CAB 850, User's Manual
Armature Version

Contents

1. General Hints

Information on our products is given on our Internet pages:

http://www.csd.de

Should this information not be sufficient, please contact our service:

service.rotec@schenck.net

1.1 Basic knowledge regarding balancing

Today, almost every rotating component is to be balanced. Rotors to be balanced include the entire range, from the turbines of a dentist's drill to the turbines of big power plants, from drives of entertainment electronics to satellites for worldwide telecommunication. During professional training and education, however, the topic "Balancing technology" is frequently treated only in passing, in spite of its importance.

Should you have basic questions regarding balancing:

- Visit one of our balancing seminars. Theory and actual practice are taught by experienced experts.
- For a deepening at home, we recommend the book "Balancing Technology" by Hatto Schneider, written in German, VDI Verlag, ISBN 3-18-401161-5. An English version of the book can be ordered at Rotec.

We are pleased to furnish additional literature. Please contact our nearest agency.

1.2 Fields of application

Universal measuring unit for balancing machines:

- Horizontal and vertical;
- 2 measuring pickups;
- Hard-bearing and soft-bearing.

1.3 Technical data

Display	Active TFT colour screen, 768x1024 pixel, touch screen
Interfaces:	– 4 x serial (COM1 – COM4) RS232 (115 KBaud full duplex) – 1 x parallel (LPT1) – USB – Ethernet (DSUB) – VGA (2nd screen) – external keyboard (PS/2) – external mouse (PS/2) – parallel printer – Profibus and Interbus S (optional)
Dialog language:	German, English, French, Italian, Slovenian, Czech (switchable in service dialog, see chapter 4.6)
Basic system:	– Measuring of dynamic unbalance in 2 planes – Automatic comparison of tolerance – Display in polar coordinates, in digits and as vectormeter – Display in evenly and unevenly distributed correction components – Balancing protocol (series or single) – Automatic self-test after switch-on.
Measuring range:	1 : 1 000 000
Accuracy:	Up to the limit of the connected mechanical system
System design:	– Modular, low-service design – electronical module, Profibus coupling to the PLC – Power supply unit with voltage supply of 115-230V +15% -20% / 50-60Hz with switch-over – Industry-type PC as input medium
Speed range:	800 to 1400 rpm
Options:	– Printer – Second display unit, to be positioned at a distance of up to 10 m
Mains supply:	Voltage supply with manual adaptation of 115 - 230V, +15% –20% / 50-60Hz

1.4 Display of the CAB 850

Button functions

Button assignment may vary, depending on the design/equipment of your balancing machine, therefore, in the following a general survey is given on the generally possible assignment of functions. The single functions and menus are explained starting with chapter 4:

		Ref. chapter
	Help	3.2
	Measuring of unbalance: Measuring display, calibration, step mode, single move, test, data input	4.1
	Correction plane 1: Display, first cut correction, axis parameter, step mode, single move, test	4.2
	Indexing for correction plane 2: Display, angle adjustment, step mode, single move, test	4.3
	Correction plane 2 (identical with "Correction plane 1"): Display, first cut correction, axis parameter, step mode, single move, test	4.2
	Verification of balancing state (identical with "Measuring of unbalance"): Measuring display, calibration, step mode, single move, test, data input	4.1

		Ref. chapter
	Survey: Display, information, backup, parts survey, production parameter	4.4
	Change over	4.5
	Service: Selection of programming language	4.6
	Conveyor: Step mode, single move	4.7
	Transfer: Step mode, single move	4.8

2. Starting the Measuring Unit

After switch-on, the measuring unit passes an extensive self-test. The measuring unit status can be seen on the status display.

The application for the evaluation of the measuring signals is started. The connection between application and measuring electronics is set up.

The connection between application and measuring electronics is set up and is active.

The connection between application and measuring electronics is interrupted. Please check the well-fixed seat of all connectors and call our service dept., if necessary.

The self-test has been completed successfully.

This icon is rotating in case of a data exchange between the display unit and the measuring unit.

The measuring unit is equipped with a special screen on which the desired functions can be opened directly and without the use of the mouse by touching the desired function. This "Touch-screen technology" (see chapter 3.3) makes a simple and complete operation of the measuring unit possible without using the dirt-sensitive keyboard or mouse.

First touch (or if you still want to use a mouse: click on) the center of the screen. The measuring unit changes from the splash screen to the dialog "Survey". Only now, the buttons on the screen are activated.

3. Basic Information on the CAB 850 Operation

3.1 Do you need assistance in using Windows NT?

The CAB 850 is operated by means of the operating system Windows NT. Knowledge of Windows NT is, however, not necessary. The measuring unit cannot be used with other Windows applications since you cannot shut down the CAB 850 application. This is done on purpose since:

The CAB 850 assumes important control functions for the entire balancing machine. Therefore, no additional programs must be installed on the CAB 850. A non-observance makes warranty claims null and void. An interference of the computer with external programs not approved and not supplied by SCHENCK RoTec may cause dangerous states of the balancing machine. The manufacturer shall not be responsible for the consequential risks.

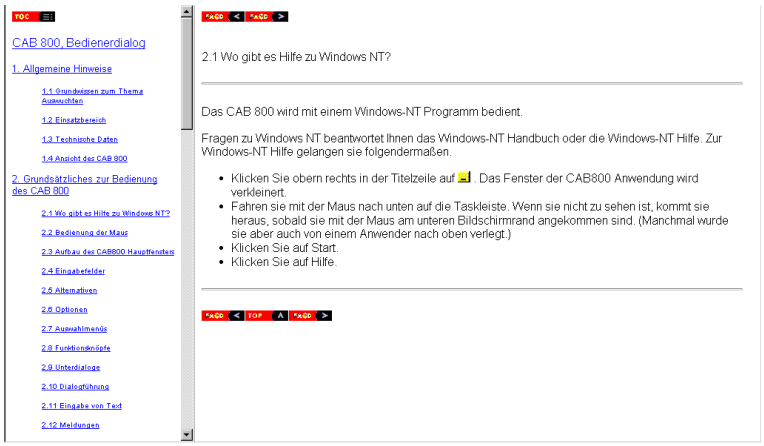
Additional questions regarding Windows NT are answered in the Windows NT manual or in the Windows NT help function.

3.2 Assistance in operating the machine and the measuring unit

If you need assistance in operating the machine or the measuring unit:

- Touch 

A help window is displayed that gives you information on the current screen contents.



If you want information on additional topics of the measuring unit:

- Touch the respective topic in the list of contents.

If you need assistance regarding the mechanical system of the machine:

- Touch TOC

The contents of the online documentation is displayed:

- Touch the topic of interest.

i	The online documentation does not treat all topics. It is, for instance, not very reasonable to describe the foundation of the balancing machine. Please refer to the printed documentation if you need information on a topic that is not included in the online documentation.

3.3 Working with the touch screen

- Touching of the screen in an optional point makes the cursor jump to this point. This action corresponds to the conventional clicking with the mouse.
- Two times touching of the screen at short intervals corresponds to a double click.

3.4 Layout of the CAB 850 main screen

The main screen of the CAB 850 always includes the following elements.

- In the title bar, the Schenck logo is displayed in the upper left position and the title of the current window and the current time are displayed in the upper right position;
- Below is a bar with the so-called tabs (see chapter 3.6);
- In bottom position, the menu bar with the touch buttons is displayed that correspond to the function keys of the usually used PC keyboard (see chapter 3.5);
- A status bar (see chapter 3.10) is arranged above the menu bar;
- Above the status bar, information is given on the function which is currently assigned to the touch buttons "Movement forward" (DT1) and "Movement return" (DT2) on the control panel (see chapter 3.9).

The following elements are included in the single dialogs:

- Input buttons (see chapter 3.7) and
- Functional buttons (see chapter 3.8).

Dialogs and subdialogs are opened in the main screen. Dialogs are normally opened via the tabs and subdialogs are opened by means of a so-called “functional button”.

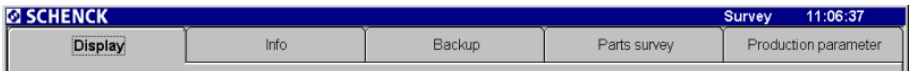
3.5 Menu bar

The single functions can easily be controlled by means of the menu bar. Upon starting the machine, the CAB 850 starts with the function “Survey”.

- Touch the function that is to be executed.

If the functions are very extensive, they are represented on several tabs and in several dialogs.

3.6 Tabs



- Touch the tab of the dialogs you need.

The tab is shown as active dialog in a “in front” position and the name of the dialog is represented in bold letters. The remaining tab titles are still visible and can be selected at any time.

3.7 Input buttons

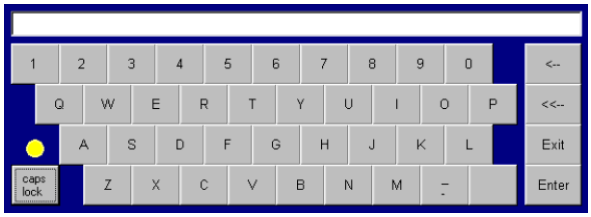
Most of the inputs to be made at the balancing machine are either text inputs or numerical values. Two special keyboards or their respective buttons are necessary on the screen of the measuring unit to make these inputs in the system.

- Activate the desired input button by touching the button directly on the screen.
- Touch 

for the keyboard or 

for the keypad.

A window for the input of texts or comments composed of letters and digits is displayed (figure on the left) or a window for the exclusive input of digits in parameter lists or similar is displayed (figure on the right):



- Make the input by touching the screen keyboard or keypad.
- At the end, touch the "Enter" key to acquire the input. The input window is removed from the screen.
- Touch the "Exit" key if the input is not to be acquired.

If admissible limits are exceeded during the input, the bar above the input button flashes once in red and the maximum value is entered.

<- Deletes the character in front of the cursor

<<- Clears all input characters

caps lock Changes between upper case and lower case letters. If the circle above is yellow, UPPER CASE is activated.

3.8 Functional buttons

, …

Functional buttons trigger an operation in the dialog/subdialog.

- They start measurements;
- They open parameter lists;
- …

- Touch the respective button for starting the desired action.

3.9 Movement

In this line it is displayed which function is currently assigned to the touch buttons "Movement forward" (DT1) and "Movement return" (DT2). In this example

- Press "Movement return" (DT1) to brake the balancing drive.
- Press "Movement forward" (DT2) to start the balancing drive.

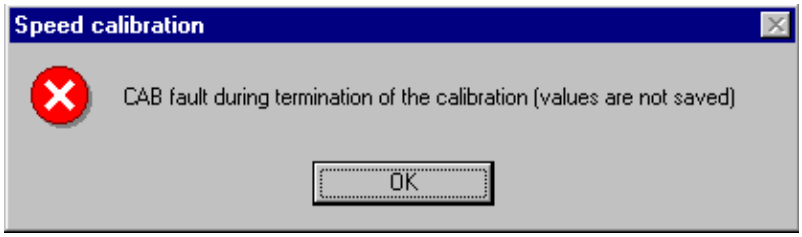
3.10 Status bar

Information on the status of the machine is displayed in the status bar. Critical messages are red highlighted.

- Touch the functional button <-> to call a subdialog with the latest status messages of the balancing machine.

3.11 Messages

Messages are to inform you on instructions being executed but also on malfunctions in the operating sequence of the balancing machine.



4. Dialogs in Detail

This description includes all possible features of the CAB 850. Not necessarily all dialogs and menus described here are included in you measuring unit. Not reasonable items or functions not needed by you are hidden.

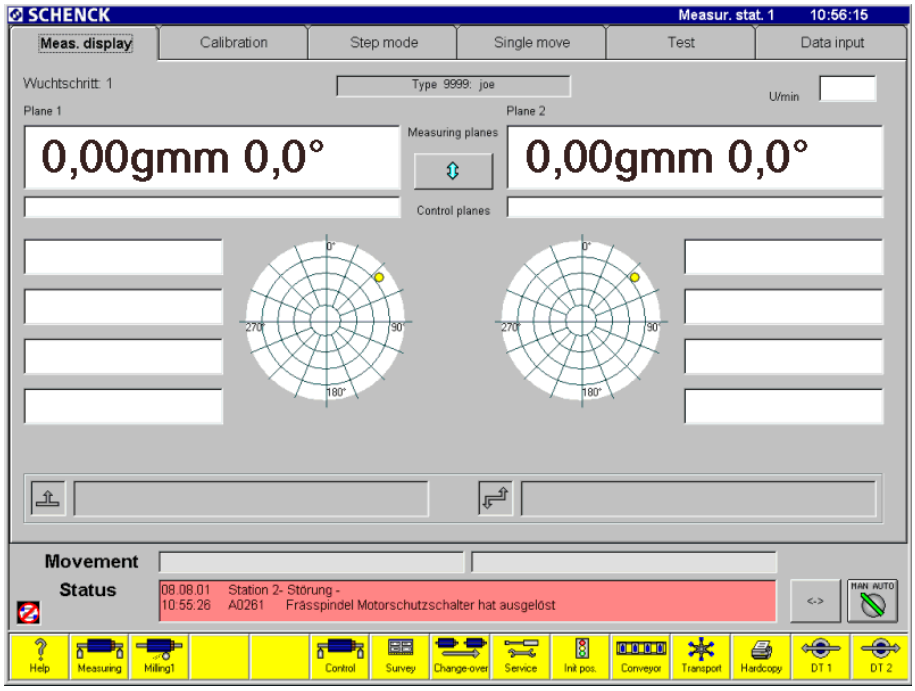
Not reasonable combinations of functions cannot be selected jointly and are, therefore, hidden or are for instance displayed in grey lettering instead of black lettering.

4.1 Measurement / control

All functions for the measuring of unbalance can be accessed. In this context, it is insignificant whether the initial unbalance is measured in the first *measuring station* (also called only measuring station) or the residual unbalance in the second measuring station, the so-called *checking station*. The needed functions are identical for both stations. The following dialogs are required for the operation of the functions:

Measuring display	see chapter 4.1.1
Calibration	see chapter 4.1.2
Step mode	see chapter 4.1.3
Single move	see chapter 4.1.4
Test	see chapter 4.1.5
Data input	see chapter 4.1.6

4.1.1 Measurement display

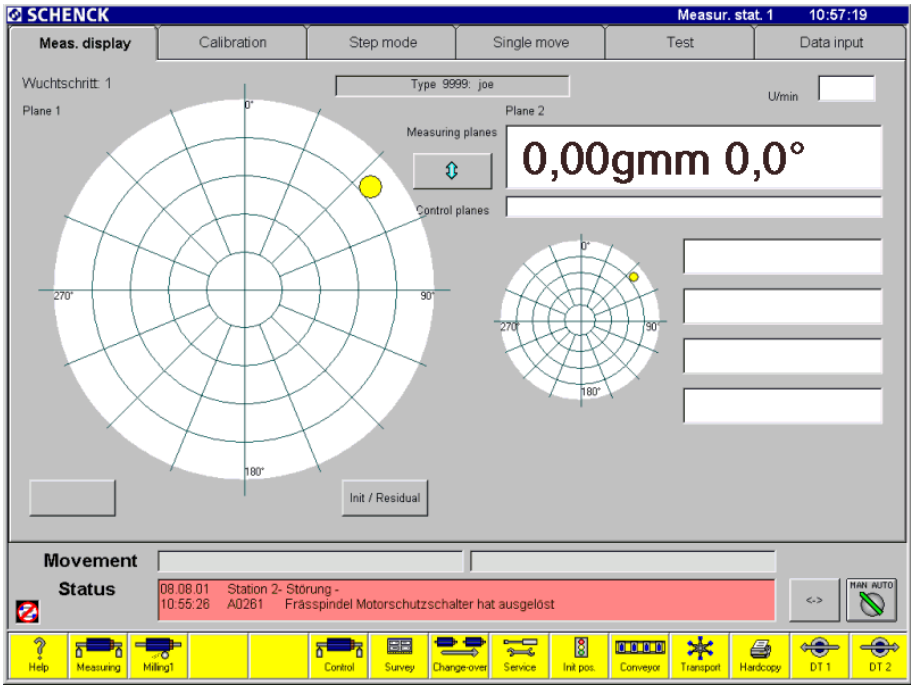


The result of unbalance measuring is displayed. For each plane you see:

- Amount of unbalance and angle;

- One or two vectormeters that clearly represent the unbalance(s);
- Probably correction instructions.

The representation of measuring results by means of the vectormeter is particularly clear. Upon direct touching, the vectometer is displayed in big size. The result could be as follows:

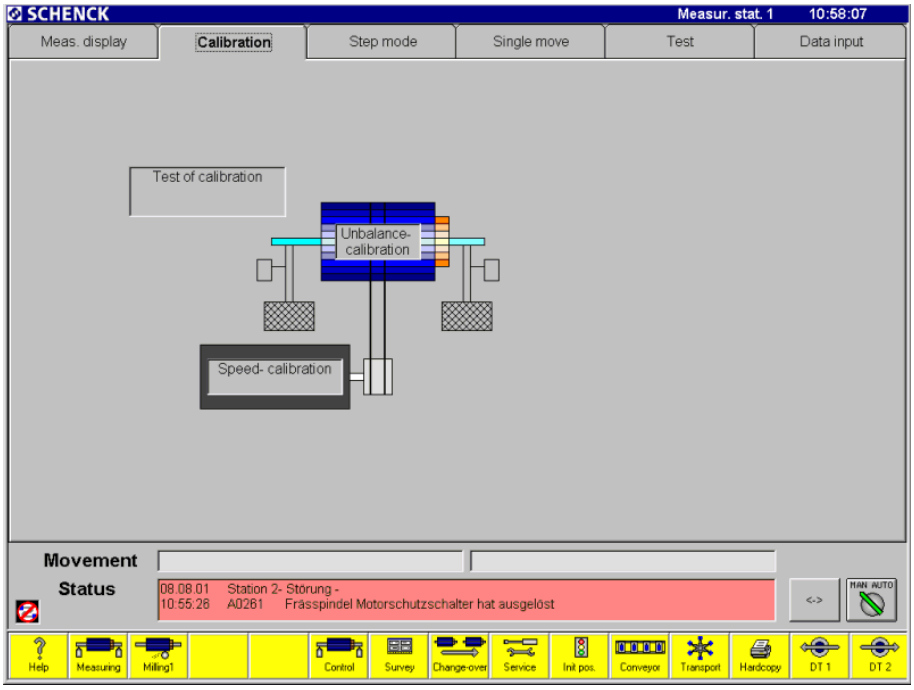


A detailed indication of the measured unbalance is given in amount (distance from the center) and angle (when compared with the reference point). The displays of the two correction planes can be switched separately from each other so that various combinations of display are possible.

- For a switching of display between measuring and checking planes - if no separate checking station and thus no function “Check” is available – just touch the functional button ⇕. The size of the measuring value indicators is switched in order to make easy reading possible.
- After a repeated touch, the indication returns to its initial size.

4.1.2 Calibration

This is a rough and very schematic representation of the machine and of the respective calibration possibilities.



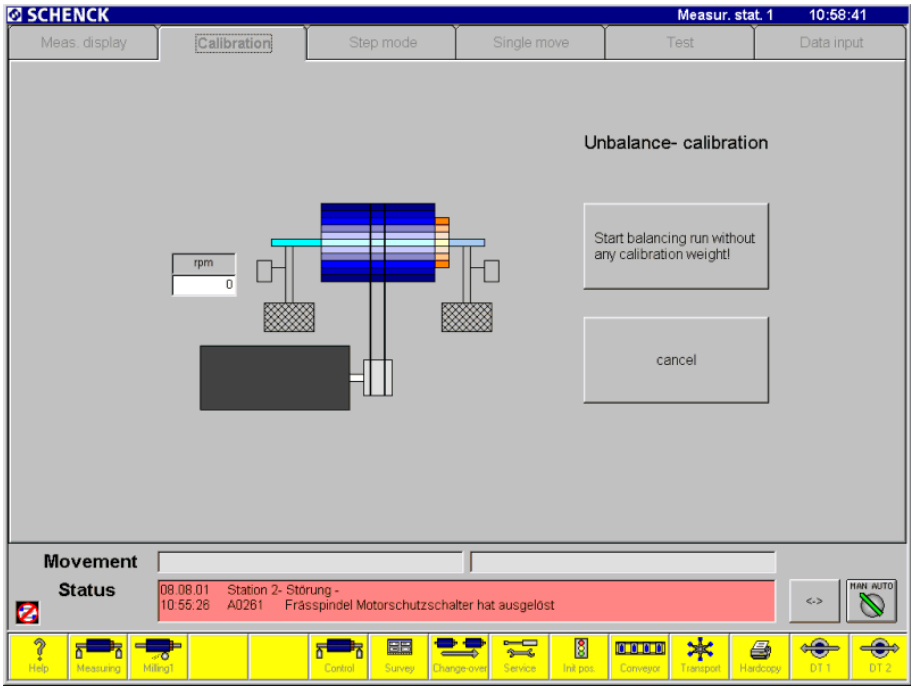
- Unbalance calibration (see chapter 4.1.2.1)
- Speed calibration (see chapter 4.1.2.2)
- Test of the calibration (see chapter 4.1.2.3)

- Touch the boxes with the key words to start the required calibration and to carry out a menu-based operation.

4.1.2.1 Unbalance calibration

Dialog “Unbalance calibration” determines the effect of a defined unbalance on the measured vibration signal. The defined unbalance to be used for calibration can be determined on tab “Data input”, described in chapter 4.1.6.

Unbalance calibration must only be made by particularly trained personnel. Wrong calibration causes wrong measuring results.



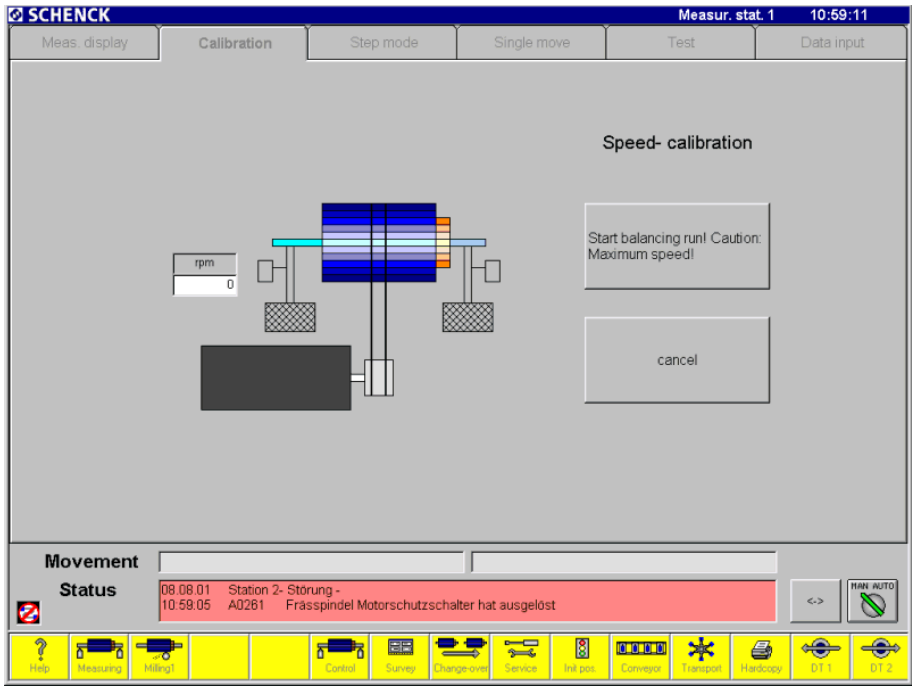
In this dialog, a step-by-step prompting is made. This documentation includes only general steps since the procedure may differ in compliance with the machine design.

- Follow the unbalance calibration instructions step by step that are displayed on the screen in succession.

4.1.2.2 Speed calibration

Voltage for the drive versus rotor speed is determined.

⚠	During this procedure, 80% of maximum speed of the measuring system are reached. Therefore, the calibration run must only be carried out with the master rotor or with a rotor balanced very well. The rotor must absolutely be suited for this speed range.

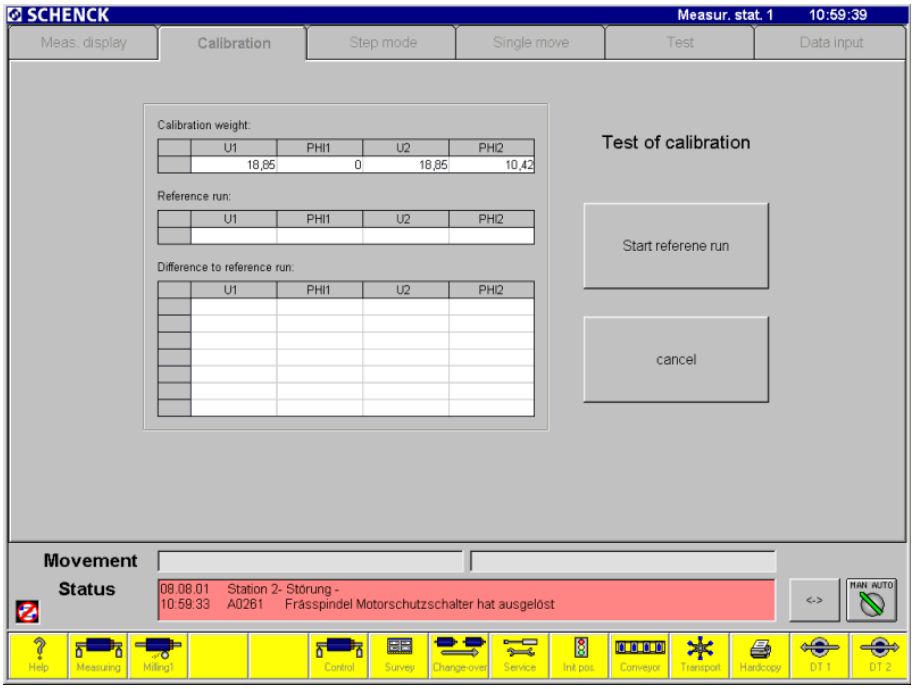


In this dialog, a step-by-step prompting is made. This documentation includes only general steps since the procedure may differ in compliance with the machine design.

- Follow the speed calibration instructions step by step that are displayed on the screen in succession.

4.1.2.3 Test of the calibration

Unbalance calibration can also be tested. The defined unbalances to be used for calibration are determined on tab Data input (accessible only in “Service Mode”).



In this dialog, a step-by-step prompting is made. This documentation includes only general steps since the procedure may differ in compliance with the machine design.

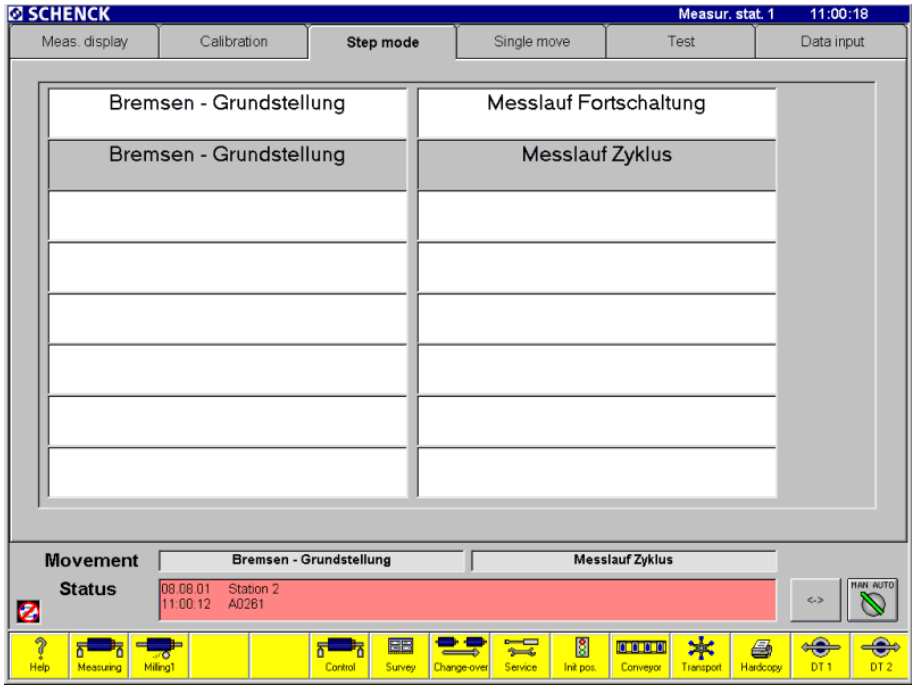
- Follow the unbalance calibration instructions step by step that are displayed on the screen in succession.

4.1.3 Step mode

For the setting or resetting of the machine or for the elimination of a crash it is necessary to carry out movements and operating steps in single mode but also in step mode, one after the other. Two different dialogs, i.e. "Step mode" and "Single move" are used to that end. Both dialogs can be accessed by touching the respective tab.

The difference of the two dialogs is that the control of the machine in "Step mode" is always made in so-called sequences while single steps can be carried out in "Single move".

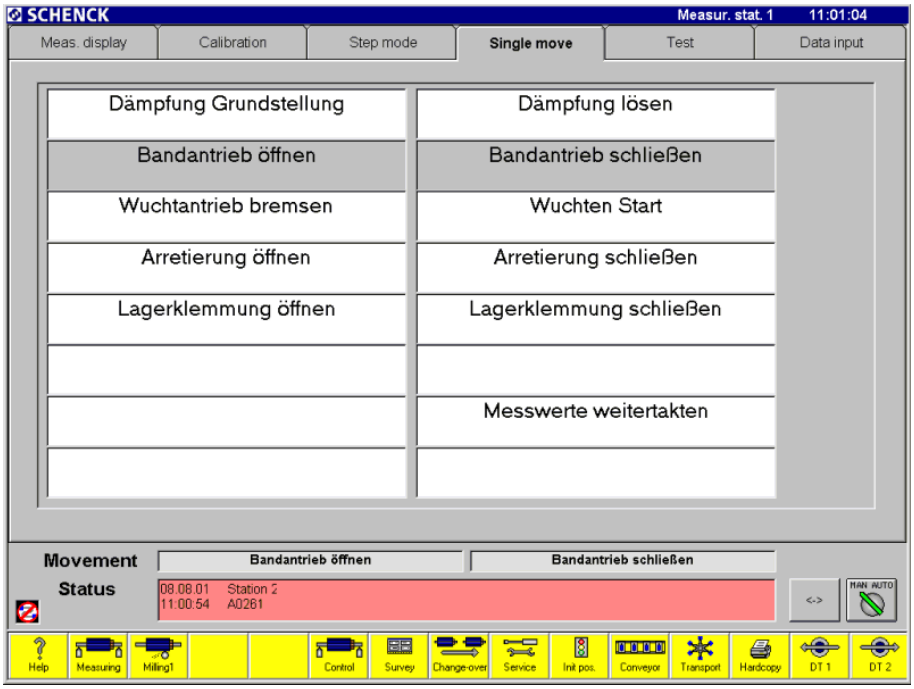
Caused by the mechanical design/equipment of the balancing machine, almost identical order lists can be displayed in the two dialogs (which of course may strongly differ from the examples shown here).



- Touch tab "Step mode".
- Touch the movement that is to be carried out in the dialog. It is then displayed grey highlighted on the screen.
  - The two selected single moves are assigned to the buttons "Movement return" and "Movement forward" of the control panel.
  - The current assignment is displayed in line "Movement".
- Press the respective buttons "DT1" or "DT2" of the control panel to carry out the movement.

4.1.4 Single move

For the setting of the machine it is necessary to carry out operating steps in single mode and one after the other. Dialog “Single move” is provided to that end. This dialog can only be used in “Service mode”.



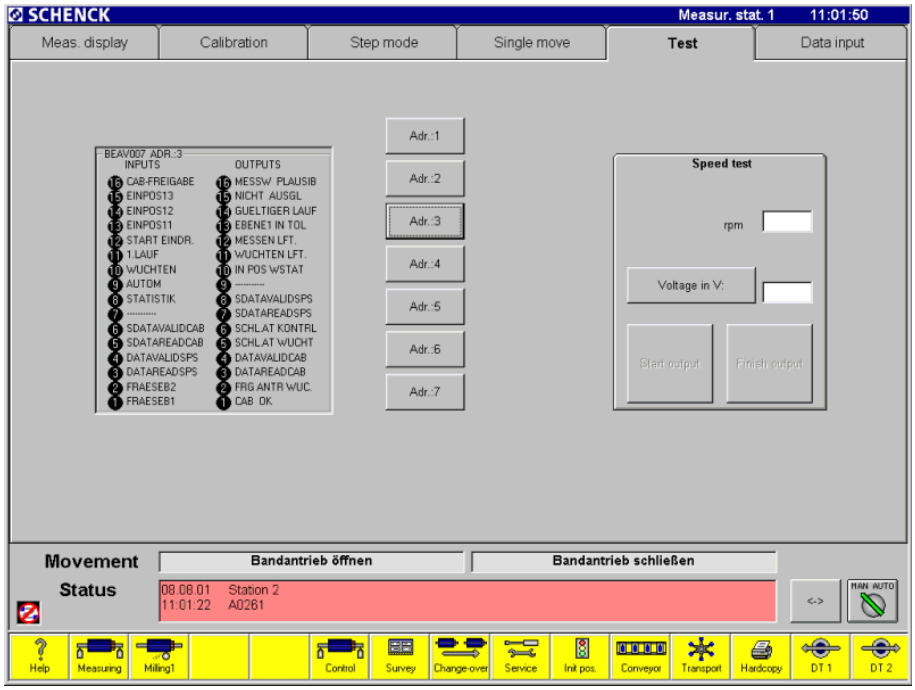
- Touch tab “Single move”.
- Touch the single movement in the dialog that is to be carried out. It is then displayed grey highlighted on the screen.
  - The two selected single movements are assigned to the buttons “Movement return” and “Movement forward” of the control panel.
  - The current assignment is displayed in line “Movement”.
- Press the respective buttons “DT1” or “DT2” of the control panel to carry out the movement.

4.1.5 Test

After the switch-on of the balancing machine, the machine automatically carries out various tests. At the occurring of an error, the respective message is displayed in the status line.

i	Please contact our service dept. if it is not possible to successfully complete the power-up test.

Probably, our service dept. will ask you to carry out additional selective tests in order to limit and locate the error. To that end, use the following dialog "Test". This dialog is only accessible in "Service mode".



4.1.5.1 Test on the input and output signals

The left half of the dialog displays the input and output signals.

- Touch the address that is to be checked or tested.
  - Active signals are marked with a red point
  - Not active signals are marked with a black point

4.1.5.2 Speed test

The right half of the dialog makes a speed test possible. Values may be input directly that are used as control signals of the drive.

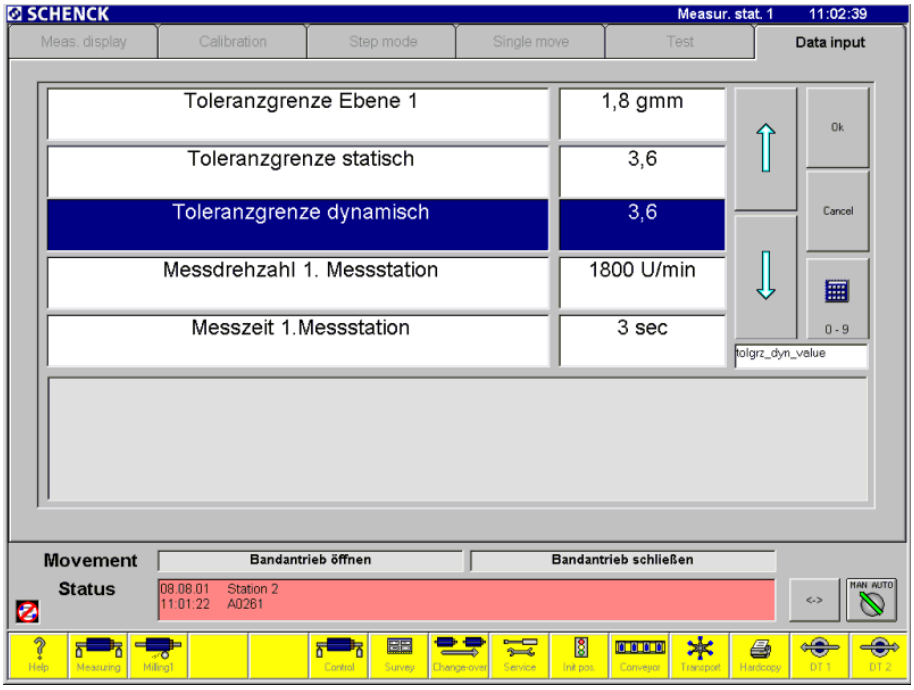
10 V	corresponds to the max. speed in clockwise direction
5 V	corresponds to the half speed in clockwise direction
0 V	corresponds to no speed
-10 V	corresponds to the max. speed in anticlockwise direction

Depending on the presetting, the max. speed can be obtained during this test. Therefore, the test must only be carried out with a rotor balanced very well. The rotor must absolutely be suited for the expected speed range.

- Enter a value for the control signal and touch “Start output”: the rotor starts the rotation.
  - If the rotor does not rotate or does not rotate at the correct speed, drive or drive control are defective.
  - If the rotor is rotating but no speed value is displayed, the reference pickup, its wiring or the evaluation electronics is/are defective.
- Touch “Stop output” to stop the rotor again.

4.1.6 Data input

Data and parameters necessary for the balancing procedure are set in this dialog. Dialog "Data input" can only be used in "Service Mode".



- Touch the parameter you want to change.
  - The line is blue highlighted on the screen, the functional buttons on the right side of the screen are activated (the lettering turns from grey to black). In the big grey box below the parameter list, important explanations are given regarding the respective parameter. Moreover, either the admissible limit values of the parameter or the exact characteristic values that are to be used for parameterizing are displayed in this box.
- If the list includes more parameters than can be displayed in one dialog page, touch the functional buttons  or  .

- Call the input keypad for digits by means of button 

, in this way, a parameter can be newly set.
- All modifications can be refused by pressing "Cancel" and can be accepted by pressing button "Ok".

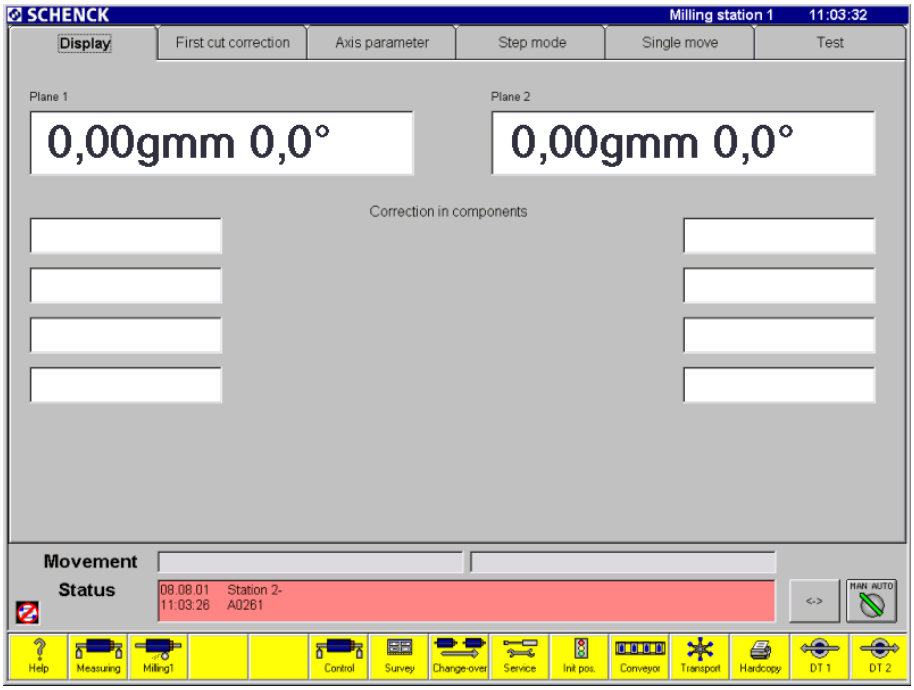
Many different parameters are to be set, depending on the design/equipment of the balancing machine. Therefore, in the following only some examples are given for single parameters and their meaning.

- Tolerance limit amount plane 1
  - ☐ How big is the max. amount of unbalance you want to admit in plane 1?
- Tolerance limit amount plane 2
  - ☐ How big is the max. amount of unbalance you want to admit in plane 2?

- Filter time
  - Filter time is the time in which the measuring signal is evaluated. It must not exceed the measuring time! A modification of the filter time requires a recalibration!
- Measuring time
  - The measuring time is the time during which the rotor runs at balancing speed. The measuring time must be at least the same as the filter time!
- Measuring speed
  - Speed at which balancing is measured.
- Calibration unbalance plane 1
  - How big is the amount of unbalance which is added in plane 1 for the calibration of the machine?
- Calibration unbalance plane 2
  - How big is the amount of unbalance which is added in plane 2 for the calibration of the machine?
- Angle of calibration unbalance plane 1
  - How big is the angle under which the calibration unbalance is added in plane 1?
- Angle of calibration unbalance plane 2
  - How big is the angle under which the calibration unbalance is added in plane 2?
- Acceleration ramp
  - Time during which the rotor is to be accelerated to balancing speed.

4.2 Correction plane 1/2

This dialog displays the unbalance correction to be made at the rotor. Dialog layout depends on the type of correction procedure, therefore, only the most important steps are indicated (our example refers to an automatic unbalance correction.)



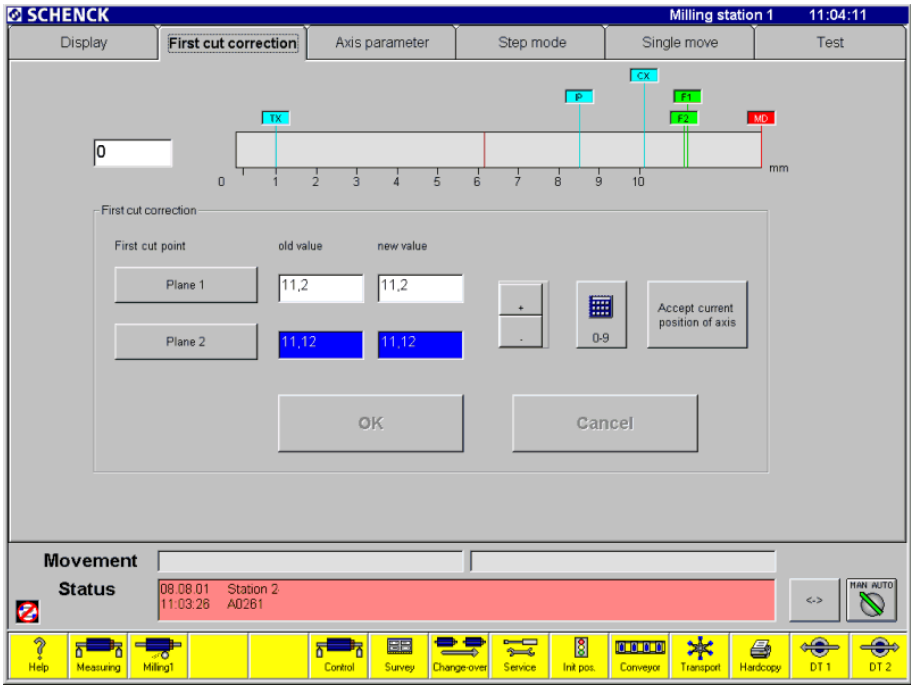
The amount necessary for the unbalance correction is displayed for each of the max. two correction planes. Depending on the design/equipment and the type of your correction system, the following data are displayed:

- Drill depth and drill diameter;
- Milling depth and length of the milled slot, probably also the diameter of milling cutter and the profile point angle or the profile radius of the cutter;
- Number, mass and the place of fastening of the correction weights;
- …

This exemplary dialog of an automatic correction system displays only data for your information. In case of a different design of the balancing machine, also concrete values, data and dimensions can be indicated. These data are then to be used to carry out a manual unbalance correction, e.g. by adding correction weights.

4.2.1 First cut correction

In metal cutting procedures, i.e. drilling and milling, a certain part based on actual geometry of the correction tool must be considered for the so-called *first cuts* of the tool. The following dialog is used.



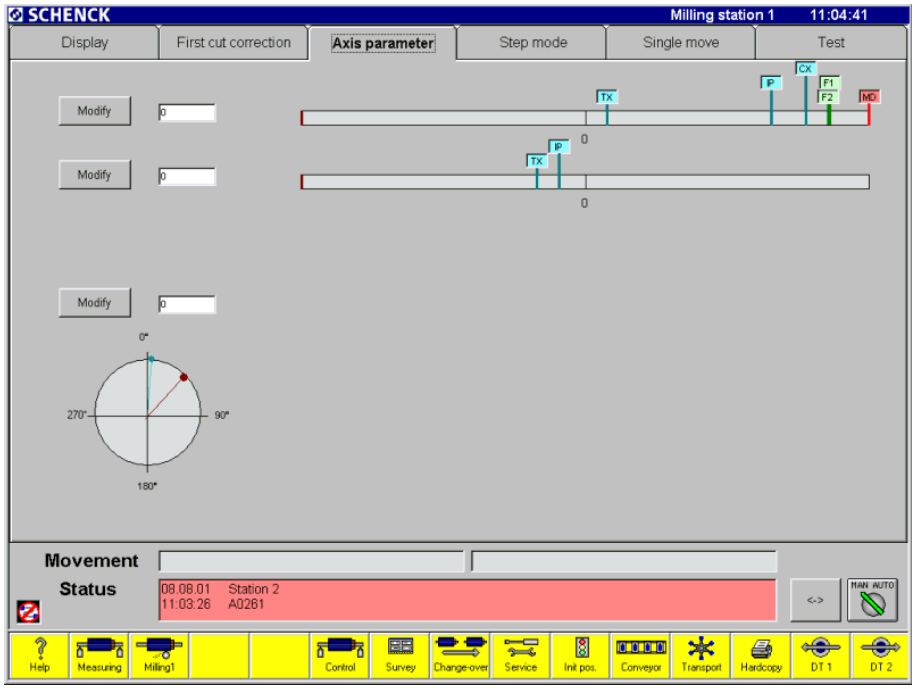
First cut is the part of the borehole or of a cutter's cut that does not have th e entire profile. For the drill, this is the tapered part of the drill point. A correction is calculated for the tapered drill point in order to obtain the necessary correction mass – that is calculated from drill depth and drill diameter. Generally, this correction increases the drill depth. This additional drill depth can be modified as described in the following:

- For a modification of the first cut correction, touch button "Plane 1" or "Plane 2" to select the tool that is to be corrected.
  - The respective input boxes are blue highlighted.
- Subsequently touch button "+" or "–" to increase or reduce the value.
  - Analogously, the small light-green mark "F1" for the *First-cut point of plane 1* or "F2" for the *First-cut point of plane 2* is displaced in the graphical representation.
- If the correction value is obtained, complete the procedure by touching button "OK". Subsequently, the system makes a safety prompt that is to be acknowledged by touching the button "OK".
- Touch button "Cancel" if you do not want to acquire the modification.
- By means of button 

, one of the required parameters can be input directly in the respective boxes.
- Should the correct position already have been approached manually by means of dialog "Single move", this position can be acquired in this dialog as valid value of the first cut correction by touching the functional button "Accept current position of axis".

4.2.2 Axis parameter

If the unbalance correction is made by metal cutting, geometry must probably be corrected after a change of the machining tool. To this end, dialog "Axis parameter" can be used that is called by touching the tab with the same name.

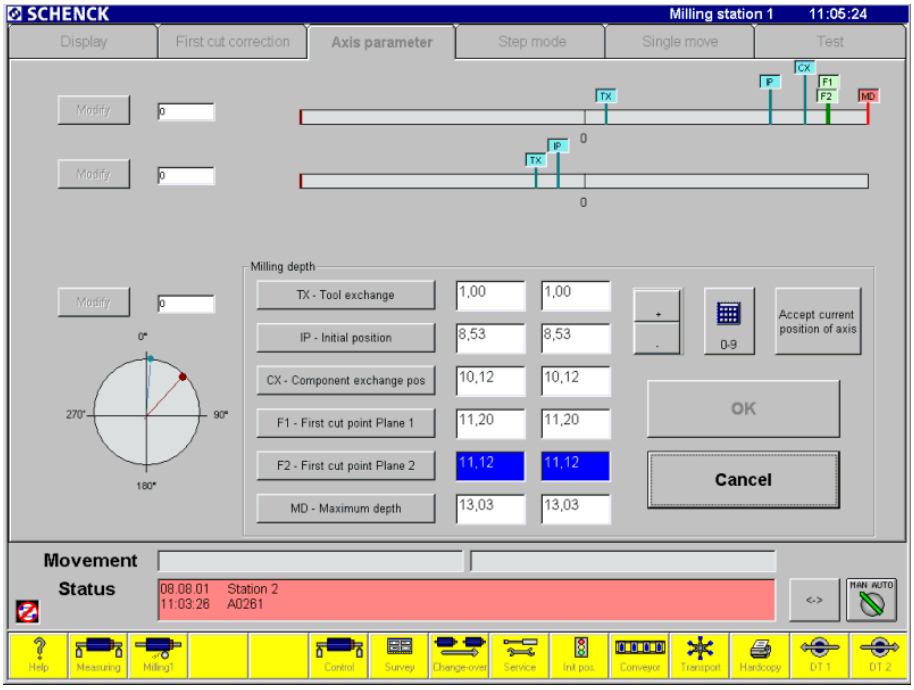


A manipulation of the axis parameters must only be made by qualified personnel. Wrong settings may cause a damaging of the machine or of the rotor.

In the dialog "Axis parameter", various movement axes of the balancing system can be parameterized in order to adjust the correct operating position. Depending on the design/equipment of the balancing system, various representations are included in this dialog, similarly to the dialog "First cut correction".

The precise setting values depend on the prerequisites of geometry, on the rotor and on many other factors. Therefore, no general statements can be made for these values.

- For the correction of the parameters, touch button "Modify" of each axis to be adjusted. This opens a new input dialog that is displayed in the following screen:



An additional window is opened in the dialog in which the signal positions of the axis can be exactly set. The name of themanipulated axis (in this example the “Milling depth”), is displayed in the upper left edge of the additional input dialog.

Depending on the importance and the function of the axis, several selection and input windows are included in the additional input dialog which are functioning in a similar way and which are to be used as follows:

- Touch, for instance button “TX – Tool exchange” in order to modify an axis parameter
  - The respective input boxes on the right are blue highlighted.
- Touch button “+” or “–” to increase or reduce the value.
  - Analogously, the small light-green mark ”TX” for the tool change position is displaced in the graphical representation.
- If the correction value is obtained, complete the procedure by touching button “Ok”. Subsequently, the system makes a safety prompt that is to be acknowledged by touching the button “OK”.
  - The additional input dialog with the setting parameters disappears from the basic dialog “Axis parameter”.
- Touch button “Cancel” if you do not want to acquire the modification.
- By means of button 

, one of the required parameters can be input directly in the respective boxes.
- Should the correct position already have been approached manually by means of dialog “Single move”, this position can be acquired in this dialog as valid value of the tool change position by touching the functional button “Accept current position of axis”.

4.2.3 Step mode

Use the functions of tab "Step mode" to move the axes to the correct positions. The control functions of the step mode with its sequencing operations are described in chapter 4.1.3.

4.2.4 Single move

Alternatively use the functions of tab "Single move" to move the axes to the correct position (possible only in "Service Mode"). This function of dialog "Single move" is described in chapter 4.1.4.

4.2.5 Test

If an error occurs during setting of the first cut correction or the axis parameters, a respective message is displayed in the status line.

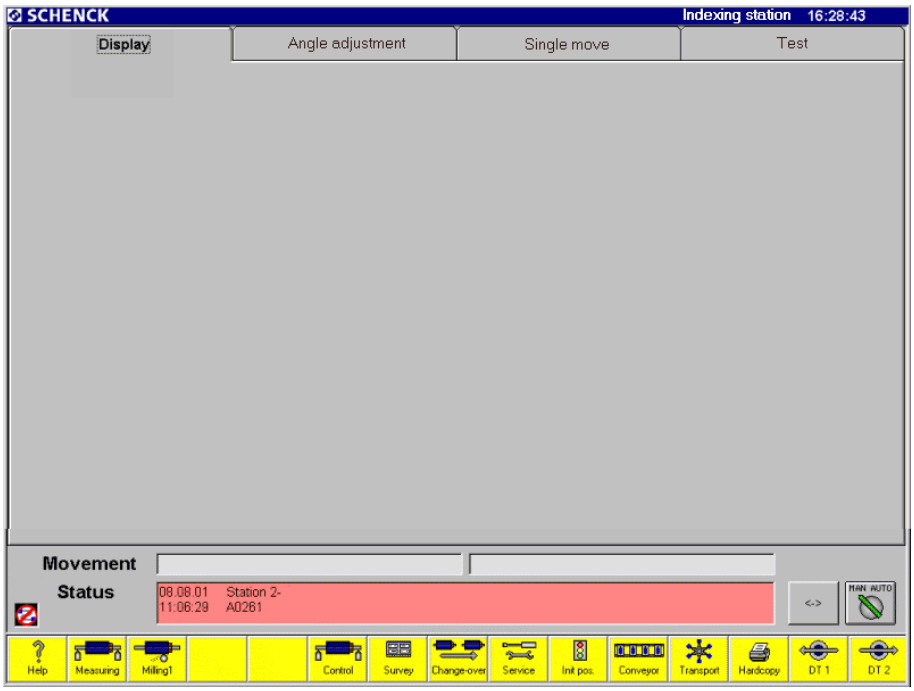
In this case, please directly contact our service dept.

Probably, our service dept. will ask you to carry out additional selective tests to limit and locate the error. To that end, use the dialog "Test" with the functions described in chapter 4.1.5.

4.3 Indexing

Between the two correction steps, the rotor is probably to be turned in order to be able to correctly balance the two planes of the rotor. In case of automatic balancing machines this is frequently made in a station of its own. If this station is available, a functional button “Indexing” is available in the bar of buton functions. By touching this button, a dialog with several tabs is started that are basically identical with the dialogs of the measuring and correction stations.

In the following dialog “Display”, values and data necessary for indexing are displayed (our example refers to an automatic indexing procedure.)



4.3.1 Angle adjustment

Adjustment of angle measurement necessary for the correct indexing of the rotor, is a procedure that is to be carried out with utmost care.

4.3.2 Single move

Use the functions of tab “Single move” to move the axes to the correct positions (the access to the dialog is possible only in ”Service mode”). The functions of dialog “Single move” are described in chapter 4.1.4.

4.3.3 Test

If an error occurs during indexing, a respective message is displayed in the status line.

i	In this case, please directly contact our service dept.

Probably, our service dept. will ask you to carry out additional selective tests to limit and locate the error. To that end, use the dialog "Test" with the functions described in chapter 4.1.5.

4.4 Survey

The measuring unit function “Survey” includes several tabs:

Display	Display of the current measuring data and information from all stations of the balancing machine	see chapter 4.4.1
Info	About the configuration of the CAB 850	see chapter 4.4.2
Backup	Copying of data to disk (visible only in “Service Mode”)	see chapter 4.4.2
Parts survey	Statistics and protocols	see chapter 4.4.4
Production parameter	Control of production and of the maintenance intervals of the balancing machine	see chapter 4.4.5

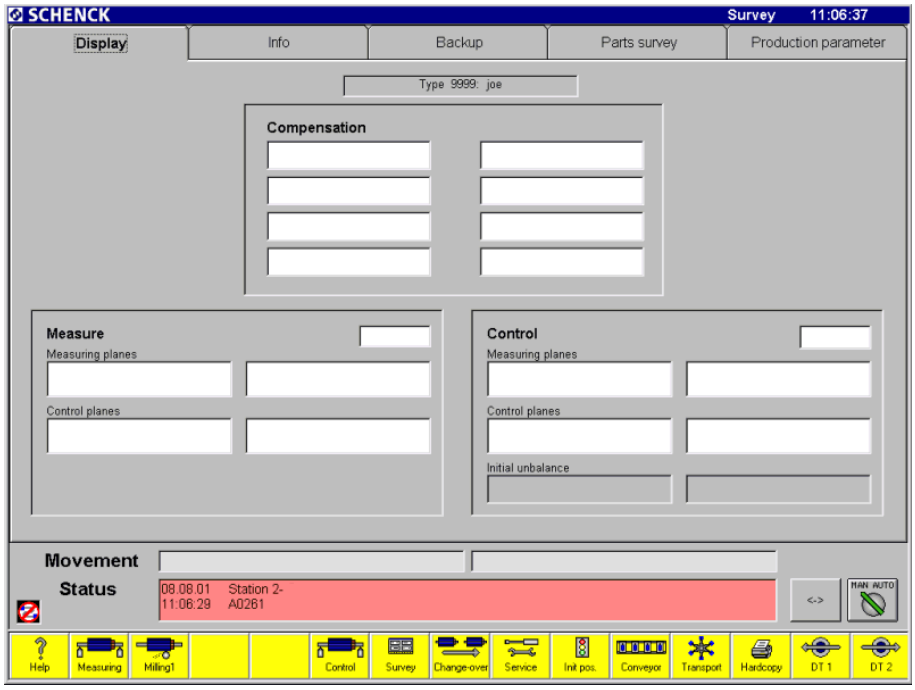
Further explanations regarding the single dialogs can be found on the following pages.

4.4.1 Display

This dialog is automatically called at the start-up of the measuring unit. The dialog offers a survey of the operating sequences and the results of all stations of the balancing machine. In their arrangement, the boxes for the display of the data of the single stations almost correspond to the actual distribution of the station of the balancing machine.

On the screen, you do ***not*** see the overall survey of a rotor from the first measuring of the initial unbalance via the correction procedure up the final check measurement; each station, however, is displayed with its current data.

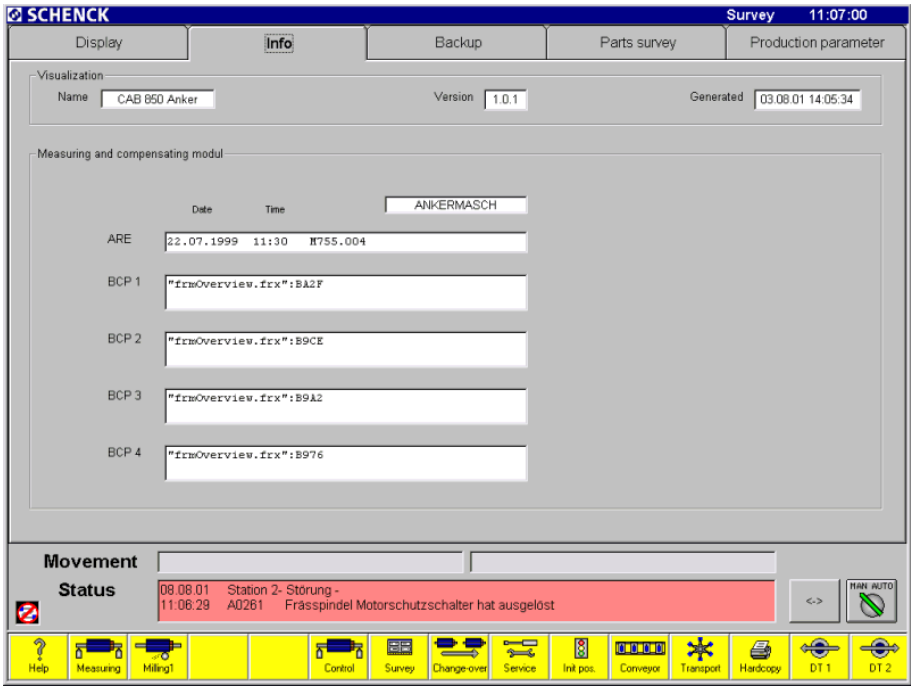
This dialog does not include functions exceeding the mere display of measuring data.



4.4.2 Info

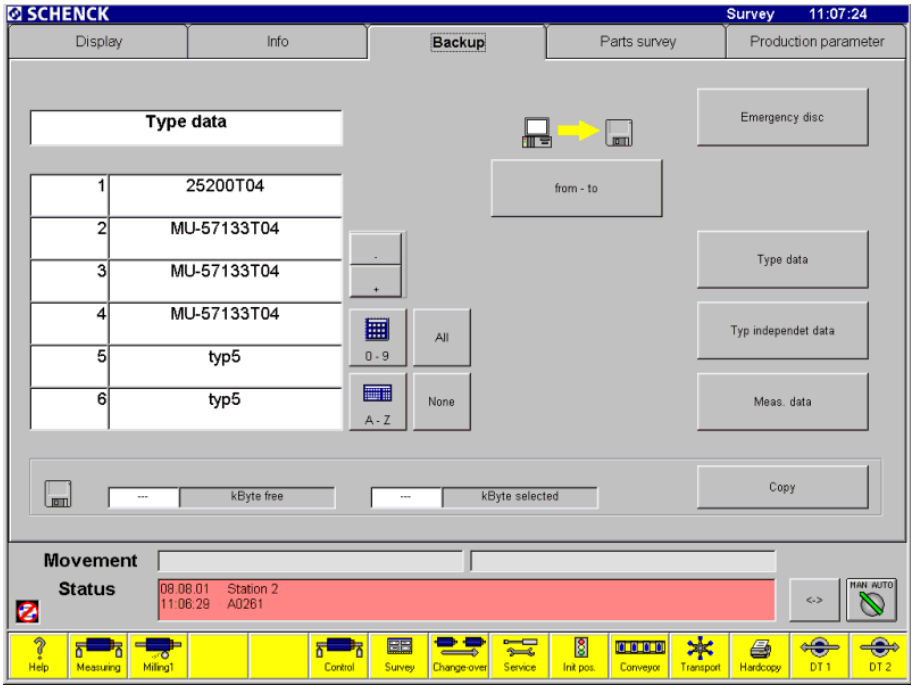
This dialog gives you information on the precise configuration of your CAB 850 (access to the dialog is only possible in “Service mode”). The information is important when you call our service dept. On the basis of this information, the service dept. is able to give quicker and in-depth information on the elimination of the malfunction causes.

Other functions are not included in this dialog.



4.4.3 Backup

In dialog "Backup", all configuration data of the CAB 850 can be copied to a disk and back from the disk to the CAB 850.



	It is reasonable to always have an empty disk inserted in the disk drive.

If no disk is in the disk drive:

	The disk drive is in the control cabinet. Disconnect the machine from power supply at the main switch. Only now, the control cabinet can be opened to insert or remove a disk. Upon closing of the control cabinet, the machine can be re-energized at the main switch and writing on the disk can be made.

4.4.3.1 Emergency disk

The last status messages are written on the disk.

Simultaneously, the data are copied to the hard disk. At a later date, the data can also be copied from the hard disk to the disk, if previously no disk had been inserted.

This option is helpful in order to recognize and eliminate the causes of malfunctions.

4.4.3.2 Type data

All available rotor type data can be copied to and from the disk.

- Touch button “from-to”.
  - An icon clearly shows whether data are copied from the disk to the CAB 850 or vice versa.
- Touch button “Type data”.
  - The generated rotor type files are displayed in the list box.
- Select the files that are to be copied.
- Touch the single files that are to be copied.

Or

- Touch button “All”.
- Subsequently touch the files that are not to be copied.

Or

- Select a single file by means of 

or 

.

- Touch button “Copy” to copy the data.

4.4.3.3 Type-independent data

Machine data, adjustment data and user data can be copied from and to the disk. Select which type-independent data are to be copied.

- Touch button “from - to”.
  - An icon clearly shows whether data are copied from the disk to the CAB 850 or vice versa.
- Touch button “Type-independent data”. The following is displayed in the list box:
  - Machine data
  - Adjustment data
  - User data
- Touch the data that are to be copied.
- Touch button “Copy” to copy the data.

4.4.3.4 Measuring data

Measuring data are collected and are written every hour on the hard disk. The automatically generated file names are, for instance 2000112710.LOG. This file includes measuring data from the 10th hour of 27.11.2000.

- Touch button "from - to".
  - An icon clearly shows whether data are copied from the disk to the CAB 850 or vice versa.
- Touch button "Meas. data".
  - The files with the measuring data are displayed in the list box.
- Select the files that are to be copied.
- Touch the single files that are to be copied.

Or

- Touch button "All".
- Touch the files that are not to be copied.

Or

- Select a single file by means of 

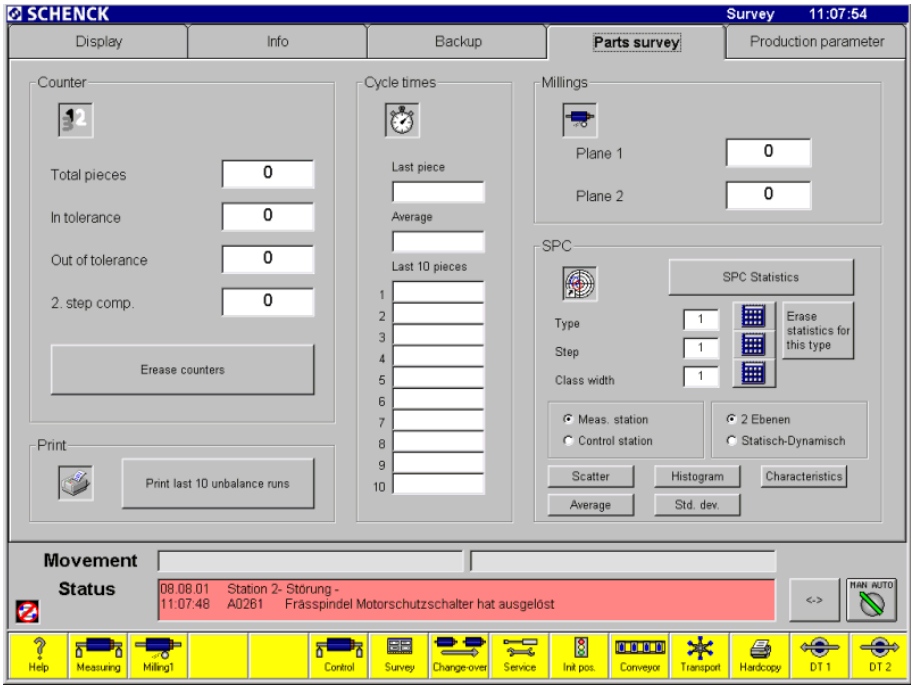
or 

.

- Touch button "Copy" to copy the data.

4.4.4 Parts survey

Dialog “Parts survey” offers a compact display of the most important production data in current operation.



Available are, among other things, counters of balanced parts, a survey of the current cycle times and an indication how many corrections had to be made at the balanced parts.

Moreover, the last ten balancing results can be printed on your system printer.

If a PLC package has been purchased with your balancing machine, a direct access to this software is included in this dialog.

Counter:

This part of the dialog includes the counter for the parts balanced since the last production shift has started, split in various fractions.

If it seems necessary, all counter readings can be reset to zero by means of the function “Erase counters”, what may become necessary for instance after a first cut correction or due to other interventions on the balancing machine.

Cycle times:

This part of the dialog includes a list of the measured cycle times of the balancing machine. The absolute cycle time of the last balanced component, the average cycle time for all components balanced since the last production shift has started as well as the absolute cycle times of the last ten components is displayed.

Millings

This part of the dialog shows the sum of the necessary corrections made since the last production shift has started. For better interpretation of the data, the distribution of these corrections to the single planes is displayed.

Print:

With this function, the last ten results can be printed as a list on the standard printer of the balancing machine.

SPC:

Statistics on the unbalance distribution of your rotors can be checked with this function. Touch button "SPC statistics" and a separate statistics program is started.

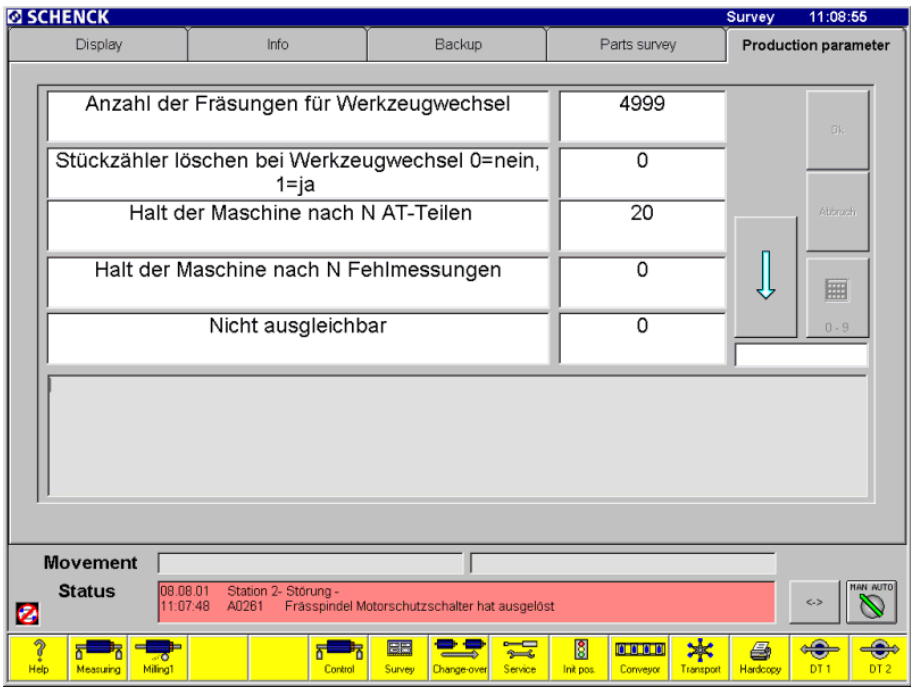
If you need only the most important characteristic data such as the "Scatter" or the "Histogram", this dialog provides direct access to the evaluation routines by means of the respective functional buttons, a starting of the SPC software is not necessary.

Select, however, type, step and class interval of the calculation to be carried out.

- For the selection of the three parameters, touch the respective boxes one after the other.
- Select whether the data of the "Measuring station" or of the "Checking station" are to be evaluated.
- For the graphical or tabulated display of the statistical data, finally touch one of the five functional buttons "Scatter" to "Standard deviation".

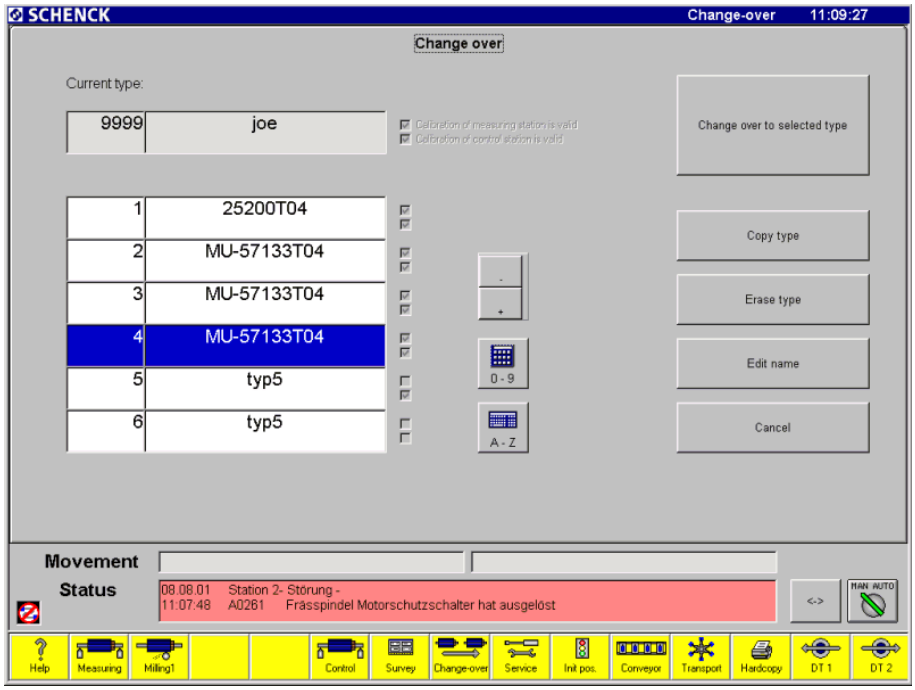
4.4.5 Production parameter

Dialog “Production parameter” makes various settings possible that regard the balancing machine behaviour in determined exceptional cases. This includes, for instance, the mechanical setting of the locking slot, if available, or the information that specifies the number of correction procedures after which the correction tool is to be changed.



- Touch the line where the input is to be modified.
  - The line is blue highlighted, the functional buttons on the right side of the screen are activated (the lettering turns from grey to black). In the big grey box below the parameter list, important explanations are given regarding the respective parameter. Moreover, either the admissible limit values of the parameter or the exact characteristic values are displayed in this box that are to be used for parameterizing
- If the list includes more parameters than can be displayed in one dialog page, touch the functional buttons ⇩ or ⇧.
  - In this way, steps up and down by 5 lines each are made in the list.
- Call the input keypad for digits by means of button 0 - 9, in this way, a parameter can be newly set.
- All modifications can be refused by pressing the button “Cancel” and can be accepted by pressing the button “Ok”.

4.5 Change-over



In dialog "Change-over", a different rotor file can be selected. The rotor file includes all important information regarding a rotor, as far as the measuring unit is concerned. These data are in particular the calibration, the balancing speed, the unbalance correction procedure etc.

i	Probably also a mechanical change-over of the balancing machine to a new rotor becomes necessary. This procedure is described in a separate document.

In the dialog, small check boxes are available on the right of the table including the rotor types. They include the following information:

- It is indicated whether a rotor type has the valid calibration of the *measuring station* (upper check box), in this case a small check mark is displayed.
- It is indicated whether in addition this rotor type has a valid calibration of the *checking station* (lower check box).

4.5.1 Select rotor file

- Select the file of the rotor for which a change-over is to be made.
- Touch button "Change over to selected type".

Now the rotor unbalance of the selected type can be measured, the calibration can be checked etc.

4.5.2 Find rotor file

It is possible to generate many rotor files. A determined rotor file can be found as follows:

- Touch button 

and input the number of the rotor file.
  - The CAB 850 jumps to the rotor file.
- Touch button 

and input the rotor name or a part of it.
  - The CAB 850 jumps to the rotor file.
- Touch button “+” or “–”
  - CAB 850 jumps to the previous or subsequent file in the rotor file list.

4.5.3 Generate new rotor file

A new rotor file is always generated on the basis of an existing rotor file.

- Select the rotor file that is to be used as templatestyle.
- Touch button “Copy type”.
  - The input of a target number is prompted.
- Input the number under which the copy is to be filed.

i	A copy of the selected rotor file is filed with the requested number. The copy has the same name as the original. Therefore, for a clear distinction it is necessary to change the rotor name first.

- Touch the target number.
- Touch button “Edit name”.
- Enter a new name for the rotor file.

4.5.4 Edit the rotor file

A rotor file can be modified at any time. It must, however, be the current rotor file.

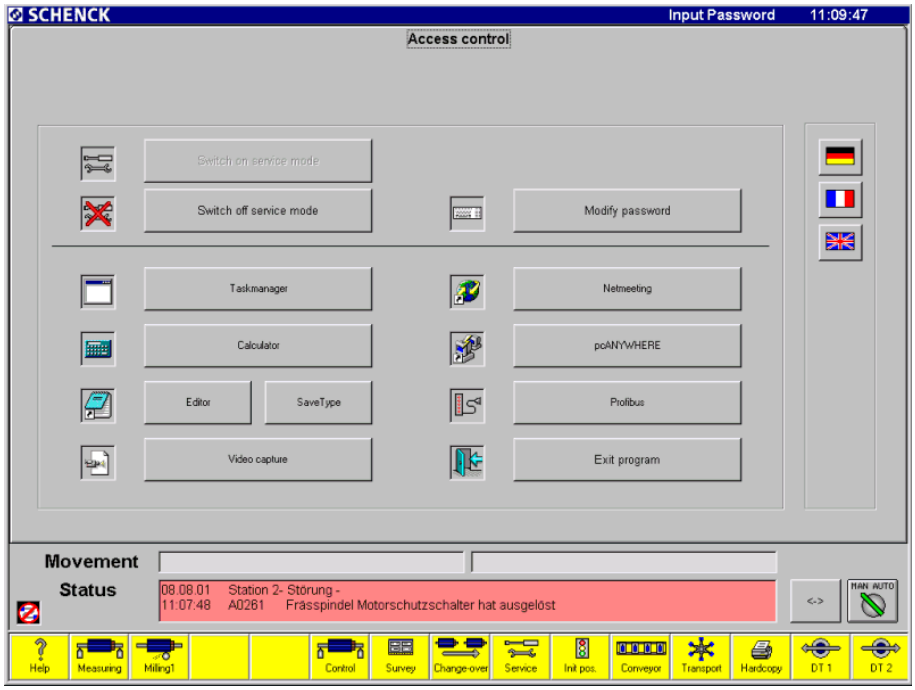
- Touch the rotor file that is to be modified.
- Touch button “Change over to selected type” .

4.5.5 Erase rotor file

A rotor file can be erased. Afterwards, it is no longer available.

- Touch the rotor file that is to be erased.
- Touch button “Erase type”.

4.6 Service



	This dialog is reserved to the service personnel of SCHENCK RoTec and is, therefore, not described.

The only function allowed to you as user of the measuring unit is the switch-over of the program language. If necessary touch one of the flags on the right side of the screen. The respective language is immediately loaded into the measuring unit. Please note, however, that the operating system Windows NT is supplied only in the *language agreed in the purchase order,* a switch-over of the language of the operating system is, therefore, not possible.

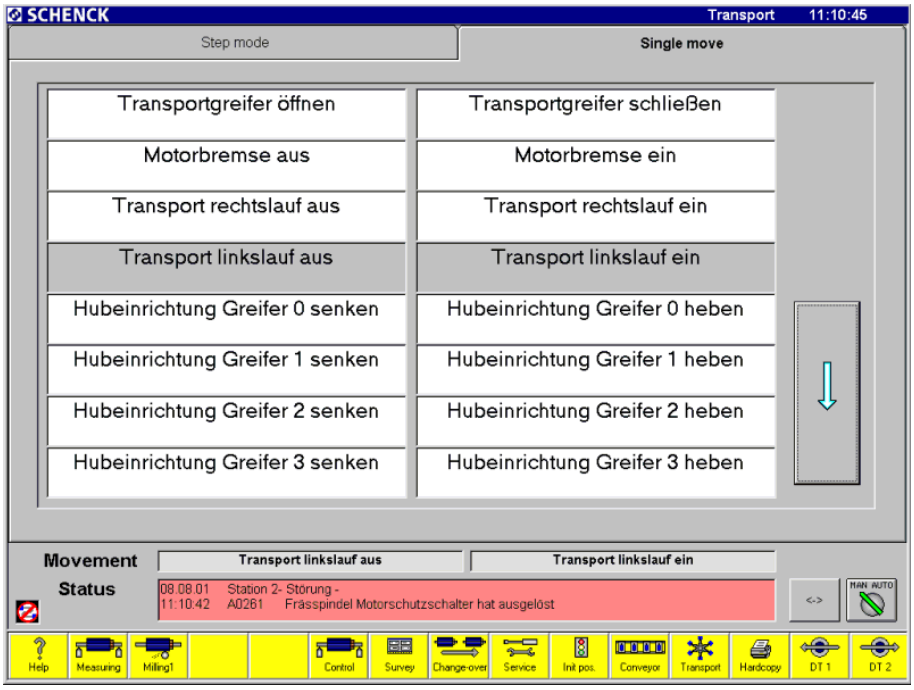
	An incorrect handling of the service dialog may put the unit completely out of operation.

4.7 Conveyor

Depending on the design/equipment and on the scope of supply of the balancing machine, a special dialog for the operation of the conveyor may be available in the measuring unit.

As “Conveyor” the transfer unit is intended that transfers the rotors from the production line to the balancing machine and, upon unbalance correction, to a subsequent station.

Layout and function of this dialog differ due to the variety of possible designs.



Normally and analogously to the previous dialogs, some tabs are available in the dialog “Conveyor” that allow the access to the single functions.

4.7.1 Step mode

Use the functions of tab “Step mode” in order to move the conveyor to the correct position or to trigger determined necessary functions. The functions of step mode control with its sequencing operation are described in chapter 4.1.3.

4.7.2 Single move

Or use the functions of tab “Single move” in order to move various components of the conveyor to the correct position (possible only in “Service Mode”). The functions of dialog “Single move” are described in chapter 4.1.4.

4.8 Transfer

Besides the already described "Conveyor", a special dialog may be available in the balancing machine for the operation of the - so to speak internal – "Transfer within the balancing machine".

As "Transfer" the transfer unit is intended that takes the rotors from the pick-up position of the "Conveyor" to the balancing machine, that transfers the rotors within the balancing machine from station to station and, after the unbalance correction, back to the "Conveyor".

Layout and possible functions differ also in this dialog due to the variety of possible designs.

Analogous to the previous dialogs, some tabs are also available in the dialog "Transfer" that allows the access to the single functions.

4.8.1 Step mode

Use the functions of tab "Step mode" in order to move the transport unit to the correct position or to trigger determined necessary functions. The functions of step mode control with its sequencing operation are described in chapter 4.1.3.

4.8.2 Single move

Or use the functions of tab "Single move" in order to move the various components of the transfer to the correct position (possible only in "Service Mode"). The functions of dialog "Single move" are described in chapter 4.1.4.

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