



**Polar HRM2**  
**File Format Description**

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## 1. General Information

The following Polar HRM file format is used in Polar software products. The data includes the exercise information transferred from the following Polar products:

- Polar Sport Tester (PST)
- Polar Vantage XL (VXL)
- Polar Vantage NV (VNV)
- Polar Accurex Plus (Acc+)
- Polar XTrainer Plus (XTr+)
- Polar Coach
- Polar S610 / S610i / S625X
- Polar S710 / S710i / S720i / S725 / S725X
- Polar S810 / S810i
- Polar E600
- Polar AXN500, Polar AXN700
- Polar RS400, Polar RS800, Polar RS800X
- Polar CS400, Polar CS600, Polar CS600X

For further information about HR monitor specific features, see HR monitor user's manuals. Make sure to handle the HRM file version number correctly. Version modifications are marked with \* and #.

The data is stored in ASCII format. CR and LF (0Dh and 0Ah) at the end of each line. There is one empty line between each data section. The data section name is separated from actual data always with brackets [ ].

The multiple data in one row are separated with tab, not with spaces.

## 2. General Parameters

DATA	COMMENTS
[Params]	Basic settings
Version=107	Exact hrm file version (1.02, 1.05*, 1.06 <sup>#</sup> , 1.07 <sup>&amp;</sup> ).
Monitor=1	Heart rate monitor type 1 = Polar Sport Tester / Vantage XL 2 = Polar Vantage NV (VNV) 3 = Polar Accurex Plus 4 = Polar XTrainer Plus 6 = Polar S520 7 = Polar Coach 8 = Polar S210 9 = Polar S410 10 = Polar S510

- 11 = Polar S610 / S610i
- 12 = Polar S710 / S710i / S720i
- 13 = Polar S810 / S810i
- 15 = Polar E600
- 20 = Polar AXN500
- 21 = Polar AXN700
- 22 = Polar S625X / S725X
- 23 = Polar S725
- 33 = Polar CS400
- 34 = Polar CS600X
- 35 = Polar CS600
- 36 = Polar RS400
- 37 = Polar RS800
- 38 = Polar RS800X

Mode=110

(abc)

With versions → 1.05

Data types:

a) Cad/Alt:

0 = Cad, 1 = Alt, 3 = None

b) CC data

0 = HR data only, 1 = HR + cycling data

c) US / Euro unit

0 = Euro (km, km/h, m)

1 = US (miles, mph, ft)

All distance, speed and altitude values depend on US/Euro unit selection (km / miles, km/h / mph, m / ft).

SMode=11011010

(abcdefgh)

With versions 1.06

Data type parameters

a) Speed (0=off, 1=on)

b) Cadence (0=off, 1=on)

c) Altitude (0=off, 1=on)

d) Power (0=off, 1=on)

e) Power Left Right Balance (0=off, 1=on)

f) Power Pedalling Index (0=off, 1=on)

g) HR/CC data

0 = HR data only, 1 = HR + cycling data

h) US / Euro unit

0 = Euro (km, km/h, m, °C)

1 = US (miles, mph, ft, °F)

All distance, speed, altitude and temperature values depend on US/Euro unit selection (km / miles, km/h / mph, m / ft, °C / °F).

i) Air pressure (0=off, 1=on) &

Date=20040831

Date of exercise (yyyymmdd)

For example 20040831 means 31<sup>st</sup> August 2004)

StartTime=14:23:36.0

Start time (hh:mm:ss.d)

If hours are less than 10, format h:mm:ss.d have also been used. Check time format by checking : character.

Length=00:30:00.4

Length of exercise (hh:mm:ss.d)

If hours are less than 10, format h:mm:ss.d have also been used. Check time format by checking : character.

Interval=5	Data type:
	1 = 1 seconds recording interval
	2 = 2 seconds recording interval
	5 = 5 seconds recording interval
	15 = 15 seconds recording interval
	30 = 30 seconds recording interval
	60 = 60 seconds recording interval
	120 = 120 seconds recording interval (dynamic)
	240 = 240 seconds recording interval (dynamic)
	300 = 5 minutes recording interval
	480 = 480 seconds recording interval (dynamic)
	238 = R - R data (VNV, S810, S810i, RS, CS)
	204 = intermediate times only (PST, VXL, VNV, XTr+, Acc+)
Upper1=160	Upper limit 1 (bpm)
Lower1=80	Lower limit 1 (bpm)
Upper2=160	Upper limit 2 (bpm)
Lower2=80	Lower limit 2 (bpm)
Upper3=160	Upper threshold / Upper limit 3 (bpm)
Lower3=80	Lower threshold / Lower limit 3 (bpm)
Timer1=00:00	Exercise timer 1 (mm:ss)
Timer2=00:00	Exercise timer 2 (mm:ss)
Timer3=00:00	Exercise timer 3 (mm:ss)
ActiveLimit=0	Limits in use in "File Summary": 0 = Limits 1 and 2, 1 = Treshold limits
MaxHR=195	Personal max heart rate (bpm)
RestHR=52	Personal resting heart rate (bpm)
StartDelay=300	RR Start delay (ms) (Vantage NV RR data only)
VO2max=50	VO2max at time of exercise (for calories calculation) ml/min/kg #
Weight=75	Weight at time of exercise (for calories calculation) kg#

### 3. Polar Coach Parameters

DATA	COMMENTS
[Coach]	Polar Coach data section
000128	Coach flag data in bit fields
0 0	Recovery data ; result HR, result time (in seconds)
0 0	Interval data ; HR average, interval time (in seconds)
0 1175 26	Target zone 1 data ; (below tz, in tz, above tz) in seconds
0 0 0	Target zone 2 data ; (below tz, in tz, above tz) in seconds
0 0 0	Target zone 3 data ; (below tz, in tz, above tz) in seconds
128 164	Average Hr of the exercise, maximum Hr of the exercise

Flags 8 - bits are in use, (87654321), rest of the bits are reserved for future needs

8 bit, 1 = recovery not used

7 bit, 1 = negative recovery

6 bit, 1 = recording in continuous interval mode

5 bit, 1 = interval mode used during recording

4 bit, 1 = time recovery calculation enabled during recording

3 bit, 1 = HR recovery calculation enabled during recording

2 bit, 1 = Limit 3 enabled during recording

1 bit, 1 = Limit 2 enabled during recording

Note: Coach parameters are only from Polar Coach HR monitor.

## 4. Exercise Note

DATA	COMMENTS
[Note]	Notes
Note!	Max 250 ASCII characters

## 5. HR Zones

DATA	COMMENTS
[HRZones]	Heart rate zones used for this exercise
190	Zone 1 upper limit (bpm)
180	Zone 2 upper limit (bpm) = Zone 1 lower limit
170	Zone 3 upper limit (bpm)
160	Zone 4 upper limit (bpm)
150	Zone 5 upper limit (bpm)
140	Zone 6 upper limit (bpm)
0	Zone 7 upper limit (bpm)
0	Zone 8 upper limit (bpm)
0	Zone 9 upper limit (bpm)
0	Zone 10 upper limit (bpm)
0	Zone 10 lower limit (bpm)

## 6. HR Limit Swaps

DATA	COMMENTS
[SwapTimes]	Time when HR limits have been swapped between limits 1, 2 and 3. By default the limits 1 are starting limits. Limit index is zero-based.
00:10:00.0      1	Time when limits have been changed to limits 2
00:20:00.0      2	Time when limits have been changed to limits 3
00:30:00.0      0	Time when limits have been changed to limits 1

## 7. HR/CC Mode Swaps

HR/CC mode swaps are available only with Polar XTrainer Plus.

DATA	COMMENTS
[HRCCModeCh]	Mode change
00:00:0.0      32	HR to CC (The change from HR measurement to cycling measurement mode at time hh:mm:ss.d)

00:05:54.7	16	CC to HR
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## 8. Lap Times

DATA						COMMENTS
[IntTimes]						Lap times
00:03:43.7	123	100	150	200		Row 1
32	0	0	0	0	0	Row 2 Lap time 0
0	0	0	0	0		Row 3
0	400	455	21	0	0	Row 4 <sup>#</sup>
0	0	0	0	0	0	Row 5 <sup>#</sup>
00:04:54.7	159	130	170	200		Row 1
32	0	0	0	0	0	Row 2 Lap time 1
0	0	0	0	0		Row 3
0	400	470	21	0	0	Row 4 <sup>#</sup>
0	0	0	0	0	0	Row 5 <sup>#</sup>

Field descriptions:

[IntTimes]						Lap times
Time	HR	HR	HR	HR		Row 1
		min	avg	max		
Flags	Rec.	Rec.	Speed	Cad	Alt	Row 2
	Time	HR				
Extra1	Extra2	Extra3	Asc	Dist		Row 3
Lap type	Lap	Power	Tempe	Phas	Air	Row 4 <sup>#</sup>
	Dist		rature	eLap	Pr	
StrideAvg	Autom.	0	0	0		Row 5 <sup>#</sup>
	lap					

### Row 1

Time Lap time in format hh:mm:ss.d  
 HR Momentary heart rate value in bpm  
 HR min Lap's minimum heart rate value in bpm  
 HR avg Lap's average heart rate value in bpm  
 HR max Lap's maximum heart rate value in bpm

### Row 2

Flags Misc lap time information in 8 bits, 87654321  
 bit 8 = Polar Coach lap/interval flag (0 = lap, 1 = interval)  
 bit 7 = Int. time erased (for Conconi test, not included to calculation)  
 bit 6 = Int. type (0 = fixed, 1 = from hrM)  
 bit 5 = Extra data 3 (1 = selected to draw)  
 bit 4 = Extra data 2 (1 = selected to draw)  
 bit 3 = Extra data 1 (1 = selected to draw)  
 bits 1,2 = Recovery (0 = no rec, 1 = Time rec, 2 = HR rec)



Rec. Time    Recovery time (seconds)  
 Rec. HR      Recovery HR (bpm)  
 Speed        Momentary speed in Xtrainer units (km/h or mph = X/128)  
 Cad          Momentary cadence (rpm)  
 Alt          Momentary altitude (HRM version 1.02: 10m / 10ft, version 1.05→ 1m/1ft)\*

**Row 3**

Extra 1 - 3    Values of extra data series (0 - 3000) (the actual value is multiplied by ten)  
 Asc          Lap ascent value from XTr+ 10m / 10ft  
 Dist         Lap distance value from XTr+ 0.1km / 0.1ft

**Row 4<sup>#</sup>**

Lap type      Lap type identifier, replaces flag 8 (Polar Coach lap/interval flag) value

Type	Description	Type	Description
0	normal lap	8192	end of exercise
1	interval	16384	off road
2	start of exercise	32768	road
4	finishing line	65536	head wind
8	uphill	131072	tail wind
16	downhill	262144	Score / goal
32	service	524288	penalty
64	stopped	1048576	city/down
128	orienteering marker	2097152	navigation
256	u-turn	4194304	altitude calibration
512	summit / peak	8388608	crossroads
1024	sprint	16777216	landmark
2048	crash		
4096	timeout		

Lap Dist     Manually given lap distance in meters / yards, units are depending on  
                   US/Euro unit selection  
 Power        Momentary power value in Watts  
 Temperature    Momentary temperature value in Celcius / Fahrenheit, units are depending  
                   on US/Euro unit selection  
 PhaseLap    Internal phase/lap information used for interval calculation  
 AirPr        Air pressure value from AXN products

**Row 5<sup>#</sup>**

StrideAvg    Stride average in cm (RS800, RS800CX only)  
 Autom.lap    Automatic lap used (TRUE/FALSE) (RS and CS products)

The rest of the new lap time parameters are reserved for future usage.  
Lap times were formerly known as Intermediate times.

## 9. Lap Time notes

DATA		COMMENTS
[IntNotes]		Intermediate time note texts
3	Traffic lights	Third intermediate time's note text.
5	Interval	Fifth intermediate time's note text.

## 10. Extra Data Series

DATA		COMMENTS
[ExtraData]		Extra data names and units (max 3 series)
Lactate		Extra data 1 name
mmol/l	15 0	Extra data 1 unit, max value, min value
Power		Extra data 2 name
W	2000 0	Extra data 2 unit, max value, min value

## 11. HR Limit Summary

DATA		COMMENTS
[Summary-123]		File summary
3780	10 40 3700 30 0	Summary for limits 1 (row 1)
195	160 80 52	Limit values for limits 1 (row 2)
0	0 0 0 0 0	Summary for limits 2 (row 1)
195	160 80 52	Limit values for limits 2 (row 2)
0	0 0 0 0 0	Summary for limits 3 (row 1)
195	160 80 52	Limit values for limits 3 (row 2)
0	756	756 x 5 secs/sample = 3780 sec Maximum of 20 selections/file

### Row 1

- 3780 = Total time for selection in seconds (=10+40+3700+30+0)
- 10 = Time in seconds when the HR was above maximum
- 40 = Time in seconds when the HR was between UL1 and maximum
- 3700 = Time in seconds when the HR was between UL1 and LL1
- 30 = Time in seconds when the HR was between LL1 and rest HR
- 0 = Time in seconds below rest HR

### Row 2

- 195 = Max. HR
- 160 = Upper limit 1

80 = Lower limit 1  
52 = Rest HR

Summary information for limits 2 and 3 follow the same pattern.

The row of selection

0 = Selection start sample  
756 = Selection end sample

## 12. HR Threshold Summary

DATA						COMMENTS
[Summary-TH]						
3780	10	40	3700	30	0	Summary for threshold limits (row 1)
195	160	80	52			Limit values for th. limits (row 2)
0	756					756 x 5 secs/sample = 3780 sec Maximum of 20 selections/file

Row 1

3780 = Total time for selection in seconds (=10+40+3700+30+0)  
10 = Time in seconds when the HR was above maximum  
40 = Time in seconds when the HR was between upper TH and maximum  
3700 = Time in seconds when the HR was between lower and upper TH  
30 = Time in seconds when the HR was lower TH and rest HR  
0 = Time in seconds below rest HR

Row 2

195 = Maximum HR  
160 = Upper (anaerobic) threshold  
80 = Lower (aerobic) threshold  
52 = Resting HR

Row 3

0 = Selection start sample  
756 = Selection end sample

## 13. Cycling Parameters

Cycling parameters are available from XTr+, S710, S710i, S720i, S725, S725X.

DATA	COMMENTS
[Trip]	Cycling trip data
87	Distance = 8,7 km / mile
1400	Ascent (hrm 1.02 10m / 10ft, hrm 1.05→ 1m / 1ft) *
92982	Total time in seconds
1159	Average altitude (HRM 1.02 10m / 10ft, HRM 1.05→ 1m / 1ft) *

1304	Maximum altitude (HRM 1.02 10m / 10ft, HRM 1.05→ 1m / 1ft) *
1882	Average speed = $1882 / 128 = 14,7$ km/h / mph
3396	Maximum speed = $3396 / 128 = 26,5$ km/h / mph
418	Odometer value at the end of an exercise, $418 = 418$ km / mile

## 14. Heart Rate Data

The following data format is valid when there is only heart rate information in exercise file.

DATA	COMMENTS
[HRData]	Heart rate data
83	Heart rate
86	When the recording interval is 5,15, 60, ... seconds, the value of the heart rate is between 0 and 250 bpm.
85	
94	When the recording interval (=data type) is 238 (=R-R), the value is R-R interval in milliseconds (=>HR[bpm] = 60000/RR).
103	
106	When the interval is 204 (= int times only), there are no values, only the header "[HRData]".
107	

## 15. Extended Heart Rate Data

The following data format is for HRM versions →1.05

DATA	COMMENTS	
[HRData] Heart Rates (bpm)	Speed (0.1 km/h / mph)	Cadence (rpm) or Altitude (m/ft, see below) <i>(optional field)</i>
86	161	770
94	165	770
107	118	770
108	126	790

Values are separated by tab characters.

**Speed:** If US units are used, speed value 165 means 16.5 mph. If Euro units are used, speed value 165 means 16.5 km/h.

**Altitude:** Altitude values with hrm version 1.02 in format 10m / 10ft (to get correct value, multiply the altitude value by ten) and with hrm version 1.05 in format 1m / 1ft \*

**Cadence:** The cadence field is optional and available only when cadence was recorded into exercise file. The availability of cadence is saved into Mode=... (→ v1.05, a) Cad/Alt = 1).

**Air pressure:** The air pressure field is optional and available only when air pressure was recorded into file. Air pressure can be saved with Polar AXN500 and AXN700 outdoor computers.

The following data format is for HRM version 1.06 →

DATA	COMMENTS				
[HRData] Heart Rates (bpm)	Speed (0.1 km/h or mph)	Cadence (rpm)	Altitude (m/ft)	Power (Watts)	Power Balance and Pedalling Index
83	173	81	760	325	12857
85	171	90	780	340	12857
94	165	92	770	335	12857

The following data format is for HRM version 1.07 →

DATA	COMMENTS					
[HRData] Heart Rates (bpm)	Speed (0.1 km/h or mph)	Cadence (rpm)	Altitude (m/ft)	Power (Watts)	Power Balance and Pedalling Index	Air pressure
83	173	81	760	325	12857	1004
85	171	90	780	340	12857	1003
94	165	92	770	335	12857	1003

The cycling data fields are optional and are available if exercise contains cycling data. The SMode field at [Params] section describes the data available.

- Speed is available if SMode a=1
- Cadence is available if SMode b=1
- Altitude is available if SMode c=1
- Power (watts) is available if SMode d=1
- Power (LRB and PI) are available if SMode e=1
- Air pressure is available if SMode i=1

**Power LRB + PI:** The second power value contains Left Right Balance (LRB) and Pedalling Index (PI) values in the following formula:

$$\text{value} = \text{PI} * 256 + \text{LRB}$$

PI bits 15-8	LRB bits 7-0
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LRB is the value of left foot → for example if LRB = 45, actual balance is L45 - 55R.  
 PI values are percentages from 0 to 100. For example value 12857 (= 40 \* 256 + 47)  
 means: PI = 40 and LRB = 47 => L47 - 53R