This **hanhart**-stopwatch

CE No. _____

made under the most careful production and control methods, by specialists using only the best materials, is guaranteed for

3 (three) years.

from date of original purchase against defect in material and workmanship. If this stopwatch should become defective within this period you are entitled to get it repaired or exchanged free of charge.
Defects resulting from abuse of the stopwatch are not covered by this guarantee: for instance, if contact springs are corroded by batteries which have leaked. Batteries are not covered by this guarantee. **After every opening of the case stopwatch has to be checked again regarding watertightness.**

Shopowner and co-garanter: .

sold on _____

DELTA E 100, E 200 and SPECTRON

Technical Data:

Temperature range:

in use	– 15° C to + 55° C
in storage	– 25° C to + 65° C

Battery:

Typ	Microncell AAA
Capacity	about 5 – 6 years
Indicator	when the battery symbol appears in the display, there ist sufficient power for approximately another 3 months

Display:
15 digits, 7 mm digit-height
a window for functions indicator and battery indicator

Split	9 h, 59 min, 59 sek, 99/100	= 7 digits	lower row
Lap	59 min, 59 sek, 99/100	= 6 digits	upper row
Event-Count	max. 99	= 2 digits	middle row

additionally on Delta E 200:

Pacer	1 to 300 tones/minute	= 3 digits	upper row
Count Down	59 min, 59 sek, 9/10	= 5 digits	upper row

additionally on SPECTRON:

Count Down	59 min, 59 sec, 9/10 sec	= 5 Digit	upper row
or	9999 min, 99/100 min	= 5 Digit	upper row

Case made of (ABS):	**water resistant** acc. to DIN 8310
Weight:	85 g
Accuracy:	+/– 7 sec/month
Measuring units:	E 100 and E 200 1/100 sec SPECTRON 1/100 sec + 1/100 min
Memories:	65

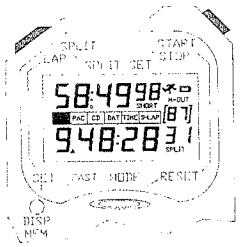
Functions E 100:
- Start/Stop, Split/Lap, Short/Lap, Time, Memory-Recall with Quick Recall and Evaluation
- Date is programmed until the year 2016

additionally for **E 200**:
- CD (Count down)
- Pacer
- Memory-Recall with evaluation of the shortest and longest LAP Time

additionally for **SPECTRON**
- CD (Count Down)
- Memory-Recall with evaluation of the shortest and longest LAP Time
- Selectable time measuring units

Keys: four

START/STOP,
SPLIT/LAP,
MEM/SET/DISP,
MODE



Remove the back of the case (7 screws). Install the new battery, observing the correct polarity! After changing a battery, the date and time must be inserted again.

Legend explaining the various technical terms:

SPLIT:	Is the time accumulated after each point in time. The last Split Time is also the total time.
LAP:	Is the difference in time between the previous point in time measured and the current time.
SHORT:	Is the shortest Lap Time measured.
CD:	Count Down (counting down from the highest value).
PACER:	Pace-setter (the number of tones per minute).
Memory:	The time values in the memory.

Available functions

a) Resetting of the stop watch
b) Changing the MODE (function)
c) Measurement of time periods
d) Event Counter
e) Pre-setting of the Split-Time
f) Memory Recall with Quick Recall and evaluation
g) Count Down E 200 + SPECTRON
h) Pacer E 200
i) Setting of the time, date, CD, Pacer, and measuring units

a) **RESETing of the watch**
By pressing the START/STOP and MODE keys at the same time, all times and values are erased from the memory. Date and Time of Day remain in memory. The display in the function window then shows *LAP.*

b) **MODE** (Change of functions):
By pressing the MODE key, the functions are changed in the versions indicated in the following sequences:

E 100 LAP → S_LAP → TIME → DATE and back to LAP
E 200 LAP → S_LAP → TIME → DATE → CD → PACER and back to LAP
Spec. LAP → S_LAP → TIME → DATE → CD → empty and back to LAP

The active function is indicated in the function window. The times and values corresponding to these functions are shown in the upper row of the display, as follows:

E 100 LAP:	Lap Time	6 digits
E 100 S-LAP:	Lap or Short Time	6 digits
E 100 TIME:	Time of day	e.g. 23:45,59
E 100 DATE:	DATE (Europa)	e.g. 10.08.97 (10. August 1997)
	DATE (USA)	e.g. 08.10.97 (10. August 1997)

additionally on E 200

PACER:	signals/min 50 ms accuracy	3 digits
CD:	Count Down 1/10 sec-accuracy	5 digits

additionally on SPECTRON:

CD:	Count Down 1/10 sec-accuracy	5 digits
Empty:	Switch	min/sec

Normally the Split Time is shown in the lower row of the display.

A note on LAP, S-LAP and TIME:
Once the watch has been started and the time is being measured, a selection can be made only from among these three functions.

A note concerning CD:
After a start, it is not possible to change the Mode. However, virtually the same time measurement can be completed with START/STOP and SPLIT/LAP (see CD function).

A note concerning PACER:
After a start, it is not possible to change the Mode. However, the total time is measured and the START/STOP function remains operative (see Pacer function).

c) **Measuring times**

- Select the one of the function LAP, S-LAP or TIME by means of the MODE key.
- The watch is started by means of the START/STOP key. Time measurement begins and is visible while in operation. The figure of a running man indicates this condition. By pressing the START/STOP key again, Split Time and Count Down are stopped. This sequence can be repeated as often as desired.
- By pressing the SPLIT/LAP key, the Split Time and Lap Time values at the moment are stored in memory. The Split-Time indicator will appear to have stopped. This, however, is only to facilitate reading the time measured. If, after pressing SPLIT/LAP, you want a current and visible reading, quickly press the DISP/MEM key.
- S-LAP as an additional function: After recalling the time with the SPLIT/LAP key, the current Lap Time will appear in upper area of the display, alternating at the rate of 2 cycles with the shortest Lap Time up to that point, which is indicated in the display by the symbol *SHORT*.

d) **Event-Counter** (2 digits in parentheses):

- Shows the number of times the SPLIT/LAP key has been activated (maximum is 99).
- In memory recall, it indicates which memory has been accessed.

e) **Advance of Split Time:**

By pressing the START/STOP and SPLIT/LAP keys at the same time, the current time of day, rounded off to the next full minute, will be entered into the Split counter. After pressing the START/STOP key, the measurement proceeds, beginning with the time just entered. The purpose of this feature is to synchronize the Split Time with an official clock. After actuating this feature, it is no longer possible to stop the watch; to do so would desynchronize it. Only the SPLIT/LAP key remains active. Time advance is limited to the functions LAP, S-LAP and TIME.

f) **Memory Recall:**

- At any time while time is being measured, a memory may be accessed by pressing the DISP/MEM key. The first 64 values recorded are stored in the first 64 memories. The last, 65th memory always holds the last time measured if more time values were stopped than there were memories to store them.

- Procedure:
  Press and hold the DISP/MEM key. The time stored will be displayed as long as the key is pressed. During this phase, the symbol *M-OUT* is displayed, and directly under it the memory which is recalled.
  By pressing the DISP/MEM key again, the time stored in the next memory will be displayed, and so forth. If the time displayed is the shortest Lap Time recorded, the symbol *SHORT* is also displayed.

  Additionally in E 200 + SPECTRON
  You will hear a tone following the shortest Lap Time with the sound sequence: 100 milliseconds TONE followed by 400 milliseconds of silence.

  If the time indicated corresponds to the longest Lap Time, you will hear a tone with the sound sequence: 400 milliseconds TONE followed by 100 milliseconds of silence.

– Quick Recall (applies to all versions):
First press the DISP/MEM key and then the MODE key together, which will initiate a Quick Recall of the times measured which are stored in the memory. When the shortest or longest Lap Time is found, the search will be interrupted for a moment. After comparing all the memories, Quick Recall will return to the first memory, and the search will be terminated.

g) Additionally function in E 200 + SPECTRON
CD (Count Down with Auto-Repeat)
– Selection of the CD function by means of the MODE key
– Before the first start, a CD time must be entered
– Although the only CD function is displayed, the Split Time and Lap Time can also be measured.
– The watch is started by means of the START/STOP key. Split Time and Count Down are visible while in operation. The figure of a running man indicates this condition. By pressing the START/STOP key again, Split Time and Count Down are stopped. This sequence can be repeated as often as desired.
– By means of the SPLIT/LAP key, the Split Time and Lap Time values at the moment are stored in memory. The Split Time appears to have stopped. This, however, is only to facilitate reading. The Count Down (upper display) continue in operation (except after the START/STOP key has been pressed).
– When the CD function reaches the value of 0 (zero), a tone will sound for 2 seconds. The sequence of operations begins immediately and automatically, using the value originally entered (Auto-Repeat).
– The Lap Time with the associated Split Time can be read out by using the Memory Recall (see below).

E 200

h) **PACER** 1-300 tones/minute
(time with an accuracy of 50 milliseconds)
– Selection of the Pacer function by means of the MODE key.
– Before the first start, a time interval must be entered (1 – 300).
– The watch is started by means of the START/STOP key. The continuing Split Time function is indicated by the figure of a small running man. By pressing the START/STOP key again, the Split Time function can be stopped. This sequence can be repeated as often as desired.
– By pressing the SPLIT/LAP key while the time measurement function is in operation, the time interval may be raised to the next possible level.
– The concept of „next possible level" is explained below under the heading of „Setting the Pacer".

i) **Setting** is only possible after a Reset.
– Resetting the watch.
– Time of Day and Date may, but need not be set. For this reason, the symbol *SET* appears only after the Set command (SET key).
– CD and PACER must be set before Start. The symbol *SET* appears immediately as a warning to set the watch.

Setting the Time of Day (4 digits: hh:mm)
– Press the MODE key until *TIME* appears. Then press the SET key, the symbol *SET* appears in the display; this prepares the watch for the Set procedure.
– Continue to press the SET key until the digit which is to be set begins to flash. Press the SPLIT key to advance the flashing digit (0 – 5 or 0 – 9).
– Seconds cannot be set. To synchronize them, round off the minutes while setting the watch, and wait until the clock with which the watch is to be coordinated reaches the minute and seconds desired.
– To terminate the Set procedure, press the MODE key; this immediately advances the display to the next MODE.

Setting the date (6 digits)
Europa version: tt, mm, jj
USA version: mm, dd, yy
– Press MODE until the symbol DAT appears in the display. Then press MEMO until the symbol SET appears in the display.
– Continue to press the SET key until the digit to be set begins to flash. Press the SPLIT key to advance the flashing digit (0 – 5 or 0 – 9).

– To terminate the Set procedure, press the MODE key; this immediately advances the display to the next MODE.

E 200 + SPECTRON
Setting CD (5 digits: mm, ss, 1/10 sec)
– Press the MODE key until the CD function is displayed.
– The Set function is already activated.
– Continue to press the SET key until the digit which is to be set begins to flash. Press the SPLIT key to advance the flashing digit (0 – 5 or 0 – 9).
– To terminate the Set procedure, press the MODE key; this immediately advances the display to the next MODE.

E 200
Setting PACER (3 digits: 1 to 300 pulses per minute, to an accuracy of 50 milliseconds)
– Press the MODE key until the PACER function is displayed.
– The Set function is already activated.
– Continue to press the SET key until the digit which is to be set begins to flash. Press the SPLIT key to advance the flashing digit (0 – 5 or 0 – 9).

– **Interpolation:** If, during input, a value has been entered which is mathematically not capable of solution, then the value displayed will be rounded off after the MODE key has been pressed to the nearest higher or lower value. For example: you entered 72 tones per minute; this would imply a sequence of tones at an interval of 0.8333 seconds; unfortunately, such a sequence cannot be produced with the accuracy desired; (page 6) the next feasible value will automatically be selected, i. e., 0.85 seconds, which corresponds to the rate of 70 pulses per minute.

Below is a conversion table which shows how the value entered is interpolated to a feasible value. The table is accurate to +/– 25 milliseconds.

Entered	Becomes	Entered	Becomes	Entered	Becomes
1-36	1:1	54, 55	54	97-104	100
37	38	56-58	57	105-115	110
38 - 41	1:1	59-61	60	116-127	120
42, 43	42	62-64	63	128-139	135
44, 45	44	65-68	66	140-159	150
46, 47	46	69-73	70	160-190	175
48, 49	48	74-78	75	191-219	200
50, 51	50	83-88	85	220-268	240
52, 53	52	89-96	92	269-300	300

The following values reflext exact times without adjustments:
1, 2, 3, 4, 5, 6, 8 10, 12, 15, 16 20, 24, 25 30, 40, 50, 60, 75, 80
100, 120, 150 200, 240, 300

SPECTRON:
– **Measurement Units**1/100 min or 1/100 sec
– Press the MODE key until the function field of the display is empty. The symbol *SET* is activated.
– The time unit is toggled by means of the SET key. The following symbols will appear in the upper display
59:59 (with semicolon) = measuring unit is seconds
9999 (without semicolon) = measuring unit is minutes
– To terminate the Set procedure, press the MODE key.