Technical Manual

wheasy 5

Instructions for the programming of electronic coin selectors using the PC software wheasy 5

wh Münzprüfer Berlin GmbH

Version 1.10

Content

1. Introduction

A new version of our well-proven programming software *w*heasy was made in connection with the progressive development in the field of coin handling technique and the introduction of the coin selector generation v7.

As with the coin selector generation v7 new ground was broken in terms of programming and as a consequence, the corresponding programming environment was newly set up. The handling is significantly faster although the data volume is much bigger now due to the complexity of the coin selector. wheasy 5 is designed for programming coin selectors of generation v6 and v7. Communication of the programming software wheasy 5 with the coin selectors v7 is encrypted. Therefore the development of a new dongle became necessary.

Coin selectors from the generation v3, v4 and v5 continue to be programmed by the wheasy 3 software, which is included in the wheasy 5 scope of delivery. wheasy 3 has been adjusted, so that it is possible to communicate with the coin selector using the new dongle. The activating code for wheasy 5 can also be used for wheasy 3. Communication between wheasy 3 and coin selector is also faster now.

wheasy 5 replaces wheasy 4. There is no need to install wheasy 4 on the notebook or PC in future.

The coin selectors generation v7 measuring systems was new developed. For this reason the coin selectors offer a high acceptance rate and an even better selectivity. Our service team is at your disposal for questions related to coin acceptance or if problems with counterfeits come up. Our application department is glad to serve you with new or modified data files, which you may get either by e-mail (info@whberlin.de) or by internet (https://www.whberlin.de) via our secured download area for registered wheasy-users. These can be transmitted into the coin selector by the cloning function, whereby the expenditure of time is less than 10 seconds per coin selector type EMP 900 v7.

The single pull-down menus which may be opened with wheasy 5, differ according to the features of the connected coin selector type resp. the uploaded coin selector data file.

We recommend that you read this manual before attempting to make changes to the units. This manual will give you an important overview as well as background information.

This manual mainly refers to the operation and the functions of *w*heasy 5. It is not a substitute for the technical manuals for the various types of coin selectors. The functions of various coin selectors are only described to the extent necessary to explain the relationships with *w*heasy 5.

1.1. Safety Instructions

Our electronic coin selectors and the software wheasy 5 are subject to constant technical review and development. The most current programming information can be loaded from our homepage. This manual explains all functions that are included in the program version dated July 29th, 2012. If you have any additional questions or need further information, we will be more than happy to assist you.

You may contact us by:
☎ +49 (0)30 84 57 23 – 0,
Fax +49 (0)30 84 57 23 23 and
info@*w*hberlin.de
https://www.*w*hberlin.de

Texts and illustrations are made with particular accuracy. Unfortunately mistakes or inaccuracies cannot completely be avoided. wh Münzprüfer Berlin GmbH is thankful for hints regarding faulty information and suggestions, which may serve for better understanding.

For potential remaining faulty information and its consequences, wh Münzprüfer Berlin GmbH may not be held legally responsible and will not assume liability.

1.2. PC Hardware Requirements

The minimum system requirements for the software wheasy 5 to run is a PC with 4 Gbyte RAM, 120 Mbyte Disc Space, operating system Windows 10, 64 bit or higher and a screen resolution of minimum 1280 x 720 pixel. The dongle needs a free USB 2.0 interface.

1.3. Installation of wheasy

In order to install the software, download the installation package from https://www.whberlin.de/service/whpublic/wheasy5_Complete.zip and run the MSI file from the archive.

You may see a warning "Windows protected your PC" – click "More info" and then "Run anyway".

1.4. Update

Our software is regularly updated and the latest version of wheasy 5 is always available from our homepage at https://www.whberlin.de.

1.5. Connection of a coin selector

Following installation, wheasy 5 starts automatically. However, the interface converter included in the scope of delivery should first be connected to the USB port. The coin selector and the interface converter are connected as shown in figure 1 or 2.

The interface converter also functions as a dongle when working with wheasy 3 or wheasy 5. At start up, the program checks that the dongle is attached, but this can only happen if power has been applied. Ideally, this should be supplied by the N 780 power supply or by N 789 power supply

(connected to the cinch socket of the dongle) but it may also be via a coin selector that is already powered.

We highly recommend the N 780 power supply for testing and programming the coin selectors. The N 780 incorporates all possible connectors and can also display the function of the output lines via LEDs and the coin return signal.

Programming interface for all wh coin selectors is the MDB connector. For programming, the dongle has to be connected to one the two "MDB" connectors of the N 780 and the coin selector has to be connected to the other one. The position of the programming connections can be found in the respective technical manual. All other connections of the power supply are for function control of the parallel output lines only. They are not needed for the programming process.

All coin selectors can also be programmed on site. In this situation the coin selector and dongle would both be powered from the host machine.

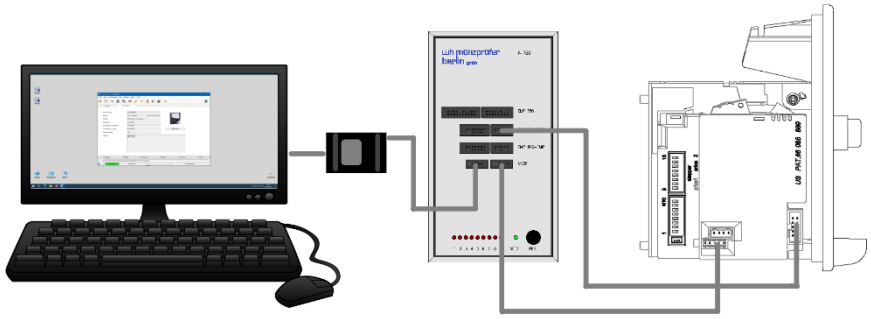


Figure 1 Configuration for EMP 800 using the N 780

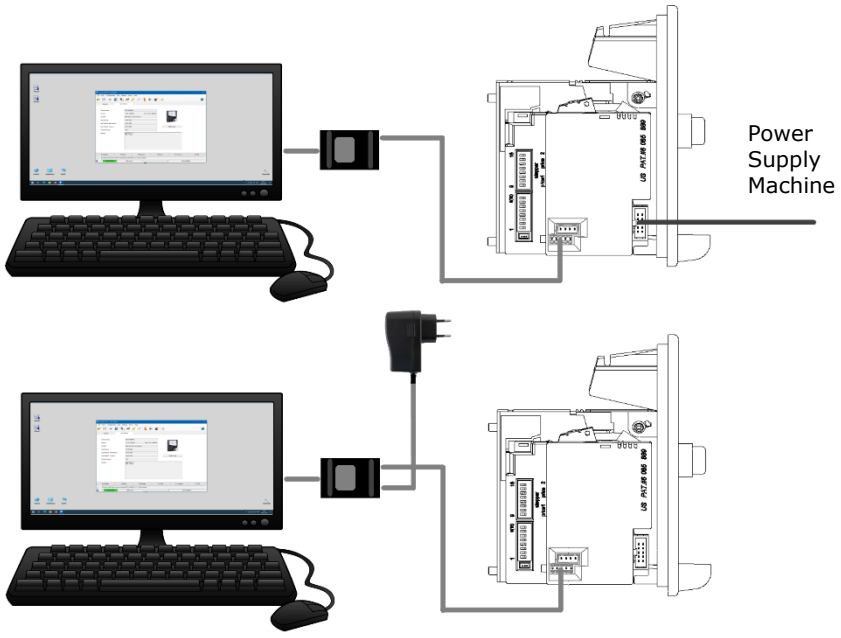


Figure 2 Configurations for EMP 800 without the N 780

Upon completion of programming with wheasy 5 the coin selector needs a Power ON Reset, so that all adjustments are taken on and the coin selector works as it should.

2. Quick Start

2.1. The Main Menu

The main window shows first the typical Menu bar for all Windows programs and also the toolbar as well as both register tabs "Data File" and "Coin Selector".

The accessibility of the single menus depends on, amongst other factors, which register tabs are presently active. The functions from wheasy 5 are described in the manual by means of the single menus and menu items.

To begin with, you will have to carry out some program adjustments after the start, e.g., the selection of the COM ports. For this purpose, open the following window under the pull-down menu "Configuration" – "Program Settings".

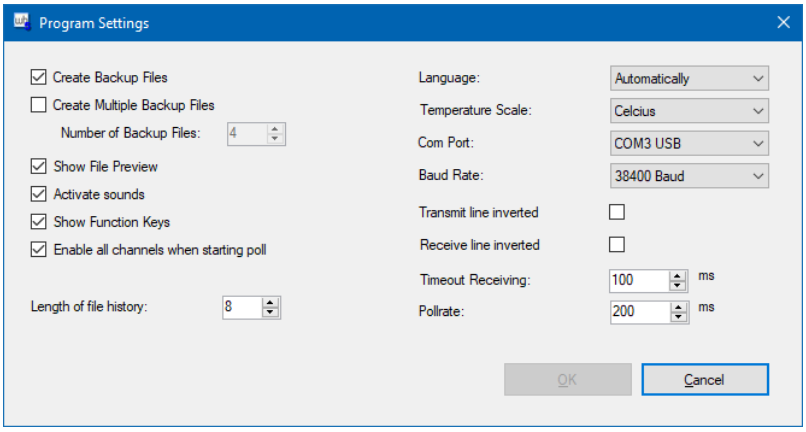


Figure 3 Program settings

The default setting for reception time out and polling rate should not be changed. The setting of the COM ports depends on the configuration of your PC or notebook. wheasy 5 is supplied with a USB-dongle, which means the interface "COMn USB" must be selected.

2.2. The Register Tabs

2.2.1. Register Tab "Data File"

wheasy 5 starts with the main window. The window contains two register tabs next to the typical Windows menu bar and the tool bar, one for the Data File and one for the Coin Selector. Data File and Coin Selector are worked on separately and independently.

The adjustments for the data file and for the coin selector are always strictly separated from each other. In addition, having connected and read out a coin selector, the data of the register tab "Data File" remain unchanged.

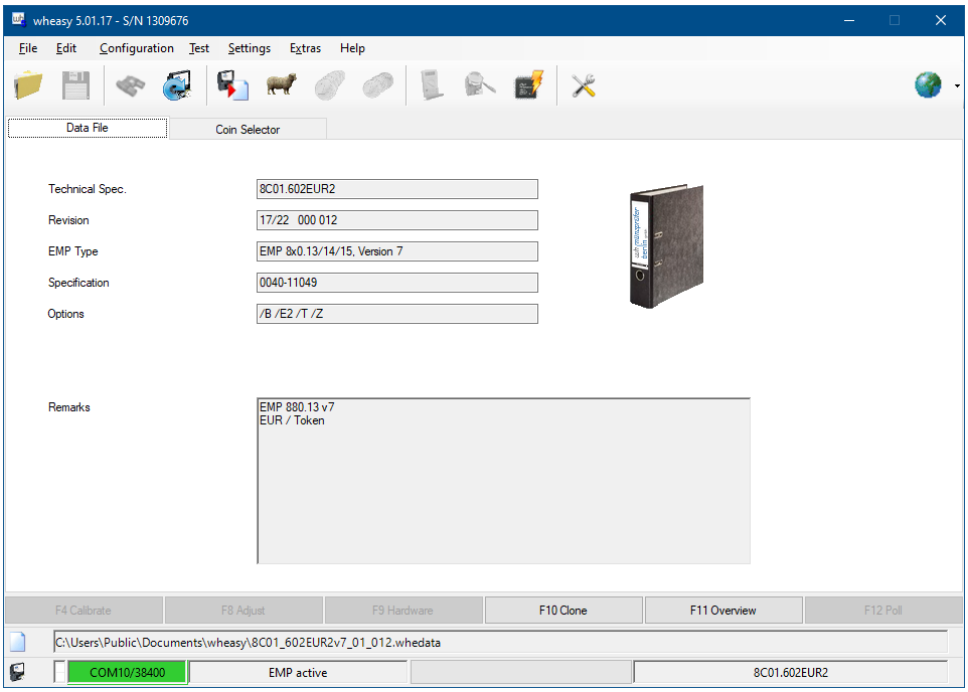


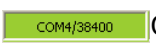
Figure 4 wheasy 5, Register Tab „Data File"

The window summarises important information regarding the loaded data file. E.g. the number of the loaded data file (technical specification), the latest revision state of the data file illustrated as "week/ year", the data files simulated EMP type, the options of the coin selector for which the data file is destined and a field for remarks, which give you important information about the data file or the coin selector. A picture of the file is always visible when a data file is being loaded.

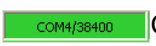
The path and file name of the uploaded data file, the active COM port with baud rate, the status bar for writing and reading the coin selector and the delivery specification of the connected coin selector are shown in the lower part of the window. The red exclamation mark at the lower left-hand side (figure 4) indicates that the connected coin selector has been programmed with a different data file than the loaded one.

The field in which the active PC-interface is shown, signals the status of the connection by three different colours.

Grey states that no interface converter has been connected or that the connected converter is not been supplied with power.



Olive-green states that wheasy has found the interface converter, but has not recognized a coin selector.



Green states that the interface converter and the connected coin selector have been recognized.

2.2.2. Register Tab "Coin Selector"

wheasy 5 automatically changes to the view of the register tab „Coin Selector" when it has been connected, has recognized and read out the

coin selector. Almost the same information as on the register tab "Data File" is shown here, expect that this information relates only to the data of the connected coin selector. The version of the firmware, and not the options, is displayed on this tab.

The image of a coin selector is visible in the window, as soon as a coin selector has been connected and read out. The exact image of the connected coin selector type is shown (e.g. EMP 900). If no coin selector has been connected, a grey coin selector contour appears.

The information in the line below the coin selector shows for which interface the connected coin selector is currently programmed.

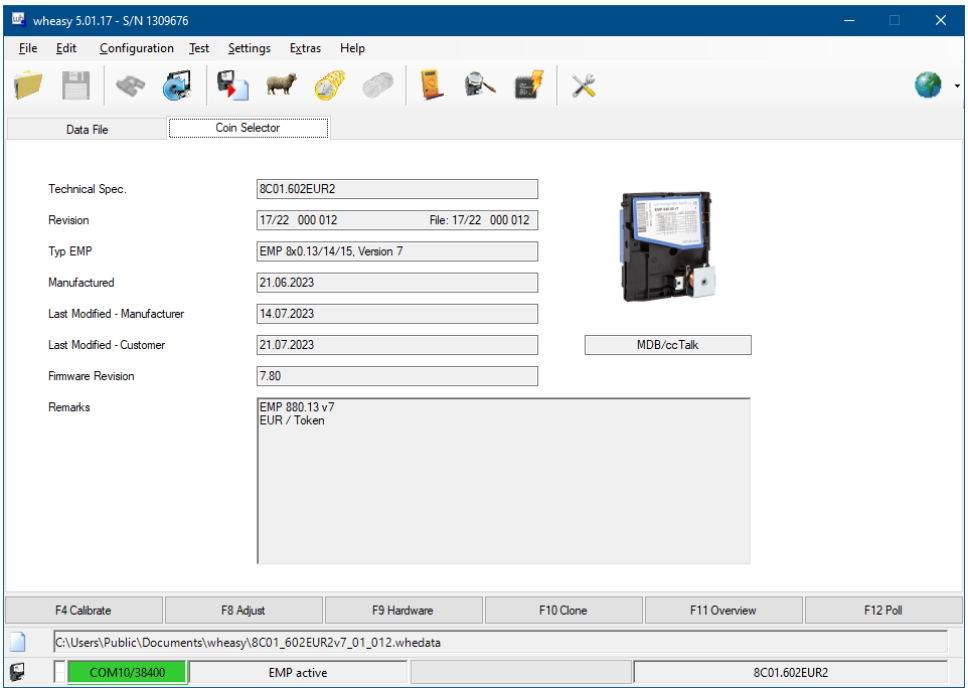


Figure 5 wheasy 5, register tab "Coin Selector"

2.3. Programming costs and settlement

Certain actions when programming the coin selectors can be subject to a charge. E.g. programming of a new coin coming into circulation or complete reprogramming of a coin selector. Settlement is carried out via a credit system. Credits can be obtained from wh Münzprüfer in form of a credit file. Credits can then be loaded from the file into the dongle and will then be used during programming. Every deduction of credits has to be confirmed by the user before executing. The credits remaining are shown in the headline of the main window.

More details are to be found in chapter "3.1.3 Load credit data file" and "3.2.2 Clone EMP".

2.4. Working with the Data Files

A data file that specifies the coin selector, the customer and currency specific settings is required by wheasy 5 for programming a coin selector. This is included in the technical specification (Data Files) for the coin selector. The numbers of the technical specifications and data file names

are usually the same. This makes it easy to program and test the coin selector because it is only necessary to load the matching data file.

If the coin selector is not reprogrammed by another data file, but only tested or updated, it is sufficient to load the data file, the name of which is indicated (after connecting the coin selector) at the register tab "Coin Selector" under "Technical Specification".

Should a coin selector be reprogrammed, e.g. for a new currency, then a suitable data file should be loaded. Data files may be downloaded from our website https://www.whberlin.de/ or are sent to you by e-mail.

2.5. Working with wheasy 5

The following chapter discusses each of the individual menu items for the purpose of programming coin selectors when working with wheasy 5. These menu selections can also be looked up in the table of contents.

3. Menu Selections and Their Function

Commonly used functions can also be accessed through function keys or buttons. Their use will be pointed out in the appropriate section.

3.1. File

The following window opens under the menu point "File":

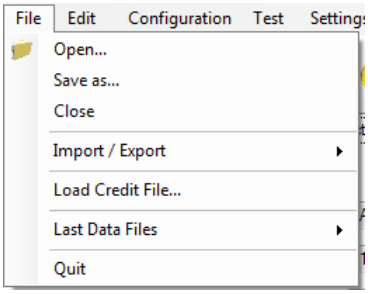


Figure 6 Pull down for "File"

The "File" menu allows you to select typical Windows items such as "Open", "Save", "Close" etc. Some specific coin selector functions are also included and will be explained below.

3.1.1. Open Data File


With this button the function "Open Data File" is also directly selectable over the tool bar.

wheasy 5 offers a preview to the data file with the standard dialogue "Open wheasy 5 Data Files". This contains the name of the data file, the coin selector type, the modification status of the data file and options as well as a coin overview.

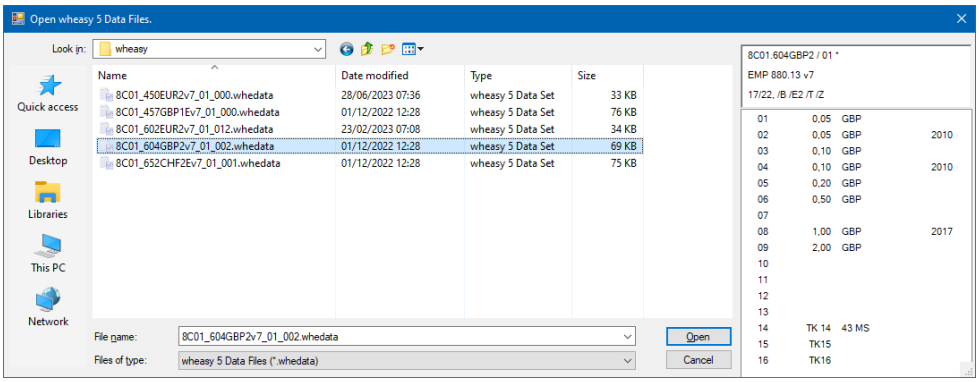


Figure 7 “Open wheasy 5 Data Files” with preview

3.1.2. Import / Export

As an option coin selector of generation v6 and v7 allow programming via MDB or ccTalk machine interface. This is possible for firmware and data file updates (remote programming). Required routines have to be integrated in the machine software and edited data files have to be available.

Function “import / export” creates such a remote clone file out of the loaded data file. After activating the function, window “export for remote cloning” shows up and wheasy 5 offers to use the name of the loaded data file of the connected coin selector.

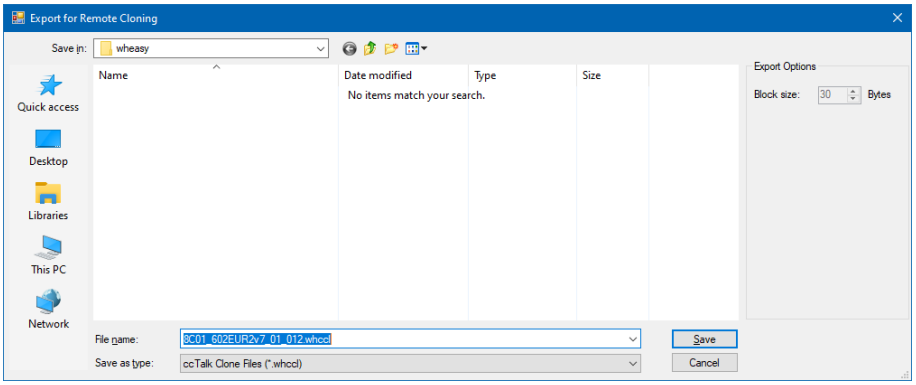


Figure 8 Window for export of remote clone file

As an adjustment for export choose the block size according to the possibilities of the machine for data buffering.

3.1.3. Load credit data file

When loading the dongle with credits for payment of actions liable for costs the following window comes up after clicking "charge credit file".

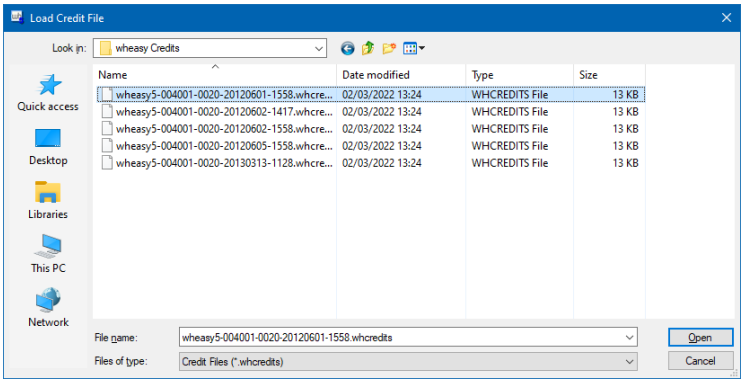


Figure 9 load credit data file

Choose one credit file in this window and click "open". The data file name of the credit file shows following information:

wheasy5-004001-0020-20120601-1558

serial number – credits – date - time

A credit file is valid for one dongle (serial number) only and has a time stamp. Please always load data file with oldest time stamp first. Time stamp and number of credits are stored in the dongle. Credits with a time stamp older than the actual loading or with the same time stamp are not accepted.

After successful loading wheasy deletes the credit file to avoid confusion with used and not used credit files.

A new credit file can be ordered directly from wh Münzprüfer Berlin GmbH. Please send an email to info@whberlin.de indicating the serial number of the dongle and requested quantity of credits.

3.2. Edit

The following pull down menu is available under "Edit":

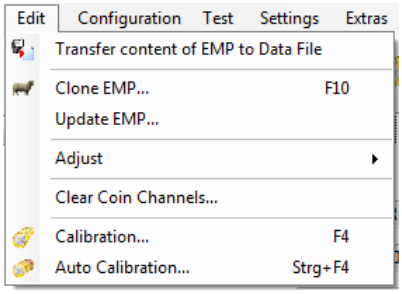


Figure 10 Pull down menu under "Edit"

3.2.1. Transfer content of EMP to Data File

 With this button the function is also directly selectable over the tool bar.

If you have modified a coin selector and wish to transmit these modifications to other coin selectors as well, you may store it in your data file using the function "Transfer content of EMP to Data File". By means of "save" or "save as" you transfer the data to your hard disc.

3.2.2. Clone EMP

 With this button the function is also directly selectable over the tool bar.

With the help of the function "Clone EMP" all operating parameters, adjustments and coin data in the coin selector are overwritten with the uploaded data file. In this way it is possible to update the coin selector (change coin acceptance or reject performance) or to program a different currency, all without actually inserting coins.

After selecting "clone EMP" the following window will come up:

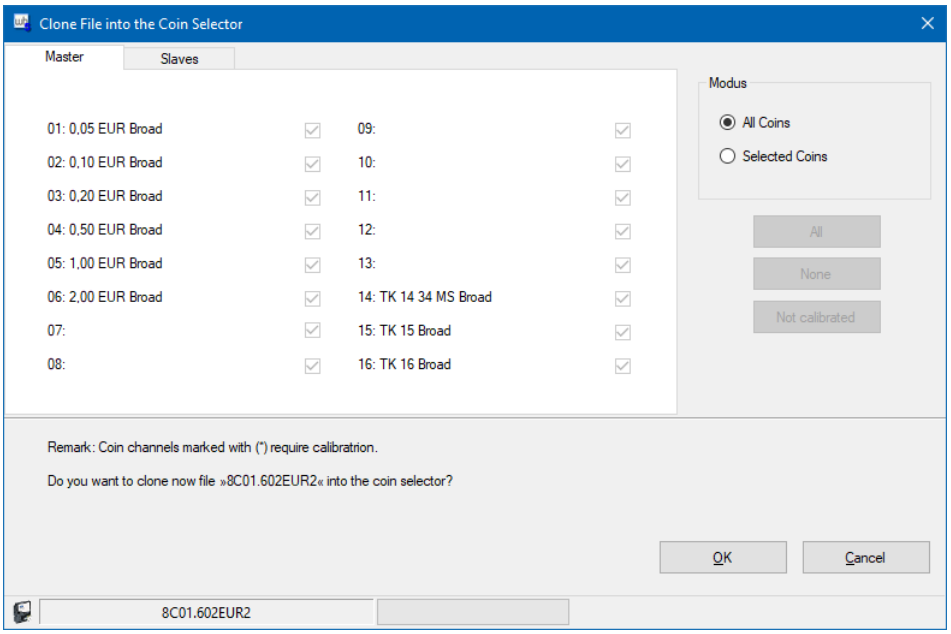


Figure 11 clone datafile in EMP

Via Radio Button it can be chosen if all or just selected coins shall be cloned. When cloning "selected coins" these coins can be chosen by clicking corresponding check box.

Tests are performed on the attached coin selector to ensure that it has the required hardware to perform in the manner relative to the data. wheasy 5 will refuse to carry out the cloning and displays an appropriate message where the cloning hardware is not compatible with the cloning data.

Some cloning actions are liable for costs, which can be payed via the credit system (see chapter 2.3 and 3.1.3). In the upper window it is displayed if credits are necessary for cloning and if yes, how many credits will be deducted ("Credit 3" and remark "This procedure will debit 3 of nn available credits from your dongle").

Please contact wh Münzprüfer or an approved wh Münzprüfer service centre regarding any further questions on cloning or new curreny files you may have.

3.2.3. Update EMP

By means of the function "Update EMP" all adjustments and operating parameters are substituted in the coin selector by the data of the loaded data file. The measuring values and tolerances of the coins remain the same.

3.2.4. Adjust

The function "Adjust" can be activated via the menu "Configuration" – "Adjust" . First a submenu is opened. You may select if the rejection for foreign coins for a certain channel or if the acceptance of valid coins should be improved. Figure 12 illustrates the window for the selection of the adjust function.

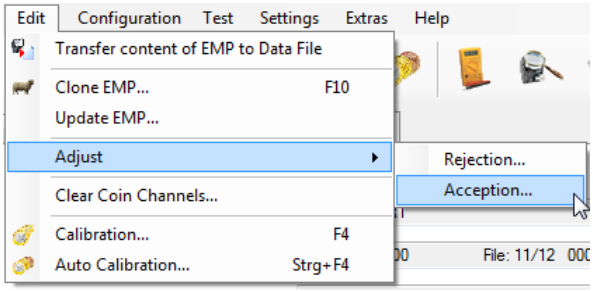


Figure 12 Adjust selection

3.2.4.1. Rejection of Foreign Coins

If the function "Rejection of Foreign Coins" is selected, the coin channel for which the counterfeit separation should be carried out has to be chosen.

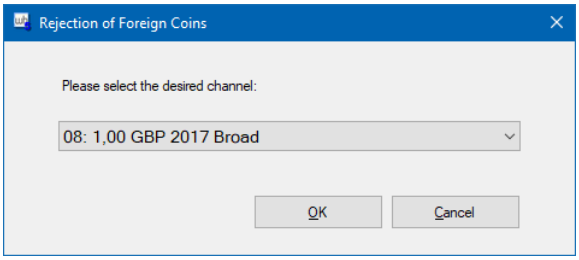


Figure 13 Selection of coin channel for rejection of foreign coins

After selecting the coin channel and confirming it with "OK" the following window comes up.

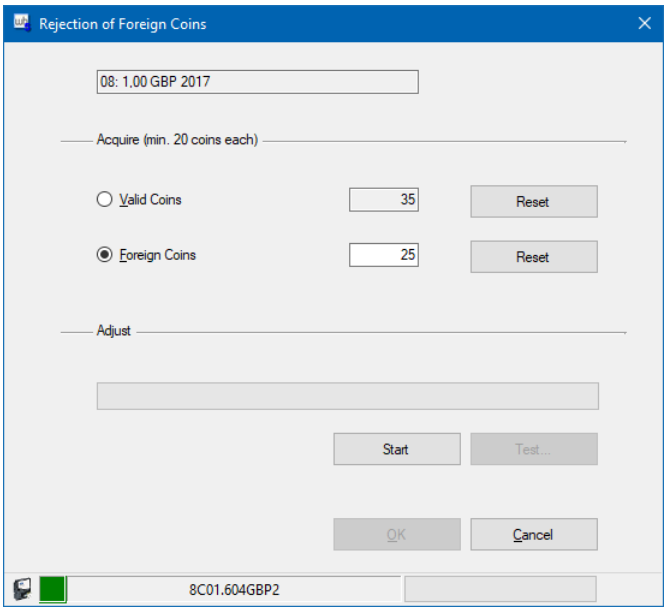


Figure 14 Rejection of foreign coins

Measured values of the valid coins (genuine coins) and the foreign coins or counterfeits have to be recorded by inserting specimens (minimum 20 pieces). Before inserting the valid coins or counterfeits, the respective radio button has to be activated. Thereby the software will know whether

the measurement values of these specimens have to be accepted or rejected. Figure 14 illustrates that already 30 valid coins and 23 foreign coins were inserted. The radio button for foreign coins is still active.

All foreign coins of the respective coin can be inserted i.e. counterfeits do not have to be of the same style, make or other similarity.

When inserting the valid coins a representative sample set should be chosen containing coins from different mints and different years. Electing for the automatic separation of foreign coins necessarily means that only coins with measurement parameters representative of the sample set are likely to be accepted.

The separation of foreign coins should always be effected for the narrowest channel of the respected coin. Block the other channels of this coin, in order to activate the new adjustment. By doing this you reserve the possibility of resetting the coin selector at any time to a good coin acceptance.

Immediately following the insertion of valid coins and foreign coins the automatic separation of counterfeits can be activated with the button "start". The software will now find an optimum adjustment on the basis of the measurement values of the inserted ranges, i.e. it attempts to provide a perfect acceptance of valid coins and at the same time a high rejection rate of foreign or counterfeit coins.

Following the optimisation procedure, it is possible to test the acceptance rate and the rejection rate achieved via the button "Test". Once confirmed with "OK" the dates will be written into the coin selector. Pressing the "cancel" button the setting can be deleted and the original setting is stored.

3.2.4.2. Acceptance of valid Coins

If the function "Acceptance of valid Coins" has been selected, the coin channel that should be adjusted for the acceptance of valid coins has to be chosen.

The following window is opened after selecting the coin channel and confirming with "OK".

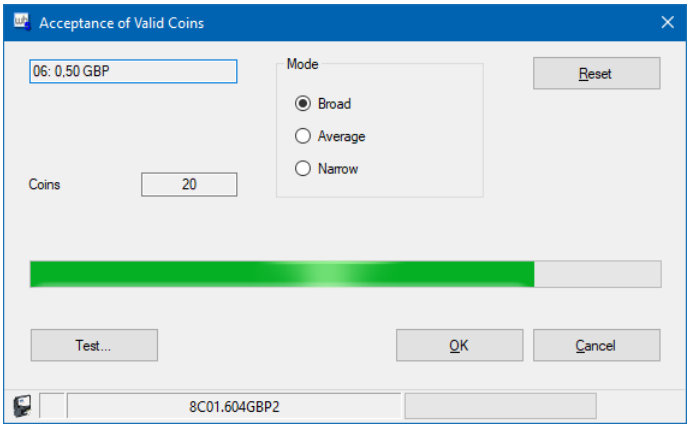


Figure 15 Acceptance of Valid Coins

This function of acceptance, particularly the improvement, of valid coin acceptance of new or deviating mintings is similar to the normal procedure for the calibration of coins. It differs in that the existing adjustment will not be deleted, but will be expanded to include the measured parameters of the new or deviating mintings. As in the case of normal calibration, you must select broad, average or narrow tolerances.

The main advantage of this function is that re-calibration does not require a set of coins in circulation, but only those coins with a poor acceptance or zero acceptance level.

Effect the adjustment of valid coin acceptance, if possible, always in the wide channel. In this way the possibility remains open to select a narrower channel, should foreign coins be selected.

There are coins or tokens that appear to be the same yet are made of completely different materials. These coins / tokens are programmed on different coin channels at our factory. Should the measurement parameters for such coins be expanded via the function "acceptance of valid coins", this may cause an overlapping with other coins or an increased acceptance of counterfeits.

If the measurement parameters of the inserted coins differ too much from those previously stored, wheasy 5 will give a warning not to accept this adjustment. In this instance it is recommended that you contact wh Münzprüfer or an authorised service centre.

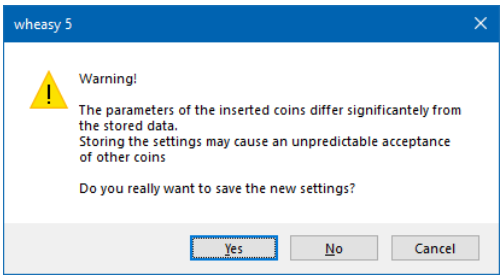


Figure 16 Warning messages are displayed if the measuring values differ too strongly.

The function "Adjust" – "Acceptance of Valid Coins" is not available for coin selectors with protected configuration.

3.2.5. Clear Coin Channels

By means of this function coin channels may be deleted irrevocably, e.g. if a coin becomes invalid or if for some reason it should not be accepted anymore. This function is available for both register tabs, "Data" and "Coin Selector" and is, of course, only applicable for the particular register tab.

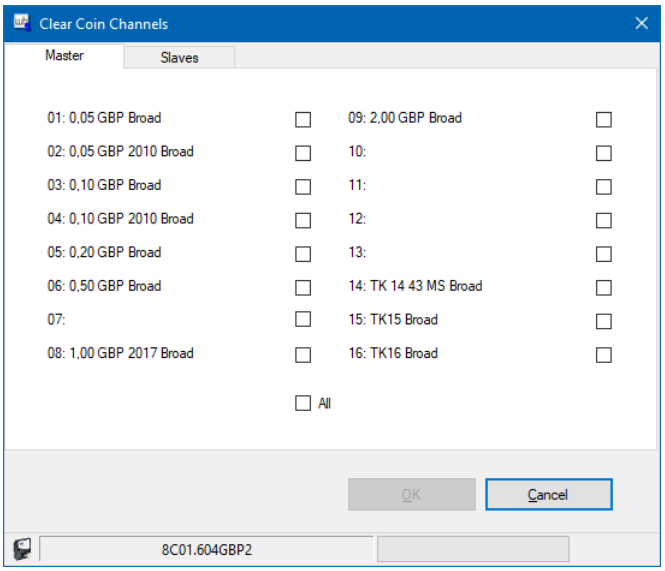


Figure 17 Clear Coin Channels

Figure 17 shows the window for clearing coin channels with the two register tabs for the differentiation of master and slave channels. After activating the respective check boxes all corresponding coin channels will be deleted.

If you delete a master channel, wheasy 5 automatically deletes the corresponding slave channel, by this, you do not have to select it again.

3.2.6. Calibration

With this button the calibration function is directly selectable.

The "Calibration" function allows you to calibrate or recalibrate individual coin channels by means of coins, which are inserted into the coin selector. This function can also be activated directly through the <F4> function key. This function brings up the following dialog box:

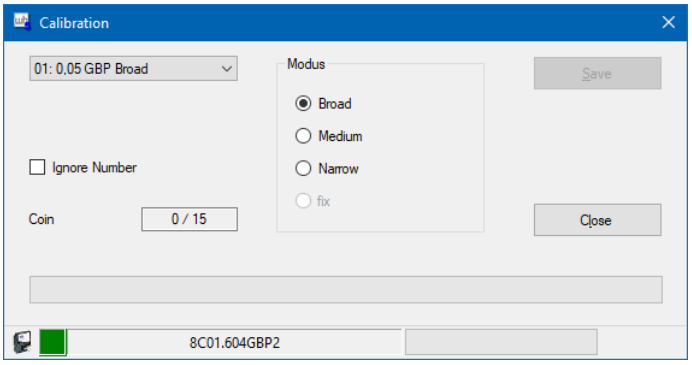


Figure 18 Window "Calibration"

In order to select the coin channel to be calibrated, open the drop-down-register at the left-hand side of the window and select the coin channel to be calibrated by means of the mouse or the cursor keys. If a currency entry for this coin channel already exists, this will also be displayed.

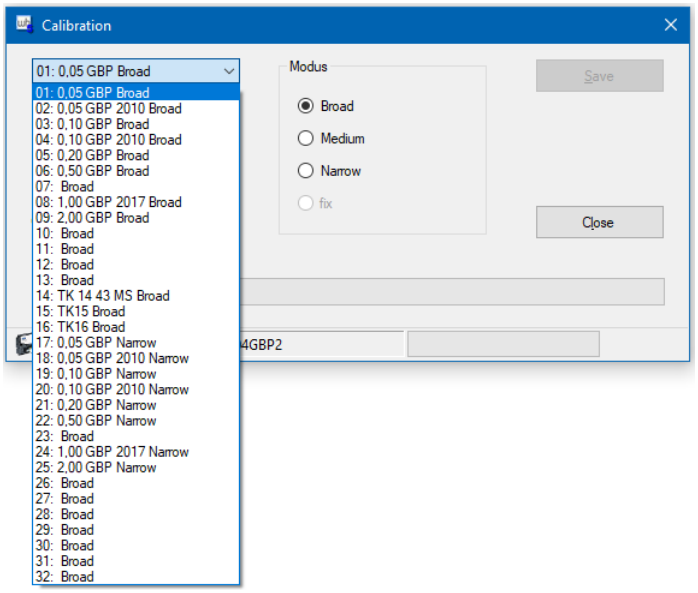


Figure 19 Calibrating Window with opened drop-down-register.

If a particular factory-made calibrating adjustment for the selected coin exists, the adjustment "Fix" is automatically pre-selected under "Modus". In other respects, the calibrating modes "broad", "medium" or "narrow" are applied, according to the tolerance data-set entry of the corresponding coin channel. In addition, the coin quantity with which the calibration should be effected, is pre-adjusted in the data file. Figure 18 illustrates 15 pre-selected coins. Should you wish to use more coins, you may activate the checkbox "Ignore Number". The calibration is then terminated by the button "Save", which may be activated if a minimum coin quantity has been inserted.

If you calibrate with the calibrating mode "fix", please only reprogram the broad channels. The adjustments for the assigned channels with medium or narrow tolerances are automatically calculated and transmitted into the coin selector by wheasy 5.

The calibrating mode "fix" is exclusively available for coin channels and coins for which parameters were already planned and programmed by the factory. "fix" generally gives the best programming results for these specified coins.

The calibration modes narrow, average and broad adjust themselves automatically to the values that were measured for the given coin.

The acceptance rates for the calibration selections are set as follows:

narrow	about 85% acceptance
average	about 95% acceptance and
broad	about 98% acceptance.

The acceptance quality can vary because of the natural variation in the quality of circulating coins. Acceptance rate variations can be inconsistent if the coins used for calibration are not representative of coins in circulation.

As the calibration proceeds by inserting coins, the calibration window will show the number of coins already inserted as well as the total number of

coins required for calibration. The calibration is automatically ended once the required number of coins has been inserted. At that point an additional channel may be chosen for calibration or the calibration session can be ended.

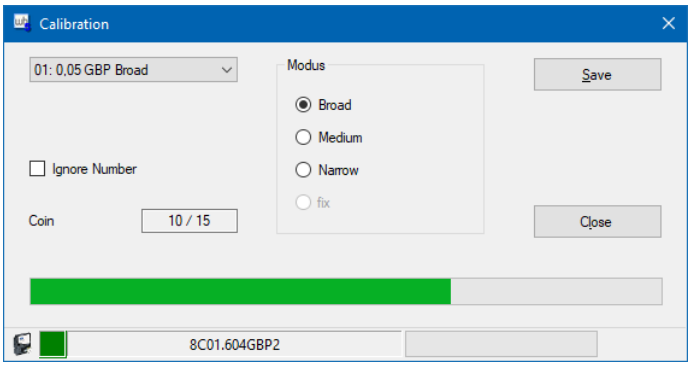


Figure 20 calibrating window with status bar

3.2.7. Auto-Calibration

Auto Calibration is available if the calibration of a coin is a pre-setting in a data file. wheasy 5 calls up one by one all coins to be calibrated. After cloning of a data file, the auto-calibration is automatically started by wheasy 5. This ensures, that the calibration of critical coins cannot be forgotten.

The corresponding windows are identical with the ones from the manual calibration of the coin channels. The auto-calibration may be started manually at any time, independently of the cloning function.

3.3. Configuration

Under the pull-down menu "Configuration" all coin selector adjustments, which are influenced in the machine with regard to its function and characteristics and which are not related directly to the coin detection, may be edited.

"Configuration" gives you the following menu items:

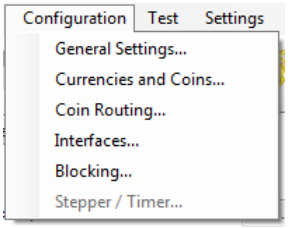


Figure 21 Menu "Configuration

3.3.1. General Settings

Clicking on "General Settings" you will find on three register tabs the settings and functions, which cannot be assigned to the other 4 categories and which directly influence the function of the coin selector.

The settings on the register tabs "Device" and "Variants" are fixed, but may be looked at. A third register tab "Remarks" allows to add additional remarks to the data file, which will then be displayed in the main window.

3.3.2. Currencies and Coins

"Currencies and Coins" defines for each coin channel the "S Value" of the coins (calculated coin value), the "Value", Remarks, the "Tolerance" (tolerance band) and the assignment to the inventory impulse values 1 and 2.

All specifications are stored in the coin selector, except for the value and the remarks, which are integral parts of the data file only.

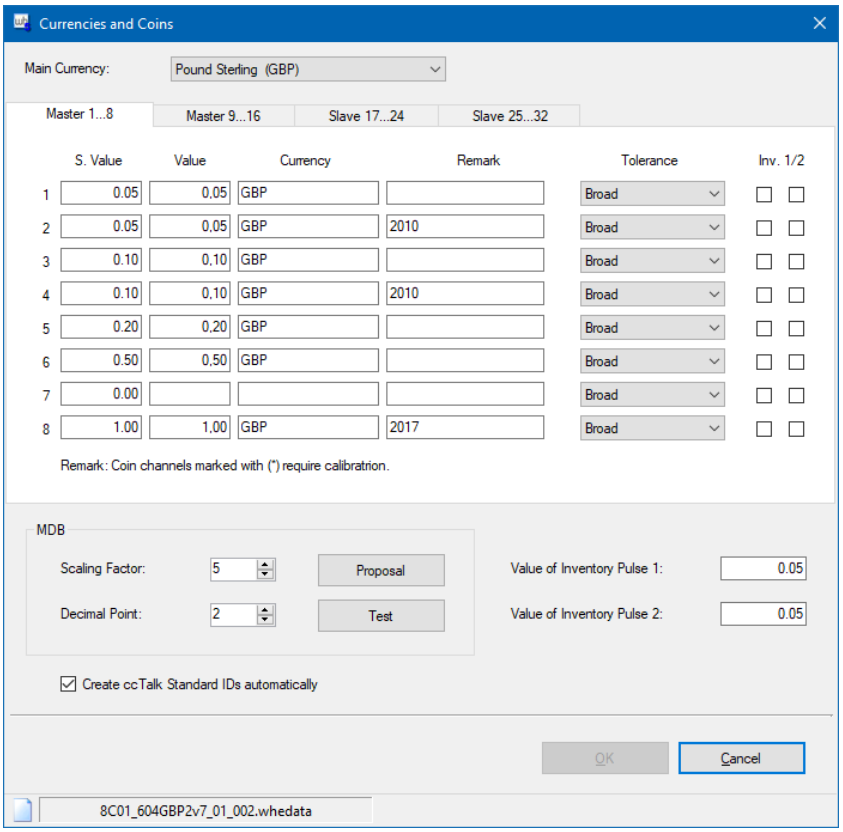


Figure 22 Window of the function "Currencies and Coins"

All 32-coin channels are divided into 4 register tabs. As the 16 slave channels of the "S. Value", the "Value" and the "Currency" are always identical to the master, these specifications cannot be changed here.

The value for the inventory impulses 1 and 2 are provided in the lower part of the window as well as the scaling factor for the MDB interface and the number of decimal places for the coin values.

General survey on the single panels in the window and its meaning.

- S.Value (Calculated Coin value)
  The calculated coin value is stored in the coin selector. This is the value used for the determination of credit. It is also transmitted to the machine controller via the MDB or ccTalk interface.

- Value (Actual coin value)
  This "value" is not stored in the coin selector. In certain situations, it may be necessary to give a coin an S.value other than its face value. For example, a rebate value may be assigned to a particularly valuable coin. In this case, the "value" is displayed for clarity when working with wheasy 5.

- Currency
  The currency information is also stored in the coin selector EMP 800 v7. This is especially important for the ccTalk interface, as this information is transmitted to the controller for each coin and it serves for clarity when working with wheasy 5.

- Remarks
  Additional information regarding the coins may be registered under "Remarks", e.g. "old", "new", "until 2001" etc., which might contain important information with regard to the corresponding coin minting. This information is included in the data file only and is not stored in the coin selector.

- Tolerance
  The selected tolerance gives information on the acceptance band width for the single coin channels. The tolerances are stored in the coin selector and also provide a better overview when working with wheasy 5.

- Inv. 1/2
  Two check boxes are provided for each coin channel through which 2 possible inventory impulse values can be assigned. As a rule, all coins are assigned to inventory pulse 1 as applications with 2 inventory pulses are limited to special cases.

- Scaling Factor
  The scaling factor is used in vending machines that communicate with the coin selector over the serial MDB protocol. It serves the transmittance of coin values which are stored in the coin selector during a status request.

- Decimal Points
  A decimal point location is likewise transferred to the vending machine during a status request as part of the MDB protocol. This value tells the vending machine how many digits to use after the decimal point as part of the coin value.

- Value Inventory pulse 1 and 2
  Here the values are indicated for the inventory pulses 1 and 2. These figures indicate the value of one pulse when generating inventory pulses.

- The button "Proposal"
  After pressing this button wheasy 5 tries to find a scaling factor and a value for the indication of decimal points. Should this not be possible e.g. because the difference between the smallest and the greatest coin value is bigger than the factor 255, an error-message is displayed.

- The button "Test"
  This button is used to let wheasy 5 test whether it is possible to create 8 bit coin values for the MDB status request with the given scaling factor and decimal location

3.3.3. Coin Routing

For those coin selectors with a sorting device the sorting path for each coin can be defined on the first register tab "Routing Paths". In addition, the main cash box path is defined i.e. the path to which the coins should be sorted, when rerouted to the main cashbox. For ccTalk and MDB communication the number of available sorting shafts is stored here.

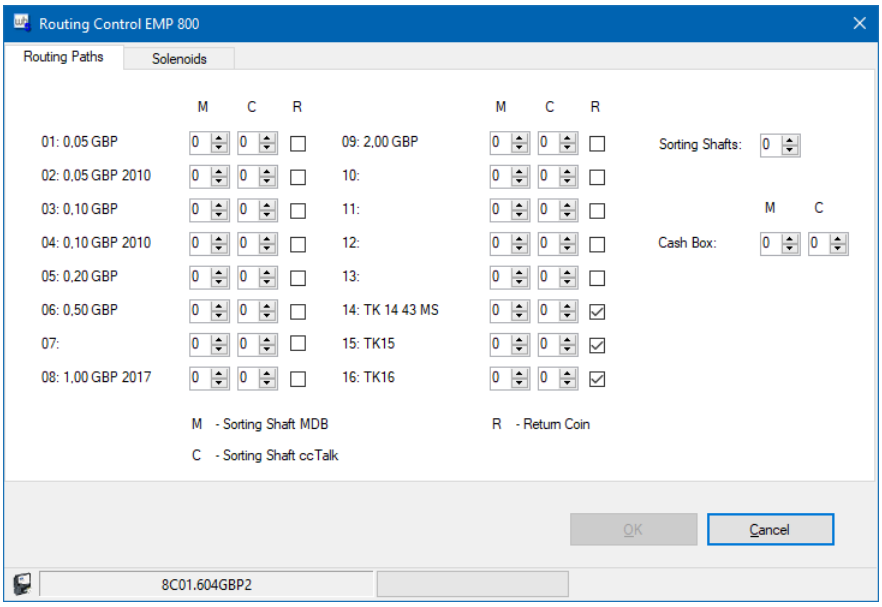


Figure 23 Window for programming the routing path alignment

Moreover, a special mode may be activated here for the corresponding coins by means of the checkbox "R" (coin return). If the checkbox "R" is activated for a coin channel, the respective coin will give a credit but will be returned to the customer. This mode, e.g., opens a barrier on to a parking lot by means of a token which is immediately returned.

By means of this function, solutions may be offered, in which staff members of a company with a token, would have free access to a parking lot, but customers or visitors would pay for parking.

The second register tab "Solenoids" serves the configuration of the sorting control. Here a pre-configured sorter may be selected from a list with which the coin selector should be operated. However, if the sorter to be used is not to be found in the determined list, a new configuration can be created.

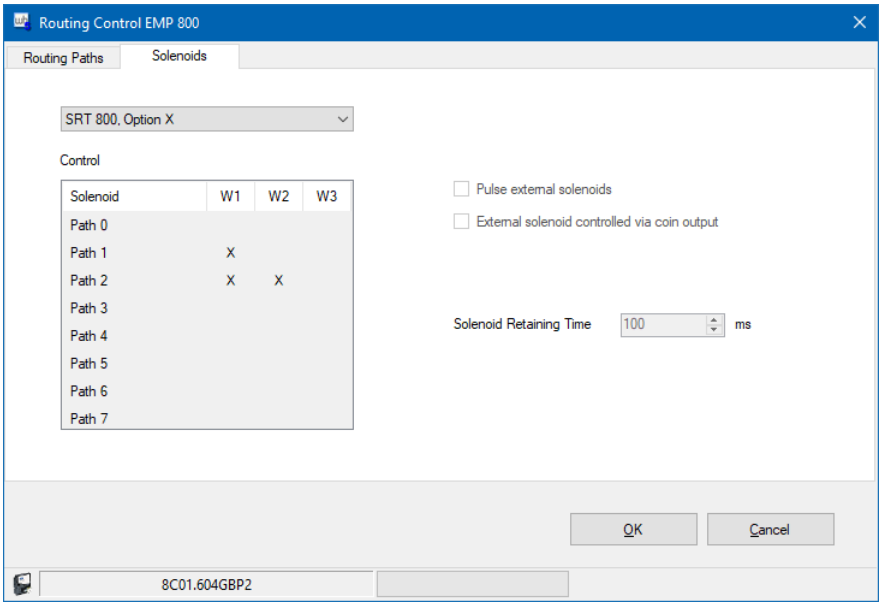


Figure 24 register tab for programming the sorting shafts

E.g. the EMP 800 has three control lines (W1 to W3) to drive external sorters. Hereby a maximum of 8 different sorting paths may be coded.

General survey on the single adjustment options and its meaning.

- Drop Down Menu
  Here a connected sorter may be selected with its complete, non-changeable configuration or a "User defined sorter" may be selected, with which all adjustments are changeable.

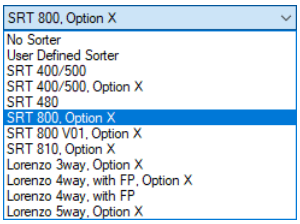


Figure 25 Drop-Down Menu for the sorter choice

- Control
  In the table "Control" control signals are assigned to each routing path number. The routing path numbers are, in this case, the same as those assigned to the single coins on the register tab "Routing Paths".

- Oscillating External Solenoids
  The checkbox "Chopping External Solenoids" defines, whether the external solenoids should be clocked voltage-dependently in order to protect against overheating and for energy saving. The pulsing is differentiated between two phases, the first phase takes 40 ms and activates the solenoid. Here the medium current is always double in value as the phase two, as in phase two the energy is only used for retaining the activated solenoid.

- External solenoid controlled by Coin Output
  Some sorters are not driven via the three external solenoid controls of the EMP 800, but directly via the coin output lines 5 and 6 of the coin selectors 10-pole plug. Output line 5 complies with W1 and output line 6 corresponds to W2. Via the checkbox "External solenoid controlled by Coin Output" the drive signals W1 and W2 are in addition switched to output lines 5 and 6.

- Solenoid Retaining
  The external solenoids are always activated together with the main solenoid switch on the coin selector. The time is programmed under "Solenoid Retaining", for which the external solenoids are activated after the main solenoid has been deactivated. If the user wishes to create his own setting, he can do this by means of "User defined Sorter". In this case however, a thorough testing with many different coins must be carried out, in order to ensure that the solenoids are not deactivated too early.

3.3.4. Interfaces

All adjustments for the different interfaces of the coin selector are effected under "Interfaces". Located at the top of the window is a drop down list, by means of which the general operating mode „parallel/SCI" or „MDB/ccTalk" of the coin selector should be set. Below this, 5 register

tabs “Output Lines”, “Receipt”, “MDB”, “ccTalk” and “RS-Talk” are to be found.

3.3.4.1. Output Lines

The setting of coin channels to the parallel output lines is being made on the register tab “Output Lines”.

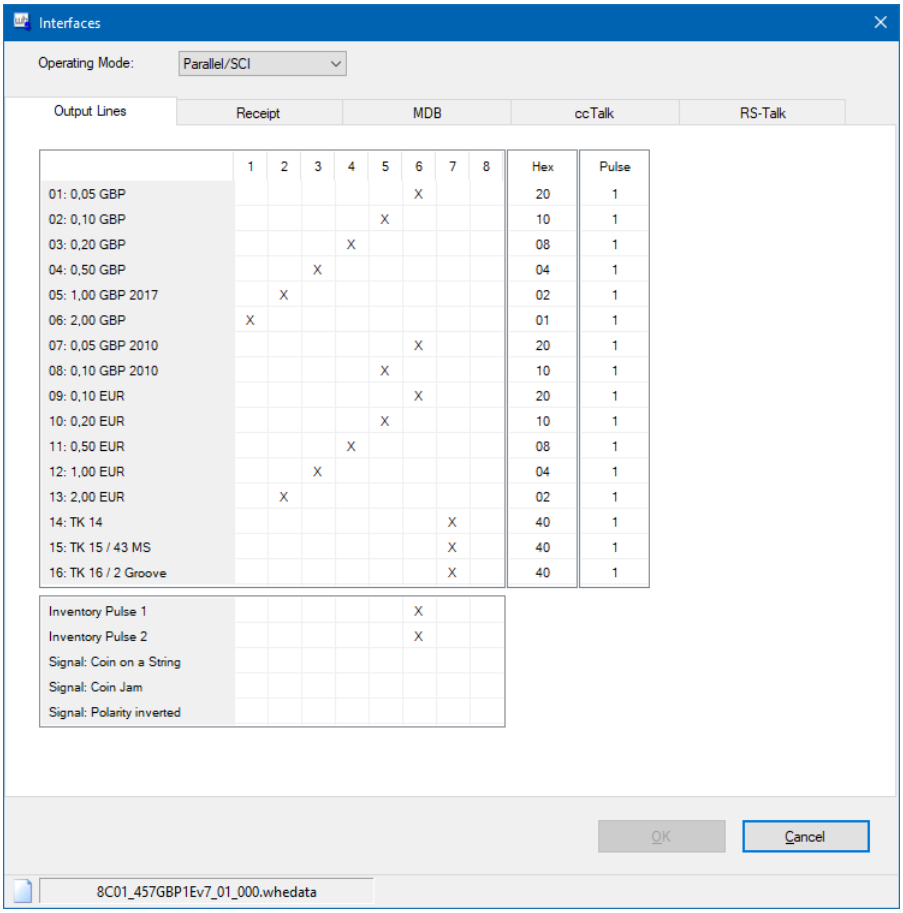


Figure 26 Register tab “Output Lines”

In this table the output lines which should be activated on coin insertion, are assigned to the coin channels 1 to 16.

If no output line is assigned to a coin channel and a coin is accepted, the coin selector does not release a coin signal via the parallel interface.

An output line is activated, if the corresponding checkbox is marked **X**. Alternatively the respective coding for the hexadecimal value may be entered in the column “Hex” (00 … FF).

Please note that the coin selector EMP 800 only offers 6 output lines, therefore entries in column 7 and 8 are without effect.

In the column “Pulse” the number of pulses which should be released via the activated output lines is entered. Differing numbers of pulses on one output line (multi-pulse-operation) enable coins of different values to be signalled via the same output line.

The output lines for the inventory pulses are defined in "Inventory pulse 1" and "Inventory pulse 2".

"Coin on a String" and "Coin Jam" define the output lines for the coin on the string – and coin jam signal.

The desired polarity for the output lines is defined with "Polarity Inverted". As a standard the Open Collector output lines switch from HIGH to LOW. Alternatively, the output line may be switched from LOW to HIGH, as soon as a coin gives a receipt. In this case the checkboxes are marked **X**.

3.3.4.2. Receipt

On the register tab "Receipt" the signal length for the receipt signal, the inventory pulses and the alarm signals are programmed for the parallel interface. Moreover, special settings for the receipt may be effected.

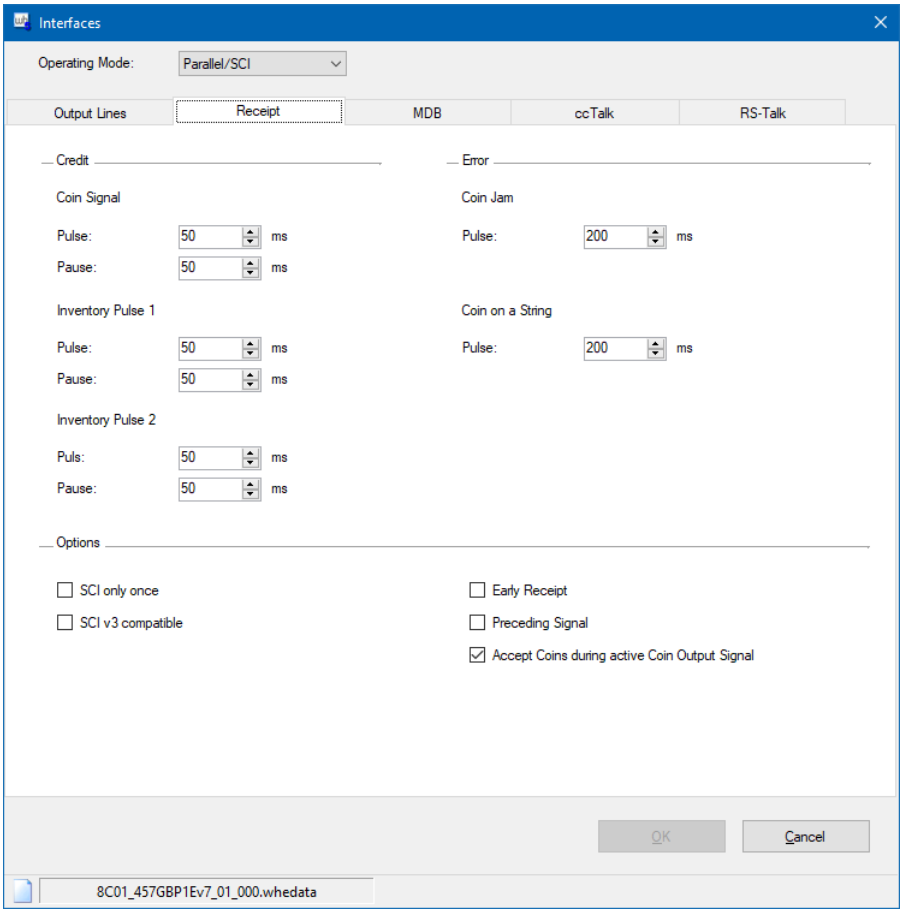


Figure 27 Register tab "Receipt"

Below the individual parameters are explained:

"Credit" parameter:

- Coin Signal – Pulse and Pause
  The length of the coin output pulse can be selected here (Default setting = 100 ms). Pause is the distance between two coin pulses when multi-pulse-operation is activated. As a standard the pause and pulse have the same length.

- Inventory Pulse 1 - Pulse and Pause
  Here the pulse width and the distance between two pulses are defined for inventory pulse 1 (Default setting = 50 ms).

- Inventory Pulse 2 - Pulse and Pause
  See Inventory Pulse 1.

Setting parameter under "Error"

- Coin Jam
  If coins are jammed in the coin selector, this can release a coin jam signal via the parallel output lines. The length of this signal may be programmed. The default setting is 200 ms.

- Coin on a String
  A coin-on-a-string-signal can be released via the parallel output lines, if the coin selector detects a manipulation. The length of this signal may be programmed. The standard definition is 200 ms

Parameter settings under "Options"

Here some settings may be made for special functions, which are described in the corresponding coin selector manuals. As these settings are not of general importance, no further details are given in this manual.

3.3.4.3. MDB

Here the scaled coin values, which are transmitted to the machine controller during the MDB status request are shown. Furthermore, additional parameters are set for the function of the MDB interface.

Below the single parameters are described:

- ACK Timeout
  The max. reaction time which may elapse before the coin selector defines a missing ACK signal as NAK is set here under „ACK Timeout".

- Extended MDB
  How the coin selector answers to a poll request, when a coin has been accepted is defined here. The extended MDB sends not only the coin value to the machine, but also the sorting path number, into which the coin has been sorted.

- Additional Changer Protocol
  If this checkbox is activated, the coin selector reports to the MDB controller not only as a coin selector but it also simulates the function of a change giver without tubes. In this way it is also possible to communicate with controllers that do not recognize coin selectors, but only change givers.

- Coin Type Default
  If MDB coin selectors are battery operated, the machine is usually not able to transmit the coin type command to the coin selector, before the first coin has passed through the coin selector. The Coin type command defines in the MDB, which coins shall be accepted. If the coin type command is missing after awaking a MDB coin selector, it does not accept coins. For this reason, the coin selector can store the

last coin type command if this option is activated and if it is used after awaking.

Next to the scaled coin values, above the checkboxes to the right-hand side, the coin type defaults may be set for each channel, if the corresponding checkbox is activated.

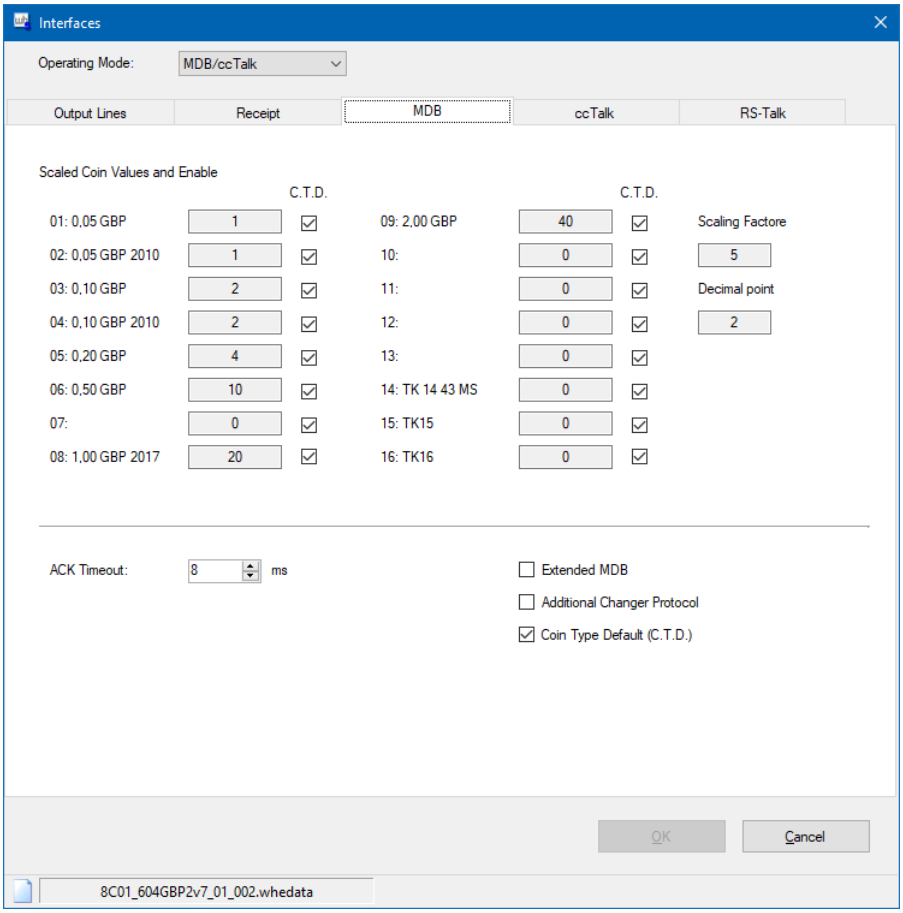


Figure 28 MDB register tab

3.3.4.4. ccTalk

All relevant parameters for the ccTalk interface can be seen and adjusted on the register tab "ccTalk".

The coin IDs can be automatically generated or be manually entered. Please note, for all coin selectors starting with generation v7 all IDs can be stored in ccTalk standard format and in extended ccTalk format. The coin selector needs the extended format for communication via ccTalk protocol according to DES (data encryption standard). The single parameters are described below:

- Push Button "Generate IDs"
  With this button the coin IDs for the ccTalk interface are automatically generated on the same basis of the entries under "configuration" – "currencies and coins".

- Standard IDs
  If the checkbox "Standard IDs" is de-activated, a manual modification of the coin IDs is possible.

- Address
  The address under which the coin selector may respond to the ccTalk interface can be defined here. The default address is 2.

- 500ms Poll Timeout
  If "500ms Poll Timeout" is activated, the coin selector is blocked for coin acceptance, if it has not been polled for 500 ms. The selector accepts coins again, as soon as the polling is restarted. This also applies, if the checkbox "Inhibit Default" has been activated additionally.

- Inhibit Default
  If the checkbox "Inhibit Default" is activated, the ccTalk coin selector will accept those coins which are stored "enabled" after a reset. The Default settings can be set for each coin channel by means of the checkboxes to the right of the IDs. The setting is only possible when the checkbox "Inhibit Default" is active. In this situation, the checkbox "500ms Poll Timeout" is deactivated the coin selector will accept all enabled coins, even if it is not connected with a ccTalk controller.

- Extended Protocol
  The coin selector signals a corresponding coin channel when a coin is recognized but blocked, if this check box is activated.

- Evaluate General Blocking
  This check box has to be activated when the coin selector is operated in time-critical applications and therefore the general blocking of the parallel interface has to be evaluated as well.

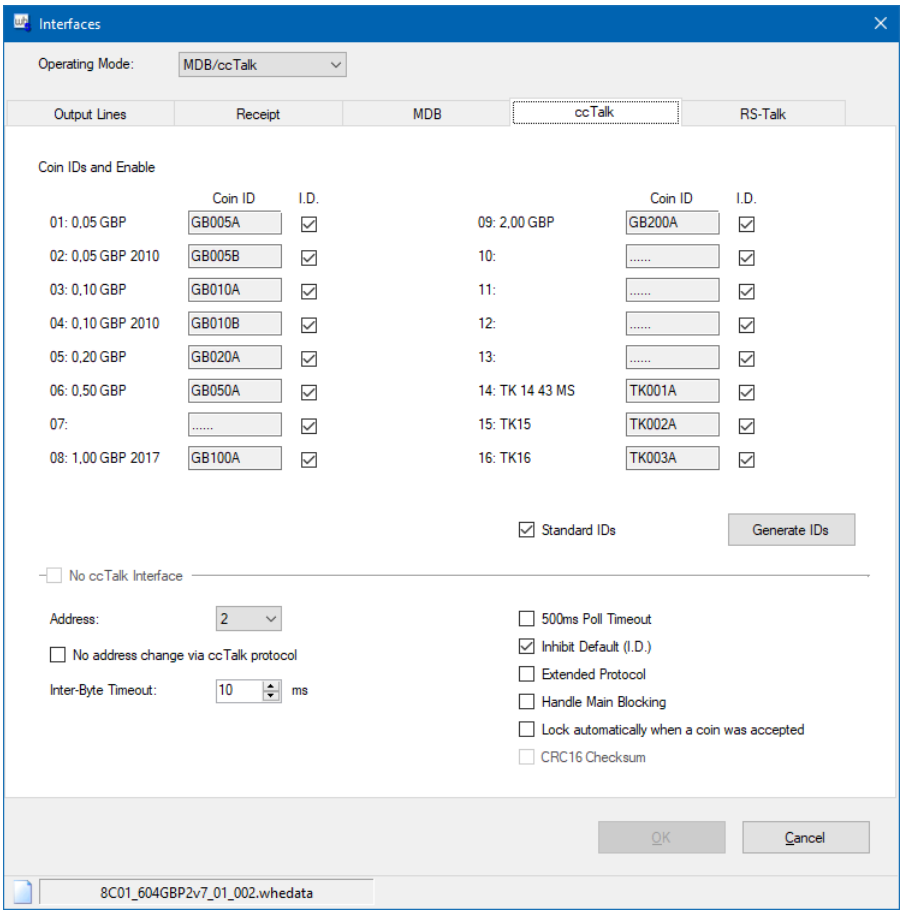


Figure 29 ccTalk register tab

3.3.4.5. RS-Talk

Here coin IDs for RS-Talk protocol can be set.

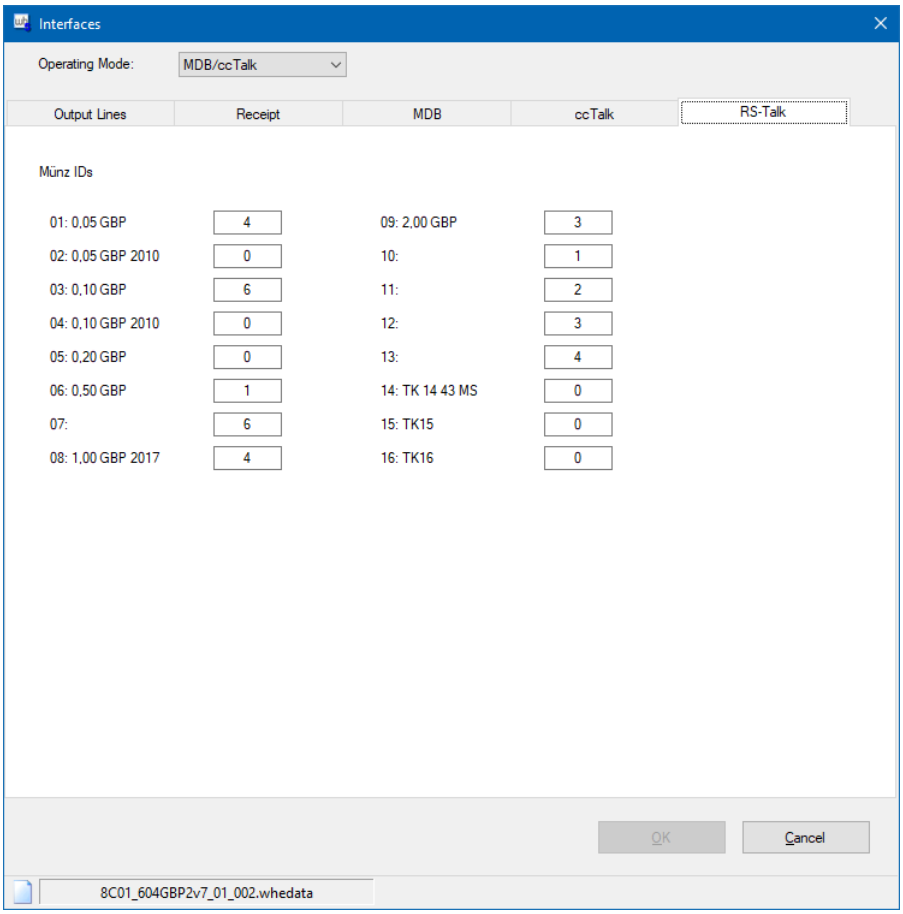


Figure 30 RS-Talk register tab

3.3.5. Blocking

Under the menu point "Blocking" the assignment of blocking switches for each coin channel, the function of general blocking and the external blocking (via the coin output lines) is defined.

3.3.5.1. Assignment of blocking switches

For coin selectors of the v7 generation any number of blocking switches (up to max. 16) may be assigned to each coin channel. By this means, it is possible to block a complete currency with one switch. And with further switches to block individual coins as well as individual tolerance bands. When no blocking switch is assigned, the coin cannot be blocked via the DIP-switches.

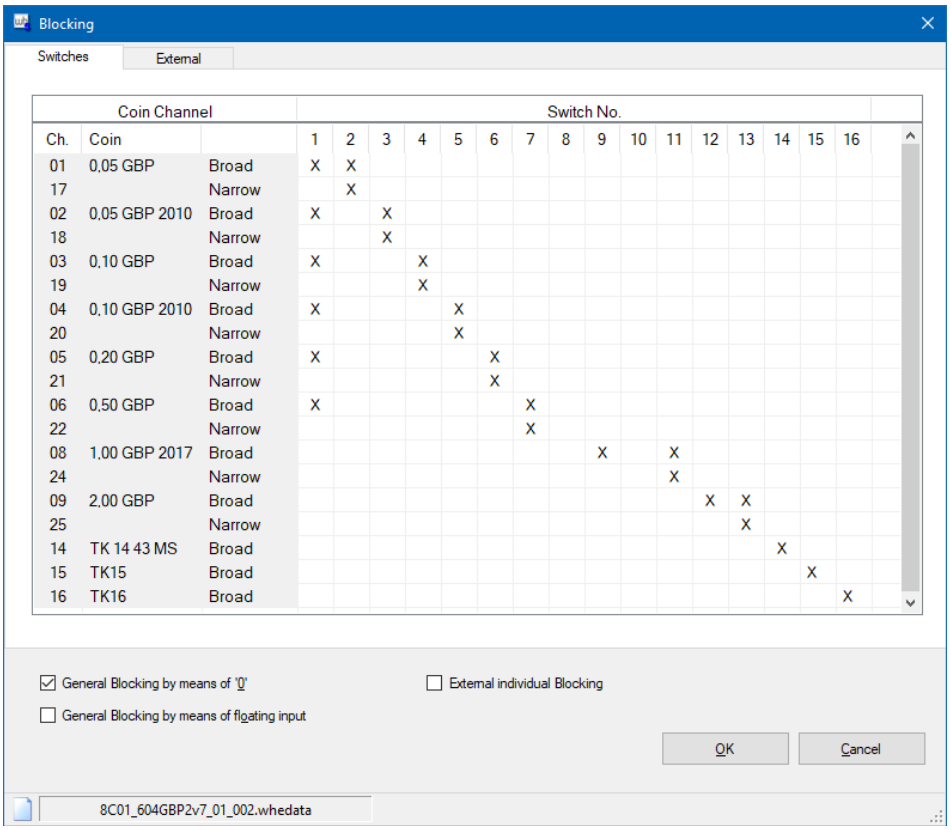


Figure 31 Window for assigning DIP switches

Figure 31 illustrates the assignment of the blocking switches for all coins and corresponding slave channels. In this sample the coin selector is adjusted in such a way, that all € coins are blocked via switch 15; and all £ coins via switch 16. In the above example 2,00 € broad is blocked via switch 5 and 2,00 € narrow via switch 11. As switch 11 also blocks 2,00 € wide, the 2,00 € coin will not be accepted when this switch is set.

In figure 32 below the register tab the checkboxes for the configuration of the general blocking line are to be found for the parallel coin selector interface.

If the checkbox "General blocking by means of 0" is not activated, the coin selector blocks if a HIGH signal is applied to its blocking input, at LOW it accepts coins. If the checkbox is activated, the opposite applies.

The activation of the checkbox "General Blocking by means of floating input" effects that the coin selector only accepts coins, if via the blocking input a LOW or HIGH signal is applied, so that the coin acceptance is enabled. An open blocking input functions in the same way as applying a blocking level.

3.3.5.2. External coin blocking

Some coin selector models offer apart from the input "general blocking" additional blocking lines on their parallel interface or as an option an external individual coin blocking via the output lines (EMP 800 with option /O). This individual coin blocking affects all the tolerance bands of a respective coin. Switching from wide to narrow channels is usually not available.

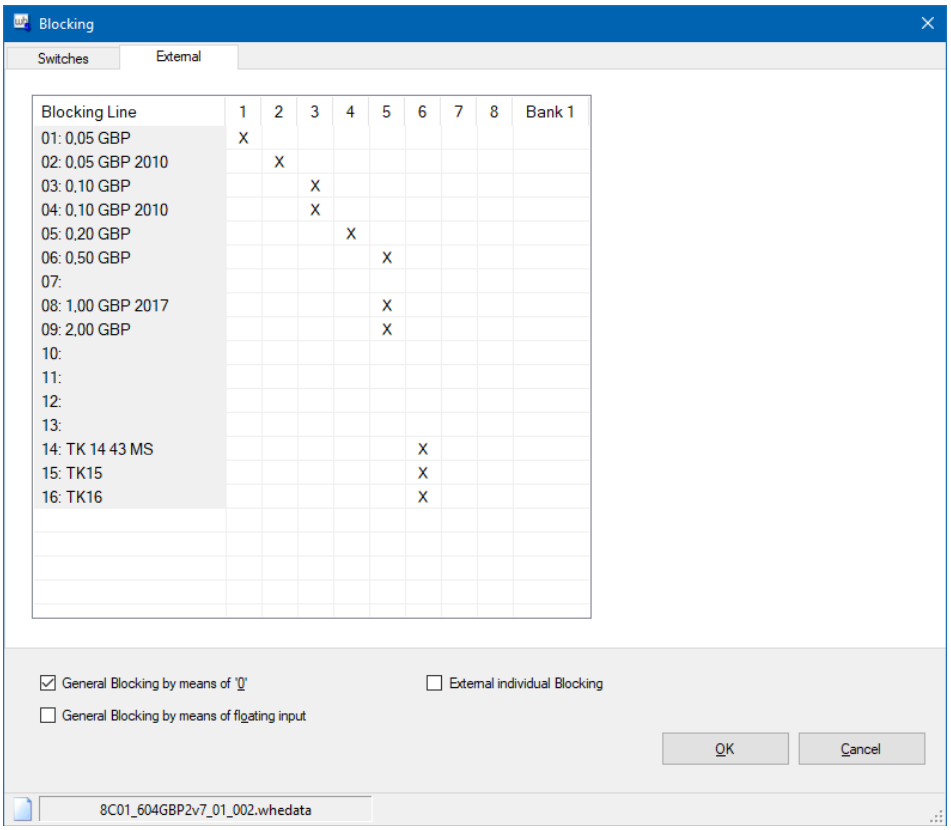


Figure 32 Window for programming external individual coin blocking

As shown in Figure 32 a maximum of 8 blocking lines can be assigned to the coins in the 16 master channels. Normally only 6 blocking lines are available, 7 and 8 are usually not assigned.

With the EMP 800 v7 the blocking is carried out via the output lines by clamping them externally to low. As this function is not a standard but a hardware option, the external individual coin blocking has to be activated by choosing the respective checkbox in the lower part of the window.

3.4. Test

The pull-down menu "Test" has various functions for testing the coin selector such as coin acceptance rate, sorting performance and hardware testing.

The menu selection "Test" brings up a window for selecting functions such as "EMP Hardware Test"\ and "Auto Poll".

3.4.1. EMP Hardware

Essential coin selector hardware functions can be tested with this function.

 Using this button the function can be chosen via the toolbar or it can also be activated by pressing the function key <F9>.

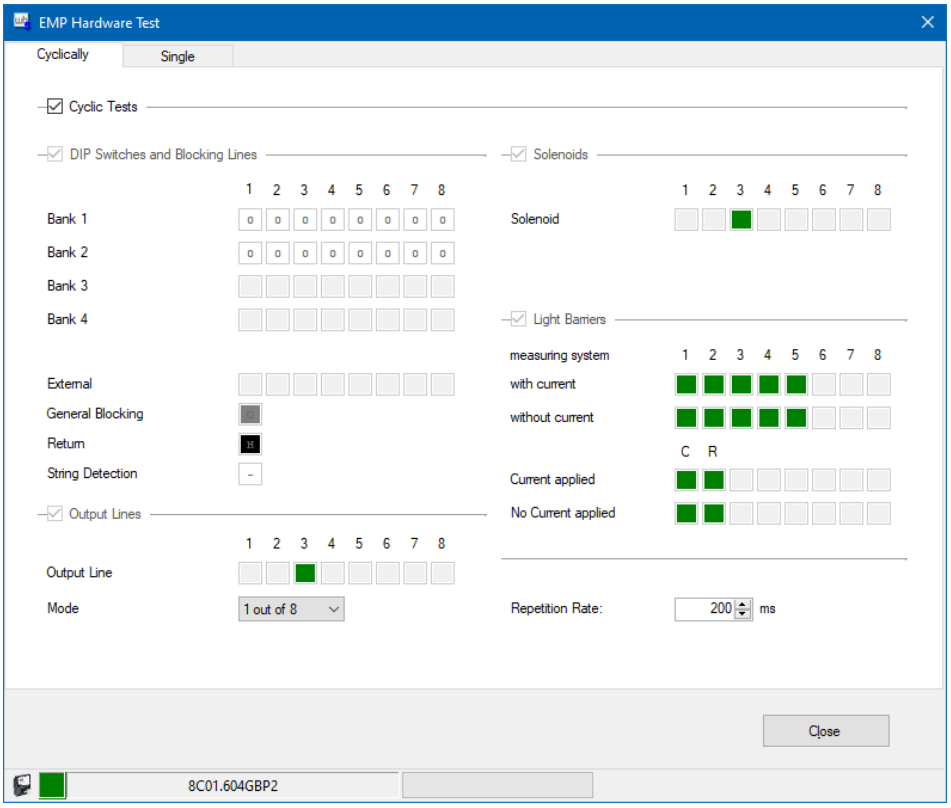


Figure 33 EMP Hardware test, register tab "Cyclically"

By selecting the appropriate check boxes in the "Cyclic test" section, it is possible continuously and automatically to test all light barriers, DIP switches, general blocking, external blocking, reject signal, solenoids and output lines. In figure 33 output line 4 is active and all dip switches are turned off.

Window "dip switches" shows 4 blocks. Block 3 and 4 are relevant only for coin selectors incorporating stepper and timer functions.

The coin selector shown above illustrates two light barriers, which are functioning correctly. If a light barrier is defective the respective cell (current applied or no current applied) turns red.

The function of the parallel output lines can be observed on the row of LEDs of the N 780 power supply. The test function provides the respective signals for the output lines. The pull-down menu "mode" gives a choice of different test modes. ("1 out of 8", "binary" and "progressing bar"). Please note that the coin selectors normally only have 6 output lines. The speed of the test can be adjusted by means of the repetition rate.

The function of the solenoids is tested acoustically. The software activates the solenoids and one can verify acoustically whether they are operating properly. If an external sorter is connected to the EMP 800 the solenoids of this sorter are also tested.

The following figure 34 shows the window "Single" of the hardware test. Here further hardware parameters can be checked and solenoids and output lines can be activated separately.

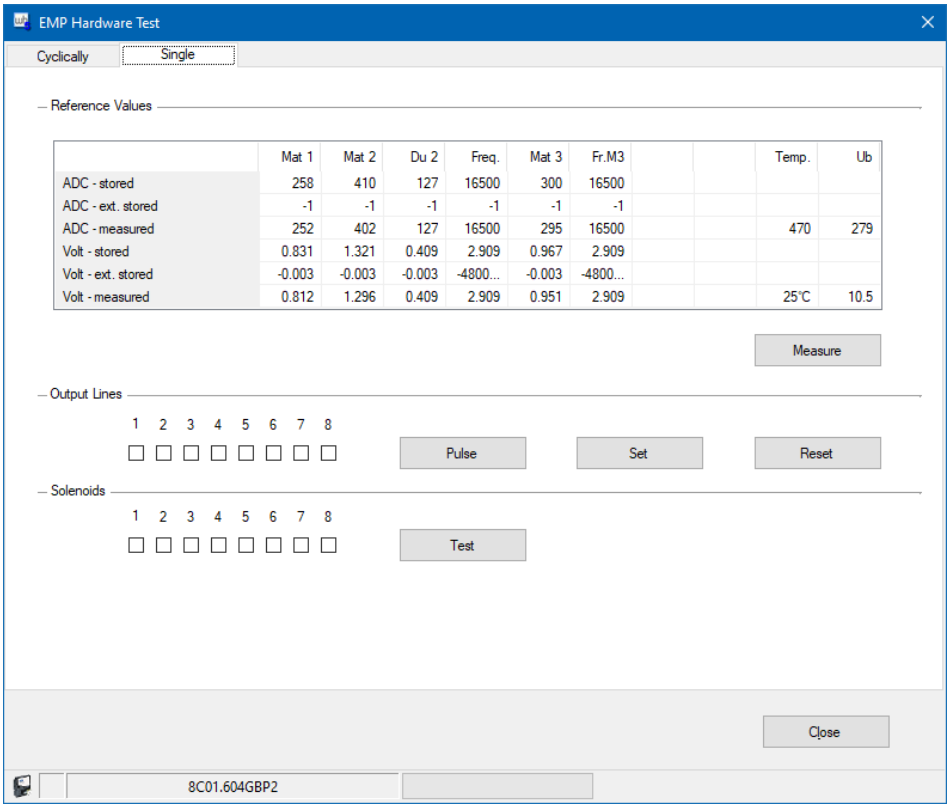


Figure 34 EMP hardware test, register tab "Single"

The "Reference values" show the stored and actual ADC (analogue-digital-converter) values of the measurement inputs of the microprocessor. These values are also converted into volts and into °C for the temperature. Significant differences between the stored and actual reference values point to a defective measurement system.

3.4.2. Coin Routing

With the "Coin Routing" tab the default settings for the coin acceptance (master and slave channels) and possible sorting path re-routing selection are defined. These settings are always temporary; i.e. - they only remain active until the next reset.

The "Path" field once again displays the coin sorting path for each coin channel which can also be changed temporarily here. The sorting of the slave channels cannot be set, as these always depend on the master channels.

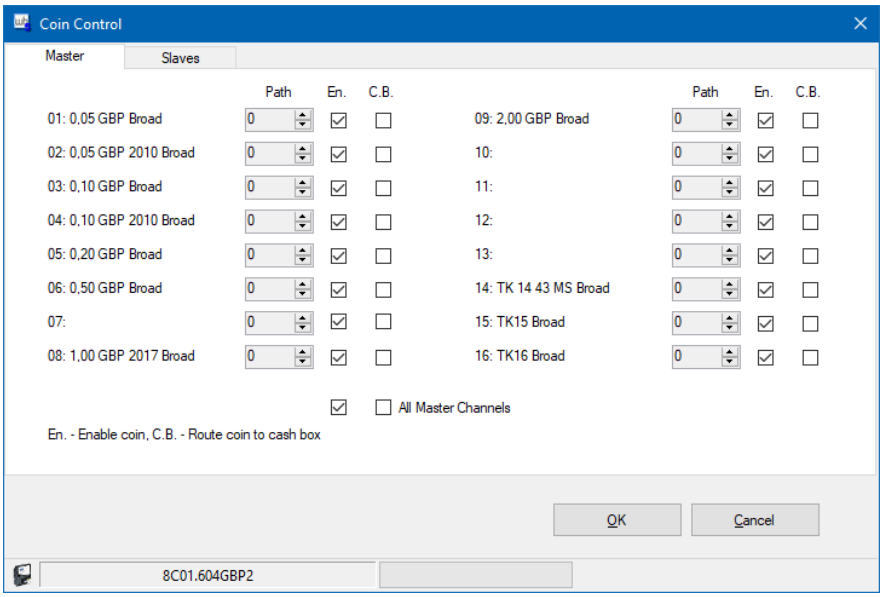


Figure 35 Register tab "Coin Control"

Coin channels with activated check boxes are released for the auto poll mode. With the check boxes "All Master Channels" or "All Slave Channels" (go to tab "Slaves") the coin channels and the routing into main coin box can be switched on or off at once.

3.4.3. Auto Poll

 With this button the function is activated via the toolbar.

The auto poll mode allows testing the acceptance and rejection rate of the coin selector. This function can also be called up with the <F12> function key and brings up the following window the size of which can be adjusted according to requirements:

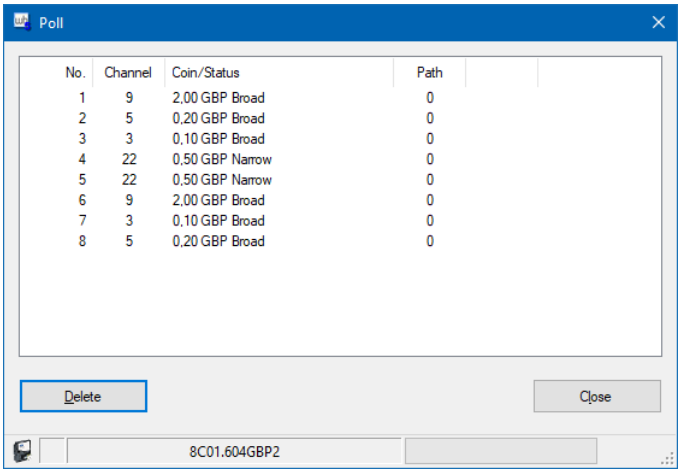


Figure 36 "Autopoll" window

This window displays all the important information with regard to the type of coin selector and the tested and identified coins in the loaded data file.

From left to right, the column headings show: row count, coin channel, actual value, currency, tolerance (broad, average, narrow) and the path into which the coin was sorted. After many coins have been inserted the information may exceed the boundaries of the window. By using the vertical scroll bar, all the information can be retrieved.

Figure 36 shows some of the information generated by the coin selector.

The right mouse button can be used to bring up the following context menu:

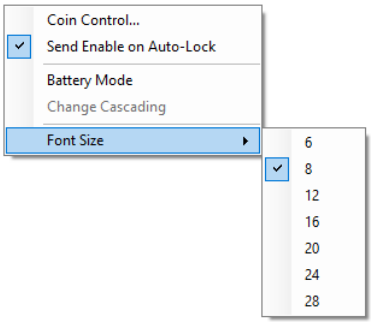


Figure 37 Autopoll context menu

The context menu can be used to access various functions. It can be used to quickly access the Coin Routing window that was discussed above. It can also be used to change the required typeface size.

wheasy 5 stores the setting for the typeface until cancellation.

3.5. Program Settings

Menu “adjustment” opens up the window for program settings of wheasy 5. These settings have already been discussed at the beginning of this manual in chapter 2.1.

3.6. Extras

The “Extras” pull down menu gives the following selections:

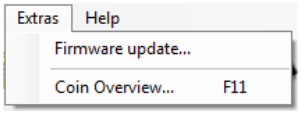


Figure 38 “Extras” Pull down menu

These additional functions are discussed below.

3.6.1. Firmware Update

This feature allows to load a new firmware into the coin selector (i.e. the processor software). To carry this out you require a data file, which can be obtained at wh Münzprüfer Berlin or via your download area on our website. Upon activating this feature you will see the following window:

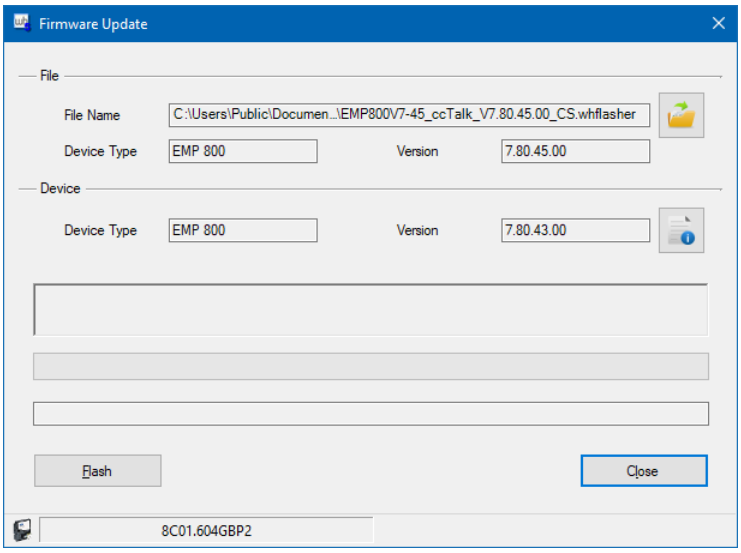


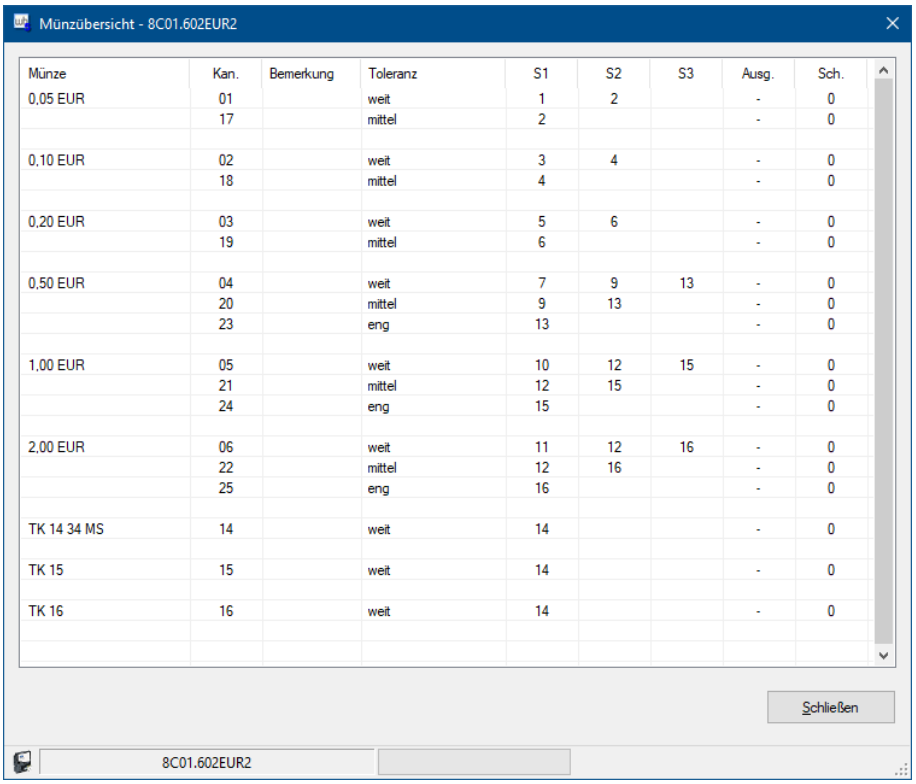
Figure 39 window "Firmware Update"

Via the  button you may load the new software. When pressing the "Flash" button you can upload the data to the coin selector.

During flashing please do not interrupt data transfer or current supply.

3.6.2. Coin Overview

The "Coin Overview" selection opens a window that gives an overview of the coin selector programmed coins along with the associated blocking switch, output lines and sorting paths.



Münze	Kan.	Bemerkung	Toleranz	S1	S2	S3	Ausg.	Sch.
0,05 EUR	01		weit	1	2		-	0
	17		mittel	2			-	0
0,10 EUR	02		weit	3	4		-	0
	18		mittel	4			-	0
0,20 EUR	03		weit	5	6		-	0
	19		mittel	6			-	0
0,50 EUR	04		weit	7	9	13	-	0
	20		mittel	9	13		-	0
	23		eng	13			-	0
1,00 EUR	05		weit	10	12	15	-	0
	21		mittel	12	15		-	0
	24		eng	15			-	0
2,00 EUR	06		weit	11	12	16	-	0
	22		mittel	12	16		-	0
	25		eng	16			-	0
TK 14 34 MS	14		weit	14			-	0
TK 15	15		weit	14			-	0
TK 16	16		weit	14			-	0

Figure 40 window "Coin Overview"

This window shows the coin value, the currency, the assigned coin channels, the tolerances, the first (S1), the second (S2) and the third (3) associated coin blocking switch, the output signal and the sorting path. If more than one output line is assigned to the coin channel, the output is shown in hexadecimal. In figure Figure 40 the output signal for 0.20 € is shown in hexadecimal 03, i.e. output line 1 and 2 are active. 0.50 € is shown in hexadecimal 04, i.e. output line 3 is active.