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Complete information to be found in the **K5 User Manual**.

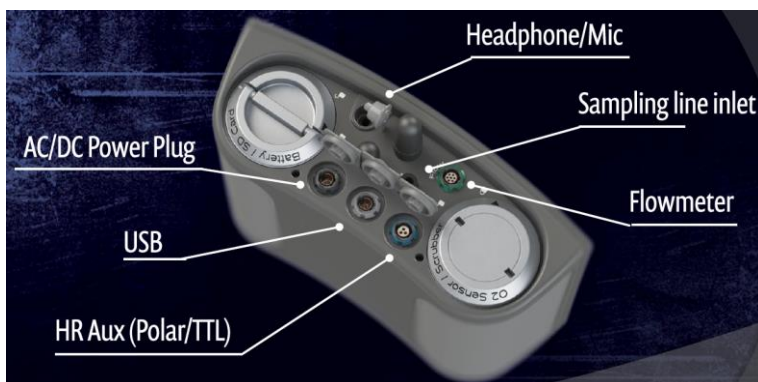
Below a small step-by-step guide for the daily use of the K5.

1. Preparation

Connect K5 to mains or connect battery.



Connect gas sample line and flowmeter to K5.



2. Warmup

Power on the K5



Note: After power on, the K5 sampling pump is always active to ensure optimal warm-up time (sampling pump goes into a 2 min standby when any command on screen is selected).

Warm-up times:

Calibration	Warm-up time from power on at 20°C (min)	Recommended Interval	Note
Flowmeter	0	Daily or whenever the turbine is replaced	Recommended after cleaning and disinfection
Scrubber	20	Before each test	ONLY if the test is performed indoor
Reference Gas (Mix)*	30	Daily	ONLY if Mixing Chamber tests are performed
Reference Gas (BxB and Delay)*	60	Daily	ONLY if BxB tests are performed

*Reference gas calibrations are test mode specific. If test mode is changed, calibration must be performed for that testing mode

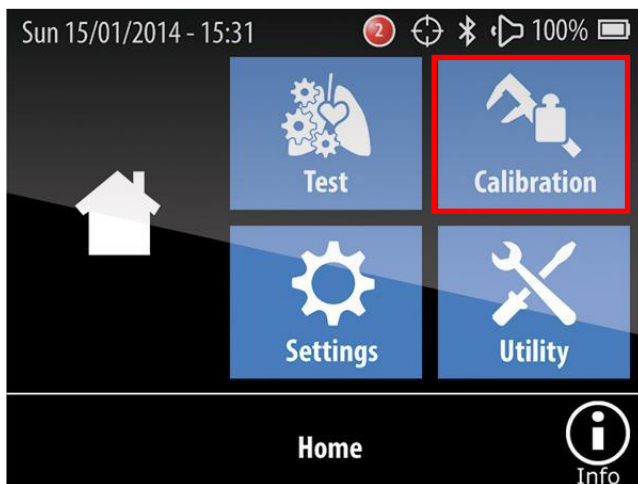
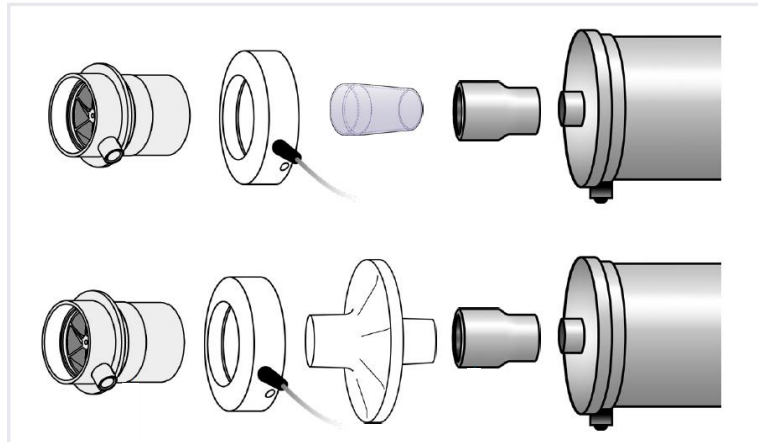
3. Flowmeter Calibration

Patient side:

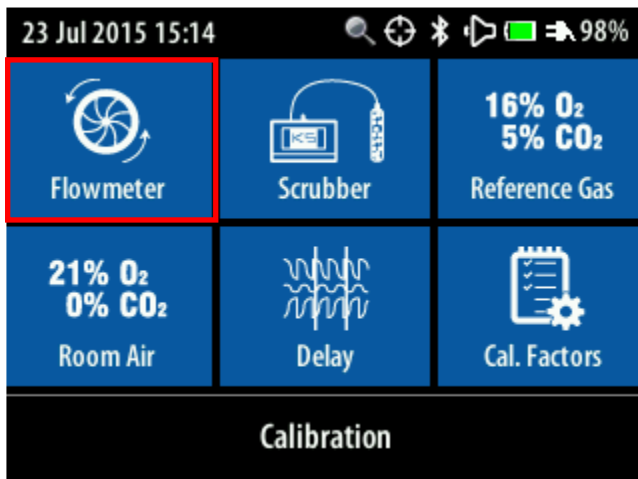
Connect syringe
via filter or plast
adapter and the
rubber adapter

Note:

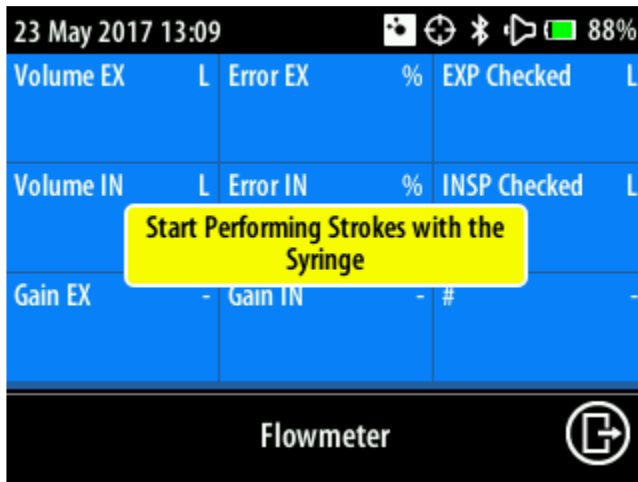
The patient
symbol on the
opto-reader:



Press **Calibration** on the K5 main menu



Press **Flowmeter** and follow the instructions on the screen – fill and empty the 3-litre syringe completely at various speed.



4. Gas Calibration

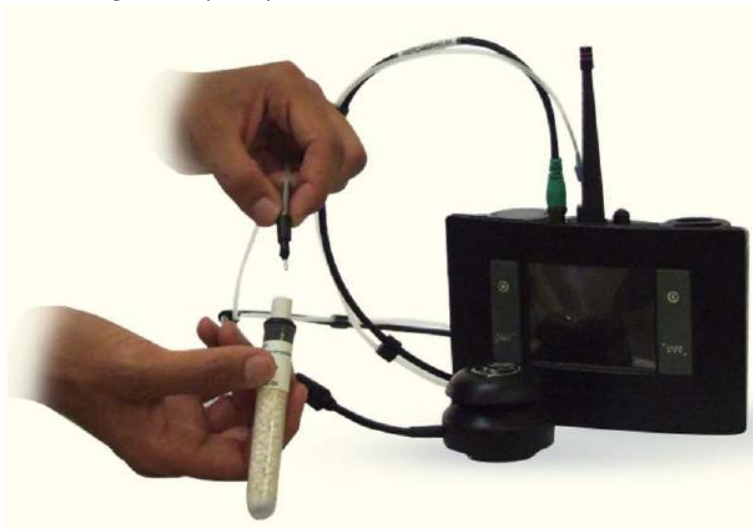
The gas calibration is a 2-step process involving a **zero-gas** calibration and a **reference-gas** calibration. The **reference-gas** calibration includes the **room air** calibration and the **delay** calibration, so these are not needed unless the **reference-gas** is not available. If both **Mix** and **BxB** mode are used, the **reference-gas** calibration must be performed for both modes.

Note:

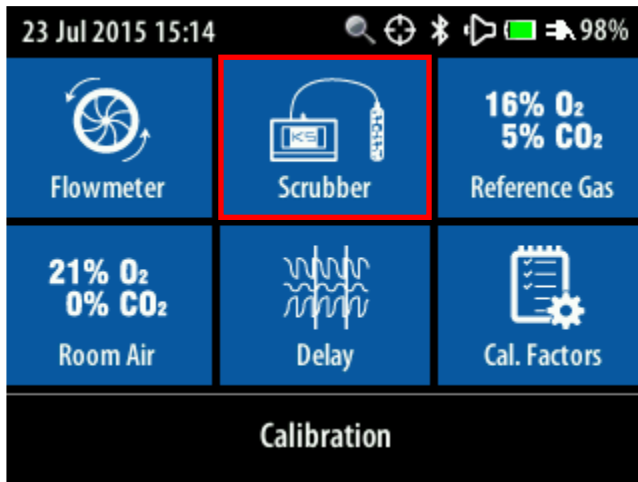
- Sampling line must be replaced after 100 tests or 6 months (whichever comes first).
- It is recommended to swap sampling lines between consecutive tests to allow drying and maintain sampling line efficiency.

Zero calibration

Connect gas sample tip to CO₂ scrubber container.



Press **Calibration** on the K5

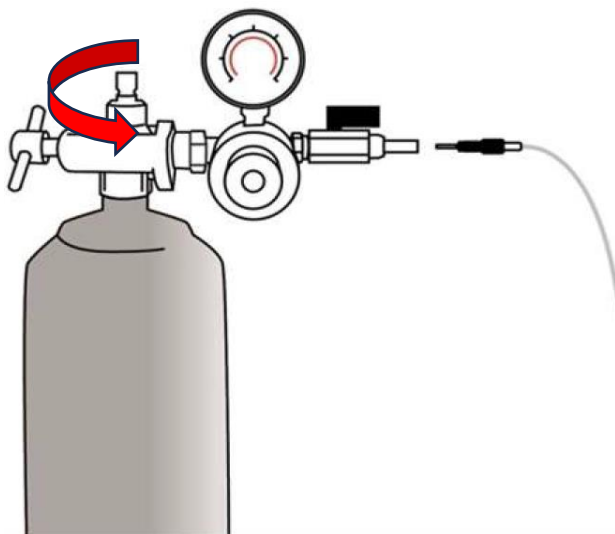


Press **Scrubber** and follow the instruction on the screen.

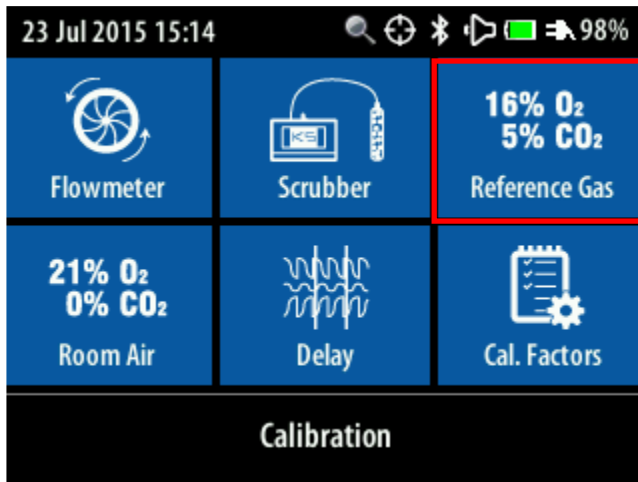


Reference gas calibration

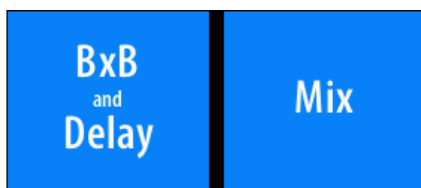
Connect gas sample tip to calibration port on calibration cylinder.
 Open main valve.



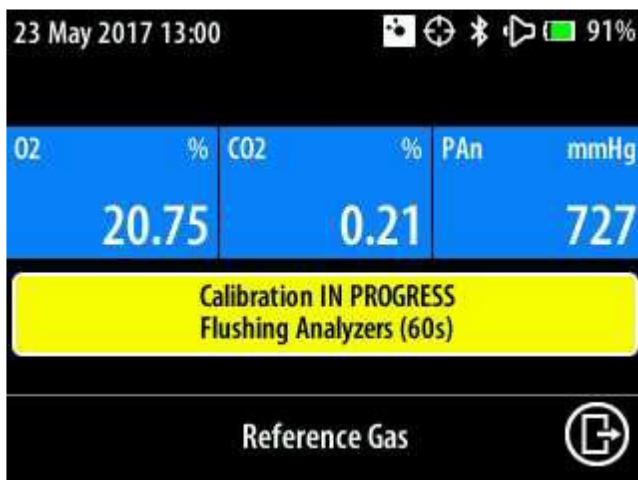
Press **Calibration** on the K5



Press **Reference Gas**



Select **BxB and Delay** or **Mix** and follow the prompts on the screen telling when to open and close the gas valve.



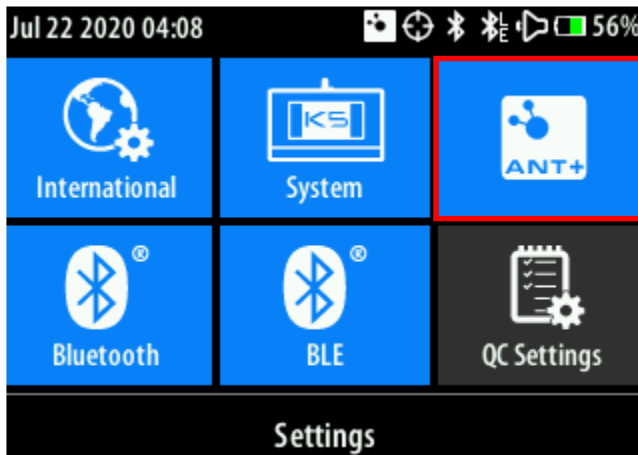
5. Other Calibration

Room Air calibration is optional, since part of the Reference gas calibration. However, can be used if the gas calibration tank is not available.

Delay calibration is also optional, since part of the Reference gas calibration for BxB. However, can be used if the gas calibration tank is not available. Breathe in and out according to the beeps given by K5.

6. ANT+ connection

Enter Settings from the main menu.





Select **ANT+**



Enable ANT+

Turn on the ANT+ profiles to use:

Enabled:	
Disabled:	

- HR (Heart Rate, Garmin, smartLAB hrm W, etc.)
- BikeSpd (Bike Speed)
- BikeCad (Bike Cadence)
- BikeS&C (Bike Speed and Cadence)
- BikePWR (Bike Power and Torque)
- StrS&Dist (stride-based speed and distance)
- MO2 (Muscle Oxygen Profile)

In Paired HeartRate Monitor it can be set if the strongest pulse belt shall be picked up (=0), or a specific one.



The screenshot shows a screen titled "ANT+ Devices Found" with a list of three heart rate monitoring devices. The first device is highlighted in blue and shows "HeartRate" and "#: 0 (Auto: strongest signal)". The second device shows "HeartRate", "#: 375", and "RSSI: -15". The third device shows "HeartRate", "#: 38079", and "RSSI: -34".

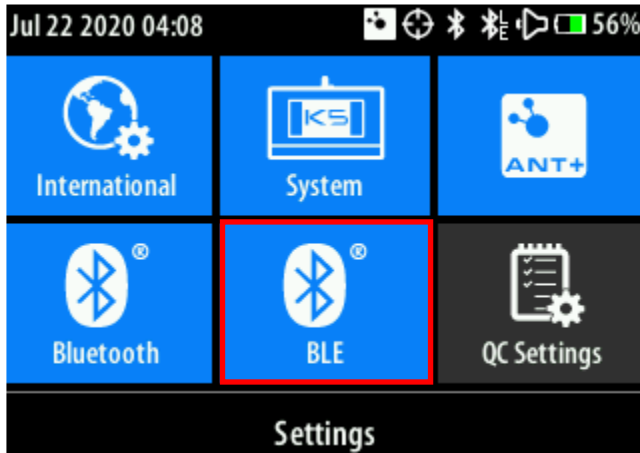
ANT+ Devices Found		
HeartRate	#: 0	(Auto: strongest signal)
HeartRate	#: 375	RSSI: -15
HeartRate	#: 38079	RSSI: -34

RSSI = "Received Signal Strength Indicator". (-15 is stronger than -34)

Tip: In **Utility - Control Panel** the HR readings can be checked.

7. Bluetooth connection (BLE)

Enter Settings from the main menu.



Select **BLE**.



Enable BLE.

Turn on the BLE sensors to use:

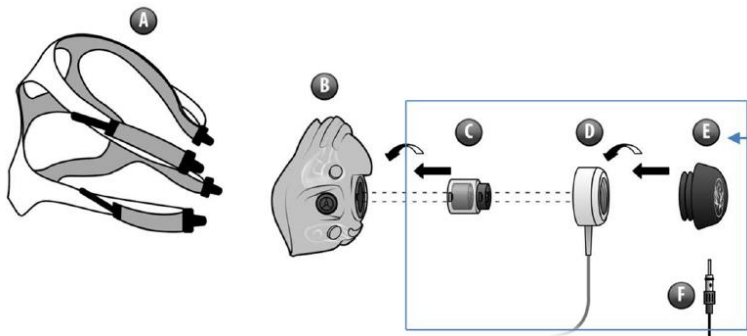
- SPO2 (Nonin® WristOx2 3150).
- HR BLE (Heart Rate, Polar H7, H9, H10, smartLAB hrm W, etc.)
- HT BLE (Health Temperature sensor)

Pair the sensor(s) by selecting **Paired xx Device**

Tip: In **Utility - Control Panel** the SpO2 and HR readings can be checked.

8. Subject preparation

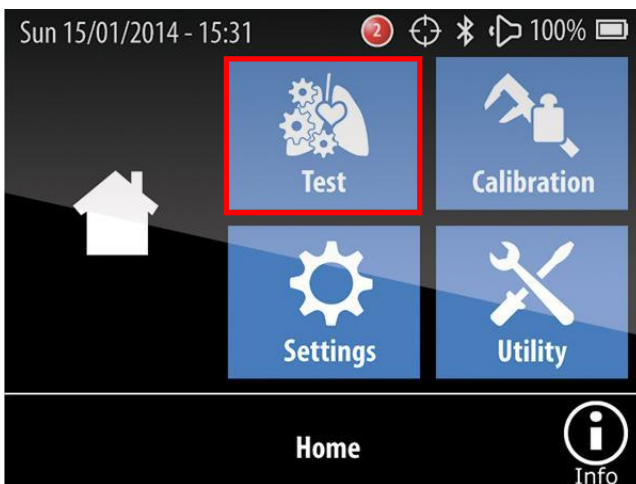
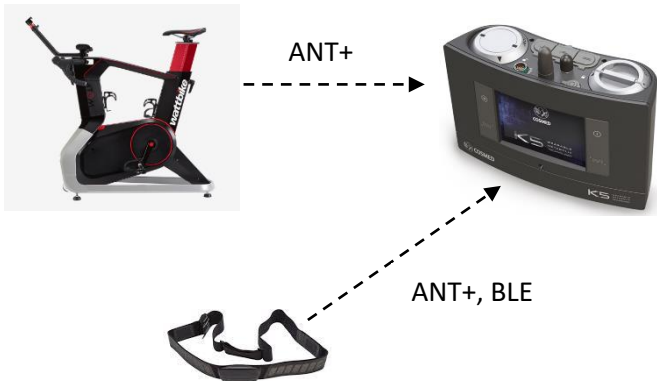
Mount facemask on subject:



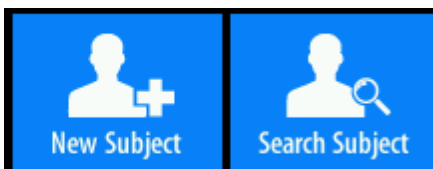
Mount K5 on back of subject



9. Test (stand-alone)



Press **Test** on main menu



Press **New Subject** or **Search Subject**.

Last Name	lastname
First Name	firstname
DOB (MMDDYYYY)	03/31/1999
Gender	Male >
Height (cm)	150.0
Weight (Kg)	50.0
Ethnicity	Caucasian >

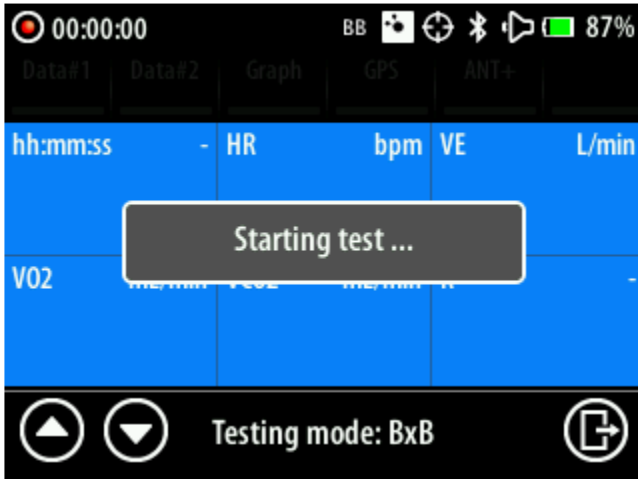



New Subject






Press **BxB** or **Mix**



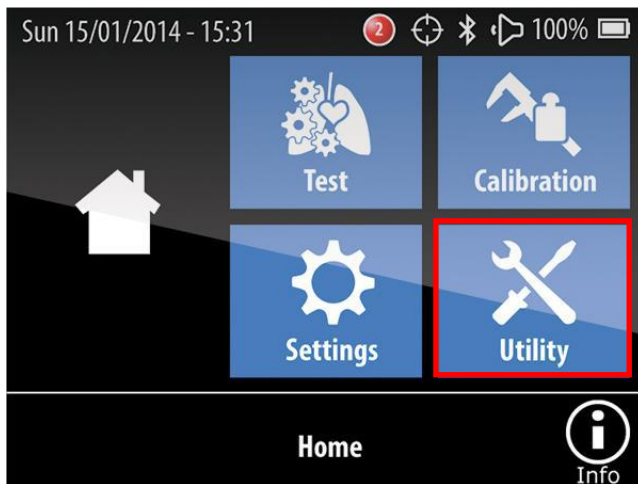
Press the **REC** button to start the recording but recommended to wait approx. 1 minute to flush internal chambers.

Note: when the REC LED is **blinking** data are **not** stored.

To stop a test: Press the REC button again or the icon:



10. Export Test from K5 to SD card



Press **Utility**.

Press **Database**.

Press **Search**.

Search by **Subject**, **Date** or **Type**.

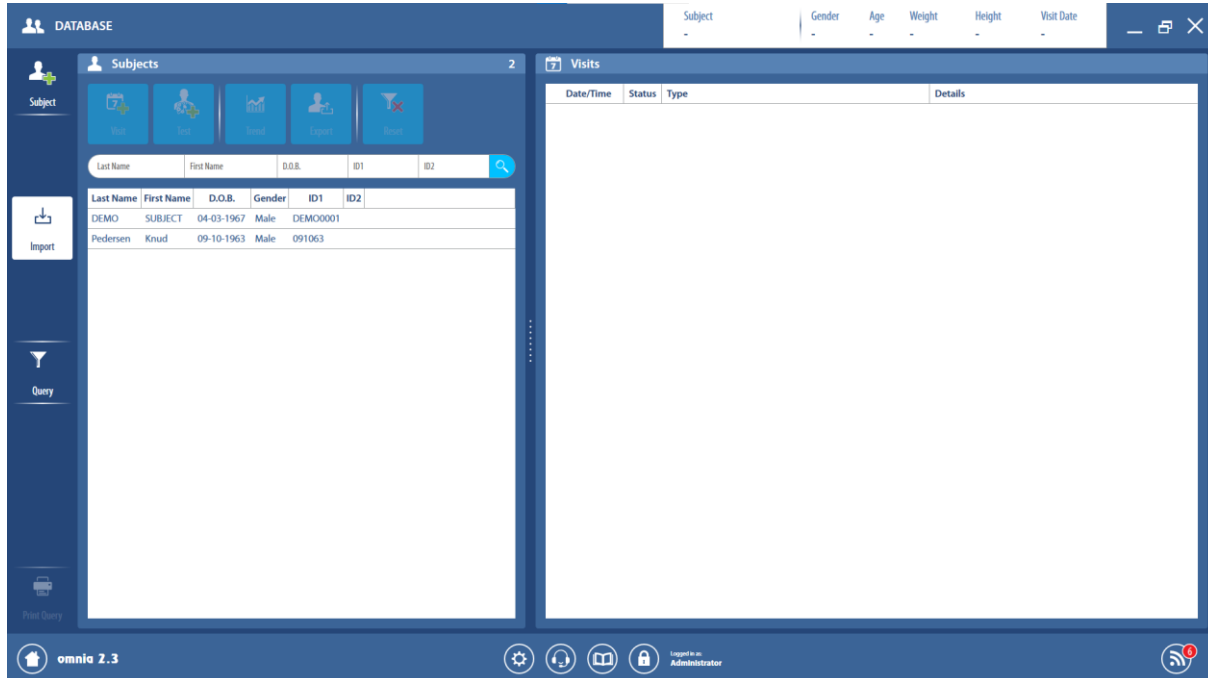
Select **TXT** or **CSV** file format.

Press \checkmark to export data.

11.Import Test from K5 to OMNIA

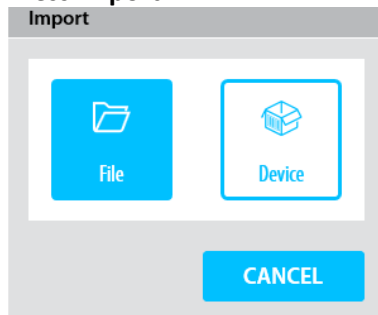
Connect OMNIA to K5 via Bluetooth or USB cable.

Go to home menu and select **Database**.



Last Name	First Name	D.O.B.	Gender	ID1	ID2
DEMO	SUBJECT	04-03-1967	Male	DEMO0001	
Pedersen	Knud	09-10-1963	Male	091063	

Press **Import**



Select **Device**

IMPORT

Read Data

Read Data

Close

Search by Name or Test Name...

DEVICE

Test date

Test Type

Last Name

First Name

D.O.B.

Gender

ID

Grouping

Height (cm)

Weight (kg)

Search by Lastname, ID1, ID2 or Insurance

DESTINATION

Last Name

First Name

D.O.B.

Gender

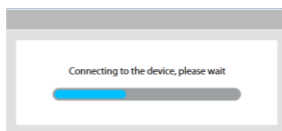
ID1

Select New Tests Only

Subject

Add To

Press **Read Data**



IMPORT

Read Data

Read Data

Search by Name or Test Name...

DEVICE

Test date

Test Type

Test Duration

Last Name

First Name

D.O.B.

Gender

ID

Height (cm)

Weight (kg)

Comments

Search by Lastname, ID1, ID2 or Insurance

DESTINATION

Last Name

First Name

D.O.B.

Gender

ID1

Select New Tests Only

Subject

Add To

Test date	Test Type	Test Duration	Last Name	First Name	D.O.B.	Gender	ID	Height (cm)	Weight (kg)	Comments
18/10/2023 12:22:57	CPET MIX	00:01:20	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
17/10/2023 15:48:09	CPET Bx8	00:07:02	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
17/10/2023 14:30:28	CPET Bx8	00:01:22	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
19/04/2023 09:40:34	CPET MIX	00:03:10	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
19/04/2023 09:34:55	CPET MIX	00:01:20	PC_TEST_0	PC_TEST_0	09/10/1963	Male		186.0	100.00	

IMPORT

Read Data

Read Data

Search by Name or Test Name...

DEVICE

Test date

Test Type

Test Duration

Last Name

First Name

D.O.B.

Gender

ID

Height (cm)

Weight (kg)

Comments

Search by Lastname, ID1, ID2 or Insurance

DESTINATION

Last Name

First Name

D.O.B.

Gender

ID1

Select New Tests Only

Subject

Add To

Test date	Test Type	Test Duration	Last Name	First Name	D.O.B.	Gender	ID	Height (cm)	Weight (kg)	Comments
20/10/2023 14:55:30	CPET MIX	00:02:40	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
20/10/2023 14:33:42	CPET MIX	00:05:50	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
19/10/2023 17:08:13	CPET MIX	00:13:40	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
19/10/2023 16:51:56	CPET MIX	00:14:20	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
19/10/2023 16:48:17	CPET MIX	00:00:15	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
19/10/2023 16:44:59	CPET MIX	00:00:58	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
18/10/2023 14:39:34	CPET MIX	00:02:00	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
18/10/2023 12:22:57	CPET MIX	00:01:20	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
17/10/2023 15:48:09	CPET Bx8	00:07:02	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
17/10/2023 14:30:28	CPET Bx8	00:01:22	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
19/04/2023 09:40:34	CPET MIX	00:03:10	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
19/04/2023 09:34:55	CPET MIX	00:01:20	PC_TEST_0	PC_TEST_0	09/10/1963	Male		186.0	100.00	

pedersen

DESTINATION

Pedersen

Knud

09/10/1963

Male

091063

Subject

Add To

Select the Test(s) to import.

Press **Subject** (Add subject), or **Search** the subject in the Database and press **Add To**.

IMPORT

Read Data

Read Data

Close

Search by Name or Test Name...

Search by Lastname, ID1, ID2 or Insurance

DEVICE

Test date	Test Type	Test Duration	Last Name	First Name	D.O.B.	Gender	ID	Height (cm)	Weight (kg)	Comments
17/10/2023 14:30:28	CPET Bx8	00:01:22	Pedersen	Knud	09/10/1963	Male		186.0	100.00	
19/04/2023 09:40:34	CPET MIX	00:03:10	PEDERSEN	KNUD	09/10/1963	Male		186.0	100.00	
19/04/2023 09:34:55	CPET MIX	00:01:20	PC_TEST_0	PC_TEST_0	09/10/1963	Male		186.0	100.00	

Select New Tests Only

DESTINATION

Last Name	First Name	D.O.B.	Gender	ID1
-----------	------------	--------	--------	-----

0/0 Subject(s), 0/0 Visit(s),
2/2 Test(s) imported

OK

Go to **Database** and check that the new test(s) are present.

DATABASE

Subject

Gender

Age

Weight

Height

Visit Date

Knud Pedersen

Male

-

-

-

-

Subjects

Visit

Test

Trend

Export

Share

Last Name

First Name

D.O.B.

ID1

ID2

Last Name	First Name	D.O.B.	Gender	ID1	ID2
DEMO	SUBJECT	04/03/1967	Male	DEMO0001	
Pedersen	Knud	09/10/1963	Male	091063	

Visits

Date/Time	Status	Type	Details
18/10/2023		CPET MIX	
12:22		CPET MIX	★ - Duration: 01:20 min
17/10/2023		REE Mask (2), CPET Bx8	
15:48		CPET Bx8	★ - Duration: 07:02 min
15:45		REE Mask	Duration: 06:58 min
14:28		REE Mask	★ - Duration: 01:19 min
13/10/2023		FVC, FVC post BD (3), CPET Bx8 (2)	
11/10/2023		CPET MIX (7)	
08/02/2023		FOT, SVC, FVC, DLCO SB, TGV/RAW, MIP/MEP/SNIP, P0.1	
13/12/2022		ADP (2)	
22/07/2022		CPET MIX	
28/06/2022		-	
21/06/2022		-	
14/06/2022		CPET Bx8, FVC, REE Mask	
09/06/2022		-	
08/06/2022		CPET Bx8 (3)	
18/05/2022		REE Mask	
07/04/2022		CPET MIX	
15/08/2020		CPET Bx8	
05/04/2020		CPET MIX	

omnia 2.3

Settings

Help

Logfile

Administrator

Signal

Share

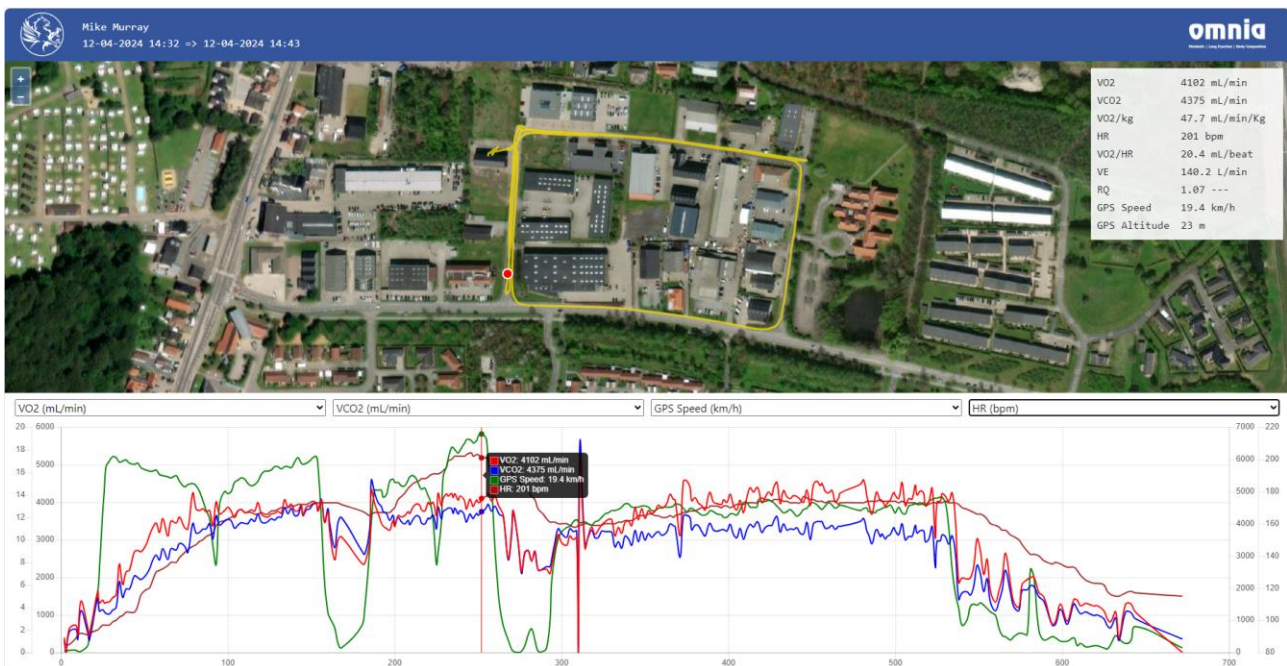
12.Examples

Running with Foot Stride sensor and GPS:

t	h:m:ss	VO2/kg	VO2	VC02	RQ	VE	RI	VT	FeO2	FeCO2	FI02	FI02	HR	Power	Speed	Grade	Phase	Stride Count	Stride Distance	Stride Cadence	GPS Speed	GPS Altitude	Stride Speed	Cadence
---	---	ml/min/Kg	ml/min	ml/min	---	L/min	l/min	L(btps)	%	%	%	%	bpm	(--)	(--)	(--)	---	---	m	1/min	km/h	m	m/s	1/min
04:02		46.7	4015	4202	1.05	142.2	42.9	3.317	17.49	3.60	20.91	0.06	202	---	---	---	None	293	1008	94	18.6	23	5.83	198
04:03		44.4	3818	4051	1.06	137.2	44.4	3.086	17.53	3.60	20.91	0.06	203	---	---	---	None	295	1018	94	18.9	23	5.86	198
04:05		47.5	4083	4302	1.05	138.5	42.3	3.277	17.34	3.78	20.91	0.06	204	---	---	---	None	297	1027	94	18.9	23	5.89	198
04:06		46.5	3999	4229	1.06	140.5	45.8	3.068	17.46	3.67	20.91	0.06	204	---	---	---	None	299	1036	94	18.8	23	5.92	198
04:07		45.2	3888	4166	1.07	138.8	47.6	2.915	17.50	3.66	20.91	0.06	202	---	---	---	None	302	1049	94	18.6	23	5.94	165
04:09		47.2	4061	4321	1.06	141.3	46.9	3.014	17.42	3.73	20.91	0.06	203	---	---	---	None	303	1054	94	18.8	23	5.94	165
04:10		46.5	3998	4263	1.07	143.8	45.5	3.163	17.53	3.61	20.91	0.06	203	---	---	---	None	305	1064	94	19.2	23	5.94	165
04:11		46.5	4000	4304	1.08	142.3	47.2	3.011	17.49	3.69	20.91	0.06	202	---	---	---	None	307	1071	94	19.4	23	5.94	165
04:12		47.7	4102	4375	1.07	140.2	45.5	3.084	17.35	3.80	20.91	0.06	201	---	---	---	None	310	1085	94	19.4	23	5.97	165
04:14		48.2	4142	4440	1.07	145.9	46.5	3.137	17.46	3.71	20.91	0.06	201	---	---	---	None	312	1094	94	19.2	23	6.00	165
04:15		48.4	4163	4515	1.08	149.2	48.0	3.108	17.51	3.69	20.91	0.06	201	---	---	---	None	313	1098	94	18.9	23	6.00	165
04:16		49.3	4240	4603	1.09	144.8	42.6	3.403	17.34	3.87	20.91	0.06	200	---	---	---	None	314	1102	92	17.1	23	5.94	165

Performance 9P Panel 9P Panel 5th Ed 9P Panel AG DEU Cardio (Clinical) Thresholds POETTS 9P QC

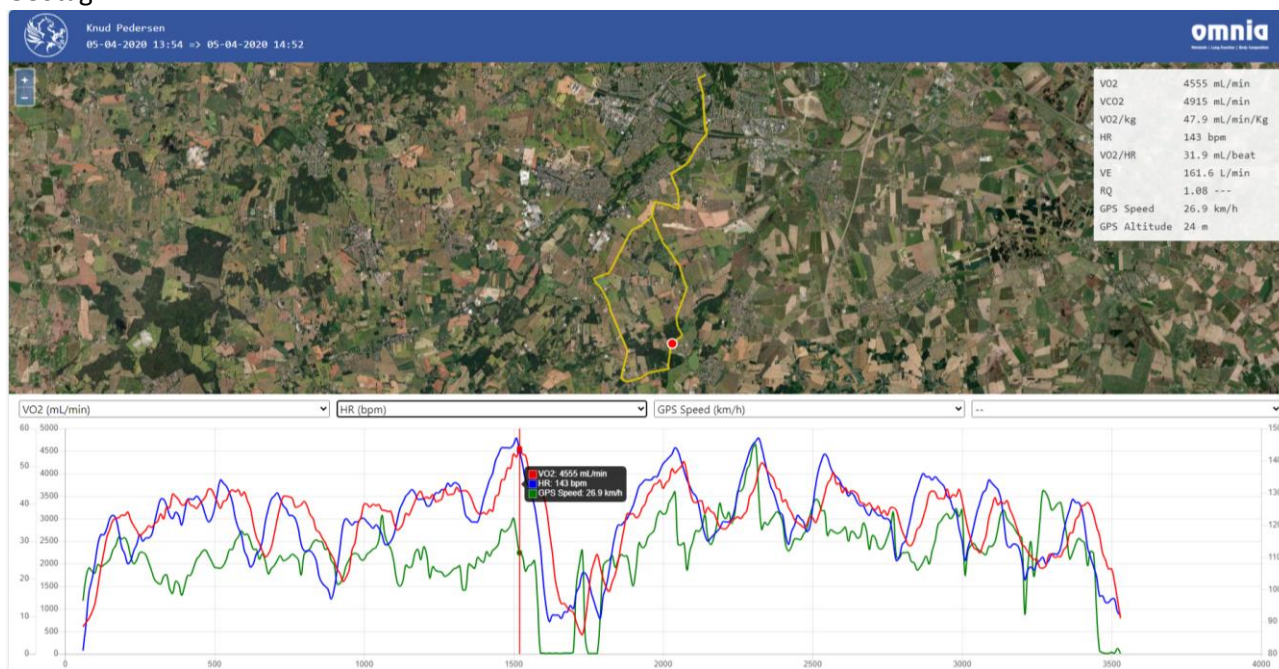
Geotag:



Cycling with left sided cycle power meter and GPS:

...	t hh:mm:ss	VO2/kg ml/min/Kg	VO2 ml/min	VC02 ml/min	RQ	VE L/min	RF l/min	VT L(btps)	FeO2 %	FeCO2 %	FI02 %	FI02 %	HR bpm	Power (--)	Speed (--)	Grade (--)	Phase ---	Left Balance %	Bike Torque@crank Nm	GPS Altitude m	GPS Speed km/h	Bike Power Watt
	05:30	31.5	2994	2934	0.98	94.4	37.1	2.544	17.16	3.75	20.93	0.04	128	75	0	0	Exercise	---	---	16	20.6	---
	05:40	34.3	3256	3212	0.99	102.8	36.9	2.786	17.16	3.77	20.93	0.04	126	75	0	0	Exercise	86	23.0	16	21.0	199.0
	05:50	34.1	3242	3210	0.99	101.9	36.6	2.784	17.14	3.80	20.93	0.04	123	75	0	0	Exercise	---	---	17	17.3	---
	06:00	37.3	3544	3544	1.00	111.6	37.0	3.016	17.14	3.83	20.93	0.04	122	75	0	0	Exercise	44	54.5	18	16.1	405.0
	06:10	36.8	3492	3526	1.01	109.9	36.4	3.019	17.13	3.87	20.93	0.04	124	75	0	0	Exercise	85	55.4	19	19.3	192.0
	06:20	36.0	3419	3500	1.02	108.5	35.6	3.048	17.15	3.89	20.93	0.04	123	75	0	0	Exercise	85	21.8	17	18.6	181.2
	06:30	34.8	3307	3455	1.04	107.4	35.8	3.000	17.22	3.88	20.93	0.04	120	100	0	0	Exercise	53	93.0	22	15.6	515.5
	06:40	34.9	3312	3499	1.06	109.9	36.8	2.986	17.29	3.84	20.93	0.04	124	100	0	0	Exercise	95	88.3	22	18.0	549.0
	06:50	36.0	3416	3598	1.05	114.2	38.2	2.990	17.32	3.80	20.93	0.04	128	100	0	0	Exercise	95	32.2	22	20.8	271.7
	07:00	34.8	3302	3465	1.05	110.3	38.1	2.895	17.32	3.79	20.93	0.04	128	100	0	0	Exercise	---	---	23	20.9	---
	Performance	9P Panel		9P Panel 5th Ed		9P Panel AG DEU		Cardio (Clinical)		Thresholds		POETTS 9P		QC								

Geotag:

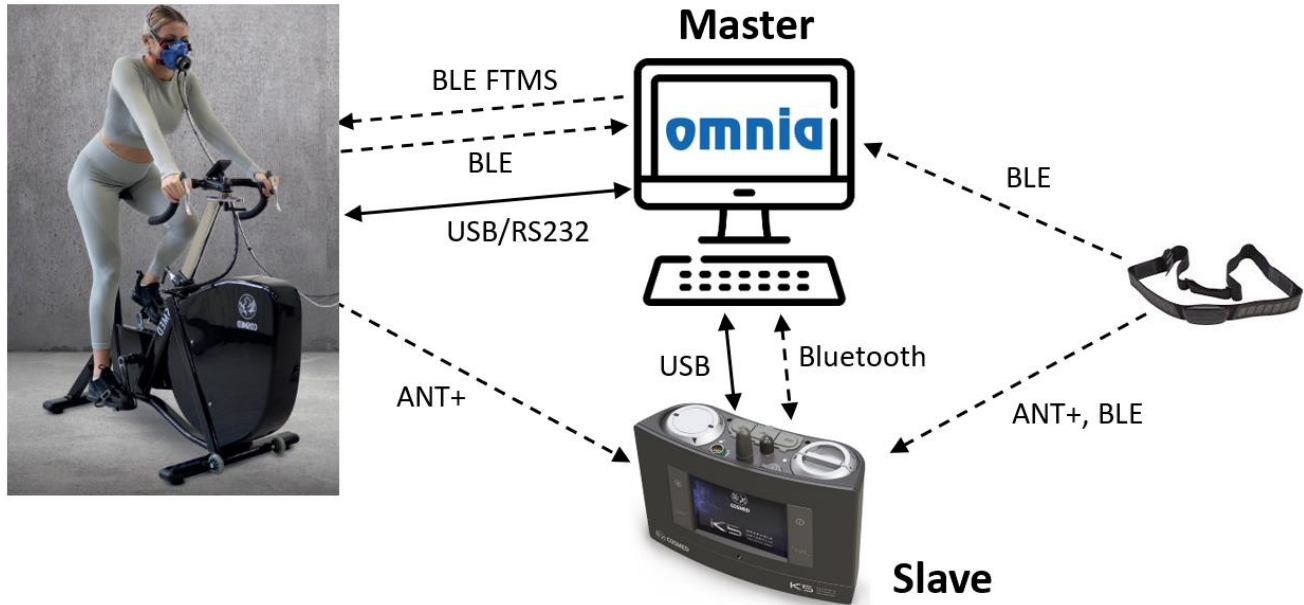


13.Test (via OMNIA)

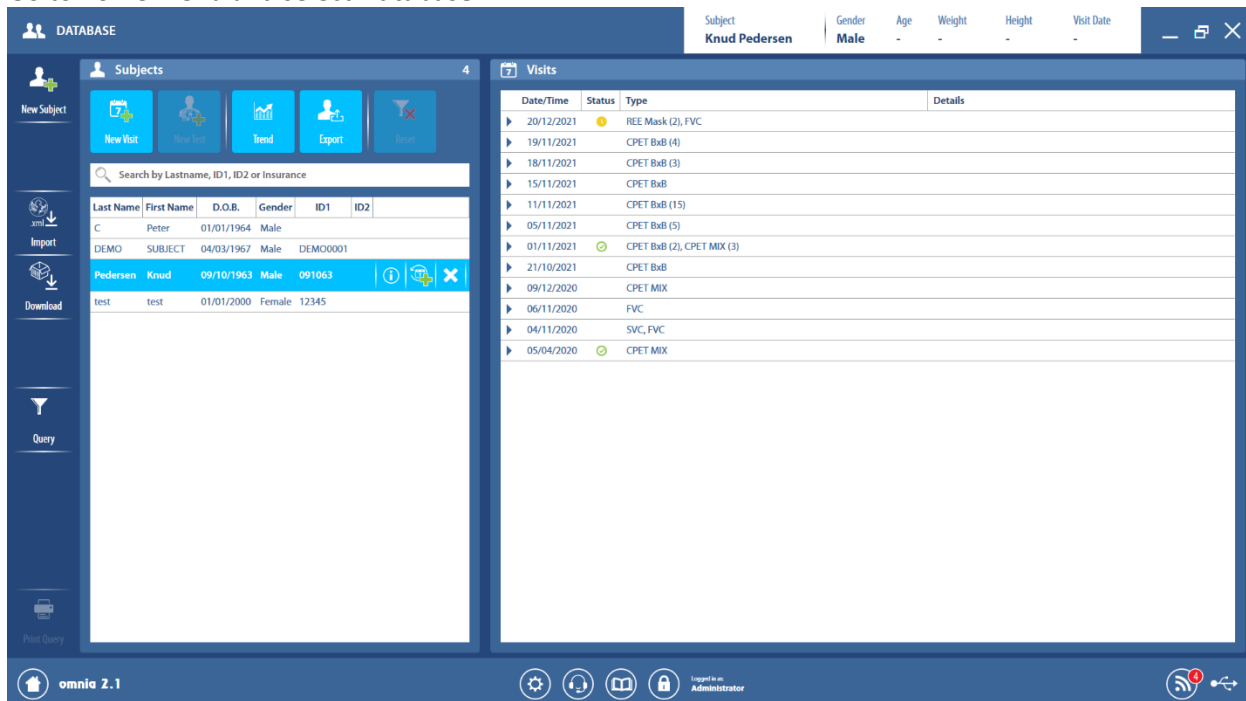
Connect OMNIA to K5 via Bluetooth or USB cable.

E.g. connect ergometer via USB/RS232 or Bluetooth BLE FTMS (Fitness Machine Service).

FTMS is a newer standard available on many new ergometers, e.g. used for Zwift.



Go to home menu and select **Database**.



The screenshot shows the OMNIA 2.1 software interface. The top bar displays 'DATABASE' and 'Subject Knud Pedersen'. The left sidebar contains navigation options: 'New Subject', 'New Visit', 'Trend', 'Export', 'Import', 'Download', 'Query', and 'Print Query'. The main area is divided into two panels: 'Subjects' and 'Visits'.

Subjects Panel:

Last Name	First Name	D.O.B.	Gender	ID1	ID2
C	Peter	01/01/1964	Male		
DEMO	SUBJECT	04/03/1967	Male	DEMO0001	
Pedersen	Knud	09/10/1963	Male	091063	
test	test	01/01/2000	Female	12345	

Visits Panel:

Date/Time	Status	Type	Details
20/12/2021	●	REE Mask (2), FVC	
19/11/2021		CPET Bx8 (4)	
18/11/2021		CPET Bx8 (3)	
15/11/2021		CPET Bx8	
11/11/2021		CPET Bx8 (15)	
05/11/2021		CPET Bx8 (5)	
01/11/2021	●	CPET Bx8 (2), CPET MIX (3)	
21/10/2021		CPET Bx8	
09/12/2020		CPET MIX	
06/11/2020		FVC	
04/11/2020		SVC, FVC	
05/04/2020	●	CPET MIX	

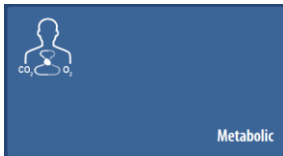
The bottom status bar shows 'omnia 2.1', system icons, and 'Logged in as Administrator'.

Select **New Subject**.

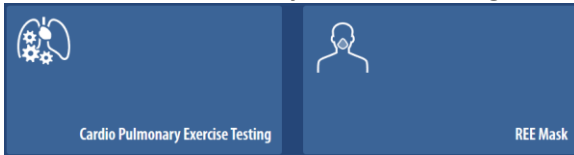
Select **New Visit**.

Select **New Test**.

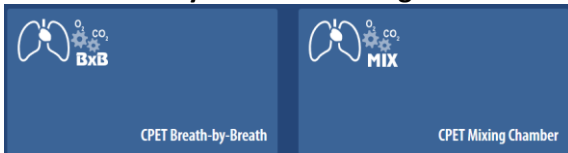
Select **Metabolic**.



Select **Cardio Pulmonary Exercise Testing**.

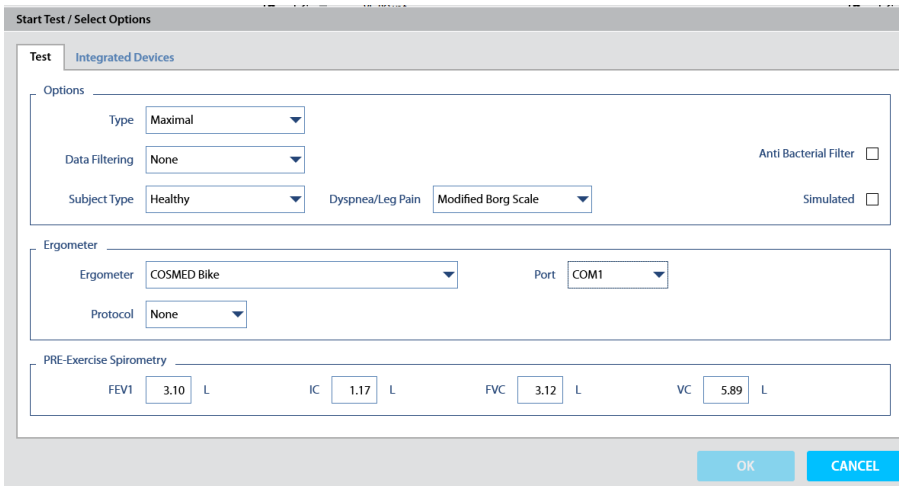


Select **Breath by Breath** or **Mixing Chamber**.



Mixing chamber is more accurate than Breath-by-Breath especially at high breathing frequency but requires the exercise level to be stable for approx. 2 minutes.

Press **Start**.



Select **Ergometer** type if exercise device shall be controlled by Omnia.

USB:

Set the **Ergometer** = “*name of ergometer driver*” and set the **Port** to the Com port of the connection to the computer (e.g. via USB to serial).

Bluetooth:

Set the **Ergometer** = “Fitness Machine BLE”, if the ergometer is connected to the computer via Bluetooth, and select the Device.

Note Ergometer must be paired with Windows first – see section 21.



Select a **Protocol** (New protocols can be defined in **Utility – Metabolic Protocols**, see section 16).

Start Test / Select Options

Test Integrated Devices

HR Source

Source: Metabolic Cart

Device: None

SpO2 Source

Source: Metabolic Cart

Device: None

Blood Pressure

Source: None

Port:

Emogas Analyzer

Source: None

Port: None

Physioflow

Port: None

BLE Sensors

Device: None

OK CANCEL

On tab **Integrated Devices** select **HR Source** to “Metabolic Cart”, if HR is coming from ANT+ or Bluetooth receiver inside K5.

Set **Source** = “Bluetooth LE Device”, if HR pulse belt is connected to the computer via Bluetooth, and select the Device.

Note HR pulse belt must be paired with Windows first – see section 21.

Test Integrated Devices

HR Source

Source: Bluetooth LE Device

Device: None

Blood Pressure

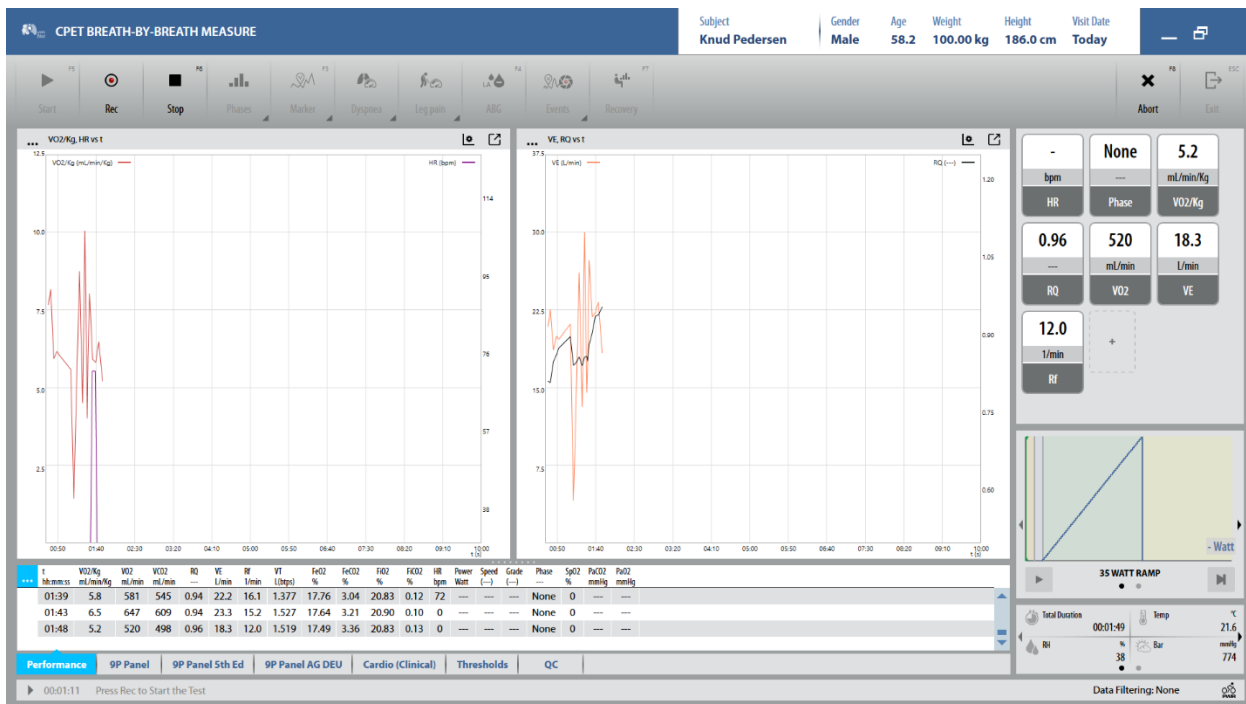
8125 0000375

Polar H7 DFD6D815

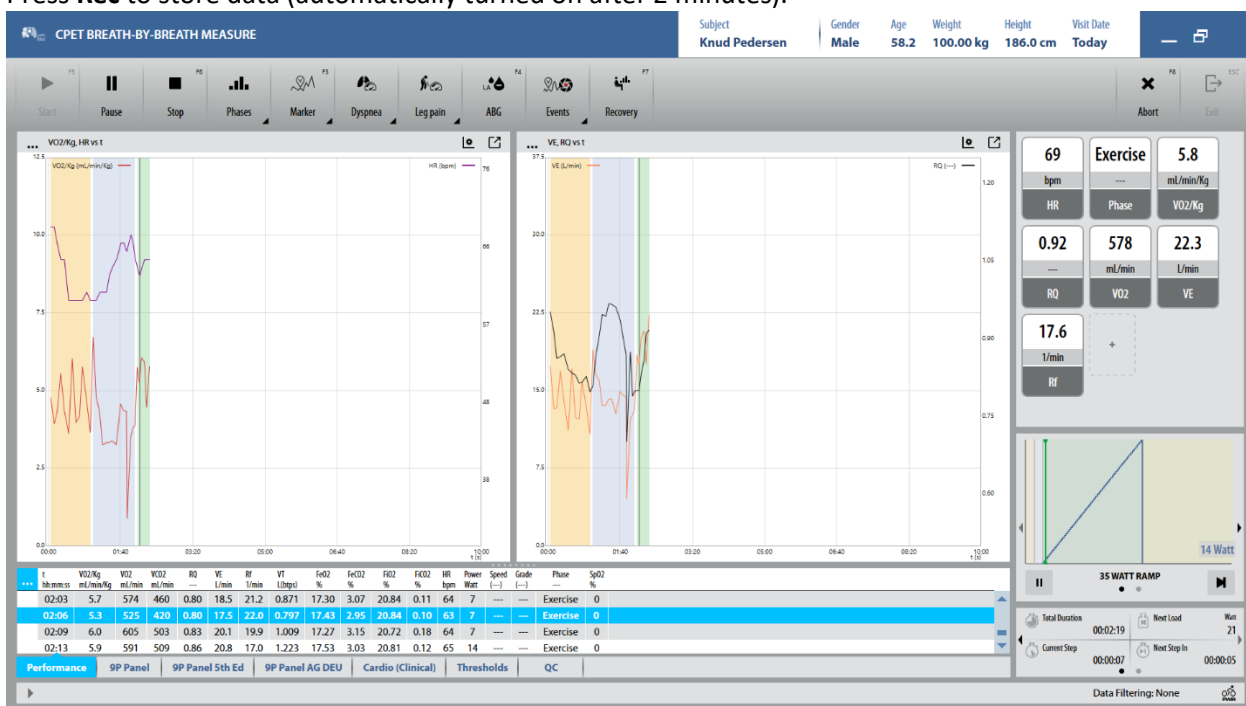
If other Bluetooth sensors are available, they can be selected in **BLE Sensors**.

Press **OK**.

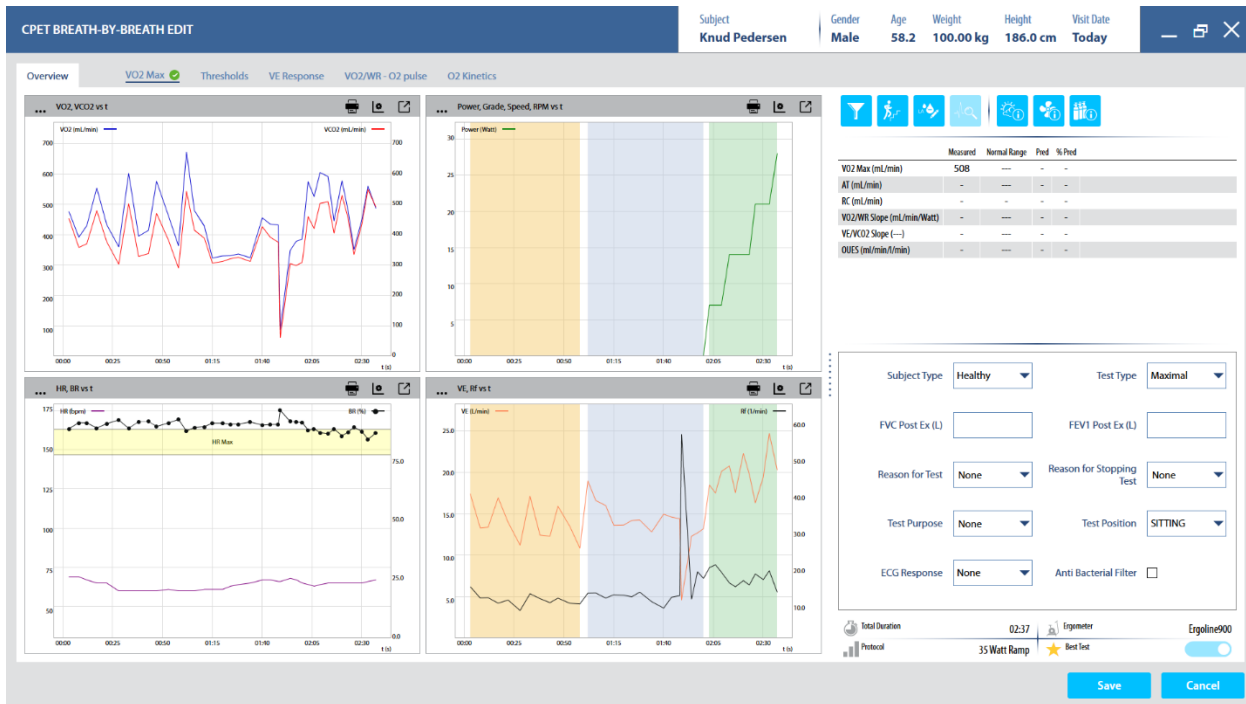
Press **Rec** to store data (automatically turned on after 2 minutes) but recommended to wait approx. 1 minute to flush internal chambers.



Press **Rec** to store data (automatically turned on after 2 minutes).



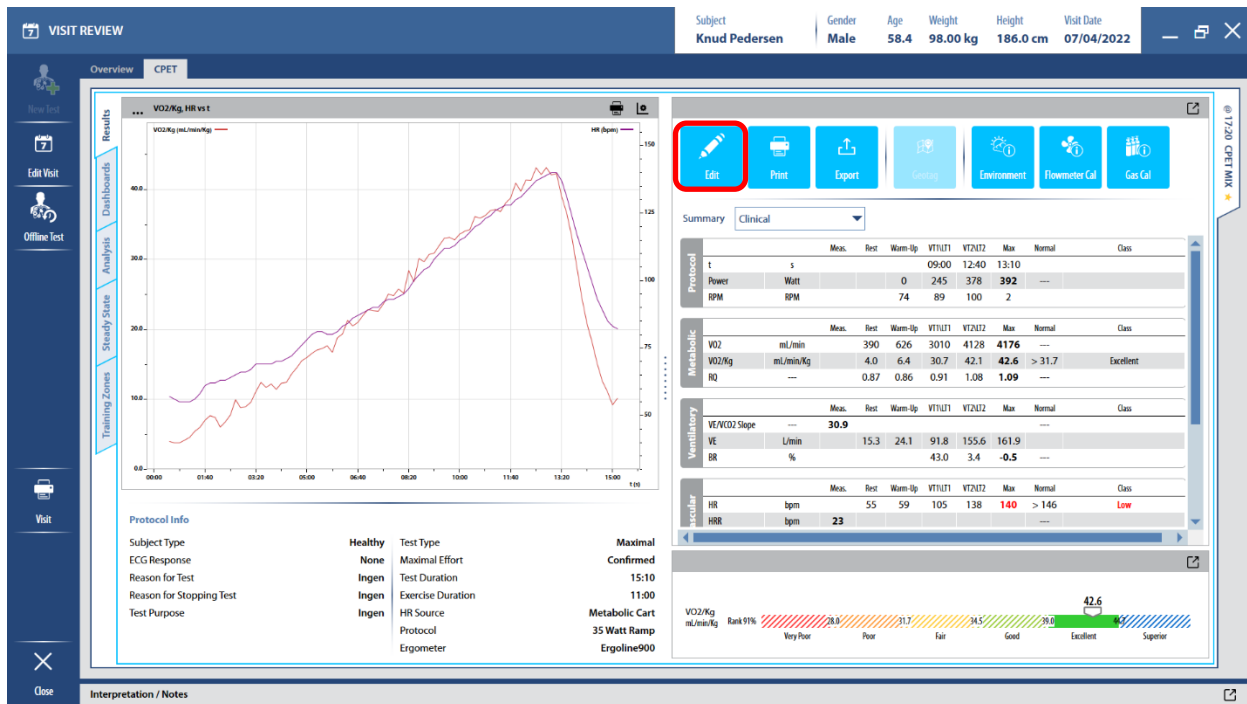
Press **Stop** when finished.



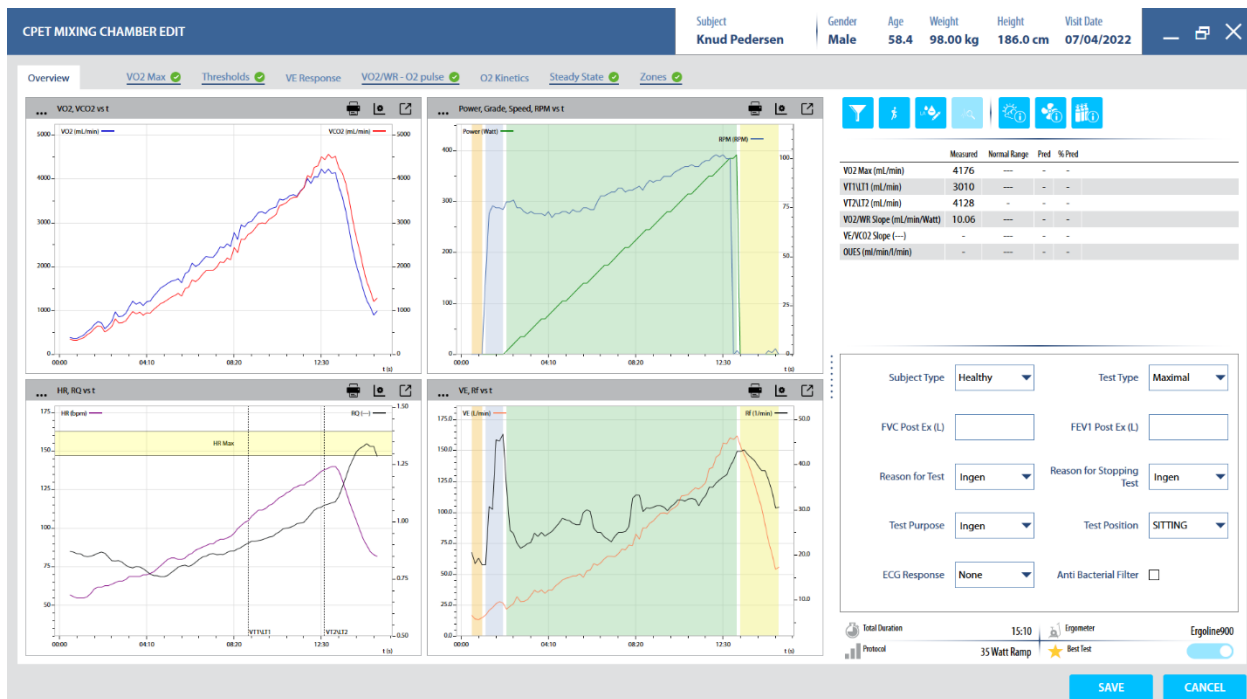
Press Save (e.g. first check/set VO2 max, Threshold, VE Response...)

14.Edit Test

Go to home menu and select **Database** and select test to edit.
Select CPET.

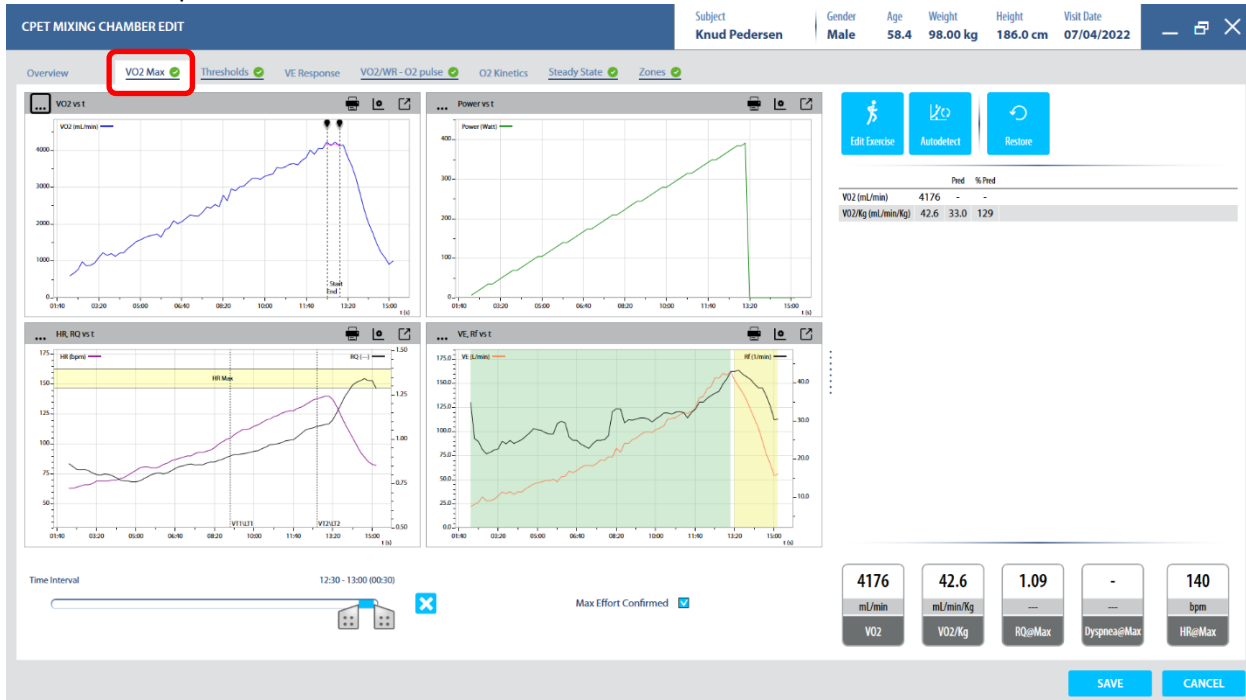


Press Edit

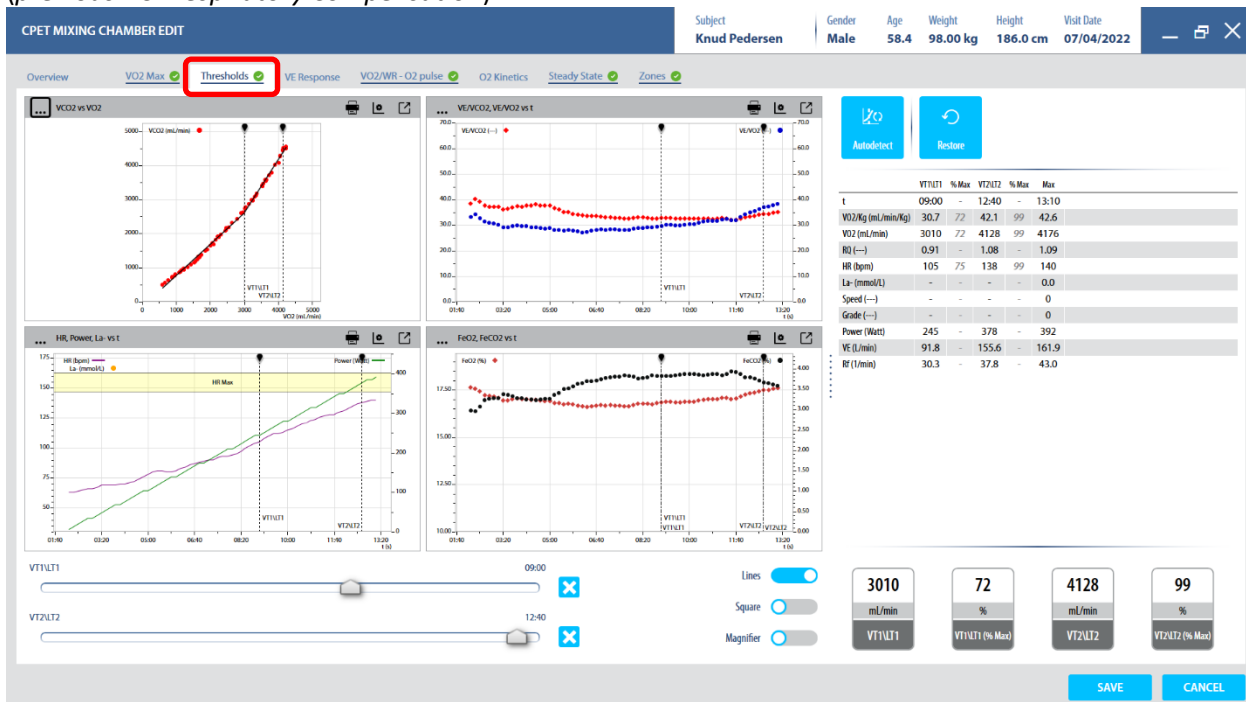


First check that the exercise period is correct. If not, press the Edit Exercise to change it. Note that the HR max is set to the value at the end of the exercise period.

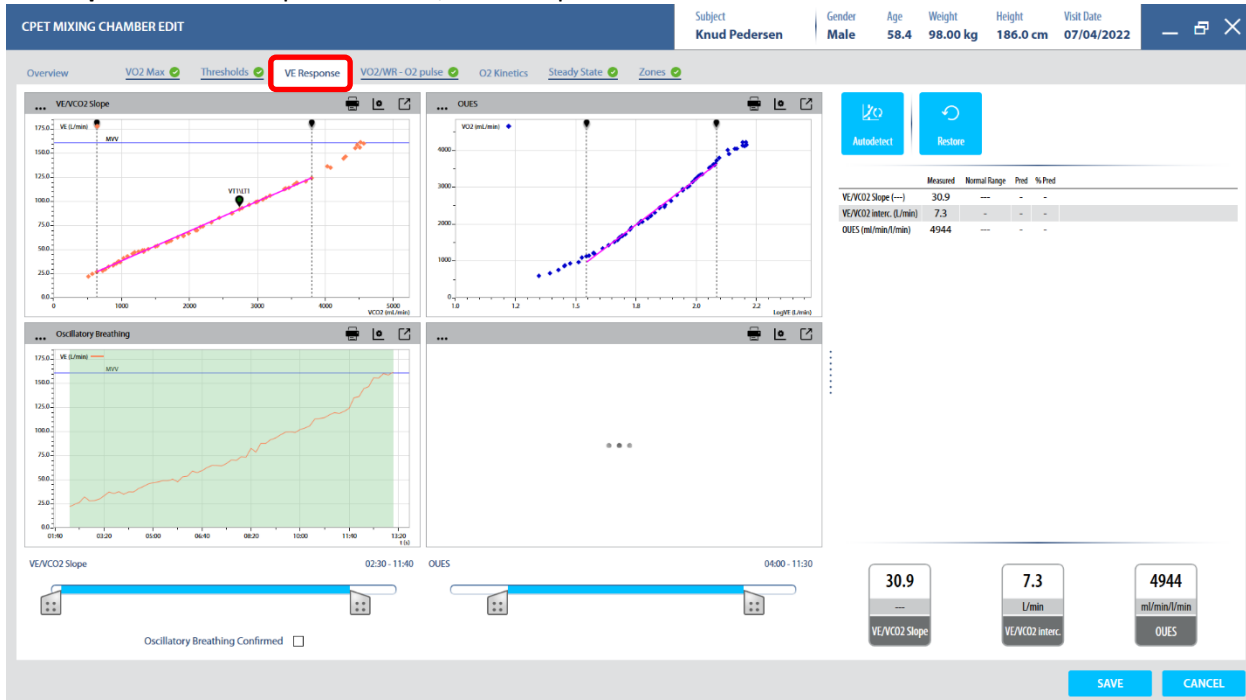
VO2 Max: Set period for max VO2.



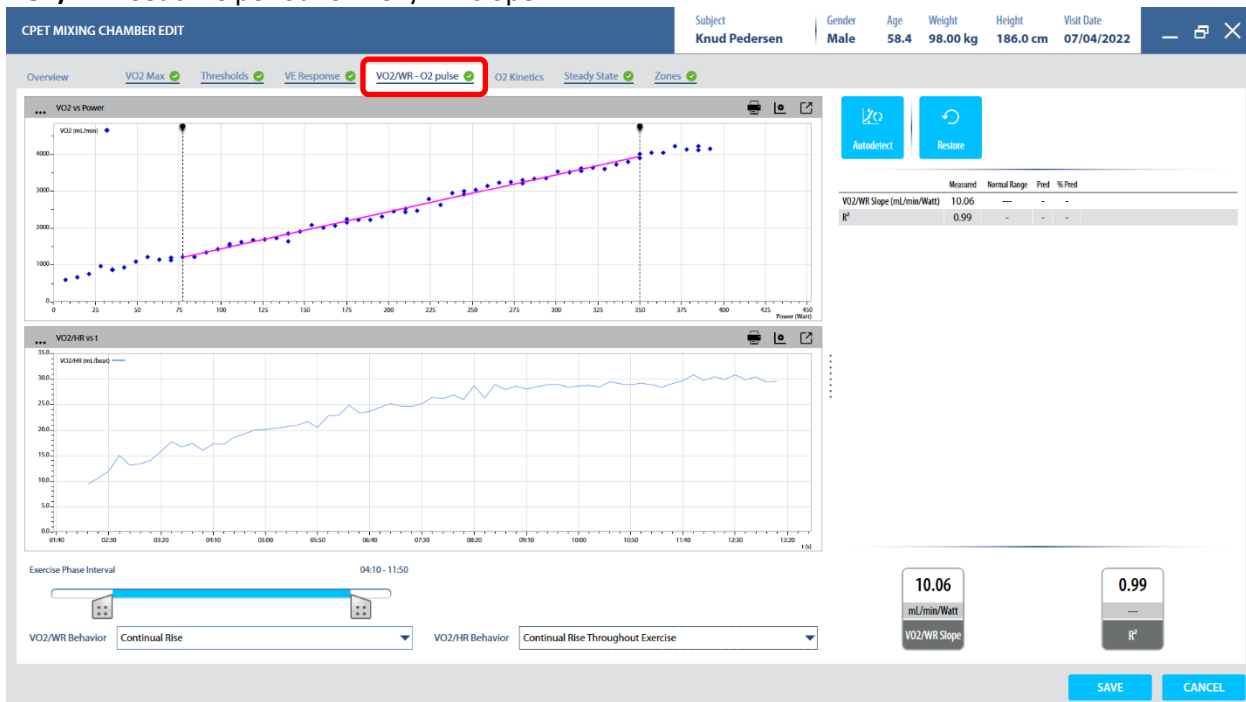
Thresholds: Set time for threshold 1 (LT1/VT1) (previous AT: Anaerobic Threshold) and threshold 2 (LT2/VT2) (previous RC: Respiratory Compensation).



VE Response: Set time period for VE/VCO₂ slope.



VO₂/WR: Set time period for VO₂/WR slope.



Extra analysis can be enabled in the settings. Go to Settings – Tests – CPET and enable/disable one or more of the following:

- Training zones (Steady State & Zones)
- O₂ Kinetics
- FatMax



Settings

- International
- Environment
- Calibration
- QC
- Predicteds
- Tests**
- ECG
- Admin
- Export
- Licenses
- Appearance
- About

Respiratory Mechanics	Pulse Oximetry	Post BD/BC	Advanced
Spirometry	DLCO	Body Plethysmography	CPET
REE			

General

Start recording after 2 minutes ☒ Print Stored ECG ☐

Subject Type: Healthy Dyspnea/Leg Pain: Modified Borg Scale

Calculate MVV: 40 *FEV1 Show calibration warning message ☒

Mixing Chamber Setup: Standard

Data Filtering

☒ None ☐ Time Average 30 s

☐ Smoothing 3 Steps ☐ Rolling Time Average

Accepted Range ☒

VT > 0.2 L(btps) 50 ≤ VO2 ≤ 7500 mL/min

2 ≤ RF ≤ 80 breaths/min 0.5 ≤ RQ ≤ 2

Additional Analyses

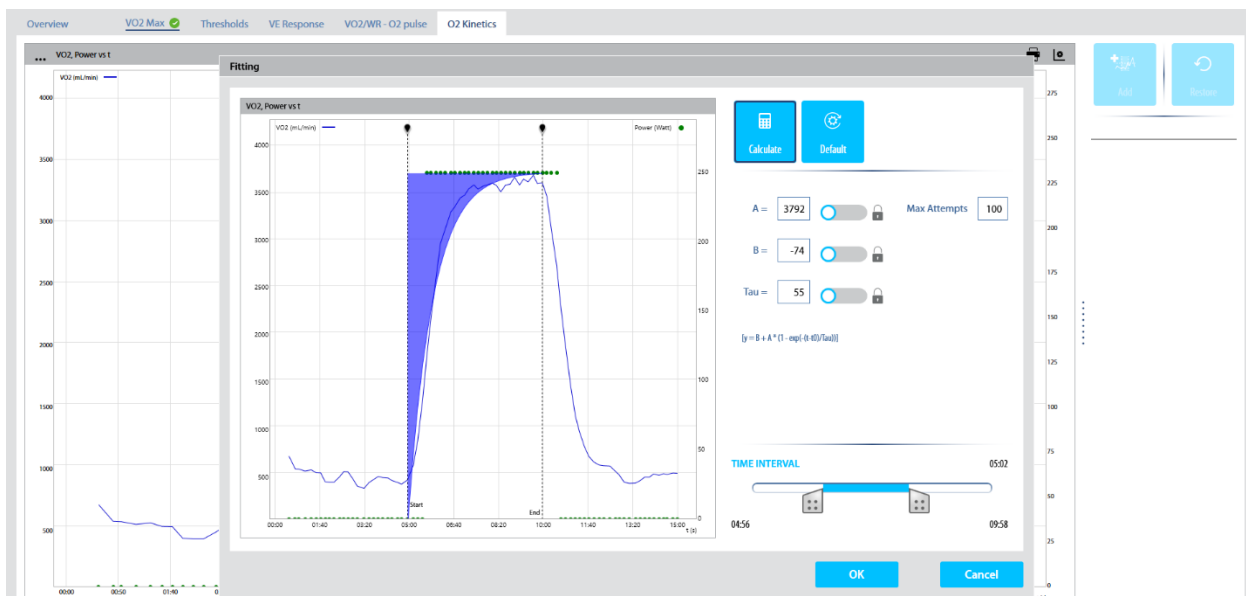
Enable Training Zones ☒ Enable FatMax ☒

Enable O2 Kinetics ☒ Enable Analysis ☒

Restart OMNIA to apply changes

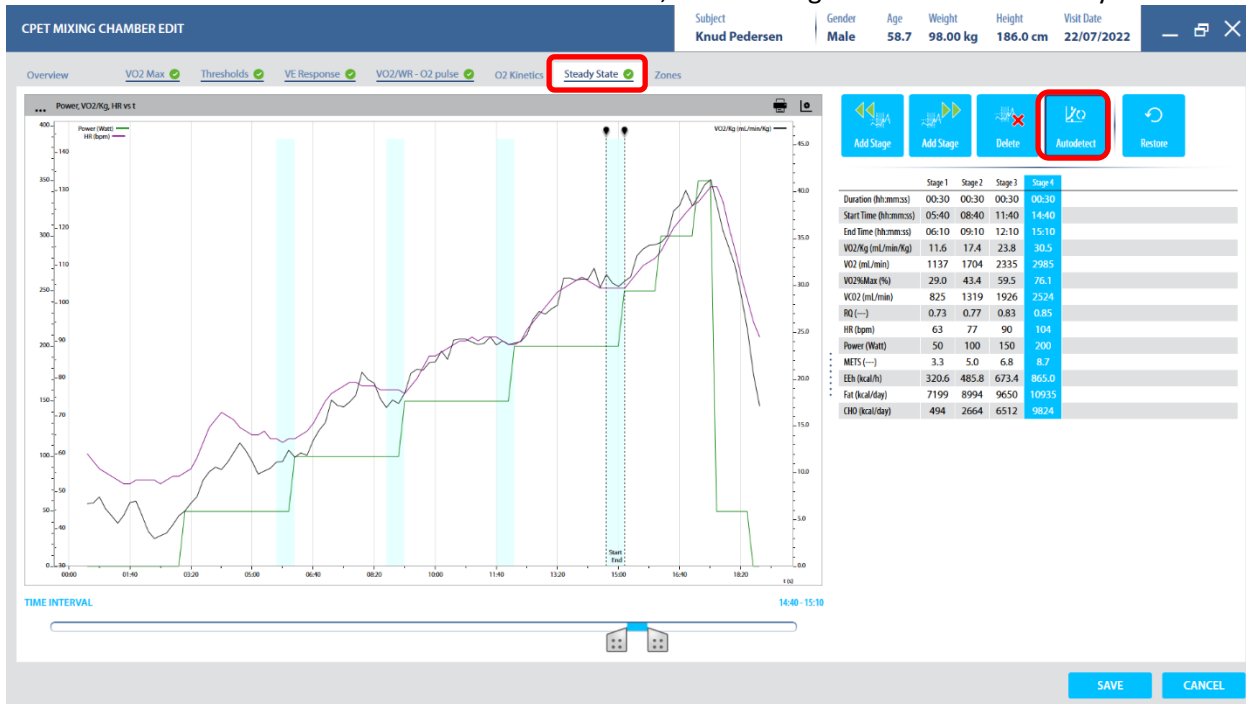
SAVE CANCEL

O2 kinetics: If exercise is performed as a step test, the response of the VO2 can be analysed.



Steady State: Use Auto detect or select stages manual.

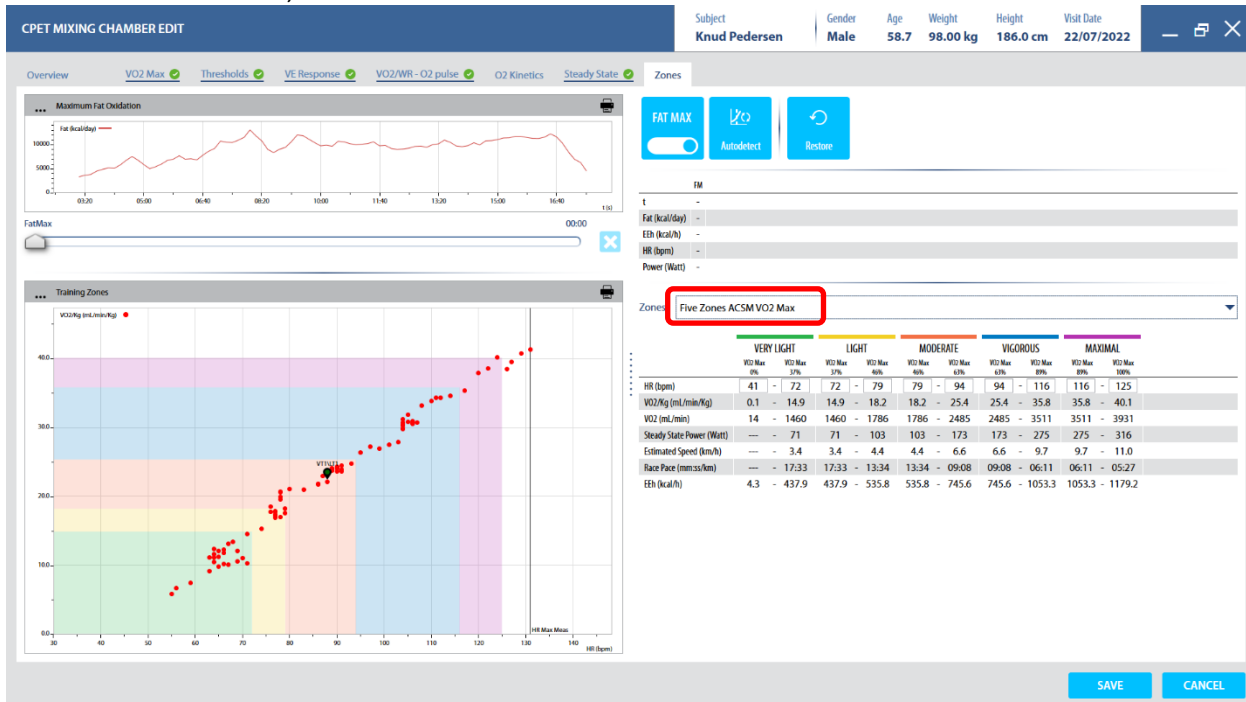
The load profile is used to auto detect 30 seconds periods at the end of each interval. If the intervals are shorter than 3 minutes the auto detect cannot be used, and the stages must be set manually.



When stages are defined an extra TAB (Steady Stage) will be available when exporting the test to Excel:

[illegible]

Zones: can be used to determine training zones based on various protocols. If Steady State is set, these are used for the calculation, otherwise all exercise data are used.



OMNIA comes with:

- Five Zones ACSM based on VO2 max (requires VO2 max is set).
- Three Zones based on threshold 1 and 2 (requires VT1/LT1 and VT2/LT2 is set under Threshold).
- Fat Zone based on Fatmax (requires Fat Max is enabled and set).

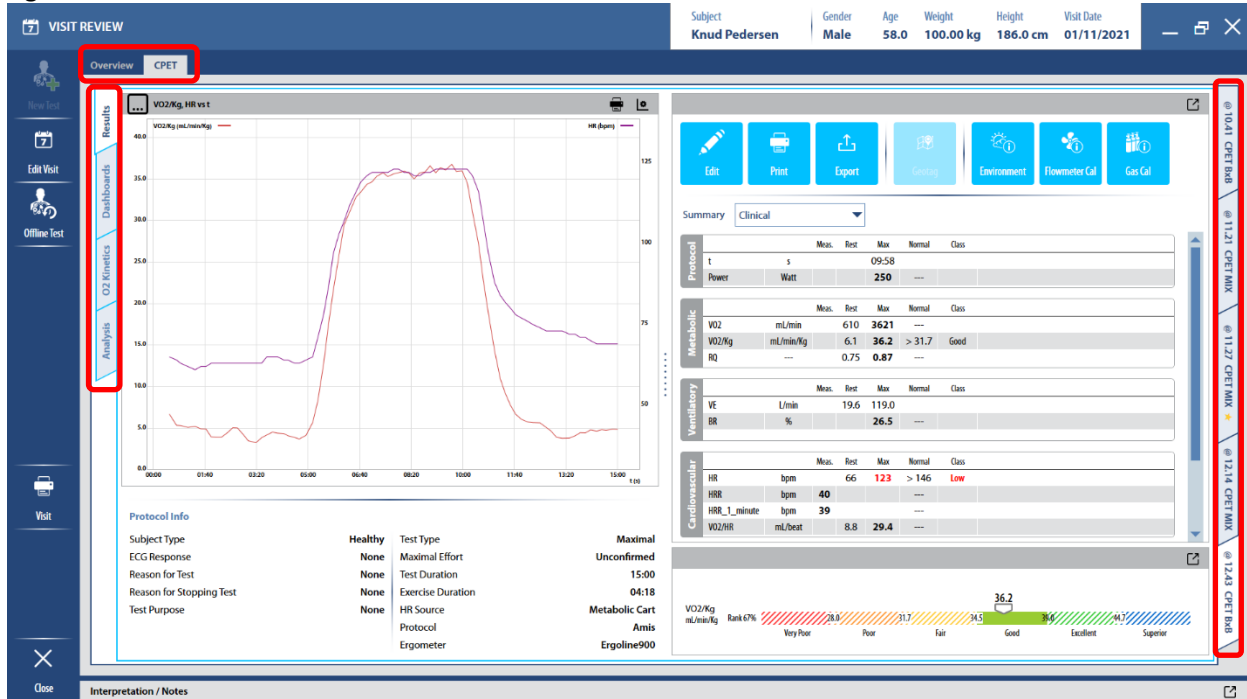
More zones can be defined in **Utility – Training Zones Protocols**.

15. Viewing a Test

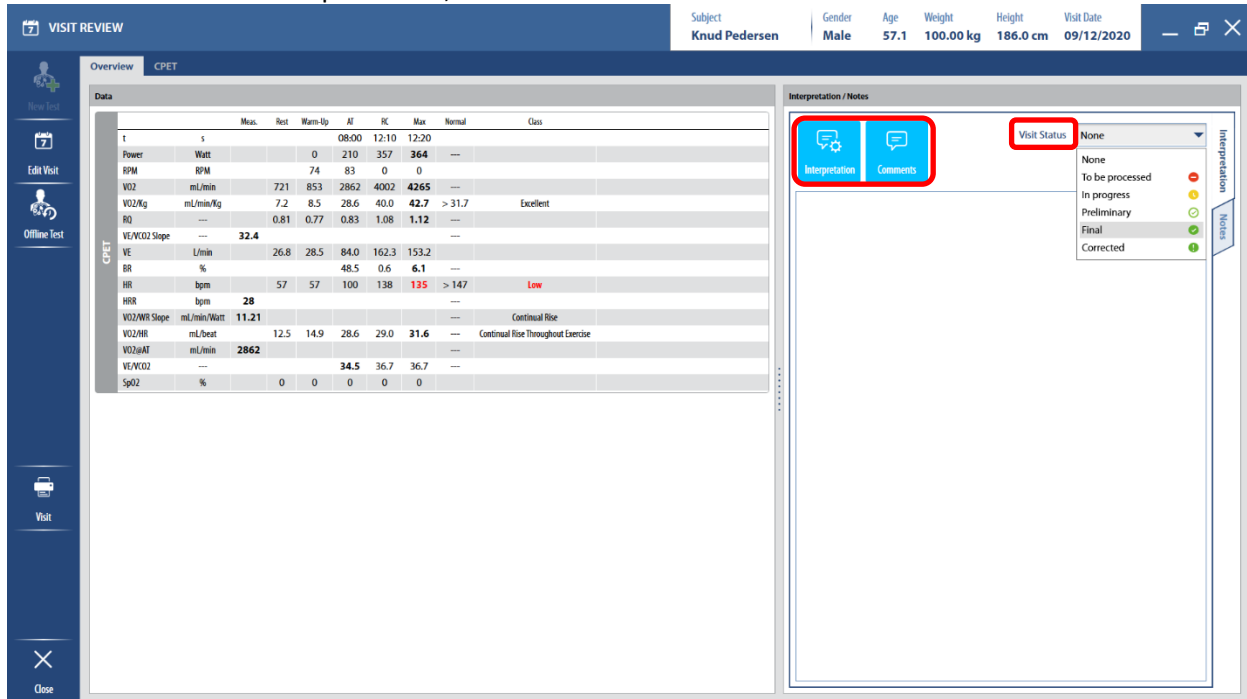
At the top various test can be selected with an overview to the left.

At the left various tabs can be selected to view the test in various ways (Results, Dashboard...)

If a test contains several manoeuvres of same type (on the same day) – they can be selected via tabs on the right.

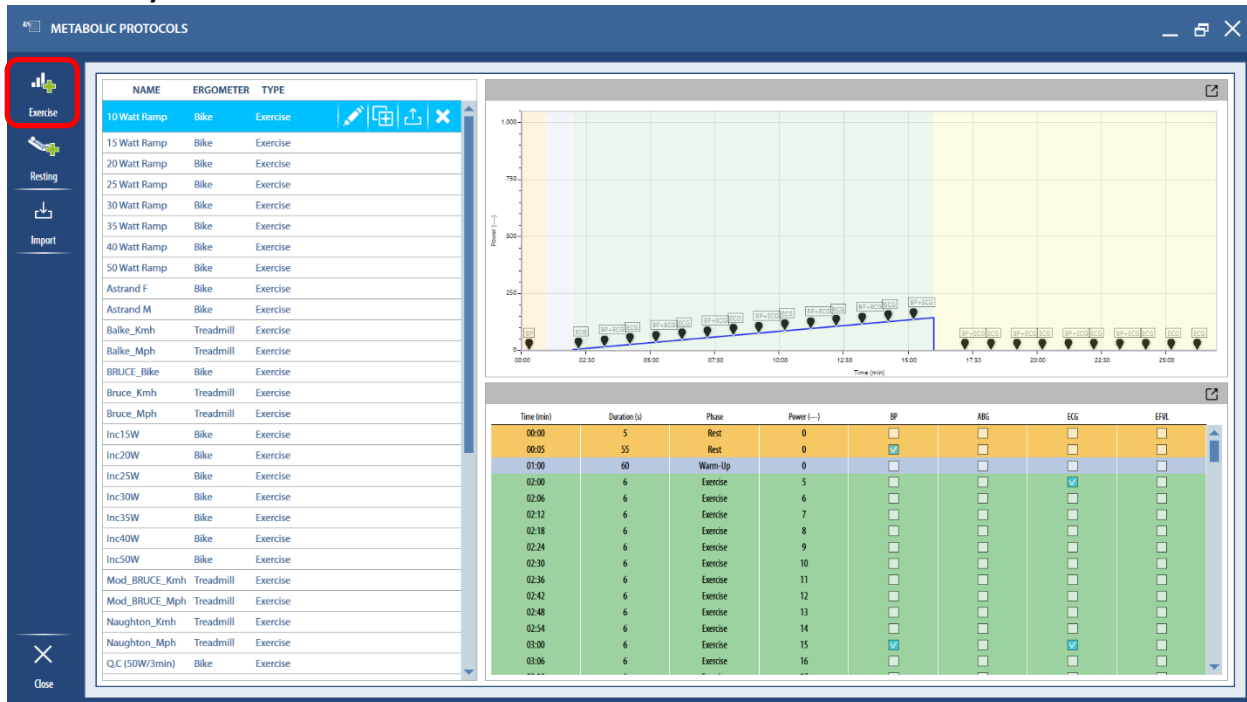


On the **Overview** tab interpretations, comments and notes can be entered. The **Visit Status** can also be set.



16. Configure protocol

Select **Utility – Metabolic Protocols**.



METABOLIC PROTOCOLS

Exercise (highlighted)

Resting

Import

Close

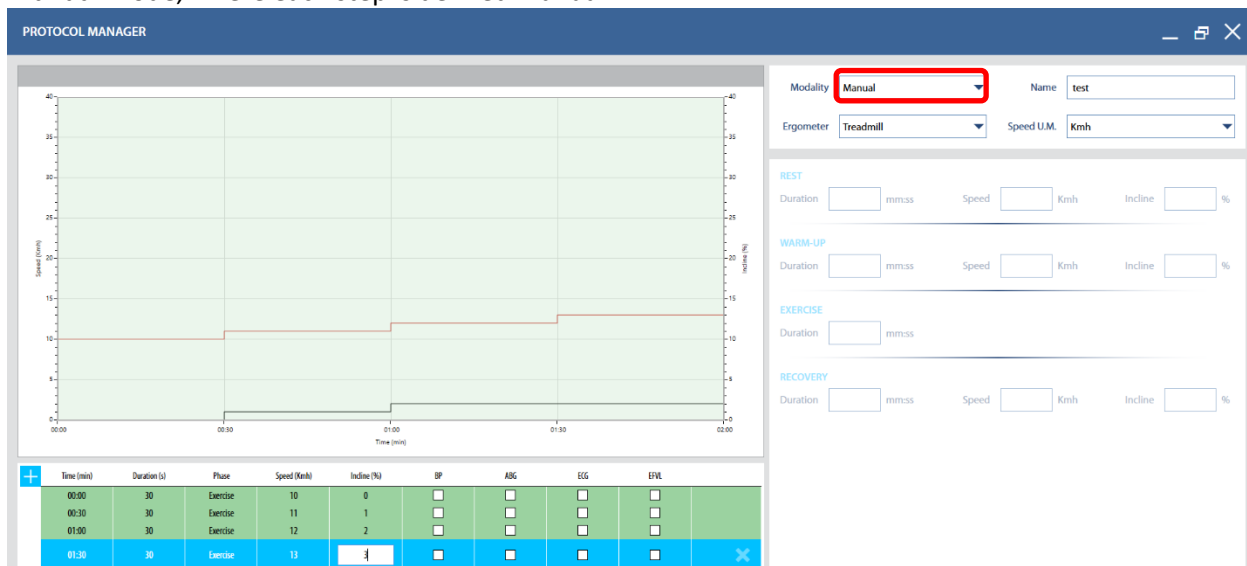
NAME	ERGOMETER	TYPE
10 Watt Ramp	Bike	Exercise
15 Watt Ramp	Bike	Exercise
20 Watt Ramp	Bike	Exercise
25 Watt Ramp	Bike	Exercise
30 Watt Ramp	Bike	Exercise
35 Watt Ramp	Bike	Exercise
40 Watt Ramp	Bike	Exercise
50 Watt Ramp	Bike	Exercise
Astrand F	Bike	Exercise
Astrand M	Bike	Exercise
Balke_Kmh	Treadmill	Exercise
Balke_Mph	Treadmill	Exercise
BRUCE_Bike	Bike	Exercise
Bruce_Kmh	Treadmill	Exercise
Bruce_Mph	Treadmill	Exercise
Inc15W	Bike	Exercise
Inc20W	Bike	Exercise
Inc25W	Bike	Exercise
Inc30W	Bike	Exercise
Inc35W	Bike	Exercise
Inc40W	Bike	Exercise
Inc50W	Bike	Exercise
Mod_BRUCE_Kmh	Treadmill	Exercise
Mod_BRUCE_Mph	Treadmill	Exercise
Naughton_Kmh	Treadmill	Exercise
Naughton_Mph	Treadmill	Exercise
Q.C (50W/3min)	Bike	Exercise

Graph: Power (W) vs Time (min). The graph shows a series of data points and a blue line representing the protocol.

Time (min)	Duration (s)	Phase	Power (W)	BP	ABG	ECG	EPVL
00:00	5	Rest	0				
00:05	55	Rest	0				
01:00	60	Warm-Up	0				
02:00	6	Exercise	5				
02:06	6	Exercise	6				
02:12	6	Exercise	7				
02:18	6	Exercise	8				
02:24	6	Exercise	9				
02:30	6	Exercise	10				
02:36	6	Exercise	11				
02:42	6	Exercise	12				
02:48	6	Exercise	13				
02:54	6	Exercise	14				
03:00	6	Exercise	15				
03:06	6	Exercise	16				

Select **+Exercise** to define a new.

Manual mode, where each step is defined manual:



PROTOCOL MANAGER

Modality: Manual (highlighted)

Name: test

Ergometer: Treadmill

Speed U.M.: Km/h

REST

Duration: mm:ss Speed: Km/h Incline: %

WARM-UP

Duration: mm:ss Speed: Km/h Incline: %

EXERCISE

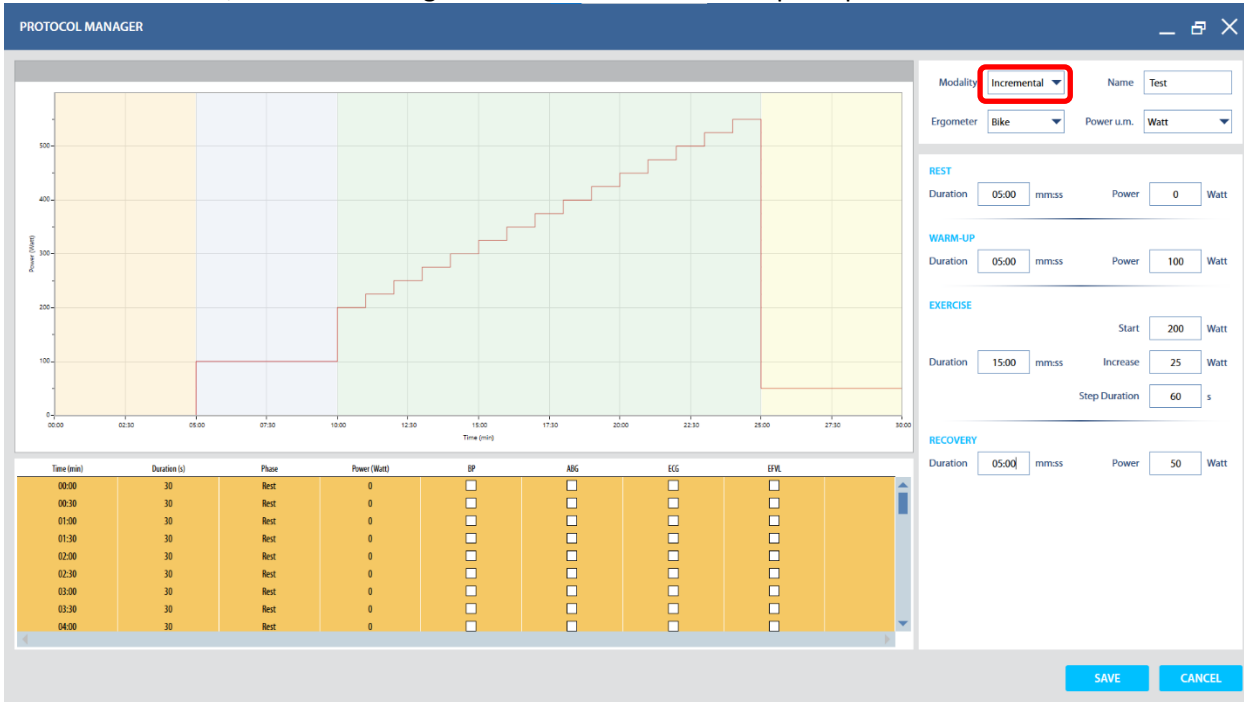
Duration: mm:ss

RECOVERY

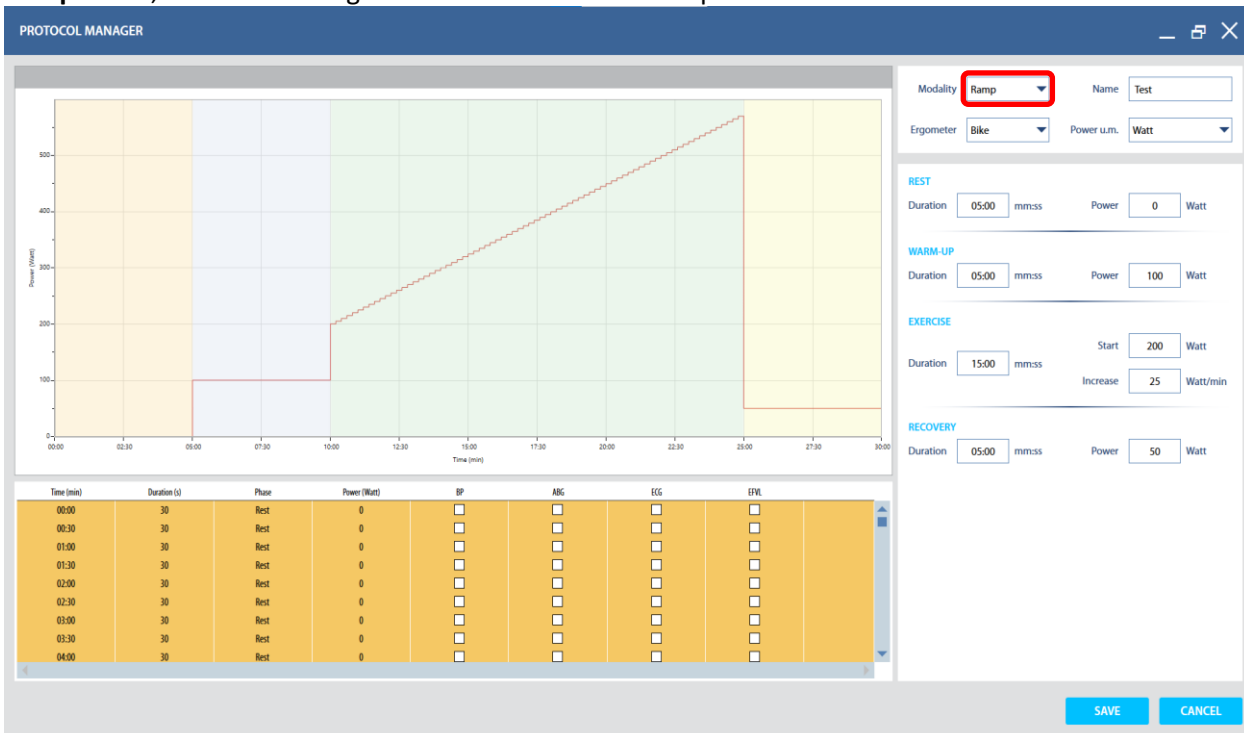
Duration: mm:ss Speed: Km/h Incline: %

Time (min)	Duration (s)	Phase	Speed (km/h)	Incline (%)	BP	ABG	ECG	EPVL
00:00	30	Exercise	10	0				
00:30	30	Exercise	11	1				
01:00	30	Exercise	12	2				
01:30	30	Exercise	13	3				

Incremental mode, where total length and incremental increase pr step is defined:

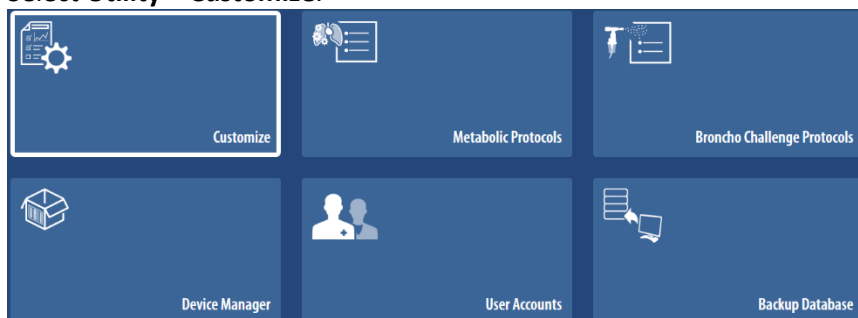


Ramp mode, where total length and incremental increase pr min is defined:



17. Customize

Select **Utility – Customize**.



Header: top header of printouts can be change

CUSTOMIZE

HEADER PFT CPET REE ADP


HEADER LINES

Header line 1: COSMED Logo: .\LOGO_COSMED.jpg

Header line 2: Lucernemarken 23, DK-5260 Odense S

Header line 3: http://www.cosmed.com

PREVIEW



COSMED
The Metabolic Company

Lucernemarken 23, DK-5260 Odense S
http://www.cosmed.com

Name	SUBJECT DEMO	ID1	DEM00001	Gender	Male	Age	46.0	Weight (kg)	76.00	Height (cm)	178.0
Grouping	COSMED	D.O.B.	04/03/1967	ID2	--	BMI (kg/m2)	24.0	Smoker	No	Smoking Years	--
Operator	Mr. Q	Physician	Dr. House	Class 2	demo subject	Ethnicity	Caucasian	Visit Date	28/03/2013	Printed On	12/01/2022

Select **CPET** to customize CPET layout on screen and print.

Results defines the numerical result layout.

HEADER PFT **CPET** REE ADP

RESULTS DASHBOARDS REPORTS

NEW

SUMMARIES

Clinical

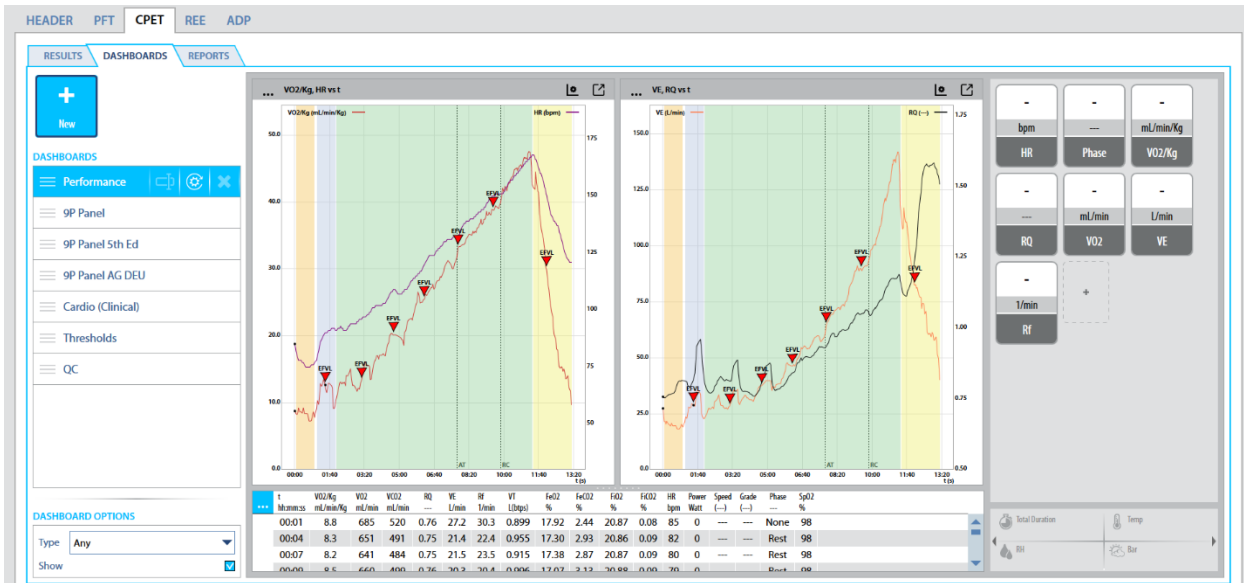
Performance

SUMMARY OPTIONS

PRE-Exercise Spirometry

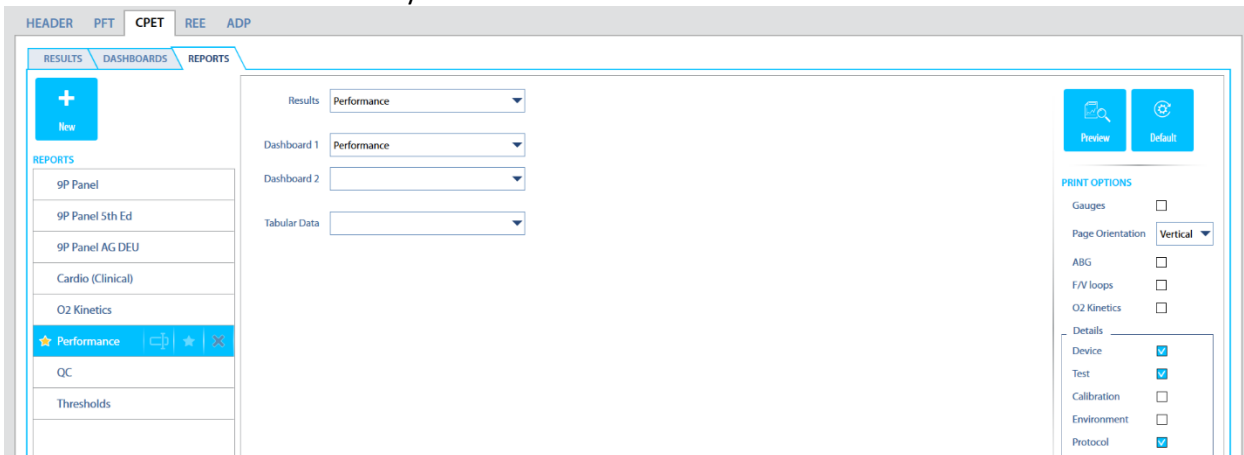
PARAMETERS	Meas.	Rest	Warm-Up	AT	BC	Max	Pred	% Pred	Normal	Class	Results	Overview
Pulmonary												
t	s	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Speed	(--)	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Grade	(--)	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Power	Watt	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
BPm	BPm	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Dyspnea	--	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Leg Pain	--	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Metabolic												
VO2	ml/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VO2/Rg	ml/min/kg	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VE	l/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
MEETS	--	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
RQ	--	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Ventilatory												
VE/VO2 Slope	--	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VE/VO2 Interc.	l/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
QUES	ml/min/100ml	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VE	l/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
HR	%	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VE	l/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
HR	l/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
Cardiorespiratory												
HR	bpm	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
HRV	bpm	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
HRV_1_min	bpm	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VO2/HR Slope	ml/min/Watt	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VO2/HR	ml/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
P SpO2	mmHg	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
P Diast	mmHg	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓
VO2aAT	ml/min	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	✓	✓

Dashboards defines the graphical layout in the Omnia software, but can also be used as templates for the printouts.



Reports defines the print layouts.

Preview can be used to see the layouts



Results: Performance

Dashboard 1: Performance

Dashboard 2: Performance

Tabular Data: Performance

Preview Default

PRINT OPTIONS

Gauges ☐

Page Orientation: Vertical

ABG ☐

F/V loops ☐

O2 Kinetics ☐

Details

Device ☒

Test ☒

Calibration ☐

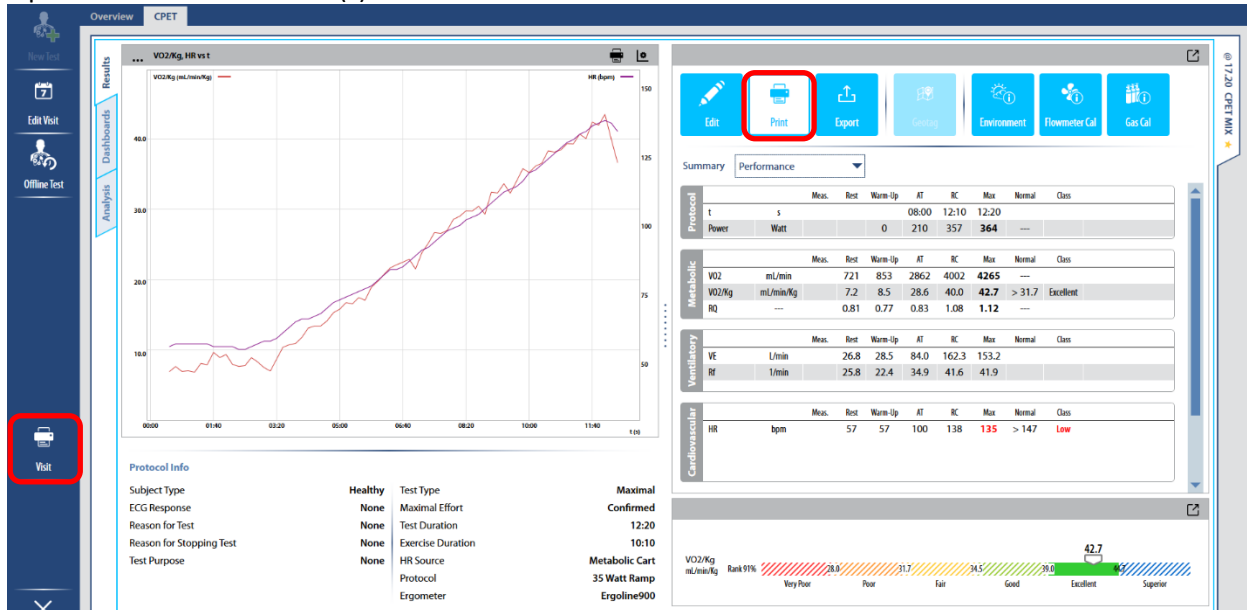
Environment ☐

Protocol ☒

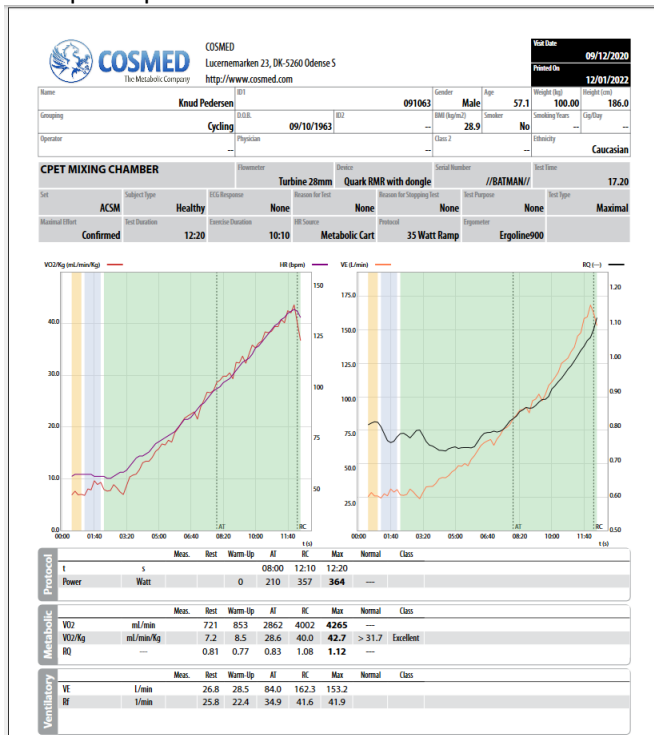
18.Print

Select Test from **Database**

Visit or **Print** can be used to print the results. Visit is the top level corresponding to an overview, and Print is a print of the individual test(s).



Example of print of CPET test:



Example of print of Visit:

Select reports to print:

Visit

☒ Overview

Metabolic

☒ CPET

Performance

Options

Interpretation

Top

Print
Create PDF
Cancel


COSMED
 The Metabolic Company

COSMED
 Lucernemarken 23, DK-5260 Odense S
<http://www.cosmed.com>

Visit Date

09/12/2020

 Printed On

12/01/2022

Name	Knud Pedersen	ID1	091063	Gender	Male	Age	57.1	Weight (kg)	100.00	Weight (lbs)	186.0
Grouping	Cycling	D.O.B.	09/10/1963	HR (b/min)	28.9	Gender	No	Smoking Status		Eye/Ear	
Operator	Physician	Class 2		Ethnicity	Caucasian						

Interpretation

Sign: _____

OVERVIEW

		Max.	Rest	Warm-Up	AT	RC	Max	Normal	Class
CPET	t				08:00	12:10	12:20		
	Power	Watt			0	210	357	364	---
	VO2	ml/min	721	853	2862	4002	4265	---	
	VO2/Kg	ml/min/Kg	7.2	8.5	28.6	40.0	42.7	> 31.7	Excellent
	RQ	---	0.81	0.77	0.83	1.08	1.12	---	
	VE	l/min	26.8	28.5	84.0	162.3	153.2	---	
Ventilatory	RF	l/min	25.8	22.4	34.9	41.6	41.9	---	
	HR	b/min	57	57	100	138	135	> 147	Low
	VO2@AT	ml/min	2862						

Name	Knud Pedersen	ID1	091063	D.O.B.	09/10/1963	Gender	Male	Age	57.1	Weight (kg)	100.00	Weight (lbs)	186.0
------	---------------	-----	--------	--------	------------	--------	------	-----	------	-------------	--------	--------------	-------

CPET MIXING CHAMBER

Subject Type	Healthy	ECG Response	None	Respiratory	None	Heart Purpose	None	Test Type	Maximal			
Maximal Effort	Confirmed	Test Duration	12:20	Exercise Duration	10:10	HR Source	Metabolic Cart	Protocol	35 Watt Ramp	Ergoline900		





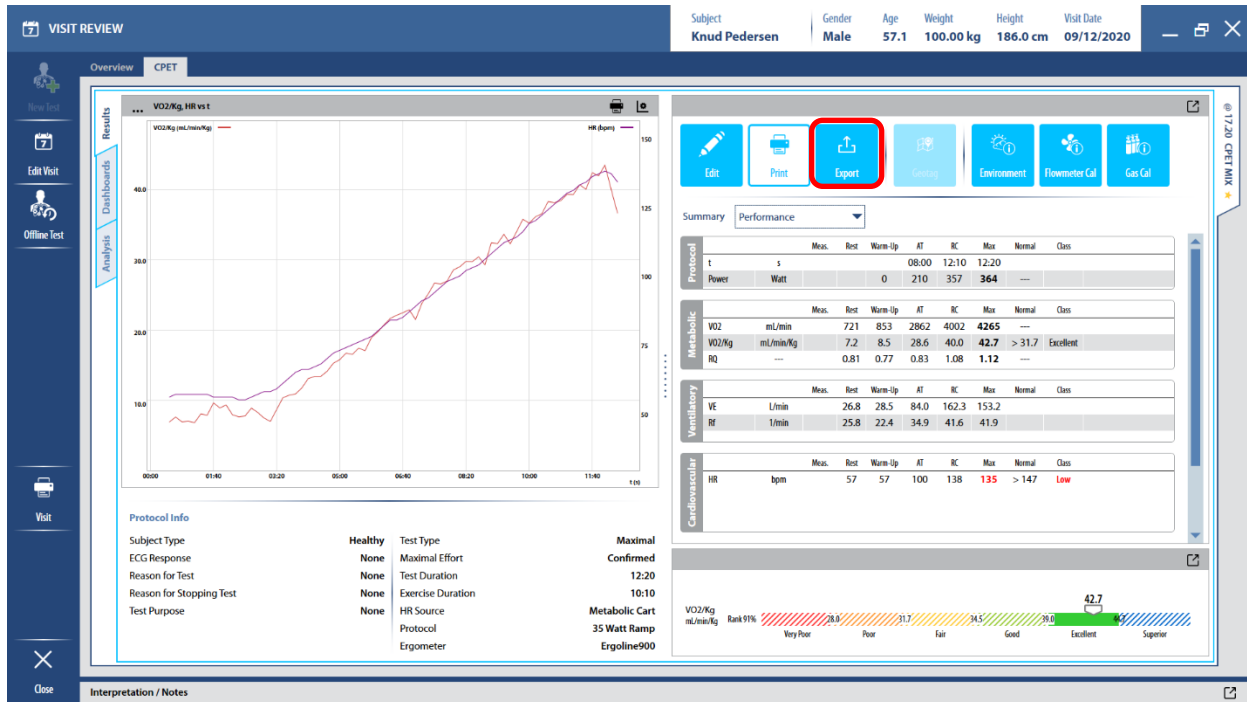


		Max.	Rest	Warm-Up	AT	RC	Max	Normal	Class
Protocol	t				08:00	12:10	12:20		
	Power	Watt			0	210	357	364	---
	VO2	ml/min	721	853	2862	4002	4265	---	
	VO2/Kg	ml/min/Kg	7.2	8.5	28.6	40.0	42.7	> 31.7	Excellent
Metabolic	RQ	---	0.81	0.77	0.83	1.08	1.12	---	
	VE	l/min	26.8	28.5	84.0	162.3	153.2	---	
	RF	l/min	25.8	22.4	34.9	41.6	41.9	---	
Cardiovascular	HR	b/min	57	57	100	138	135	> 147	Low

See "OMNIA print layout.pdf" for details on how to configure the print layout.

19.Export

Select Test from **Database**



Press Export and select format.

XML can be used to export test to another Omnia s/w.

Excel is a fixed format to be used for further analysis via EXCEL.

Choose an export format

☒ XML

☐ Excel

OK **Cancel**

20. Connect device

Mount USB cable (REF C04117-01-12) between K5 and computer:

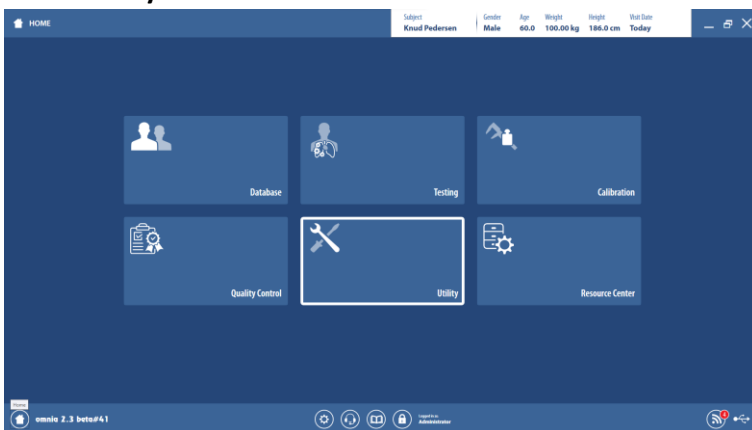


Power on the K5.

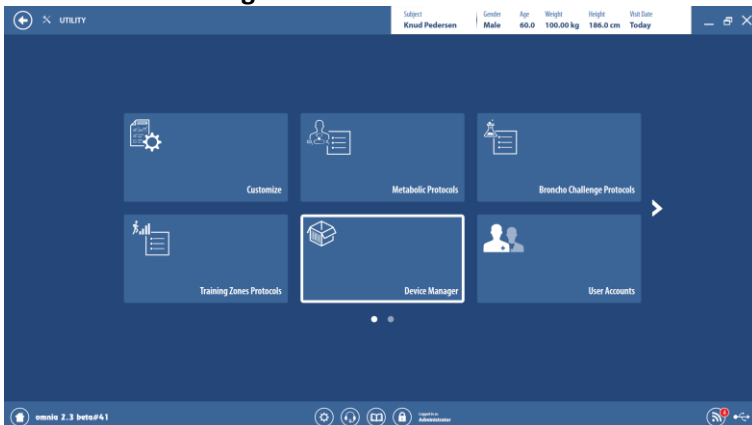
Wait until Main Menu is shown on K5.

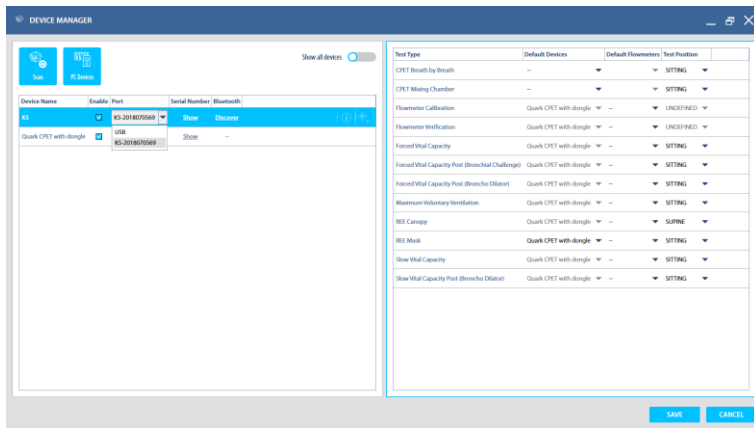
Start **OMNIA**.

Select **Utility**.

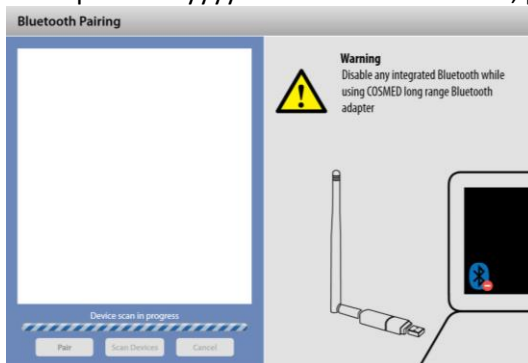


Select **Device Manager**.

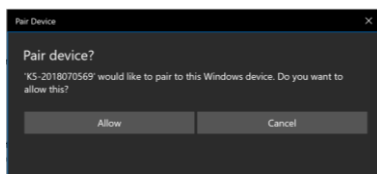
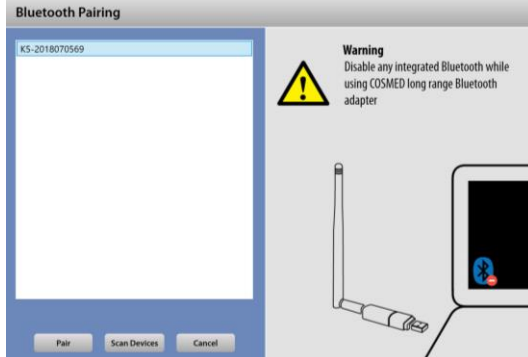




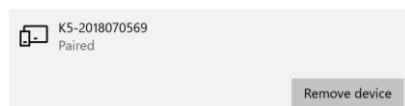
The Port can either be USB or K5-yyyyxxxxxx (Wireless via Bluetooth).
If the port “K5-yyyyxxxxxx” is not available, press the **Discover** to make a Bluetooth connection.



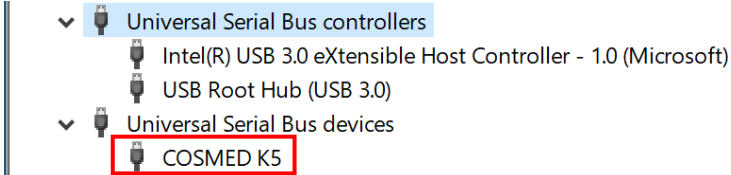





When the K5 Bluetooth is found, press the “K5-yyyyxxxxxx” and select **Pair**.



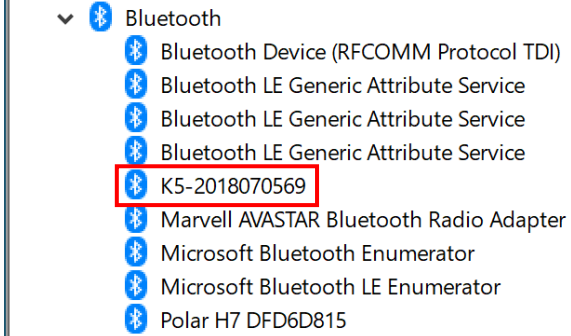










In windows “Bluetooth & other devices” you can see the paired connection and – if needed – troubleshoot.



The USB connection to the K5 is shown in Device Manager:

- 
- ▼  Universal Serial Bus controllers
 -  Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
 -  USB Root Hub (USB 3.0)
 - ▼  Universal Serial Bus devices
 -  **COSMED K5**

Similar with the Bluetooth:

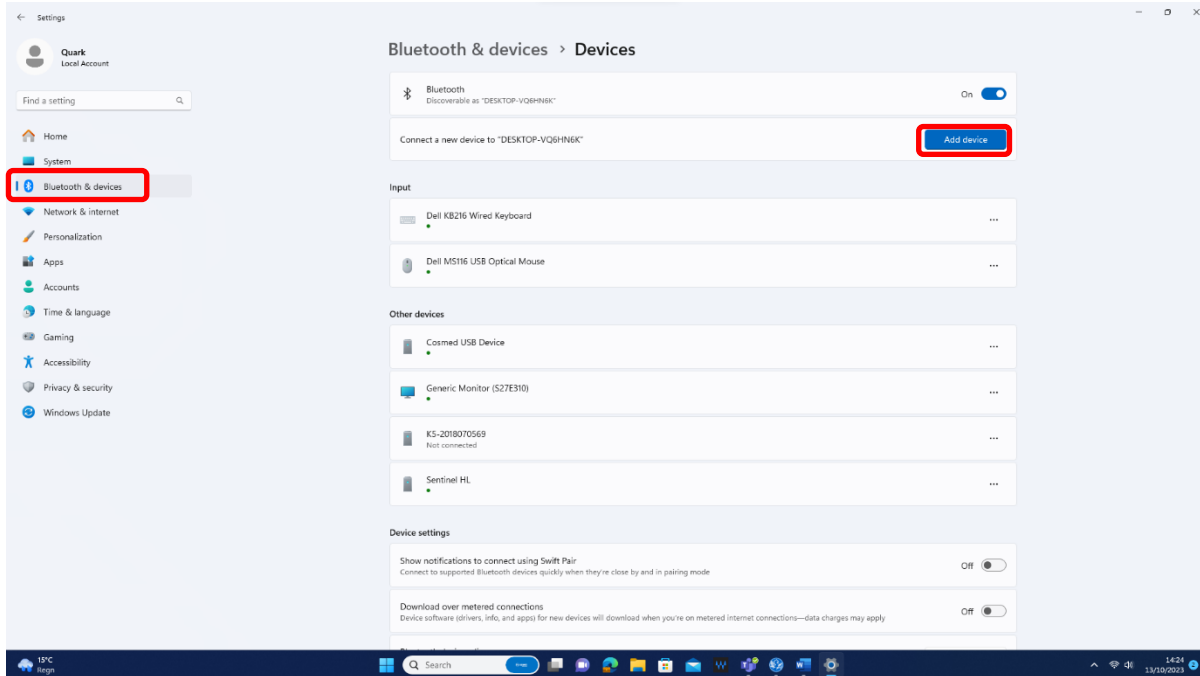
- 
- ▼  Bluetooth
 -  Bluetooth Device (RFCOMM Protocol TDI)
 -  Bluetooth LE Generic Attribute Service
 -  Bluetooth LE Generic Attribute Service
 -  Bluetooth LE Generic Attribute Service
 -  **K5-2018070569**
 -  Marvell AVASTAR Bluetooth Radio Adapter
 -  Microsoft Bluetooth Enumerator
 -  Microsoft Bluetooth LE Enumerator
 -  Polar H7 DFD6D815

Note: it takes some time before the Bluetooth is found.

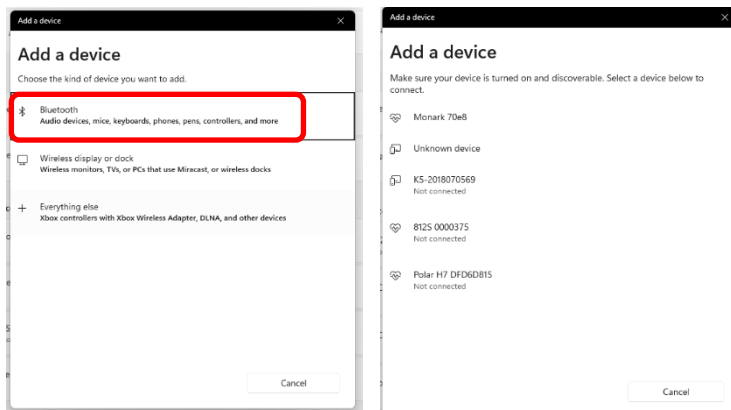
21. Bluetooth pairing in Windows

Go to Windows settings.

Select **Bluetooth & devices**



Select **Add device**



Select **Bluetooth**

Note: Windows 11 is not always supporting the Bluetooth LE receiver inside the computer. It may detect standard Bluetooth but can have problems in detecting BLE devices (Bluetooth Smart). Check that the driver is up to date and that the Bluetooth Device Discovery is set to Advanced.

22.Cleaning

Complete information to be found in the **Cleaning & Disinfection User Manual**.

Below some relevant information for the K5.

Any reusable parts must be cleaned and disinfected immediately after use unless otherwise specified

Detergent and disinfectant agents for manual reprocessing:

Tested for material compatibility and disinfection efficacy:

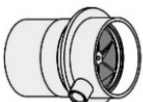









The manual reprocessing instructions provided by COSMED have been validated for material compatibility and disinfection efficacy by third-party independent laboratories, making use of specific agents:



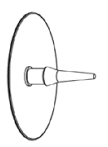





- Detergent: enzymatic detergent (e.g. Cidezyme®/Enzol®, Johnson & Johnson).
- High-Level disinfectant: ortho-phthalaldehyde 0.55% (e.g. CIDEX® OPA Solution, Johnson & Johnson).
- Low/High-Level* disinfectant: AHP® (Accelerated Hydrogen Peroxide) spray (e.g. Oxivir® Tb RTU, Sealed Air). *Depending on contact time.

Tested for material compatibility only:



The below listed agents are known to be compatible with the materials of the reusable parts listed in this manual. This list is not exhaustive and other agents may also be found compatible.

- Detergent and Low-Level disinfectant: Clinell Universal Wipes, GAMA Healthcare
- Detergent and Low-Level disinfectant: CaviWipes, Metrex
- High-Level disinfectant: Revital-Ox Resert, STERIS

REF and Description	Image	Level of Disinfection	Materials	Reprocessing Group	Notes
C05270-01-05 Turbine T3		High	Fan blades: plastic film (PET) Axes: metal (stainless steel) Conveyor: plastic (PC) Enclosure: clear plastic (MABS)	C	Do not place under running water or compressed air. Do not use Accelerated Hydrogen Peroxide (AHP) disinfectants (such as Revital-Ox Resert, STERIS). Scrub only external surfaces.
C02120-01-05 Turbine 2000		High	Fan blades: plastic film (PET) Axes: metal (stainless steel) Conveyor: plastic (PC) Enclosure: clear plastic (MABS)	C	Do not place under running water or compressed air. Do not use Accelerated Hydrogen Peroxide (AHP) disinfectants (such as Revital-Ox Resert, STERIS). Scrub only external surfaces.
C04349-01-06 Optoelectronic reader 2000 / T3		Low	Enclosure: plastic (ABS) Gasket: plastic (nitrile rubber) Cable: TPE plastic	A	
C05068-01-08 Wind Shield Turbine T3			Plastic (ABS)	C	N/A
C02155-02-08 Closing ring for optoelectronic reader 2000		High	Plastic (ABS)	C	Before reprocessing remove sampling line.
C02107-02-08 Wind Shield for Turbine 2000		High	Plastic (ABS)	C	Before reprocessing remove sampling line.
C02106-02-08 Mouthpiece adapter for Turbine 2000		Low	Plastic (ABS)	C	If only used for calibration, follow instructions in section 2.1.4 in Cleaning & Disinfection User Manual. Reprocessing Interval: monthly
C04254-01-08 Sampling line		High	Tip: plastic (Nylon) and metal B (stainless steel)	B	Do not submerge. Do not use automated reprocessing
A-800-XXX-XXX Mask without inspiratory valves		High	Mask: blue elastomer (silicone rubber) and clear plastic (PC)	C	Steam sterilization can be used on the face mask only (free from any adapters, brace set or valves) following manual cleaning: <ul style="list-style-type: none"> • Type of Cycle: Gravity Displacement • Type of Load: Wrapped Method • Temperature: 132-135 °C • Cycle Time: 10-15 min
A-800-XXX-XXX Mask without inspiratory valves		High	Mask: blue elastomer (silicone rubber) and clear plastic (PC)	C	Complete details and updates on manufacturer's website www.rudolphkc.com Steam sterilization can be used on the face mask only (free from any adapters, brace set or valves) following manual cleaning: <ul style="list-style-type: none"> • Type of Cycle: Gravity Displacement • Type of Load: Wrapped Method • Temperature: 132-135 °C • Cycle Time: 10-15 min

REF and Description	Image	Level of Disinfection	Materials	Reprocessing Group	Notes
A-800-900-030 Mask brace set		Low	PP plastic, Nylon fabric, PU foam	B	Compete details and updates on manufacturer's website www.rudolphkc.com Can remain connected to the face mask and be reprocessed as per the face mask instructions.
C04194-01-20 Mask inspiratory valve frame		High	Plastic (ABS)	C	
C04245-01-20 Mask inspiratory valve membrane		High	Elastomer (silicone rubber)	C	N/A
C04381-01-08 Mask adapter for Turbine 2000		High	Plastic (ABS)	C	N/A
C02466-01-20 VO2max ID28 / T3 flowmeter mask adapter		High	Plastic (ABS)	C	N/A
C02839-01-20 RMR ID18 flowmeter mask adapter		High	Plastic (ABS)	C	N/A
C05085-01-20 Mask/filter adapter		High	Plastic (POM)	C	N/A
A-800-900-02X Head cap		Low	Headgear: plastics (PU Foam, D Nylon UBL Gray and Nylon Fabric Red) Headgear Hook: plastic (Nylon) Headgear Strap Clips (4): plastic (PP)		Do not iron



Phase Group	Pre-treatment	Cleaning 	Disinfection 	Drying
A	Wipe soil with a moist sponge or towel	Wipe with a soft cloth sprayed with disinfectant solution. Dispose the soft cloth.	Repeat cleaning Wipe with a soft cloth moistened with water. Dispose the soft cloth.	Let air dry
B		Wipe with a soft cloth sprayed with disinfectant solution for 30 seconds.	Wipe with a soft cloth sprayed with disinfectant solution for 30 seconds.	
C	Rinse in water at 22-40°C	Soak for 3 minutes in a detergent solution at room temperature (>22°C). Using a soft bristle brush, scrub the submerged part during the 3 minutes. Wipe while rinsing for 5 minutes in water. Inspect all surfaces and part features to ensure that it is visibly clean, repeat Cleaning if not.	Soak in disinfectant solution at room temperature (>22°C) for 12 minutes. Rinse three (3) times in a volume of room temperature (>22°C) water, large enough to completely submerge the part, for at least 3 minutes for each rinsing cycle.	Dry immediately after the disinfection steps by using filtered air (oil-free, low germ and low particle) or dab with a lint free cloth and let air dry. Inspect all surfaces and part features to ensure that they are visibly dry, repeat Drying if not.
D			Repeat Cleaning	