheme: press "Reset"

*Display* all segments

now press "SET" longer: menu: Individual Settings

**Display:** Total kilometers e.g. "odo 1120"

### 1. Deletion of total kilometers

**Function:** Deletion of total kilometers

Jointly press "Plus" + "Minus"

**Display:** "odo 0."

Press "Set": switchover to next setting

**Display:** data OFF or On

Or

Skip deletion of total values by pressing "SET" only

**Display:** data OFF or On

### 2. Storage of defaults

Press "Plus" or "Minus"

Defaults for time, energy, distance, age, target pulse and initial power are stored permanently

**Function:**

**ON = Storage also after "Reset"**

**Off = Storage until next "Reset"**

Press "Set":

Switchover to next setting

**Display:** SPEED and DISTANCE

### 3. Display of kilometers or miles

Press "Plus" or "Minus"

**Function:** selection of kilometer or miles display

Press "Set": selected unit (flashing) is accepted and switchover to the next setting

**Display:** ENERGY

### 4. Display of energy consumption in kjoule or kcal

Press "Plus" or "Minus"

**Function:** Selection of the energy consumption display

Press "Set": selected unit (flashing) is accepted and switchover to the next setting

**Display:** MAXPULSE OFF or ON

### 5. Alarm sound for exceeding maximum

Press "Plus" or "Minus"

**Function:** Switch alarm sound on or off.

Press "Set": selected setting is accepted and "Restart" of the display

**Display:** restart of the display

# General notes

## System sounds

### Switching on

On switching on, a short sound is emitted during the segment test.

### Default countdown

The achievement of a default is signaled by a short sound.

### Maximum pulse exceeding

If the set maximum pulse is exceeded by one pulse beat, 2 short sounds are emitted every 5 seconds.

### Error output

For errors, e.g. recovery not executable without pulse signal, 3 short sounds are emitted.

## Recovery

In the function the centrifugal mass is slowed down automatically. Further training is unsuitable.

Calculation of the fitness grade (F):

$$\text{Grade (F)} = 6.0 - \left( \frac{10 \times (P1 - P2)}{P1} \right)^2$$

P1 = load pulse, P2 = recovery pulse

F1 = very good, F6 = insufficient

## Arrows up/down

If a power rate cannot be achieved with speed (e.g. 400 Watts with 50 pedal revolutions), the up or down arrow prompts faster or slower pedaling.

## Average value calculation

The average value calculation takes place per training unit.

## Notes on pulse measurement

Pulse calculation starts, when the heart in the display is blinking simultaneously to your pulse beat.

### With ear clip

The pulse sensor works with infrared light and measures the alterations of the translucency of your skin, which are caused by your pulse beat. Before you clamp the pulse sensor to your earlobe, rub it well 10 times to increase circulation.

Avoid disturbing pulses.

- Attach the ear clip carefully to your earlobe and search for the most suitable point for measuring (heart symbol blinking without interruption).
- Do not execute your training directly under strong incidence of light e.g. neon light, halogen light, spot, sun light.
- Completely exclude vibrations and wobbling of the ear sensor including the cable. Always fix the cable to your clothing by means of the clip or even better to a headband.

### With chest strap (accessory)

Not included in delivery, available from authorised dealers.

The Cardio-Pulse-Set with Polar chest strap and plug-in is available as an accessory (item no. 07937-600). If you already have the Polar chest strap, you will only need the plug-in (item no. 07937-650).

## Interferences at the training computer

Press the reset key

### Notes on the interface

The program "ERGO concept" ["ERGO-Konzept II"], item No. 07926-500, available at your specialist dealer, allows you controlling of the KETTLER ergometer with a commercially available PC via this interface.

On our homepage [www.kettler.net](http://www.kettler.net) you'll find the DEMO version of the training software ERGO KONZEPT II in German and English for downloading.

## Training instructions

Sports medicine and training science use bicycle ergometry, among others, for examination of the functionality of the cardiovascular and respiratory system.

Whether your training achieved the desired effects after some weeks you can determine as follows:

1. You achieve a certain stamina with lower cardiovascular performance than before
2. You keep a certain stamina with the same cardiovascular performance over a longer period.
3. After a certain cardiovascular performance you recover faster than before.

### Guide values for the stamina training

**Maximum pulse:** maximum load means the achievement of the individual maximum pulse. The maximally achievable heart rate depends on the age.

To that applies the empirical formula: the maximum heart rate per minute corresponds 220 pulse beats minus years of age.

**Example:** age 50 years > 220 - 50 = 170 pulse/min.

Weight: a further criterion for determination of the optimal training data is the weight. The nominal default for maximum load is 3 Watts/kg body weight for men and 2.5 for women. Furthermore, it must be observed, that from age 30 on capability decreases: for men approx. 1 % and for women 0.8 % per year of age.

**Example:** man; 50 years; weight 75 kg

> 220 - 50 = 170 pulse/min. maximum pulse

> 3 Watts x 75 kg = 225 Watts

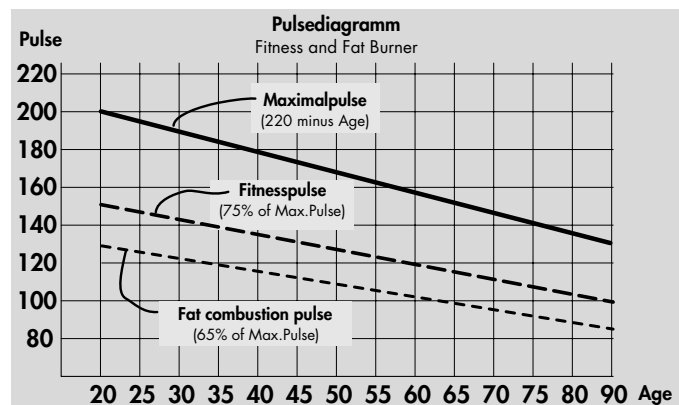
> Minus "age discount" (20 % of 225 = 45 Watts)

## Training and Operating Instructions

$> 225 - 45 = 180$  Watt (nominal default for maximum load)

### Load intensity

Load pulse: the optimal load intensity is achieved at 65–75 % (comp. diagram) of the individual cardiovascular performance. This value changes depending on the age.



### Scope of load

#### Duration of a training unit and its frequency per week:

The optimum scope of load is given, when over a longer period 65–75 % of the individual cardiovascular performance is achieved.

#### Empirical rule:

Either 10 min / training unit for daily training  
or approx. 30 min / training unit for 2 - 3 times / week  
or approx. 60 min / training unit for 1 - 2 times / week  
You should choose the Watts power such that you are able to stand the muscle load over a longer period.

Higher powers (Watt) should be yielded in connection with an increased pedaling frequency. A too low pedaling frequency of less than 60 rpm results in a pointedly static load of the musculature and thus to early exhaustion.

The load for your further stamina training should basically be increased over the scope of load, e.g. instead of 10 minutes your training is 20 minutes or instead of 2 times a week 3 times a week.

### Warm-up.

At the beginning of each ergometer training unit, you should for 3-5 minutes pedal with a slowly increasing load to warm and to get your heart/circulation and your musculature moving.

### Cool-down

The same importance has the so-called "cooling down". After each training unit (after/without recovery) you

should continue pedaling against a slight resistance for approx. 2-3 minutes.

## Glossary

### Recovery

Recovery pulse measurement at the end of training. From start and end pulse of one minute the deviation and a fitness grade are determined. For the same training, the improvement of this grade is a measure for increase in fitness.

### Interface

9-pole SUB-D socket (RS232/serial) for data exchange with a PC.

### Reset

Deletion of display contents and restart of display.

### Programs

Training possibilities requiring manual or program-determined performances or target pulses.

### Dimension

Units for display of km/h or mph, kJoule or kcal, hours (h) and power (Watts)

### Power

Current value of the mechanical (braking) power in Watts, which the ergometer converts into heat.

### Percent scale

Comparison display between current power and personal maximum power (400W)

### Energy

Calculates the energy turnover of the body with an efficiency of 25 % to provide the mechanical power. The remaining 75 % does the body convert to heat.

### Control

The electronic equipment controls the power or the pulse for manually entered or default values.

### Pulse

Recording of the heartbeat per minute

### MaxPulse(s)

Calculated value of 220 minus years of age

### Target pulse

Manual or program-determined pulse value, which is to be achieved.

### Fat burning pulse

Calculated value of: 65% MaxPuls

### Fitness pulse

Calculated value of: 75% MaxPuls

### Manual –

Calculated value of: 40 – 90% MaxPuls

### Age

Entry for calculation of maximum pulse.

### HI symbol

With "HI" displayed, a target pulse is too high by 11 beats. With HI blinking, the maximum pulse is exceeded.

**LO symbol**

With "LO" displayed, a target pulse is too low by 11 beats.

**Menu**

Display in which values are to be entered or selected.

**Glossary**

A collection of attempts for explanation.