



# Release-Notes

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## MetaSoft® Studio

Version 5.11.0 - 4.1.0



## Dear User!

We are glad to provide you the latest MetaSoft® Studio release version.  
Please read also the currently **Product Update Information**.

Instructions for operating the software you find in the MetaSoft® Studio-user-manual.

If you need further information, please contact your local sales partner or CORTEX directly:

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### Version 5.11.0

**Important** | The update to the MetaSoft® Studio version 5.11.0 possibly requires a firmware update of your CORTEX CPET device METAMAX® 3B (R2) or METALYZER® 3B (R3).

Update the device firmware **as soon as possible** after updating the software. Otherwise, you will be informed about the necessary firmware update later in your work with MetaSoft® Studio.

If you are currently using a MetaSoft® Studio version **lower** than 5.5, all stored test data in the data logger will be deleted after updating the firmware of the METAMAX® 3B (R2). If necessary, read out the METAMAX® 3B (R2) data **before** updating via MetaSoft® Studio.

### New functions

#### 1 Implementation of the Weekly Exercise Prescription

MetaSoft® Studio version 5.11.0 introduces the new workflow module CPET WEEKLY EXERCISE PRESCRIPTION, which is activated with the new licence WEEKLY EXERCISE PRESCRIPTION. This licence is linked to the already available licence PERFORMANCE ASSESSMENT AND HEART RATE EXERCISE ZONES.

The licence PERFORMANCE ASSESSMENT AND HEART RATE EXERCISE ZONES is required for activating the licence WEEKLY EXERCISE PRESCRIPTION (as well as the existing licence EXERCISE SCHEDULER). If you activate the licence EXERCISE SCHEDULER, the licence WEEKLY EXERCISE PRESCRIPTION will also be activated.

You can also use the new workflow PERFORMANCE ASSESSMENT AND WEEKLY EXERCISE SCHEDULER. With the workflow module CPET WEEKLY EXERCISE PRESCRIPTION you receive a prescription for your training and you can define various parameters for your training (e. g. type of sport, number, duration and intensity of training sets).

### **2 Working with the Hidden patient list**

The new display mode HIDDEN PATIENT LIST has been added to the Patient Center for reasons of data protection. In this mode, you can select a patient without displaying the complete patient list with all created patient data (such as last name, first name, date of birth).

## **Spirometry improvements**

### **1 Replaying breathing manoeuvres in the test analysis**

It is now possible to replay the breathing manoeuvres of a patient within the test analysis in real time. For this purpose, the button SWITCH ON/OFF REAL-TIME PLAYBACK MODE was added. You can replay the breathing manoeuvres in the following modules:

- Spirometry VC Test Evaluation
- Spirometry FVC Test Evaluation
- Spirometry MVV Test Evaluation

### **2 Excluding valid breathing manoeuvres from the result calculation**

Until now, it has not been possible to exclude valid breathing manoeuvres (according to the ATS criteria) from the result calculation. To ensure this functionality, the button [\[DISCARD\]](#) for a valid breathing manoeuvre has been added with the update to MetaSoft® Studio version 5.11.0.

### **3 Identification of valid and invalid breathing manoeuvres**

A valid breathing manoeuvre is marked with a green check mark and an invalid breathing manoeuvre is marked with a red cross on the respective button of the breathing manoeuvre.

### Other improvements

#### 1 Editing patient data within the test analysis

With MetaSoft® Studio version 5.11.0, the options for editing patient data within the test analysis have been extended and made more comfortable. In addition to the previous ones, the following data can now also be changed:

- Title
- Last Name
- First Name
- Name Addition
- Date of Birth

For this purpose, the button EDIT  has been added in the following modules:

- CPET Check and Edit Test Data
- Spirometry Check and Edit Test Data
- BMR/RMR Check and Edit Test Data

#### 2 Selecting measurement unit g/L for haemoglobin

You specify the measurement unit to be used for haemoglobin in the MSS Toolbox. In addition to the units MILLIMOL PER LITER and GRAM PER DECILITER, the new MetaSoft® Studio version 5.11.0 also offers the unit GRAM PER LITER.

#### 3 Using the Downhill Option for treadmills

Some treadmills offer the possibility to run “downhill”. With the update to version 5.11.0 MetaSoft® Studio supports this option. This means, that a negative grade can be set in the load protocol.



### Version 5.10.0

**Important** | The update to the MetaSoft® Studio version 5.10.0 also requires a firmware update of your CORTEX CPET device **METAMAX® 3B (R2) or METALYZER® 3B (R3)**.

Update the device firmware **as soon as possible** after updating the software. Otherwise, you will be informed about the necessary firmware update later in your work with MetaSoft® Studio.

If you are currently using a MetaSoft® Studio version **lower** than 5.5, all stored test data in the data logger will be deleted after updating the firmware of the METAMAX® 3B (R2). If necessary, read out the METAMAX® 3B (R2) data **before** updating via MetaSoft® Studio.

### General improvements

#### 1 Upgrading the database server »Firebird«

With the new release version 5.10.0 of the MetaSoft® Studio, the database server »Firebird« has been updated to version 2.5.9.

### Version 5.9.0

**Important** | The update to the METASOFT® Studio version 5.9.0 also requires a firmware update of your CORTEX CPET device METAMAX® 3B-R2 or METALYZER® 3B-R3.

Update the device firmware as soon as possible after updating the software. Otherwise, you will be informed about the necessary firmware update later in your work with METASOFT® Studio.

If you are currently using a METASOFT® Studio version lower than 5.5, all stored test data in the data logger will be deleted after updating the firmware of the METAMAX® 3B-R2. If necessary, read out the METAMAX® 3B-R2 data before updating via METASOFT® Studio

### New functions

#### 1 Implementation of requirements for GDPR

As part of the new requirements of the General Data Protection Regulation (GDPR), numerous functions have been implemented in the new software version MSS 5.9, which will guarantee the protection of personal data against unauthorized persons in the future.

#### 2 Forced authorization in METASOFT®-Studio

With release version 5.9, all operators are forced to authorize in the METASOFT®-Studio software by using the login dialog.

#### 3 Data protection setting

With the new release version the Toolbox menu item SYSTEM SETTINGS/DATA PROTECTION SETTINGS was included and extended by numerous functionalities such as password policy and automatic logout with screen lock.

#### 4 Group and operator management

In the new MSS toolbox submenu USER DATA/MANAGE GROUPS AND OPERATORS, a new permission management has been integrated with software version 5.9. In this view you can define individual operator groups and new operators and assign different permissions.

### **5 Product registration for CORTEX devices**

The new METASOFT®-Studio version 5.9 introduces a product registration for all CORTEX CPET-devices. This allows you to benefit from our comprehensive product support and secure any warranty claims in the event of a malfunction.

### **6 Survey of customer satisfaction**

Satisfied customers are very important to CORTEX Biophysik GmbH. For this reason, with the new software version 5.9, we offer you the possibility of directly informing us of your assessment of our CPET system. With the help of your information, we can determine your satisfaction with our products and services and identify your needs and any problems.

## **General improvements**

### **1 Support of the SpO<sub>2</sub> measuring unit NONIN 7500**

Now the new METASOFT®-Studio version supports the SpO<sub>2</sub>-device NONIN Model 7500. You can add it to an existing device configuration as usual by Drag & Drop.

### **2 Additional measurement unit for blood gas variables [kPa]**

For the variables ARTERIAL CARBON DIOXIDE PARTIAL PRESSURE (PaCO<sub>2</sub>) and ARTERIAL OXYGEN PARTIAL PRESSURE (PaO<sub>2</sub>) it is now possible to enter and display the values in the unit of measurement kPa.

### **3 Adapting the anonymization option for databases**

In the database anonymization process, you can now specify which words should be used to anonymize a patient's last name and first name.

### Version 5.8.3

**Important** | The update to the METASOFT® Studio version 5.8.3 also requires a firmware update of your CORTEX CPET device METAMAX® 3B-R2 or METALYZER® 3B-R3.

Update the device firmware as soon as possible after updating the software. Otherwise, you will be informed about the necessary firmware update later in your work with METASOFT® Studio.

If you are currently using a METASOFT® Studio version lower than 5.5, all stored test data in the data logger will be deleted after updating the firmware of the METAMAX® 3B-R2. If necessary, read out the METAMAX® 3B-R2 data before updating via METASOFT® Studio

### New functions

#### 1 Introduction of the 6-minute walk test

The new METASOFT® Studio version 5.8.3 will assist you in the performance and evaluation of the 6-minute walk test (6MWT), which is a standard method for assessing the physical strain of patients with cardiac and pulmonary limitations in diagnostic and therapeutic questions.

In addition to the extensive configuration options in the MSS Toolbox, METASOFT® Studio version 5.8.3 includes new workflows (6-minute walk test and 6MGT and spiroergometry (complex test) for performing and evaluating a 6-minute walk test.

#### 2 Integration of the CORTEX SWIM OPTION FOR METAMAX® 3B-R2

The current release version of METASOFT® Studio supports the new CORTEX SWIM OPTION FOR METAMAX® 3B-R2, which is a special portable CPET solution for swimming. With the snorkel systems for backstroke and freestyle swimming developed by CORTEX, you can directly analyse the performance of athletes in the flume, in the pool or in open water with the METAMAX® 3B-R2 and the SmartControl Unit.

### Spirometry improvements

#### 1 GLI standard values: Inclusion of ethnic groups

The spirometry standard values set »GLI Standard Values (Quanjer, 2012)« considers the ethnicity of a proband. By using this standard values set, the ethnicity for each test person can now be specified in the Patient Center.

### General improvements

#### 1 New variables %V'O<sub>2</sub>normal and %V'O<sub>2</sub>peak

The following two new variables are available for CPET test/evaluation:

- %V'O<sub>2</sub>normal – Percentage utilization of the normal value of oxygen uptake
- %V'O<sub>2</sub>peak – Percentage utilization of maximum oxygen uptake (only relevant for evaluations)

#### 2 Specifying sport and test conditions

With METASOFT®Studio- Version 5.8.3 the new function block »Sport and test conditions« is available in the CPET TEST PREPARATION module. Here you can define sports to be used as the basis for a CPET test. Furthermore, the exact test conditions (e.g. time of day, test environment or condition of the test person) can be logged in an input field for each CPET measurement.

#### 3 Integration of the interface for seca® scales

With the integration and activation of the seca® interface in METASOFT®Studio, you can now import weight and height data of probands from your seca® software into the METASOFT®Studio database and/or export existing probands data directly from METASOFT®Studio.

### Version 5.7

**Important** | The update to the METASOFT® Studio version 5.7 also requires a firmware update of your CORTEX CPET device METAMAX® 3B-R2 or METALYZER® 3B-R3.

Update the device firmware as soon as possible after updating the software. Otherwise, you will be informed about the necessary firmware update later in your work with METASOFT® Studio.

If you are currently using a METASOFT® Studio version lower than 5.5, all stored test data in the data logger will be deleted after updating the firmware of the METAMAX® 3B-R2. If necessary, read out the METAMAX® 3B-R2 data before updating via METASOFT® Studio

### New functions

#### 1 Measurements with the CANOPY-option

In METASOFT® Studio version 5.7, you have the possibility to choose between two types of measurements to determine the basal or resting metabolic rate (Mask/CANOPY).

In the MSS toolbox, you can define your preferred type of measurement just like the other default settings for BMR/RMR-measurements.

#### 2 Result calculation based on measured urinary nitrogen

An additional important feature of the METASOFT® Studio-Version 5.7 is the calculation of results based on measured urinary nitrogen. In the new tab CALCULATION, you can enter the calculation method for the test results. Until now, you were able to select the estimated proportion of protein in the total energy expenditure (0-20 %) as a calculation method .

With the new release version of METASOFT® Studio, you also have the option of using the value of urinary nitrogen production (0-30 g/day) to calculate the result .

#### 3 BMR/RMR alternative normal value calculations

In the BMR/RMR TEST PREPARATION workflow module, you can select more standard values additionally to the previous normal values in METASOFT® Studio.

### 4 Real-time display of the steady-state conditions in time graphic objects

In the BMR/RMR PERFORM TEST workflow module, you can visually determine if your defined steady-state conditions (time interval, required deviation  $V'O_2$ ,  $V'CO_2$  or RQ) have been reached.

In the time charts  $V'O_2$ ,  $V'CO_2$  and RQ, a horizontal bar is displayed whose length equals the specified time interval and whose width corresponds to the permissible maximum required deviation of the measured values in this time interval.

## Spirometry improvements

### 1 Administration of medication lists

To support bronchial challenge test series, it is now possible to create a medication list and use this list when performing the test series. For this purpose, a new view has been implemented in the MSS toolbox. In METASOFT® Studio a direct access to the medication list is possible for each spirometry test performance or evaluation workflow.

### 2 Additional result parameters for FVC-tests

The result parameters VT, VT/IC and VT/FVC are now also available for an FVC-test.

### 3 New option for scaling of the time graphic V(t)

Different scaling options are now available for displaying the time graphic V(t). In addition to previously used fixed scaling of the volume axis, in which the value range is automatically increased if required, we have implemented the new option »Autoscale volume axis at manoeuvre end«.

With this option, you can improve the display of the measured values obtained, especially for test persons with limited lung volume. With a small volume curve, the value range is automatically reduced. This stretches the volume curve and makes it easier to read.

### 4 Use of text templates

In the MSS toolbox you can set up text templates for medical findings and use them now for spirometry test evaluations.

There is a standard text template for each type of test (BMR, CPET and spirometry).

## **5 Trend analysis for spirometry tests**

The METASOFT® Studio workflow module TREND ANALYSIS is also available for spirometry (as for spiroergometry tests and basal-/resting metabolic rate tests).

This allows you to analyze changes in individual test results over multiple tests.

## **Spiroergometry improvements**

### **1 Z-score and LLN for Maximum Flow-Volume-Loop**

In the CPET PRETEST REST MEASUREMENTS workflow module, the patient performs a rest test with recording the MAXIMUM FLOW-VOLUME-LOOP.

You can now additionally display the columns »**Z-score**« & »**Lower limit of normal range (LLN)**« in the result table.

### **2 Undo manual elimination of outliers**

In the CPET DATA CONDITIONING workflow module, you can perform manual outlier elimination for selected variables.

### **3 Adjust cursor position with table values**

In the CPET BASIC EVALUATION workflow module, measured values for the current cursor position are now highlighted in the »*table display object*«. This also includes a measurement range that you have defined with the band cursor.

### **4 Additional parameters for user defined variables**

In the MSS toolbox formal editor of variables, you can use the following parameters to create user defined variables FVC, MVV, TLC.

### **5 Additional tables for user defined reports**

The new release version of the METASOFT® Studio software includes three new tables for designing user defined reports. Within the MSS toolbox the configuration interface has been adapted for better usability.



- **ARTERIAL BLOOD GASES:** For this table, you can configure columns for individual or all arterial blood gas values.
- **LACTATE VALUES:** This table contains the lactate values of all taken blood samples. In addition, up to 16 separate columns can be configured for spiroergometric variables.
- **VALUES AT MARKER POSITIONS:** contains columns of up to 10 spiroergometric variables. The table displays the values for the times at which you have set markers.

### 6 Display object for test comparison: exercise zones

In the CPET COMPARISON workflow module you have the possibility to compare different exercise zones with each other.

The new display object »Exercise zones« is now available, which can be added to a data view in the usual way.

### 7 Specify the increase in training extent

Now, you will be able to set the weekly increase in extent differently for time- and distance-related training units.

Click the button [ADJUST EXTENT] . You have now the possibility to select the corresponding unit of measurement for controlling the extent of the endurance test.

The weekly increase in the extent that you enter only affects the training units whose extent is controlled in the previously selected unit of measurement.

## General improvements

### 1 Reports: Setting „Print medical findings“ unified

In the METASOFT® Studio version 5.7, the option »Print medical findings« is globally set for all three types of tests (CPET tests, spiroergometry tests and basal-/resting metabolic rate tests).

In the MSS toolbox you can adjust the settings for each report individually.

### 2 Formatting of medical findings

You can adjust the font for all medical findings with regard to type, size, formatting and color (both in the MSS toolbox and in METASOFT® Studio).

### **3 Directory for database backup**

You can now store the METASOFT® Studio-database in a user defined directory.

### **4 Deactivating the calibration of flow sensor for disposable turbines**

In the METASOFT® Studio Patient Center the button [CALIBRATE FLOW SENSOR] is active by default. When using the CORTEX flow sensor with disposable turbine, calibration is not necessary.

Therefore, we recommend that you deactivate the button [CALIBRATE FLOW SENSOR] if you mostly use this kind of disposable turbine.

### **5 Define charset for interface to ECG systems**

Various ECG systems use the GDT interface to transfer information. With METASOFT® Studio Version 5.7 the number of supported charsets for importing GDT-files has been increased.

### **6 Using SpO<sub>2</sub> measurement data from bicycle ergometers**

You can transfer SpO<sub>2</sub> readings for your measurements, which are determined during a physical performance test with a bicycle ergometer.

### Version 5.5.0

**Important** | The update to MetaSoft®Studio version 5.5.0 requires a firmware update of your CORTEX CPET device. If possible run the firmware update directly after the update of the software. Otherwise you will get later a message during your work with MetaSoft®Studio to perform the necessary firmware update.

### New functions

#### 1 **Configure a heart rate belt for field test with METAMAX®3B-R2**

It is now possible to set a heart rate belt for field test with only the MetaMax3B-R2, without direct support of MetaSoft®Studio or CORTEX SmartControl. Therefore please run the MetaSoft®Studio Toolbox and go to Test Equipment / MetaMax 3B-R2 / Field Test Settings. Here you find the new control to configure the heart rate belt to be used for field tests without support of MetaSoft®Studio or CORTEX SmartControl.

#### 2 **Interface to the Nonin SpO<sub>2</sub> device WristOx2 3150**

In this version we implemented an interface to the named SPO2 device. Please note, this device will be connected via Bluetooth to the PC (or notebook) where MetaSoft®Studio is running, not to the MetaMax 3B-R2 or MetaLyzer 3B-R3 via Bluetooth-LE.

#### 3 **Interface to the Labtech 12-channel stress ecg system**

Now there is another 12 channel stress ecg system that can be connected to MetaSoft®Studio, the 12 channel stress ecg of the Hungarian manufacturer Labtech.

#### 4 **CPET normal values of the SHIP study**

Within a broad based study (see Gläser et al: The Study of Health in Pomerania (SHIP) Reference Values for Cardiopulmonary Exercise Testing) normal values for important CPET parameters are determined. In this version of MetaSoft®Studio for maximum exercise results the determined 50% percentiles are implemented as normal values.

### **5 Heart rate exercise zones based on V'O2max**

We implemented a new “threshold” that can be used to define heart rate zone models: V'O2max. Even for one exercise zone model different thresholds can be used, e.g. for a 3-zone model 110% of VT1 as the border between the first and the second zones and 95% of V'O2max as the border between the second and third zones..

### **6 Interface to treadmills of the company Tech med Tm**

The treadmills Tech med 2850, Cardio 260 and 270, Spacio 280 and 290 can be controlled by MetaSoft®Studio.

### **7 THEDEX interface**

We implemented the THEDEX interface for data exchange. This interface is widely used in Germany in fitness, health and rehabilitation centers.

## Improvements

### **1 Spirometry**

The Lower Limit of Normal (LLN) and Z-Score are implemented. These values are available if the Normal Values of Quanjer 2012 are used.

In previous versions of MetaSoft®Studio only the representative manoeuvre for a spirometry test was saved into the database. Therefore it was not possible to review the manoeuvres later. Now this restriction is abolished, all manoeuvres of a test can be saved to the database.

Furthermore, for each individual manoeuvre validity criteria are automatically applied. If some manoeuvre does not meet the criteria, the operator will be informed and asked, if he wants to save this manoeuvre and, additionally, if he wants to accept this manoeuvre as a valid one.

Also there is a better distinction between the result presentation for a single spirometry test or a spirometry test series.

Another improvement is related to the normal values. In previous versions it was possible to select a normal values set. The different sets differ in respect of which parameters are offered for standard

values. Now it is possible to use different normal value sets for different parameters.

E.g. the currently propagated normal value set of the Global Lung Function Initiative (GLI, Quanjer 2012) does not provide normal values for VC and PEF. Normal Values for these parameters can be added now from other normal value sets.

And last but not least, for spirometry FVC test analysis we added cursors to adjust the deep inspiration and forced expiration phases.

### **2 Data Conditioning: additional grid lines when enlarge chart**

If a variable is selected in the workflow item CPET Data Conditioning in a chart and the chart is enlarged additional grid lines can be shown

### **3 Configure the initial state of the MC3000 switch**

If MetaSoft®Studio is used together with the customed 12-channel ecg, this is named MC3000. In this case we have a special switch in the Patient Center if the next test or analysis must be performed as a mc3000 test (CPET together with 12 channel stress ecg) or as a simple CPET test or analysis. Now the initial state of this switch can be configured.

### **4 Excel export and user defined report: more possibilities to configure the data table**

The configuration of the data tables has been done more flexible. As before it can be selected, if the original data or the already conditioned data must be shown in the data table. But now additionally to this selection an averaging of the values in a given time interval can be applied.

### **5 Reports / Section Patient Data**

Now it is possible to configure, if the age of the patient or his date of birth or both data must be printed.

### **6 Evaluation of exercise flow volume loops**

There are two improvements concerning evaluation of exercise flow-volume loops: As additional data for CPET the total lung capacity (TLC) can be entered and if this value is present, the ratio of EELV and EILV to TLC will be calculated. It can also be configured, which result parameters will be presented.

### Version 5.4.0

**Important** | The update to the MetaSoft®Studio version 5.4.0 also requires a firmware update of your CORTEX Spiroergometry device METAMAX®3B-R2 or METALYZER®3B-R3 to version 1.03.00 so that you can use all new functions.

Update the device firmware as soon as possible after updating the software. Otherwise, you will be informed about the necessary firmware update later in your work with MetaSoft®Studio.

Please note that after updating the MetaMax®3B-R2 firmware, all stored test data in the data logger will be lost. If necessary, read out the MetaMax®3B-R2 data before updating via MetaSoft®Studio.

### New functions

#### 1 CORTEX SmartControl Unit

The CORTEX SmartControl Unit is part of the CORTEX Spiroergometry System and replaces with the release of MetaSoft®Studio Version 5.4 the previously used CORTEX RemoteControl as a remote control unit for the MetaMax®3B-R2.

The SmartControl increased the user friendliness when carrying out field tests. For example, test data can now be displayed numerically and graphically during the mobile test

Starting with Version 5.4 the CORTEX SmartControl Unit (consisting of tablet and software) is part of the MetaMax®3B's standard scope of delivery

#### 2 New Workflow "Prepare Field Test"

An inactive workflow „Prepare field test“ is preset in the MSS Toolbox. To work with the new workflow, it must be activated it in the MSS Toolbox.

#### 3 New Workflow "Read out Logger"

An inactive workflow „Read out Logger“ is preset in the MSS Toolbox. To work with the new workflow, it must be activated it in the MSS Toolbox.

### Version 5.3.0

**Important |** The update of MetaSoft®Studio version 5.3 requires a firmware update of your CORTEX CPET device. If possible run the firmware update directly after the update of the software. Otherwise you will get a message during your work with MetaSoft®Studio later to perform the necessary firmware update.

### New functions

#### 1 CPET extended by measurement of haemodynamic variables with the device PhysioFlow Enduro

Starting from this current version it is possible to connect to the CORTEX CPET system the haemodynamic device “PhysioFlow Enduro” (Manatec Biomedical, France), measuring the haemodynamic variables Cardiac Output, Stroke Volume and others by impedance-cardiography. The device will be connected to the PC via Bluetooth and must be included into a MetaSoft®Studio device configuration. The newly introduced haemodynamic variables will be used in the same way as normal CPET variables will be used.

Because of this innovation it is possible now to calculate and show the arteriovenous difference of oxygen concentration.

#### 2 Possibility to enter SpO2-values manually

You can enter values for SpO2 manually, if you use a SPO2 device without an interface to MetaSoft®Studio. This can be done already while performing a test or after the test as a part of the analysis session.

#### 3 Cycling Power Sensor as an accessory for the MetaLyzer 3B-R3 or MetaMax 3B-R2

So-called Cycling Power Sensors, which transfer data via Bluetooth Low Energy, can be connected to the MetaMax®3B-R2 or MetaLyzer®3B-R3. Therefore in MetaSoft®Studio we have the new variables “Pedal Power (Cycling Power Sensor) / WR(CPS)” and “Pedalling Speed (Cycling Power Sensor) / RpM(CPS)”.

### **4 MetaMax3B-R2 can be used as a device for the MetaSoft-Studio Test Control Center**

Now it is possible to use also the MetaMax3B-R2 with the MetaSoft®Studio Test Control Center, not only the MetaLyzer3B-R3 as before.

## **Improvements**

### **1 New Display Object for tests with recording exercise flow-volume loops**

Using this new display object allows to display all already recorded exercise flow volume loops compared to the maximum flow-volume loop.

### **2 Special filter for breath by breath data to eliminate the “artificial” deep inhalation of exercise flow-volume loop manoeuvres**

When recording the exercise flow-volume loop manoeuvre the patient must perform one deep inhalation. Related to the normal breath by breath data this deep inhalation is something like an artificial outlier. Hence, in the data conditioning / outlier elimination for tests with recorded exercise flow-volume loops we apply a specialized filter to exchange the “artificial” deep inhalation by a normal one. This filter is activated by default, but it is possible to deactivate it using the Toolbox / Manage Workflows.

### **3 Report “9-Panel Plot (measured data)” to be used in the workflow item “CPET – Preliminary Summary”**

Only for use in the workflow item CPET –Preliminary Summary we provide the report “9-Panel Plot (measured data)”. This report shows in the plot only the measured data curves without any calculated results as VT1 and VT2. It should be used if directly after the test a report must be printed before an analysis of the data curves is done by the physician.



### **4 Skip to Recovery out of a Pause**

Now it is possible to skip to the recovery phase of a workload protocol even if currently a pause is activated.

### **5 Export of tests with anonymised patient data**

It was already possible to anonymise the whole database. Now it is also possible to anonymise a single test when exporting it. So after import the test to another MetaSoft®Studio there is no more information about the concrete patient.

### **6 Band-cursor shows the time of the begin and end of the marked interval**

In the workflow item “CPET Universal Analysis” it is possible to show a so called “Band Cursor” (if it is configured, see Toolbox, your workflow, workflow item “CPET Data Universal Analysis”). Now this Band Cursor shows the begin- and end-time of the highlighted interval.

### Version 5.2.0

**Important** | The update of MetaSoft® Studio version 5.2 requires a firmware update of your CORTEX CPET device. If possible run the firmware update directly after the update of the software. Otherwise you will later get a message during your work with MetaSoft® Studio to perform the necessary firmware update.

### New functions

#### 1 Special support of the MetaLyzer®3B-R3 when it runs on battery

MetaSoft® Studio provides special support if the MetaLyzer® runs on battery. In this case the status line shows the battery charge level, of course, if the MetaLyzer® is connected with MetaSoft® Studio. Also there is a special display object in the module CPET Perform Test to visualize the current battery charge level.

#### 2 Test Control Center

The MetaSoft® Studio Test Control Center is an additional tool to perform up to 4 CPETs at the same time. The test data is stored in the MetaSoft® Studio database, hence the tests can be analysed in the common way using MetaSoft® Studio.

### Improvements

#### 1 MetaControl 3000 (MC3000)

Besides many minor improvements concerning the handling and the stability of the system following things are changed or added:

- The limitation to one fixed workflow is removed. It can be configured in the MetaSoft® Studio Toolbox whether always a preselected workflow is to be used (the previous mode of operation) or before each test an individual workflow must be selected.
- A special list of reports can be configured. These reports will be summarized to one \*.pdf-file that is provided to the custo diagnostic software.

- Custo diagnostic joins this CPET-pdf-file with its own ecg-reports and sends this joined comprehensive\*.pdf file to the hospital information system.
- Furthermore it is not necessary to have administrator rights to configure MC3000.

Please pay attention to the fact, that most improvements are effective, if the installed version of custo diagnostics is 4.4.4 or higher.

**Important | Important information for users, having an older version of custo diagnostic:**

After you performed the update of MetaSoft®Studio please run the Toolbox and go to “Special Settings/ Software Interfaces/ MC3000. Here press the button “Save”. This operation is needed only once. It ensures, that the current version of the MC3000-interface, the file “mc3000.dll” will be copied to the program folder of the software custo diagnostic.

**2 Modul CPET – Exercise Flow Volume Loops, additional result parameter Inspiratory Capacity (IC)**

The list of result parameters for each exercise Flow-Volume-Loop has been enlarged by the parameter “Inspiratory Capacity (IC)”.

**3 Table „Overview“ on screen and reports: possible to show time, respectively time intervals, for thresholds and phases**

In different modules of MetaSoft®Studio and on reports so called Overview Tables (tables that show mean values for phases and values for thresholds and  $\dot{V}O_2$ peak) are presented. Now it is possible to show the corresponding time respectively time interval in the first row of this table.

To enforce this you must activate the option „Show time“ individually for each table.

**4 Medical findings: now also available in the module „CPET – Rest Measurements Evaluation“**

Now it is possible to show the medical findings and enter additional information also in the module “CPET – Rest Measurements Evaluation”.

### **5 Export to Excel directly from the Toolbox: the configured template will be used**

Until now the standard template was used when export to excel was performed directly from the MetaSoft®Studio Toolbox (Database / Tests). Now, if the export to Excel is configured to “Use fixed template” (Special Settings / Software Interfaces / Excel), this configured template will be used.

Beside the listed improvements we eliminated some discomfort in handling and fixed minor bugs.

### Version 5.1.0

**Important |** The update of MetaSoftStudio version 5.1 requires a firmware update of your CORTEX CPET device. If possible run the update directly after the update of the software. Otherwise you will later get a message during your work with MetaSoft®Studio to perform the necessary firmware update.

### New functions

#### 1 Sending reports via e-mail

It is possible now to send reports via e-mail at the end of an analysis workflow (e.g. UNIVERSAL ANALYSIS).

### Improvements

#### 1 Stability to Bluetooth-LE devices is improved

The stability of the connection between the CORTEX CPET device and Bluetooth-LE devices (e.g. POLAR®-H7 belt) is improved.

#### 2 Reminder for sensor adjustment before test start

If you close the workflow module CPET test preparation without performing the sensor adjustment, you receive a message.

#### 3 Absolute maximum values in medical findings

In addition to the already existing placeholders for "Threshold Values" there are now also placeholders for the "Absolut maximum value" of a variable.

#### 4 Text-templates in the workflow selectable

For creating a medical findings in MetaSoft®Studio it is possible now to configure the workflow, that you will have the decision between different text templates. Previously it was only possible to use one of the configured text templates.

### **5 Function blocks in Performance Assessment are hideable**

These function blocks in the workflow module CPET Performance Assessment are now hideable:

- Assessment to VT1 and VT1
- Assessment to Maximum Exercise
- Exercise Heart Rate Zones

### **6 Function block Reasons for Test Abort extended**

A new category is added to the function block Reasons for Test Abort. There you will find now special "Reasons for Test Abort" that were previously allocated to the categories Test complications and Patient complaints.

### **7 Chinese normal values for V'O2max available**

The chinese normal values for V'O2max are now implemented in MetaSoft®Studio. You can select them via the normal values menu for Maximum Oxygen Uptake (e.g. in the workflow module CPET Test Preparation).

### Version 5.0.0

#### New functions

##### **1 Reconstruction of MetaSoft®Studio database**

As a result of reconstruction of the MetaSoft®Studio database the software is gaining more performance especially for databases with several thousand tests. Please note, that an update may take a longer time to complete. As an orientation: The update of database of a size of 16 GB with about 4.200 probands on a 4-5 years old PC (Intel Core 2 Duo E8400) took about 2 hours and 15 minutes.

##### **2 Expansion of Bluetooth-LE device connectivity**

It is possible now to use the POLAR® H7 heart rate belt and the Nonin 3230-SPO<sub>2</sub> sensor at the same time via the Bluetooth LE with the MetaLyzer®3B-R3 and MetaMax®3B-R2 devices.

##### **3 Revised version of MetaSoft®Studio manual**

The software manual has been completely revised.

### Version 4.9.2

#### New functions

##### **1 French and Czech localisation is completed**

The French and Czech localisation of MetaSoft®Studio is now completed.



### Version 4.9.1

#### New functions

**1 Interface to the Welch-Allyn-12-channel-ECG realised**

An interface to the 12-channel ECG of Welch-Allyn is available now.

**2 Normal values of Takken & Bongers implemented**

The CPET normal values of Takken & Bongers for maximum exercise for children are implemented now.

**3 Polish localisation is completed**

MetaSoft®Studio is now available completely in Polish language.

## Version 4.9.0


### New functions


#### 1 MetaLyzer®3B-R3 device is supported


MetaSoft®Studio now supports the new CORTEX-CPET device MetaLyzer®3B-R3. Detailed information on all new features of the device as well as on how to handle it can be found in the (➔MetaLyzer®3B-R3 manual).


#### 2 Different handling for the evaluation of exercise tidal flow-volume loops

The procedure for the evaluation of CPET EXERCISE FLOW-VOLUME LOOPS in the workflow module of the same name has been changed. The following changes were made:

(1) The average breath for all manoeuvres can now be calculated automatically as well. This is then the representative breath. The new CALCULATE AVERAGED BREATH button  is available for this purpose.

(2) As before, you can also select the representative breath manually, but the procedure in this case has changed somewhat: You only need to select the breath, and the confirmation button  MARK BREATH AS REPRESENTATIVE has been eliminated.

(3) It is now possible to force confirmation of the results. The new CONFIRM RESULTS button  is available for this purpose in the workflow module.

(4) A manoeuvre can be marked as "not analysable" in general now. The new MARK MANOUVRE AS NOT ANALYSABLE button  is available for this purpose.

#### 3 New workflow module: Device Check

MetaSoft®Studio now helps you check the function of the device before you start a test. The new DEVICE CHECK workflow module is available for this purpose.

### **4 Scheduled spirometry tests after a stress test**

For spirometry tests (e. g. FVC tests) that need to be conducted after a CPET, you can now specify down to the second when it should start.

### **5 Additional normal values implemented**

The following new normal values are now available for the following parameters:

#### **"Japanese Normal Values" for:**

- Maximum Relative Oxygen Uptake
- Maximum Heart Rate
- Maximum Arterial Blood Pressure

#### **"Finnish (for Children)" for:**

- Spirometry Normal Value Sets

### **6 Interface for the ECG software Dr. Schmidt Smartsoft**

The software interface for the 12 channel ECG System "Dr. Schmidt Smartsoft" was implemented.

## Improvements

### **1 Functionality of actions extended**

Actions that you have added (e. g. RECORD EXFVL) to the test protocol (in the CPET PREPARATION workflow module) are now easier to configure. The following operations are possible:

- (1) Deleting actions by clicking with the mouse
- (2) Configure individual actions separately
- (3) Set extended options for certain actions

### **2 New print options for reports**

You now have extended options for USER DEFINED REPORTS (CPET). The following new sections can be configured and printed:

- (1) Slope Summary
- (2) Mean Values at Rest
- (3) Extended Data Table

### **3 Printing all reports at the same time**

You can now print all printable reports in a workflow at the same time at the end of the workflow.

### **4 GPS module in the device configuration**

If you want to use a GPS module in a test with the MetaMax®3B, you must create the GPS module now in the device configuration.

### **5 Using spirometry values**

In the NORMAL VALUES function block (in the workflow modules EDIT PATIENT DATA, CPET PREPARATION, CPET CHECK AND EDIT TEST DATA), you can enter spirometry (normal) values for additional calculations or for display during the CPET or when analyzing the results.

The values entered are used for the following purposes, among others:

- To calculate the individual normal values for the maximum respiratory minute volume
- To display (VC and MVV) in the display objects (e.g. in the CPET - PERFORM TEST workflow module)

Some fields are filled in automatically. These values come from:

- (1) A previous spirometry test or
- (2) From the selected normal value set

### **6 Extended calculation of the normal values for the maximum respiratory minute volume from MVV**

The method of individual NORMAL VALUES BASED ON MVV OR FEV1 that has been implemented for some time now has direct access to the MVV value. You can now have the normal value calculated in the following manners:

- (1) Directly using the MVV value
- (2) Using the FEV1 value and multiplying it with the MVV factor

### **7 9-panel plot comparison report**

You can now use the new "9-Panel Plot Comparison" report to compare the results of two CPETs.

### **8 Extended functions for creating text templates**

The functions for creating / changing the text templates for diagnostic texts are now more extensive and easier to use. A wide ranging collection of placeholders for data makes it easier to write diagnostic texts.

### **9 Quick Info tooltips for display elements**

In the display objects of the workflow modules PERFORM TEST and UNIVERSAL ANALYSIS, the names of all lines – except for markers – are displayed when you hover with the mouse over them:

- Cursor
- VT1 (AT)
- VT2 (RCP)
- Isopleths
- Normal Values

### **10 MetaMax®3B-R2: Announcing the speed**

In addition to the familiar voice commands and the HF, V'O<sub>2</sub>, and RER parameters, with the MetaMax®3B-R2 device it is also possible now to announce the speed during a field test to the test subjects in the form of audio feedback.

### **11 Additional calculation intervals for slopes**

For the calculation of the slopes, you now have the ability to use the following new calculation intervals:

- Begin and end of unloaded pedalling
- Begin and end of warm up

### **12 Exporting test data to Excel**

Test data for which no evaluation has been created (yet) in MetaSoft®Studio can now be exported directly to Excel.

### **13 For the Lode Katana Sport treadmill: Grade can be set to a negative value**

For the Lode Katana Sport treadmill, you can now configure a negative grade.

### **14 Deactivating the automatic smoothing option**

The default setting for smoothing test data is preconfigured so that smoothing is executed automatically when the CPET DATA CONDITIONING workflow module is opened. You can now disable this option.

### **15 Additional averaging for values in table.**

For the TABLE display object in the CPET PREPARATION and UNIVERSAL ANALYSIS workflow modules, you can now use the configuration menu to specify if you want to apply an "additional averaging" method to the values of the variables selected in the table.

### **16 Displaying the load at a certain time in the Check and Edit Test Data workflow module**

In the CPET CHECK AND EDIT TEST DATA workflow module, you can now display the workload at a specific time in a separate column in all tables.

### **17 "Save as" for workflows**

Changed (or new) workflows in the Toolbox submenu WORKFLOWS / MANAGE WORKFLOWS can be saved now by clicking on the new [SAVE AS] button without overwriting the original workflow.

### **18 Possible to delete standard training plans**

It is possible now to delete standard training plans in the toolbox.

### **19 ExFVL: Quick Info tooltips for the short names of the result parameters**

In the CPET EXERCISE FLOW-VOLUME LOOPS workflow module, hovering with the mouse over the short name of a result parameter displays the full name in a Quick Info tooltip.

## Version 4.8.0

### New functions

#### 1 Compare Test

MetaSoft®Studio supports you now in comparison of 2 tests. For this purpose, a new workflow module is available. That means, it is possible now to compare the results of the **current test** with which of a (already occurred) **reference test**.

#### 2 Test View in Patient Center

Now in the Patient Center there is a new view mode to search for tests. In this new **Test View** it is possible, to filter tests according to specific criteria.

#### 3 HL7 is extensively expanded

The HL7-Interface in MetaSoft®Studio was extensively expanded (according to HL7-Version 2.x). There are much more possibilities now to use the data exchange between MetaSoft®Studio and a hospital information system (HIS).

#### 4 New variable Excess CO<sub>2</sub>

As of now the new variable Excess CO<sub>2</sub> is available in the configuration bar (in the modules CPET Perform Test and CPET Universal Analysis).

#### 5 New method Excess CO<sub>2</sub>

Now with Excess CO<sub>2</sub> an additional method to more accurately determine the VT1 (AT) has been introduced in MetaSoft®Studio.

#### 6 O<sub>2</sub> value is modifiable

MetaSoft®Studio now supports measurements at modified O<sub>2</sub> concentration in the ambient air.

#### 7 Quanjer- Standard values set

The Quanjer Standard Values 2012 is implemented in MetaSoft®Studio now. It is available in all workflow modules, in which spirometric calculations are performed.

**8 Software-Interface for Spacelabs-ECG**

The Software Interface for the Spacelabs-ECG-Software „Sentinel“ is now implemented.

**9 New backup restore tool**

With the new backup restore tool in MetaSoft®Studio you can now save your data and if needed restore. You can carry out the backup manually. Also it is possible to set a counter to carry out regularly and automatically backups.

**10 Network-Client: Database synchronization**

As of now it is possible to synchronize data (patients and tests) of your local and the network database (e.g. after a field test). To use this function you must have installed the Network-Client-Installation.

**Improvements****1 Further functions for rest measurements**

In the workflow module CPET Pretest Rest Measurements there are the following new functions:

- Cursors for more accurate determination of the tidal volume (VT)
- Cursors to limit the forced breathing maneuver

**2 Signal for manually BP measurement**

If you have determined actions for the measurement of blood pressure (BP) in the test protocol without a blood pressure device is part of the device configuration, you now will be alerted by a visual signal to carry out manual blood pressure measurement(s) during the test on the set time points.

**3 Watt/kg in universal created test protocol**

As of now it is possible to define Watt per weight in an "universal created" test protocol. Until now this was possible only in a manual or automatical created test protocol.

**4 Device configuration in MetaSoft®Studio**

As of now you can select the device configuration directly in MetaSoft®Studio.



### **5 Configuration of Protein Utilization**

It is possible now to configure the share of the protein utilization related to the total energy expenditure for a CPET test or a BMR/RMR test.

### **6 Spirometry: Comments in test series**

Comments in individual tests of a spirometry test are now reported in a test serie report.

### **7 MVV adjustable**

In the workflow modules CPET PREPARATION and CPET CHECK AND EDIT TEST DATA you can now adjust the multiplier for the MVV of FEV1 calculations for each patient.

### **8 Show MVV and normal value parallel**

In the display objects of the workflow modules CPET PERFORM TEST and CPET UNIVERSAL ANALYSIS it is possible now to show the normal value and the MVV value parallel for the variable V'E.

### **9 Default normal value determinable**

You can now determine the standard method for the calculation of the normal value which shall be pre-selected in MetaSoft®Studio.

### **10 Import/Export of user definded reports**

You can now import/ export reports user defined reports. To do this, open the Toolbox submenu REPORTS/ CPET/ TEST REPORTS/ USER DEFINED REPORTS.

### **11 Flexible Exercise Schedules creatable**

Micro-, Meso-, and Macrocycle schedules templates are now more flexible creatable: So it is possible now to select/ exchange the kind of sport (running, cycling etc.) of an exercise unit by one click. The defined extend of an exercise unit (minutes, kilometres etc.) is adjusted automatically.

### **12 Support of Medset-ECG PADS Y**

MetaSoft®Studio supports now the Medset-ECG PADS Y. The setting options for this you will find as usual in the Toolbox submenu SPECIAL SETTINGS/ SOFTWARE INTERFACES/ ECG SYSTEMS/ MEDSET PADS Y.

### **13 Test-Import: Multiple selection possible**

When you import tests in the MetaSoft®Studio database you can now select and import several tests at the same time. Therefore open the Toolbox submenu Database/ Tests. Click on [Import] and select in all tests, which you want to import, from the menu.

### **14 Complex Workflow: Test abort message**

If a complex workflow is aborted, a confirmation message is shown now (by clicking the Cancel button in the 1st workflow module of the subworkflow).

### Version 4.7.0

#### New functions

##### 1 Support of MetaMax®3B-R2

Up from now MetaSoft®Studio supports the new CORTEX Spiroergometry device MetaMax®3B-R2. You can find detailed information on all new features of the device as well as on its handling in the User Manual MetaMax®3B.

##### 2 Significant improvement of Runtime Performance

The runtime performance of MetaSoft®Studio has been significantly improved. Depending on the performance of your PC, you should notice an increased performance of at least 50 percent.

##### 3 New Standard Value for Maximum Performance

In the function block NORMAL VALUES (input of patient data and workflow module PERFORM TEST) you can select the new standard value for “Maximum Work Rate” CALCULATED BASED ON WEIGHT AND AGE.

##### 4 Set of Standard Values after Knudson

In the function block NORMAL VALUES (EDIT PATIENT and workflow module PERFORM TEST), the set of standard values of spirometry now includes the additional option of KNUDSON STANDARD VALUES.

##### 5 Simplified Data Export to GDT

You have now the following new options to carry out the data export to GDT:

- Automatic data export
- Manual data export (by clicking the button at the end of a workflow)
- Export of PDF-Files
- Choice which reports and parameters are to be exported

### **6 New Variables for Spiroergometry**

For a spiroergometry test/-analysis you have the following variables available now:

- Expiration time (tE)
- Inspiration time (tI)

You can find the settings for these variables in the Toolbox submenu SPECIAL SETTINGS/VARIABLES/MANAGE VARIABLES.

### **7 Variable Metabolic Equivalent for BMR/RMR available**

The variable Metabolic Equivalent (METS) is now optionally available for a Basal-/Resting Metabolic Rate test/-analysis.

### **8 Confirmation Query for "Save" in the Toolbox**

If you have accidentally forgotten to save the settings configured in the Toolbox, you will be reminded with a message when closing the page.

### **9 Improved Entry of Lactate**

It is now possible to define the points of time for taking lactate samples. This allows you to assign lactate levels (even at a later date) to the actual sampling times.

### **10 Optical Signal for Exercise Flow-Volume-Loops**

During a test, a visual signal (blinking lung symbol) will be displayed in the caption bar during the recording of an Exercise Flow-Volume-Loop (exFVL), regardless of whether you have opened the display object Intrabreath-Daten in the workflow-module PERFORM TEST.

### **11 Reasons for Abortion can be added during Evaluation**

The function block REASONS FOR STOP TEST is now also available in the workflow-module CHECK AND EDIT TEST DATA.

### **12 Limitation for Break Sections removed**

In the workflow module DATA CONDITIONING you now can enter the actual (break) time numerically without any limitations.

### **13 PWC-Values for Ergometer Test and Evaluation**

For an (ergometer) test and its evaluation, from now on also the PWC values ("Physical Work Capacity", i.e. the values of the respective wattage at a heart rate of 130, 150, 170) will be calculated and are available as placeholders for a takeover in the diagnostic report.

### **14 BMR-/RMR-/Spirometry-Test-Reports available for HL7**

Reports of Basal-/Resting Metabolic Rate and Spirometry measurements can now be transferred to HL7.

### **15 New Report: Patient Data**

You will find the new report PATIENT DATA in the Toolbox menu REPORTS and its submenu of the same name. In order to use this function, you first have to configure it in the respective workflow modules.

### **16 Software Interface for Medset-ECG-System PADSY**

MetaSoft®Studio now supports the Medset-ECG-System PADSY (only in czech localisation!).

### **17 Spirometry: Check and Edit Test Data possible**

The workflow module CHECK AND EDIT TEST DATA is now also available for Spirometry measurements and evaluations.

### **18 Visual Help for Analysis of exFVL-Curves**

Visual markers now support your analysis of Exercise Flow-Volume-Loops.

### **19 Display of 2 Additional Variables in the Training Schedule**

In addition to the heart rate, the generated exercise schedule (workflow module: EXERCISE SCHEDULER) now shows 2 additional variables, configured in the function block EXERCISE HEART RATE ZONES (workflow module PERFORMANCE ASSESSMENT).

### **20 Slope V'E (V'CO ) integrable in Diagnosis Text**

The slope V'E (V'CO ) is available as a placeholder for integration in the diagnosis text (Toolbox-submenu: SPECIAL SETTINGS/TEXT TEMPLATES).

### **21 Display of Values at the VT1/VT2-Cursors configurable**

For the workflow module UNIVERSAL ANALYSIS you can now configure whether you want the numerical values at the cursors VT1 und VT2 (green) to be shown by default (in time-graphs).

**Version 4.6.0****New functions****1 Slopes**

MetaSoft®Studio now supports the calculation of slopes. For this you can use the new function block SLOPES in the workflow module CPET BASIC EVALUATION.

A slope is the increase of a regression line of a particular linear function of two variables.

Upon delivery of MetaSoft®Studio you will get these configured slopes already supplied:

- $\dot{V}E(\dot{V}CO_2)$
- $\dot{V}O_2(P)$
- OUES (Oxygen Uptake Efficiency Slope)
- HF recovery

**2 Configuration of reports improved**


Reports which you want to print or export are now easier to configure. For this the configuration options were revised. They are now better structured.

**3 Support of further ECG systems**

With the new version of MetaSoft®Studio the following ECG systems will be supported:

- Imed Ergocid Plus
- Norav PC ECG
- Fukuda Stress ECG
- Schiller SDS-104

**4 New licence: "Export to Exercise Manager Software"**

With the new licence it is possible to transfer test data to the exercise manager software. For this you will find the new button  EXPORT TO EXERCISE MANAGER SOFTWARE in all analysis workflow modules.

### **5 Reminder to exchange worn parts**

Regularly you need to exchange the following components of the CORTEX spiroergometry system:

- O2-sensors
- sample line
- masks

As of now you will be reminded of the exchange of worn parts by a message at program start.

A certain amount of time before the necessary exchange you will be reminded. You can configure these “Advance warnings” in the Toolbox submenu TEST EQUIPMENT/MAINTENANCE/SETTINGS.

### **6 Support of an additional workload device**

The ergometer Lode Excalibur 38400 is now supported by MetaSoft®Studio.

### **7 Functionality for GDT has been extended**

In addition to the transfer of patient data and the transfer of reports (pdf) you can transfer test data as well as numerical values of the following test types to GDT:

- CPET
- BMR/RMR
- Spirometry

### **8 New instruction manual for CORTEX CPET systems**

On delivery of a CORTEX CPET system (e.g. MetaMax® + MetaSoft® Studio) as of now you will get an instruction manual in printed form. This instruction manual describes the most common steps for installing and working with a CORTEX CPET system.

### **9 Czech Localisation**

When required you will get MetaSoft®Studio also in Czech language.

### Improvements

#### 1 Visual signals in module “Basic Evaluation“

If certain calculations must be checked by the user, a visual signal will be shown (in the title bar of the function block). A typical situation is that the RCP has not been determined but a slope has to be calculated up to RCP.

#### 2 Trend Analysis: Percent changes representable

In the workflow modules CPET TREND ANALYSIS and BMR/RMR TREND ANALYSIS it is now possible to represent percent changes of test results in the previous display objects as well as in the newly implemented display objects.


#### 3 Labelling of axes using the colour of the variable

In the workflow modules CPET PERFORM TEST and CPET UNIVERSAL ANALYSIS axis labels in the display objects are shown in the colours of the variables.

#### 4 45°-line on report 9-panel-plot printable

It is now possible to print the 45°-line on the report of 9-panel-plot/edition 2012.

#### 5 “Exit” button in MetaSoft®Studio and Toolbox

It is now possible to quit MetaSoft®Studio and the Toolbox in a quick and easy way via the new button EXIT . It is located in the lower left corner.

#### 6 Micro-/Mesocycles-exercise-schedules deletable

You can now delete complete micro-/mesocycles in the workflow module CPET exercise scheduler as well as in the Toolbox submenu SPECIAL SETTINGS/EXERCISE DATA.

#### 7 Manual change of heart frequency for exercise units

You can now manually adjust the heart frequency for individual exercise units in the workflow module CPET EXERCISE SCHEDULER.




### 8 Advanced options for Excel export

The configuration options for the export of test data have been revised. Open the Toolbox submenu SPECIAL SETTINGS/SOFTWARE INTERFACES/EXCEL.

The following options are possible for the export to Excel:

- for tests with a step protocol you can now configure, if only the last measurement value as well as the last measurement values of a certain time interval per step is exported (this applies to the data table)
- a working Excel installation is not needed for data export
- it is possible to export data also into other spreadsheet programs
- it is possible to select several Excel sheets

### 9 User manual is accessible from MetaSoft®Studio

You are able now to open the MetaSoft®Studio manual via the the new button  in the title bar (patient centre).

### 10 Hemoglobin value is representable also in g/dl

In the Toolbox submenu SPECIAL SETTINGS/PATIENT DATA/ PHYSICAL UNITS & CLASSIFICATIONS for the hemoglobin value you can configure the unit g/dl. The hemoglobin value is used to calculate the variable cardiac output and stroke volume.

### 11 Medical findings: placeholder for V'O2 on RCP


There are placeholders for the following parameters in the text templates of medical findings for values of V'O2 on RCP:

- V'O2 (VT2)
- V'O2/kg
- V'O2 in relation [%] to normal value V'O2max
- V'O2 in relation [%] to reached V'O2peak

### 12 Outlier elimination for SpO<sub>2</sub>

In workflow module CPET DATA CONDITIONING the outlier conditioning is implemented for the variable SPO2.

### 13 Step test: Skip to recovery at the end of the current step

With the new button  SKIP TO RECOVERY AT THE END OF THE CURRENT STEP you can now jump to recovery phase at the end of a step.

You need to activate the button before in the respective test modules (e.g. CPET PERFORM TEST in workflow GENERAL CPET) in the Toolbox submenu WORKFLOW/MANAGE WORKFLOWS.

### **14 Name of thresholds selectable**

In the Toolbox submenu SPECIAL SETTINGS/CPET/GENERAL SETTINGS you can now configure the name you prefer for the thresholds.

### **15 Complex workflows simplified**

When you create a complex workflow in such form: [Spirometry] -> [CPET] -> [Spirometry] you do not need to include the workflow module SPIROMETRY TEST PREPARATION in the 2nd spirometry workflow.

### **16 Dialogue „Reasons for Stop Test“ configurable**

For a CPET test you can configure to show the dialogue REASONS FOR STOP TEST.

### **17 MetaControl 3000: Advanced selection of workflows**

For work with a MetaControl3000 (MC3000) measuring station you can now use CPET workflows (test and analysis).

### **18 Data restore after system crashes**

You can restore the data of an interrupted test as result of a system crash in the Toolbox submenu DATABASE/TESTS. At the restart of MetaSoft®Studio you will be informed by a message, whether you want to restore the test data and how you need to proceed.

### **19 Advanced option for BMR/RMR**

In the workflow module BMR/RMR EVALUATION it is now possible to represent more than 11 variables in the display object MEAN VALUES.


### **20 Colour scheme CPX International configurable**

For the representation of the variables in the display objects it is now possible to configure the colour scheme CPX INTERNATIONAL. To do this open the Toolbox submenu SPECIAL SETTINGS/VARIABLES/GENERAL SETTINGS.

### **21 Test protocol: W/weight for workload selectable**

In determining the workload in a test protocol for a bicycle test, you can also select the unit W/weight (usually W/kg).

### **22 Module Universal Analysis: Show values at cursor**

When the button  SHOW CURSOR (action list) is selected, the test values of the display object configured variables will be displayed directly at the cursor.

### Version 4.5.0

#### New functions

##### 1 Oxygen Kinetics

Starting now, you have access to the new OXYGEN KINETICS functional block in the CPET - BASIC EVALUATION module for the evaluation of a step test. You can use it to examine the adaptation in oxygen uptake of a subject to a workload change.

This means: The measured oxygen uptake is analysed to determine how high the **oxygen deficit** was for every load increase (change over) and - derived from this - the total **oxygen deficit** at the end of the exercise *phase* . You can also easily analyse the **oxygen debt** during the transition from the exercise to the recovery phase.

##### 2 Trend Analysis

For CPET tests with the CPET TREND ANALYSIS module you now have access to a new analysis tool that provide support in assessing whether and how the performance of a subject improves/deteriorates within a certain period of time. This means: changes of exercise capacity can be identified on the basis of several tests of a subject that are displayed next to each other.

##### 3 Complex workflows

You can now combine different test types (e.g. spirometry and CPETtests) in *one complex workflow*. In so doing, the individual workflows of a complex workflow are linked to another like containers. The results of such tests can be evaluated as a complex or as individual tests. It is possible to link any type of workflow to another.

##### 4 Load Phases during Field Tests

It is now possible to assign workload phases (rest, warming up, exercise etc.) after the fact for the evaluation of field tests. To do this, in the CHECK AND EDIT DATA module the new WORKLOAD PHASES functional block is available, and is provided to you in place of the TEST PROTOCOL functional block - if the test was performed without a previously established test protocol.

### 5 Revision of the Reports

The reports that can be printed and/or exported from MetaSoft®Studio have been thoroughly revised. This has the following advantages:

- a significant quality improvement of the print
- the configuration of reports is simpler and more efficient due to the comprehensive restructuring
- during the export of results via the GDT or HL7 interfaces several reports can now be written to one pdf file.

Furthermore certain functionalities were expanded and various deficiencies were removed. As an example, sections of multi-page reports can now be selected for printing.

## Improvements

### 1 Support for additional ECG systems

The new MetaSoft®Studio-Version now also supports ECG systems from the Japanese market, which are connected via the Kyokko Busan Interface box.

### 2 Markers for blood gas samples

In module PERFORM TEST (CPET) you now can set markers for the moments of taking blood gas samples.

### 3 Barcodes for reports are possible

The following reports can be provided with barcodes:

- CPET Basic Results
- CPET Summary
- 9-Panel-Plot
- 9-Panel-Plot - Edition 2012
- Performance Assessment
- Trend report
- User Defined Reports

### 4 Printer for reports is selectable

You now can select the printer you want to use for printing the reports.

### 5 Variables configurable in „Performance Assessment“

Concerning the performance assessment and the assessment of AT and RCP you now can configure, whether the following variables should be displayed or not:

Performance Assessment:	AT and RCP:
-------------------------	-------------

V'O <sub>2</sub> , HR, V'E, RER, HR, BF, FAT, BMI	WR, V'O <sub>2</sub> /kg, V'O <sub>2</sub> /HR, V'E, RER, HR, BF
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### 6 The toolbox selection menu of masks was improved

Masks can be activated/deactivated directly in the toolbox-submenu TEST EQUIPMENT/MASKS now.

### 7 The sending of reports via GDT/HLT was improved

You now can select the reports which you like to send as pdf-files via GDT or HL7.

### 8 FVC value is usable as VC value

For resting measurements there is the new option „Use FVC as VC“. If you have set this option the value of FVC will be set as VC-value in the CPET test.

### 9 French localisation

MetaSoftStudio is now also available in french language.

### Version 4.4.2

#### Improvements

##### 1 Master licence active at Universal Dongle

If an universal dongle is connected to PC, the Master licence must not be activated anymore.

##### 2 Function of cutting out pauses has been improved

In the module Data Conditioning (CPET) the function for cutting out pauses is available now also for repeated evaluations (until now the function was only available in the first evaluation).

### Version 4.4.1

#### Improvements

##### 1 Spanish localisation

MetaSoft®Studio is now also available in spanish language.

## **Version 4.4.0**

### **New functions**

#### **1 Master licence**

With every purchase of MetaSoft®Studio you automatically buy a master licence. You unlock MetaSoft®Studio for general using by entering the master licence number in toolbox-submenu USER DATA/LICENCES. After this you unlock the single licences as usual by entering the licence keys.

#### **2 Implementation of Micromed-ECG**

With interface implementation of the ECG-system Elite (Micromed) you now can perform CPET tests with this EGC device. You integrate the ECG in an existing device configuration (toolbox) and configure it in the toolbox submenu SPECIAL SETTINGS/SOFTWARE INTERFACES/ECG SYSTEMS/MICROMED ELITE.

#### **3 Immediate network update of local data**

After performing a CPET test the patient- and test data are immediately available also on other MetaSoft®Studio workstations in the network.

#### **4 Localization for Russian**

MetaSoft®Studio now is also available in russian language.

#### **5 Implementation of PFT Interface is complete**

Now it is possible to start an analysis of a lung function test (PFT) by MetaSoft®Studio. The analysis itself will be done in MEE Smart Soft.

### **Improvements**

#### **1 Improvements of User defined reports**

1. For the xy-graphics you now can configure whether you want to display data of the phases: rest, warm up, cool-down and recovery or not (toolbox-submenu: REPORTS/USER DEFINED REPORTS/CONFIGURE TABLE).
2. For the tabular expression you now can especially configure the data averaging.





### 2 Excel export: path selection has moved

The option for selecting the excel export path you find now in the toolbox submenu SPECIAL SETTINGS/SOFTWARE INTERFACES/EXCEL (before: SYSTEM SETTINGS/EXPORT/IMPORT).

### 3 Test protocol for treadmill tests improved

The test protocols of treadmill tests now can be configured with regards to grade in 0,1% steps and to the changing of grade in 0,5% steps. Before it was possible only in whole steps.

### 4 MC3000: ECG Measurement improved

If you perform a CPET test with MC3000 you now can determine specific time points in test protocol at which point custo diagnostics shall record and store the ECG sequences. There are these 2 new icons   for that action which you can find in module PREPARATION in menu ACTIONS. This action is particularly advantageous for ramp protocols. To use this action MetaSoft®Studio must control the load device.

**Notice!** This action only works for tests with MC3000. With other ECG devices it doesn't work.


### 5 Exercise Schedule/Performance Assessment

1. In the toolbox submenu SPECIAL SETTINGS/EXERCISE DATA/GENERAL DATA with the new button  you now can configure, whether you want to print the adaption of heart rate zones at the report or not.
2. If the age of a patient is outside the valid range a message is shown in the analysing-module EXERCISE SCHEDULE (in workflow PERFORMANCE ASSESSMENT AND EXERCISE SCHEDULE). After that you have the option to realize the performance assessment manually.

### Version 4.3.2

#### Improvements

##### 1 Improved input of blood values

In the module PERFORM CPET TEST in the action bar under MANUAL INPUT there you will find a new button  that lets you register a blood sample for the blood gas analysis. In the subsequent analysis in the module DATA CONDITIONING you still only have to enter the values for the recorded time points. Furthermore the presentation of the blood values was improved in the display objects.

##### 2 Heart reserve values are representable during a test

During a (CPET) test the variables HR-R, %HR-R, %HR-R(u) now can be displayed as estimated values. That means, for the calculation of these values, instead of the individual maximum heart rate, the predicted value is used. As resting heart rate the value from the resting measurement is used, if it is present. If not, the mean value from the resting phase is used.

##### 3 Improved graphical display of FVL manoeuvres

Now expiratory and inspiratory time of forced breathing during FVL manoeuvres can be displayed in the following modules:

- Perform test (Spirometry), test and analysis
- Perform FVC test and Analysis a FVC test (Spirometry)

##### 4 Improved presentation of User defined Reports

The data view of the USER DEFINED REPORTS has been greatly improved.

##### 5 Threshold values: Improved display for t-1000

In the table VALUES ON THRESHOLDS in the module BASIC EVALUATION, in function block SUMMARY, for the variable t-1000 now the values for the variable speed are displayed under AT %Max, RCP %Max. The percentages are based on the highest speed.

### **6 Correction value for predicted value of heart rate**

If a patient is taking a medicine which has an influence on the heart rate (e.g. beta blocker), regarding to the predicted value of the maximum heart rate you now can enter a correction value.

### **7 Flexible choice of variables for reports**

At all points where variable lists are compiled (e.g. when you select variables for the reports in the toolbox submenus REPORTS/9-PANEL-PLOT, -USER DEFINED REPORTS, -REPORTS BMR/RMR), you now can change the order of the variables via drag & drop (in the variable lists).

### **8 Fixing the data view is possible**

In the modules PERFORM TEST (CPET), UNIVERSAL ANALYSIS (CPET) AND PERFORM TEST (BMR/RMR TEST), EVALUATION (BMR/RMR TEST) you now can permanently lock or unlock the *configuration list*, for instance to prevent or allow modifications in the data view. For that open the toolbox submenu WORKFLOWS/BASIC WORKFLOW ITEM SETTINGS and select one of the mentioned above Workflow modules (e.g. CPET PERFORM TEST). Under VISUAL ELEMENTS click on ACTION BAR and subsequently on VIEW. Then activate/deactivate the function via click on  ALLOW EDIT DATA VIEW.

### Version 4.3.1 - 4.3.0

#### New functions

##### 1 Flowchart Interpretation

You now have access to a new workflow in MetaSoft®Studio for the evaluation of your spiroergometric tests: CPET FLOWCHART INTERPRETATION (based on Karlman Wasserman a. o.)<sup>1</sup>. As before, you select it via the the action bar in the Patient Centre (Analysis Workflow).

To perform the flowchart-guided evaluation you can access the new FLOWCHART APPROACH TO INTERPRETATION workflow module in the workflow mentioned above. In the module 5 flowcharts of the physiological processes that are explained in the Wasserman model are compiled in an overall flowchart. On the basis of this overall flowchart you are guided step-wise through the evaluation, or to a medical finding (a diagnosis). You can evaluate individual steps of the analysis, and possibly change them.

##### 2 Universal Test Protocols

In the test preparation module you now have access to the new function **Universal Test Protocols**. You can use it at your discretion to create individual test protocols, meaning for stress phases, such as for example combining steps with ramps and/or to design work rate and time of the individual test phases so they can be varied.

##### 3 Integration of ECG Systems

With the integration of the interface for ECG systems you can now perform tests with the following ECGs:

- GE CASE
- GE CardioSoft
- Amedtec ECG Pro

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<sup>1</sup> Karlman Wasserman a. o.: „Principles of Exercise Testing and Interpretation (3rd ed.), S. 183 ff, Lippincott Williams & Wilkins, Philadelphia 2005

### 4 User Defined Reports

You have access to a new and easy-to-use function for the creation of *User Defined Reports*. Besides the already known options (➔ch. 5.3.6, MetaSoft®Studio user handbook) you can now link and print up to 4 time charts and up to 4 XY charts.

### 5 New Analysis Workflow Module

In the Analysis Workflow you now have access to a new spiroergometry workflow module - **CPET Rest Measurements Evaluation**. The functionality is similar to the one you already know from the PRE-TEST REST MEASUREMENTS workflow module in the test workflows. For further information, consult the MetaSoft®Studio user handbook (➔ch. 4.2.2).

## Improvements

### 1 Editing saved Test Protocols

Saved test protocols can now be edited.

### 2 Columns in display object Table can be configured

In the display object Table the sequence of the columns can now be configured (in the workflow modules Perform Test and Universal Analysis (both spiroergometry)). To do this, drag the column in the column head into the desired position.

### 3 New Option for Display object with V'E variable

In display objects (time chart and XY chart) in which the variable V'E is displayed, there is now a new option 'Use MVV instead of standard value' that can be used (in the workflow modules Perform Test and Universal Analysis (both spiroergometry)).

### 4 Sequence Control in Spiroergometry Test renamed

If the challenge protocol in the workflow module PERFORM TEST (spiroergometry) contains the Cool-Down phase, the Start button changes to 'Skip to cool-down' (previously the button had the function/label 'Go to Recovery')

### **5 Intrabreath Display Object can be configured**

Configurations in the Intrabreath display objects used in the workflow module PERFORM TEST (spiroergometry) can now be established so that a switch to the flow volume display during the recording of the stress flow-volume curves is made, or whether the stress flow volume curve should be displayed “frozen” for some time after the recording.

### **6 Online Smoothing can be configured**

The online data smoothing in the workflow module Perform Test (spiroergometry) can now be configured in the toolbox submenu SPECIAL SETTINGS/CPET/GENERAL SETTINGS.

### **7 New Button [Finish]**

In all of the Analysis Workflows you now have access to the additional button [FINISH] in the control bar. With it you can interrupt each workflow at any time. Data that were analysed up to that time are stored in the database.

### **8 Change in default measurement unit for speed**

The standard measurement unit for the variable Speed is now km/h (previously m/s).

### **9 Other icons for VT1 and VT2**

In the Universal Analysis module you have access to other Icons for VT1 and VT2 in the action bar.

### **10 Button [Start Test] renamed to [Start Manoeuvre]**

The button ‘Start Test’ has now been renamed to ‘Start Manoeuvre’ in the workflow module Perform Test (spirometry).

### **11 New column in Spirometry Workflow modules**

In addition to the manoeuvre result columns for VC and FVC single test reports a special ‘Result’ column was added with the sub columns ‘Value’ and ‘%Standard’. The reason is that some result values are not retrieved directly from the representative manoeuvre.

### **12 Graphical support during variable search**

While setting up a device configuration for the MetaMax®, graphical support is displayed during the search for the best variable.

### **13 New entry field for master data**

In the USER DATA/MASTER DATA toolbox submenu you now have access to a new entry field for the designation 'Supervising person' (e.g. chief physician, supervisor, director etc.). The entry is used in the foot note of a report.

### **14 Improved export of data**

If the directories for the export of data in the toolbox submenu System settings/Export/Import have not been configured yet, a corresponding 'Save under' dialogue opens.

### Version 4.2.1

#### New functions

##### **1 Integration of MEE-PFT Interface**

With integrating the software interface for the MEE SmartSoft software by the company Medical Equipment Europe (MEE) you can now perform a complete Pulmonary Function Test (PFT) by using a bodyplethysmograph. Measurement and analysis are performed in MEE SmartSoft which is started from MetaSoft®Studio.

##### **2 Extension of the GDT Interface**

The function GDT Interface has been enhanced that now reports can be sent as pdf files to your hospital information system.

##### **3 MC 3000: Source for heart rate selectable**

In the test workflow of MC 3000, in module 'Prepare Test' now it is selectable, whether the heart rate of MC 3000 standard is taken from the custo diagnostic software or from another source, which is defined in the device configuration



## Version 4.2.0

### New functions

Version 4.2.1

Version 4.2.0

#### 1 Basal-/resting Metabolic Rate Test

MetaSoft®Studio also supports you now in performing basal-/resting metabolic rate tests (BMR/RMR). The determination of the BMR/RMR rate in MetaSoft®Studio is based on the determination of the Steady State Interval (state with values that remain stable within a certain time interval). The values refer to the oxygen uptake ( $V'O_2$ ), carbon dioxide output ( $V'CO_2$ ) and the Respiratory Quotient (RQ). This means that the Steady State Interval (SSI) is reached during a BMR/RMR examination when the values mentioned above remain 'stable' over a certain time interval, or (no longer) exceed limits above or below that were previously specified. In MetaSoft®Studio the Steady State Interval can be determined using 4 different methods:

- Automatically (by an iterative process)
- Search for an interval according to specified condition
- Search for the best interval
- Manual setting of a time interval

#### 2 User Defined variables

Besides the variables provided from the factory in MetaSoft®Studio, you now have the option of defining your own variables for your exam purposes. For this purpose you have access to an easy-to-use Formula Editor, with the help of which it is for the first time also possible to combine variables whose values have breath cycle related and are collected at irregular intervals (e. g.  $V'O_2$  and lactate).

#### 3 Integration of MetaSwim

MetaSoft®Studio supports now also the CORTEX MetaSwim device that can be used for spiroergonomic tests in (competitive) swimming. The application of the device is however not limited to swimming; you only have to change a few settings to perform 'normal' spiroergometric tests with bicycle ergometers or treadmills.

### 4 Integration of PFT-MEE Interface

By integrating the software interface for the MEE SmartSoft software by the company Medical Equipment Europe (MEE) you can now perform a complete Pulmonary Function Test (PFT) using a body plethysmograph or spirometer. The MEE SmartSoft software that you use to perform the measurement/analysis is in that case started from MetaSoft®Studio.

### 5 Spirometry Test

MetaSoft®Studio also supports you now in performing and analysing spirometry exams. By default the 3 classic test of Pulmonary function diagnostics, VC, FVC, and MVV are arranged in MetaSoft®Studio such that they execute one after the other. You can, however, also assemble an individual spirometry test.

### 6 Integration of the GDT Interface

With the integration of the GDT interface in MetaSoft®Studio you can import, starting now, new patient data from your practice software or hospital information system via GDT messages into the data base of MetaSoft®Studio, and/or update already existing patient data. The data are imported automatically when MetaSoft®Studio displays the Patient Center, and the GDT interface in the toolbox is set to 'active'.

By means of the GDT interface MetaSoft®Studio can also receive requests from your practice software to start a test or an analysis (Spiroergometry, BMR/RMR, Spirometry and PFT) After an analysis MetaSoft®Studio sends the finding, together with specifications regarding the type and time of the test, back to your practice software.

## Improvements

### 1 Final ramp in the step protocol

For performing a spiroergometry test you now have the option of adding a so-called 'final ramp' during the selection of the challenge protocols. This means that you can add, for a step protocol, a ramp to the end of the challenge phase. If this function is provided in the Preparation module (CPET), an additional 'Add Final Ramp' button appears in the Perform Test module. Clicking on this button aborts the running stage and initiates the final ramp.

### **2 Pause without stopping treadmill**

For pauses in the challenge protocol, the option Pause without stopping the treadmill is now available. This avoids the time required to brake and then re-accelerate the treadmill.

### **3 3-zone model with training planner**

The 3-zone model is now also available for the determination of the training intensities in the Exercise Sheduler module. Based on this you have access in the Performance Assesment module to 2 additional micro- and 3 meso-cycle training plans.

### **4 Further query prior to program end**

Prior to closing MetaSoft®Studio or the toolbox you now receive a corresponding query. You can turn it off in the toolbox.

### **5 New display object for MetaMax®**

You now have access to a new display object for use with test with the MetaMax®. It displays the current Load of the data logger and the charging state of the rechargeable battery.

### **6 Faster useability of data smoothing**

The slider for data smoothing no longer has to be explicitly activated in the toolbox. The handling for implementing data smoothing is consequently faster and simpler.

### **7 Original finding text is restorable**

An additional Refresh Medical Findings button is now available for restoring the initial findingtext in the corresponding analysis modules. It is displayed directly next to the Medical Findings button.

### **8 Readability of values at cursors improved**

The readability of the values at the cursors that are displayed in the display objects in the Universal Analysis module is now improved through use of a one-color background.

### Version 4.1.1 - 4.1.0

#### New functions

##### **1 Support of MetaMax®3B**

The implementation of MetaMax®3B into MetaSoft®Studio provides the customer not only with the stationary but also with the mobile CORTEX spiroergometry device. Therewith MetaSoft®Studio is usable also for outdoor operations.

##### **2 Implementation of HL7-Interface**

With the implementation of the HL7 interface into MetaSoft®Studio you are now able to import patient's data or to update existent data of patients from your hospital-information-system (HIS) via ADT-messages into the data base of MetaSoft®Studio.

##### **3 Implementation of Mortara-(XScribe)-Interface**

With the implementation of the Mortara-(XScribe)-Interface is it now possible to use MetaSoft®Studio with a Mortara-ECG-device (M12A-USB) and so to perform ECG-measurements with that.

##### **4 Implementation of Excel-Interface**

The implementation of the Excel-Interface enables an output of test data of a file that can be read by a table-calculation-program like Microsoft® Excel or OpenOffice/Calc. Now you can export all relevant data of measurements- and evaluations into an excel-sheet (also usable with another table-calculation-program like OpenOffice/Calc).

##### **5 Superimpose other tests**

With the implementation of the function Superimpose Tests you are able to superimpose tests during a current spiroergometry test (module General CPET) or in the module Universal Analysis. By means of that function you can compare the current test with previous tests. The test superimposition will be displayed in the display objects XY-Charts and Time--Charts.

### **6 Firmware Update**

With the implementation of the function Firmware Update you are able to update the firmware of your CORTEX spiroergometry device(s) anytime.

### **7 Export test data from MetaSoft® 3**

With the upgrade to MetaSoft®Studio it is possible to export test data of spiroergometry tests which are performed with MetaSoft® 3. This is done in 3 steps:

- Selection and export from MetaSoft®3
- Import into MetaSoft®Studio with the help of the tool METASOFT 3 DATA IMPORT.

You can export the test data individually or in blocks. The test data will be imported with the accompanying patient(-data) into the MetaSoft®Studio database and are available in the patient center then.

## **Improvements**

### **1 Export and import of HF-models**

under SPECIAL SETTINGS/EXERCISE DATA/HR-ZONE MODELS there you can now use a function for export and import Heart rate models (HF) and for the exercise schedules.