

Coin changer G-46 MDB

Manual

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4-tube coin changer G-46

The advantages at a glance:

- A programmable coin validator enables a fast reaction to changing market situations or new false coins
- Configuring by use of the PC software "WinEMP" and the Palm Handheld software "G-46 setting program" and "PalmEMP1"
- Easy switching to memory block 0 or 1 for the required coin configuration
- Reliable sensing and optimum rejection of false coins due to the proven electronic coin validator G-40.4000
- Universal payout mechanism for all coin diameters and thicknesses
- Optional payout combinations by simply changing the tubes
- Longer tubes and an additional 4th tube offer an optimum change capacity
- Universal application in almost all machines simply by using a different connecting cable or interface module
- Fast service due to error diagnosis
- Individual combination with peripheral devices and adaptation to all market demands
- Splash-proof electronics
- Monitored coin run and forced sorting guarantee an improved operating reliability and protection against manipulation

This description gives you a survey of the most important technical features and options of the G-46 changer series.

If you have any questions, please do not hesitate to contact us. Our sales staff will provide the necessary information.

National Rejectors Inc. GmbH

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1 The most important information first

Brief information on the 4-tube coin changer

The 4-tube changers of the G-46 series are designed for application in vending and service machines. By changing the connecting cable and/or the interface module, they can easily be adapted to different machines. They support the following machine interfaces:

- 2-price relay output (parallel interface)
- 4-price relay output (parallel interface)
- 4-price API (parallel interface)
- Simplex V (serial interface)
- BDV (serial interface)
- MDB (serial interface)
- VCCS (serial interface)

In comparison to the former 3-tube changers, the 4-tube changers do not only have an additional tube, but also lengthened tubes, more coin channels and further functions. The coin validator offers a reliable sensing system and rejection of false coins with the proved and well known coin validator G-40.4000.

Due to the modular design, you can individually combine your changer with accessories (see chap. 3 "Options"). Configuration is carried out via a PC, Palm handheld or via the setting module.



This manual only considers the setting module for configuring the coin changer. Using the PC and Palm handheld programs the same functions can be displayed and set, for these programs separate operating instructions are at your disposal (see chap. 3 "Options").

The menu of the setting module is clearly divided into programming functions (PRO), and service functions (SER). Some of the programming functions (filling and emptying tubes) can also be carried out directly on the device via the internal keyboard.

Information regarding this manual

This manual is intended to be a reference book for workshop staff. However, if you still have any questions please do not hesitate to contact us.

To facilitate orientation within this manual and the operation of the device, the following fonts and signs were used in the text:

- **Safety instructions**, which have to be complied with in order to protect operator and devices, have been written in bold writing and a pictogram  has been used.
- Special *notes* which are meant to help the user use the coin validator have been written in italics and also been identified with a pictogram .
- Requests to perform an action are given sequential numbers (1., 2., 3. etc.).

2 For your safety

The 4-tube changers of the G-46 series are designed for application in vending and service machines. They have been constructed in compliance with the state of the art and the recognized safety regulations. Nevertheless this equipment can be a source of danger. Therefore please follow the safety regulations below.



Only use the coin validator for the above-mentioned purpose. Under no circumstance can the manufacturer be held liable for any damage or loss resulting from improper use of the device.

The changer must only be connected by a qualified electrician.

The coin validator pcb is fitted with components which may be damaged beyond repair by electrostatic charges. Please observe the handling instructions for components at risk due to static.

Select the correct voltage for each changer (see label).

Never remove the coin validator's connecting cable from the changer when it is live.

Remove the vending machine's plug from the socket before installing, cleaning or removing the changer.

Always transport the changer without any coins in it and never carry it by means of the cables.

Please contact NRI if you want to extend or alter the device in a way that is not described in this guide.

Protect the changer against contact with water or any other liquids.

Dispose of the device in accordance with environmental laws.

We reserve the right to make technical modifications to the device which are not covered by these instructions!

3 Options

In order to adapt the coin validator to your individual needs, NRI offers the following peripheral devices:

String sensor

Due to the monitored coin run and a string sensor, the device is further protected against manipulation.

Configuration tools

For checking and modifying programmed coin changer data in situ and without removing the coin changer from the vending machine there are three configuration tools available: the Setting Module and the two Palm handheld programs "G-46.4 Setting Program" and "PalmEMP1".

Setting module G-55.0460

The setting module enables you to

- read out error messages,
- check or change adjustments (PRO mode),
- carry out service functions (SER mode).

Chapter 6 "Connecting and operating the setting module" will give you further information about its function.

Palm handheld G-46.4 Setting Program

The Palm handheld software is also used for diagnostics and configuration purposes and offers the same setting options as the Setting Module G-55.0460.

For more details about installing and operating the program separate software instructions can be downloaded at any time from the NRI homepage (www.nri.de) in a compressed PDF format.

Palm handheld program "PalmEMP1"

This Palm handheld software is used to download the latest coin changer data into memory block 0 and 1 of the device memory (data block download) as well as to adjust acceptance bands.

Programming stations

NRI offers computer programming stations by means of which you can change adjustments of the G-46. The programming stations enable you to

- check the coin acceptance and payout of the changer,
- find out what causes malfunctions,
- programme channels of the coin validator,
- programme the coin sorting,
- compare measured values of inserted coins with measured values programmed,
- programme coin channels by inserting selected coins (teaching the coin validator),
- adapt the adjustments of the changer to your machine.

The WinEMP programming station includes

- the tester G-19.0641,
- a test stand
 - G-19.0643 for the complete changer or
 - G-19.0584 for the coin validator,
- the software WinEMP with the following system requirements:
 - operating system Windows 95b/95c/98/NT/2000/XP (not CE)
 - working memory of at least 32 MB
 - CD-ROM drive
 - graphic resolution 800 x 600 dpi min./High Color
 - serial interface COM1/COM2
- the software instructions for the G-40.4000 "WinEMP – The configuration and diagnostics program for NRI coin validators".

The configuration software WinEMP cannot only be used with the G-46 changer, but also with NRI coin validators of the G-40, G-18 and G-13 series, if you have the corresponding licence and programming station for these series (see software instructions for the corresponding coin validator series).



If these instructions are not available to you, they can be downloaded at any time from the NRI homepage (www.nri.de) in a compressed PDF format.

With another programming station you can update the program of the new G-40.4000/3 series. This programming station includes

- the tester G-19.0641,
- the programming adapter G-19.0646 and
- a software available at NRI upon request with the following system requirements:
 - MS-DOS operating system from version 3.3
 - working memory of at least 512 KB
 - serial interface COM1/COM2.

4 Design and function of the G-46

Overview of the device

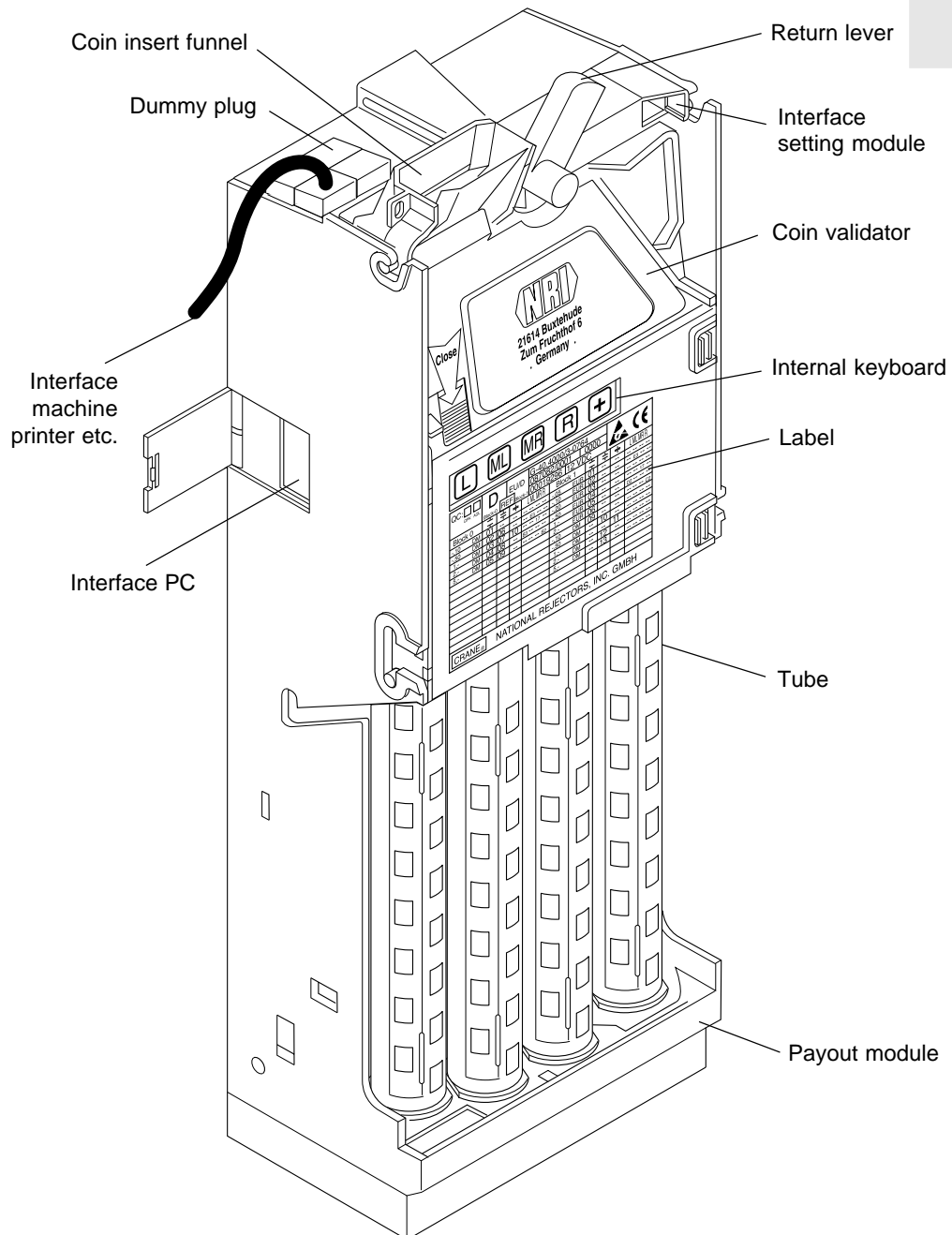


Fig. 1: Design of the G-46

Sorting the coins

A coin inserted into the machine first enters the electronic coin validator, where coin characteristics such as alloy, diameter, weight and embossing are checked by means of probes and light barriers. If the measured values do not lie within the programmed limit values the recognized false coin will be rejected via the coin return. Otherwise, the acceptance gate opens to the sorting system. The coin validator now checks if the coin is to be sorted into one of the four tubes. If the coin is not programmed as tube coin (see label of the coin validator) or when the light barrier of the appropriate tube indicates a full tube, the coin falls into the cash-box.

Payout set with interchangeable tubes

The payout set consists of the payout module and 4 coin tubes. In order to guarantee a reliable payout of coins with different diameters, you can choose the suitable tubes from various coin tubes with different diameters.

Measuring principle

Coins inserted into the coin validator pass sensors which check the coins and there they generate individual measurement values. Due to a special construction and arrangement of the sensors, each coin is checked for its material properties and dimension. An upper limit and a lower limit are stored for each coin type, a so-called acceptance band, so that the coin validator knows whether to accept a coin or not. If the coin values measured are within the acceptance band, the coin is accepted for sale, but if they are outside the band, it is rejected and directed into the return area.

Programmed coin channels

The coin validator has 16 „memory locations“ for coin acceptance which can be assigned up to 16 different coin types or tokens. These „memory locations“ are called coin channels. The acceptance band of a coin type/ token is allocated to a coin channel and the coin type/token is accepted in that channel.

To be able to reject false coins reliably, channels with a narrow or even a very narrow acceptance band are frequently set up for a coin type, in addition to the standard coin channel. The limits of these coin channels are closer to one another so that false coins with similar measurements are rejected. However, narrow und very narrow coin channels also accept less genuine coins.

In addition it is possible to allocate coins with different measurements but identical coin values to different coin channels. In this way the coin validator can, for example, accept one type of old and new coins.

However, a coin channel is not only assigned the acceptance band and the coin value of one coin type but also other coin information which defines further processing of the coin after its acceptance: e.g. inhibit and sorting information.

Since in most cases the manufacturer’s customer-specific programming does not take up all the coin channels, channels which are still vacant can be assigned coin values and the desired further information at any time using the programming station (WinEMP).

The coin validator offers two memory blocks configured independently from one another and including 16 coin channels each (see section "Selecting memory block 0 and 1 with DIL switch" in this chapter).

The label indicates which coin types are assigned to which channels (see fig. 2).

QC: <input type="checkbox"/> <input type="checkbox"/>		D		EU/D		G-40.4000/3-0764			
OPK AQL						087082/0001 0000			
Block-0		REF		Block-1		00019296 12 VDC			
Block 0	$\frac{+}{-}$	$\frac{+}{-}$	$\frac{+}{-}$	LMLMR R	Block 1	$\frac{+}{-}$	$\frac{+}{-}$	$\frac{+}{-}$	LMLMR R
-.10	DM	01	--	-- -- -- --	-.05	EUR	01	--	-- -- -- --
-.50	DM	02	06	-- E3 -- --	-.10	EUR	02	--	-- E3 -- --
1,-	DM	03	07	10 -- -- 17 --	-.20	EUR	03	--	-- -- -- --
2,-	DM	04	08	-- B3 -- -- --	-.50	EUR	04	--	-- -- 17 --
5,-	DM	05	09	-- -- -- -- B2	1,-	EUR	05	--	-- D2 -- -- --
					2,-	EUR	06	--	-- -- -- -- C2
					-.10	DM	09	--	-- -- -- --
					-.50	DM	--	10	-- -- -- --
					1,-	DM	--	--	11 -- -- -- --
					2,-	DM	--	--	12 -- -- -- --
					5,-	DM	--	--	13 -- -- -- --
NATIONAL REJECTORS, INC. GMBH									

Fig. 2: Label of the G-46

Inhibiting coin channels with DIL switches

The 16 coin channels can be inhibited by means of the setting module (Pro 15, see chap. 8). In addition, it is possible to inhibit the channels 1–8 by means of DIL switches, which are situated on the rear of the coin validator. In order to get free access to the switching block, the coin validator must be removed (see fig. 3). In order to inhibit a channel, push the corresponding switch to the right to the ON position (fig. 4).

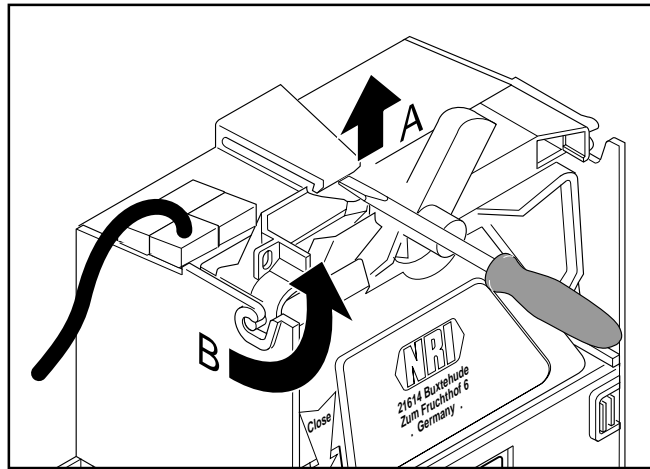


Fig. 3: Removing the coin validator

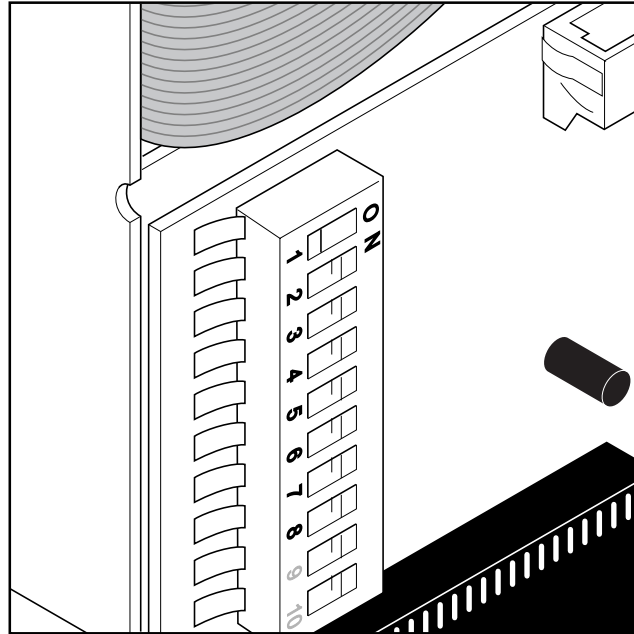


Fig. 4: Inhibiting channel 1 to 8 with DIL switches 1 to 8 on the rear of the coin validator (CPU card)



With DIL switch 9 of the switching block the G-46 can be switched over to MDB-protocol, if it is fitted with a coin validator G-40.4000 from /3 upwards. This may be necessary when a new validator has to be installed in a changer with an old MDB interface module.

Selecting memory block 0 and 1 with DIL switch

The G-46 can manage two memory blocks 0 and 1 which are configured independently. Each block has been allocated 2 times 16 coin channels with different coin values, sorting and inhibiting information etc. The blocks are programmed according to customers' requirements at NRI. Always only one block is active and can be used for coin validation.

Using DIL-switch 10 of the switching block, memory block 0 or 1 can be activated:

1. Remove the coin validator from the device at the top (fig. 3).
2. For block 1 set DIL-switch 10 into the right-hand ON position, for block 0 into the left-hand position (OFF) (fig. 5).
3. Reinstall the coin validator.
4. Switch off and on the power.

The required memory block is activated.

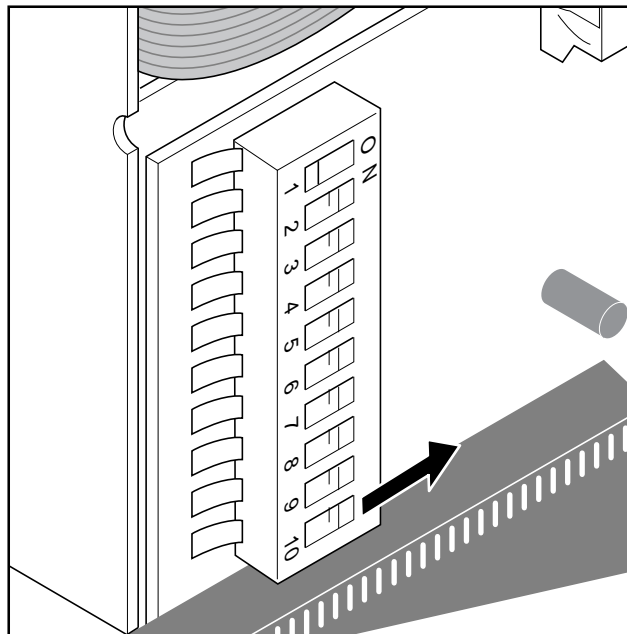


Fig. 5: Activate memory block 1

5 Transporting and installing the changer

Transporting the changer



Empty the tubes, before transporting the device (see chap. 7 "Putting the changer into operation"). If not, loose coins could damage the pcb.



To prevent damage, transport the device only in the original packaging and never carry it by means of the cables.

Installing the changer



Before installing, to prevent damaging the device you must ensure,

- that the interface module and the connecting cable of the changer are suitable for the machine,
- that the supply voltage of the changer coincides with the specification given on the label.

Here are the instructions for installing the changer:

1. Remove the machine's plug from the mains socket.
2. Fit the changer into the machine:
 - Mount the changer (3 holes) (fig. 6)
 - Remove coin validator (fig. 7)
 - Screw on changer's housing.
 - Reinsert coin validator.



Ensure that there is a gap between the return levers of the machine and the changer.

3. Connect the changer to the machine.
4. Reconnect machine to mains supply.

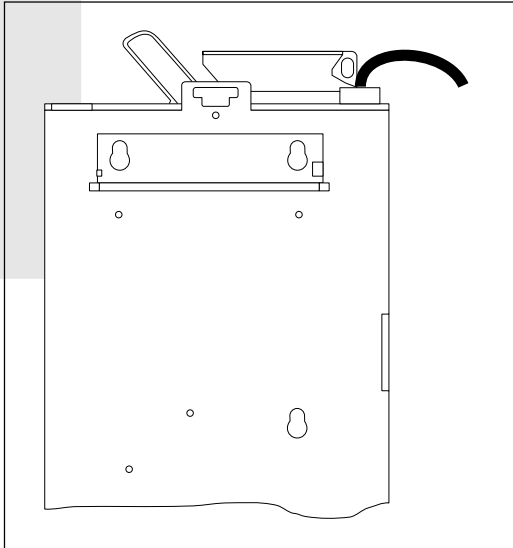


Fig. 6: Mounting the changer

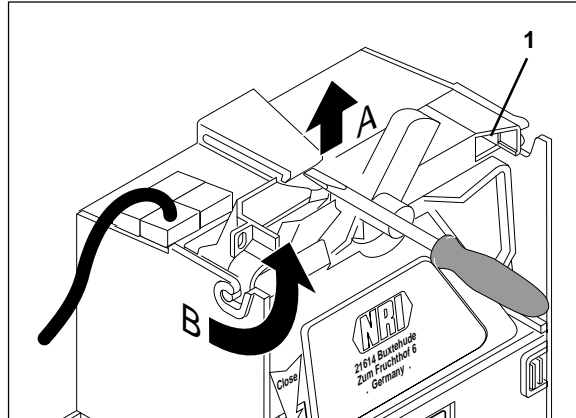


Fig. 7: Removing the coin validator

6 Connecting and operating the setting module

The setting module G-55.0460 enables you to

- read out error messages,
- control or change adjustments (PRO),
- carry out service functions (SER).

Connect the setting module to the socket (1) which is situated on the frontside of the changer at the top right (fig. 7).

General key functions

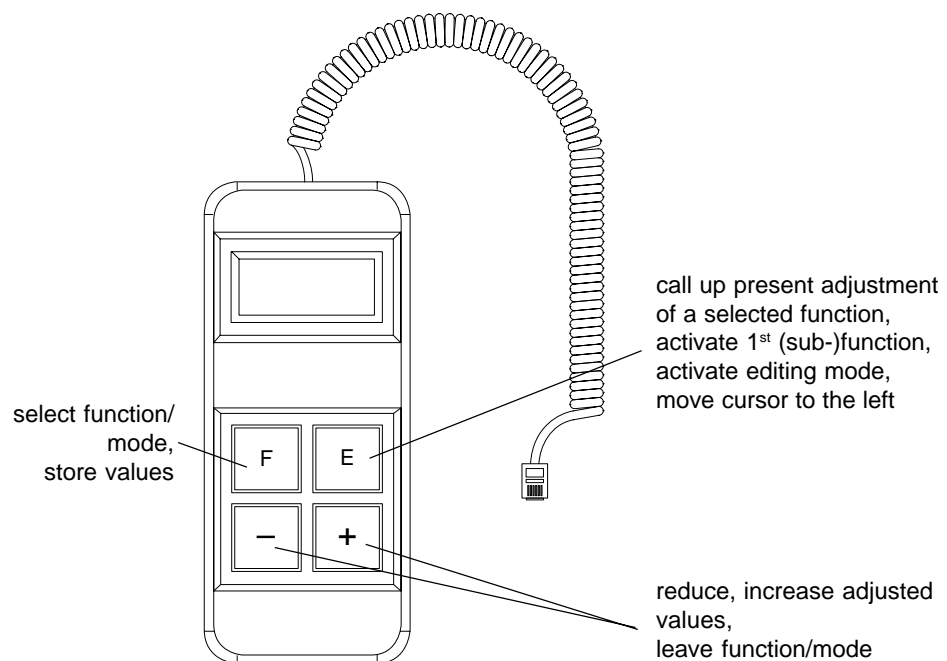



Fig. 8: Key function of the setting module

Menu structure

Via the -key of the setting module, three modes can be selected:

- DIS mode not used
- PRO mode Here you can adjust different parameters
(s. chap. 8 "Programming functions")
- SER mode Here you can find service functions
(s. chap. 9 "Service functions")

Via the display, you can check in which mode you are.

Basic steps of programming

Primarily, the programming basics describe the general programming steps. However, the instructions for changing the values are explained in a different chapter. The subfunctions in the SER mode can be selected in the same way as in the PRO mode.

Basic programming

Starting from the normal mode, which means the display is off, you can activate the programming mode by pressing the \boxed{E} -key two times and afterwards the \boxed{E} -key. The display then indicates Pro 04 which is the first programming function. Once you are in the programming mode, you need to follow these steps:

Programming step	Press key	Display
1. Select function	\boxed{E} <i>until</i>	Pro xx (two digits) <i>appears</i>
2. Activate function	\boxed{E}	Value of function or number of 1 st sub-function
3. Call up adjustment of sub-function	\boxed{E}	Value of 1 st sub-function
4. or call up further sub-function	\boxed{E} <i>until</i>	Pro xxyy (four digits) <i>appears</i>
5. Activate editing mode	\boxed{E}	Pro xxyy (four digits) and Value of desired sub-function
6. Change value (see next section)		
7. Store value	\boxed{E}	number of selected (sub-)function

If you do not want to adjust any more functions by following basic programming, keep pressing the $\boxed{+}$ -key until the display shuts down. Otherwise the display will shut down automatically after 40 seconds.

When you only want to read the adjustments of a function, the step "Changing data" is generally omitted.

Changing data

Here, a change of the individual coin inhibit (Pro 1501) serves as an example to explain how to change data. Channel 3 has to be inhibited:

Programming step	Press key	Display (example)
1. Activate editing mode (see previous section)	\boxed{E}	Pro 1501 00000000
2. Move cursor to the left (here: for channel 3, to the 3 rd place from the right)	\boxed{E} <i>twice</i>	Pro 1501 00000000
3. Increase flashing digit by 1	$\boxed{+}$	Pro 1501 00000100
4. Store value	\boxed{E}	Pro 1501 00000100

7 Putting the changer into operation (minimal adjustments)

Filling tubes

Before filling the tubes you should empty the cash-box, because coins that route to the cash-box during filling will not be counted.

When there are no coins in the tubes, but the coin counters of the tubes indicate an amount of money, set the coin counters to zero by means of Ser 06 (see chap. 9 "Service functions" in "Resetting the coin counters of the tubes").

Limit tube filling if necessary in Pro 25 (see chap. 8 "Programming functions" in "Setting the maximum coin number per tube").

Filling tubes using the internal keyboard

1. Press \square -key.
An acoustic signal confirms that you are in the tube-filling mode.
2. Insert coins.



When inserting the first coin in each tube, make sure that the coin lies flat in the tube.

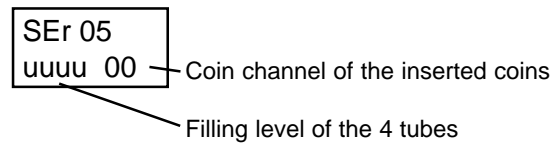
3. Press \square -key.
The display shuts down.

Filling tubes using the service function (Ser 06)

If you additionally want to control the filling level of the tubes, the tubes can also be filled by means of the service function Ser 05:

1. Select Ser 05.

When all tubes are empty, the display of the setting module now indicates the following (see below):



2. Insert coins.

The display changes the indication of the filling levels.

3. Press \oplus -key.

The display shuts down.

Meaning of the display for the filling levels:

Display	Meaning
	Tube empty
	Tube not empty
	Tube full
	Contradictory messages from the tube filling sensors
	Programmed tube filling level reached
	When the display indicates , check the filling level sensors.

Emptying tubes

You can empty the tubes by means of the internal keyboard or a service function.

Emptying tubes using the internal keyboard

When you need some coins for test vends or you want to empty the tubes before transporting the changer, you can empty the tubes by means of the internal keyboard on the frontside of the changer:

- L pay out a coin from the left tube
- ML pay out a coin from the middle/left tube
- MR pay out a coin from the middle/right tube
- R pay out a coin from the right tube

If you press a key for more than 4 seconds, the coins will be paid out continuously. Simply press any another key if you want to stop this process.



If in function 0401 the third digit from the right is set to "1", the machine control must enable inventory for emptying the tubes via the internal keyboard. (See description of the machine control).

Emptying tubes using the service function (Ser 01)

When the machine control does not enable inventory via the internal keyboard, the inventory can be carried out by means of the service function Ser 01.

1. Select the required tube:
 - SEr 01 01 tube left
 - SEr 01 02 tube middle/left
 - SEr 01 03 tube middle/right
 - SEr 01 04 tube rightThe filling level will be indicated for each tube.
2. Press -key in order to return a coin.

8 Programming functions

Structure of the PRO functions

Function	Meaning of the adjusted value
0401	Operation mode 1 00000000 Adding up credit which cannot be displayed (1), reset credit (0) Disable internal keyboard (release via machine control) (1), enable keyboard (0) Security stock in tubes can be paid out with DISPENSE (1)
0404	Operation mode 3 00000000 While filling the tubes, only accept coin to be sorted into tubes (1) reserved Transmit tube filling level incl. security stock to the machine (1) Not enable inventory keys via the machine control (1)
1501	Individual inhibiting of channels 1–8 (1) 00000000 channels 1–8 (right to left) 8 1
1502	Individual inhibiting of channels 9–16 (1) 00000000 channels 9–16 (right to left) 16 9
2101	Sensitivity of the string sensor
2501	Maximum number of coins in left tube
2502	Maximum number of coins in middle/left tube
2503	Maximum number of coins in middle/right tube
2504	Maximum number of coins in right tube

Function	Meaning of the adjusted value
2601	Security stock of coins in left tube
2602	Security stock of coins in middle/left tube
2603	Security stock of coins in middle/right tube
2604	Security stock of coins in right tube
5301	Wake-up time
5401	Coins to be sorted into left tube, channels 1–8 (1) 00000000 channels 1–8 (right to left)
5402	Coins to be sorted into left tube, channels 9–16 (1) 00000000 channels 9–16 (right to left)
5501	Coins to be sorted into middle/left tube, channels 1–8 (1) 00000000 channels 1–8 (right to left)
5502	Coins to be sorted into middle/left tube, channels 9–16 (1) 00000000 channels 9–16 (right to left)
5601	Coins to be sorted into middle/right tube, channels 1–8 (1) 00000000 channels 1–8 (right to left)
5602	Coins to be sorted into middle/right tube, channels 9–16 (1) 00000000 channels 9–16 (right to left)
5701	Coins to be sorted into right tube, channels 1–8 (1) 00000000 channels 1–8 (right to left)
5702	Coins to be sorted into right tube, channels 9–16 (1) 00000000 channels 9–16 (right to left)
7001	Coin channel of hopper 1
7002	Coin channel of hopper 2
7101	00 Hopper 1 activated (1) Hopper 2 activated (1)

Adding up credit which cannot be shown on the vending machine display (Pro 0401)

If two different currencies are managed by the coin changer, the set smallest coin value is seldom the lowest common multiple of both currencies. The credit of the coins inserted during one sale, which can not be shown on the vending machine display as it is not divisible by the smallest coin value, can be added up nevertheless and taken into consideration during the vending operation.

With the first place from the right-hand side of function Pro 0401 you set, whether the credit, which cannot be displayed, is to be added up or not:

Pro 0401 00000000

Add up credit, which cannot be displayed (1),
reset credit (0)

Release of inventory keys via the machine control (Pro 0401)

Whether the inventory keys (L, ML, MR, R) of the internal keyboard are to be disabled and enabled via the machine control or not, you set using the third place from the right-hand side in function Pro 0404:

Pro 0401 00000000

Disable inventory keys, must be enabled by means of
the machine control (1),
enable inventory keys (0)

Pay out security stock (0401)

The security stock defines the number of coins not to be paid out for each tube. Usually, the default is 3. For critical coins the set value can also be higher (see section "Setting the security stock per tube (Pro 26)" in this chapter).

Using the fourth place from the right-hand side in function Pro 0404 you can set the changer so that also the security stock is paid out:

Pro 0401
00000000

Security stock can be paid out with DISPENSE (1),
Security stock cannot be paid out (0)

Accept only tube coins when filling the tubes (0404)

Use function Pro 0404 to set, whether only those coins are to be accepted, which are sorted into tubes or all coin types programmed, while filling the tubes. In the first case cash coins would be rejected.

Set the first place from the right-hand side:

Pro 0404
00000000

Only accept tube coins while filling the tubes (1),
also accept cash coins (0)



Concerning function Ser 05, the cash-box does not need to be emptied before filling the tubes with setting "1".

Not enable inventory keys via machine control (0404)

If the inventory keys L, ML, MR, R of the internal keyboard are not to be enabled via the machine control, you can determine this in function Pro 0404 with the first place from the left-hand side:

Pro 0404 00000000

Inventory keys cannot be enabled via the machine control (1),
Keys can be enabled via the machine control (0)

Inhibiting individual coins (Pro 15)

In the subfunctions 01 and 02 of Pro 15 the coin channels can individually be inhibited, by setting the digits assigned to the channels to 1.

Pro 1501 00000000

Inhibit coin channel 1 (1)
Inhibit coin channel 2 (1)
Inhibit coin channel 3 (1)
Inhibit coin channel 4 (1)
Inhibit coin channel 5 (1)
Inhibit coin channel 6 (1)
Inhibit coin channel 7 (1)
Inhibit coin channel 8 (1)

Pro 1502 00000000

Inhibit coin channel 9 (1)
Inhibit coin channel 10 (1)
Inhibit coin channel 11 (1)
Inhibit coin channel 12 (1)
Inhibit coin channel 13 (1)
Inhibit coin channel 14 (1)
Inhibit coin channel 15 (1)
Inhibit coin channel 16 (1)



If more than one coin channel is assigned to a single coin type (normal, narrow, very narrow), all relevant coin channels must be inhibited in order to inhibit the coin type.

Setting the sensitivity of the string sensor (Pro 21)

This function is of special interest for validators with string sensor. With function Pro 21 you can change the sensitivity of the sensor. The maximum sensitivity is set by a value of 00. With a value >50 the sensor is only activated, when the acceptance flap is opened by the string or the coin.

Setting the maximum coin number per tube (Pro 25)

In the sub-functions 01 to 04 of Pro 25 you can set the maximum number of coins to be collected by each tube. When the programmed number of coins is achieved for a tube, all following coins for this tube will be led into the cash-box. Only when coins have been paid out from this tube, is the tube able to collect coins again.

When "0" is programmed, coins will be sorted into the tube until the upper filling level sensors indicate "tube full".

For each tube a sub-function is assigned:

- Left tube Pro 2501
- Middle/left tube Pro 2502
- Middle/right tube Pro 2503
- Right tube Pro 2504

Setting the security stock per tube (Pro 26)

In the sub-functions 01 to 04 of Pro 26 you can set the number of coins not to be paid out for each tube. Usually, the default is 3. For critical coins the set value can also be higher. When paying out, only values from 1 to 9 are considered.



In function Pro 0401 you can determine, that also the security stock can be paid out.

For each tube a sub-function is assigned:

- Left tube Pro 2601
- Middle/left tube Pro 2602
- Middle/right tube Pro 2603
- Right tube Pro 2604



*The coin changer is set at the manufacturer so that the security stock is not sent to the vending machine control, if the machine control questions the tube filling level
(real filling level = sent filling level + security stock).*

Setting the wake-up time (Pro 53)

For coin changers in battery operation and with an external wake-up line a time period can be set in function Pro 53, which specifies how long the coin changer remains switched on after having received the last message from the vending machine (wake-up time).

After the wake-up time had passed the coin changer is switched off automatically and must be re-waked by the vending machine which activates the external wake-up line.

There are factors (1–255) to be set, which are multiplied with a time unit of 0,264 seconds. If the setting is ≤ 10 (= 2,6 seconds), a wake-up time of 30 seconds, set at the manufacturer, is applied.

Setting of the coin sorting to the tubes (Pro 54–57)

In the functions Pro 54–57 you can adjust which programmed coin types are to be sorted in which of the four tubes. Each tube has a corresponding function:

- Left tube Pro 54
- Middle/left tube Pro 55
- Middle/right tube Pro 56
- Right tube Pro 57

The coin type to be sorted into a tube is defined via its channels (see label in chap. 4 "Design and function of the G-46" for the assignment coin type – coin channel).

- Channel 1–8 in tube L Pro 5401, 9–16 in tube L Pro 5402
- Channel 1–8 in tube M/L Pro 5501, 9–16 in tube M/L Pro 5502
- Channel 1–8 in tube M/R Pro 5601, 9–16 in tube M/R Pro 5602
- Channel 1–8 in tube R Pro 5701, 9–16 in tube R Pro 5702

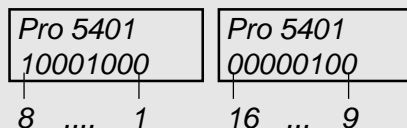
Example:

Left tube (L) is to collect 2 Euro coins and no longer 1 Euro coins.

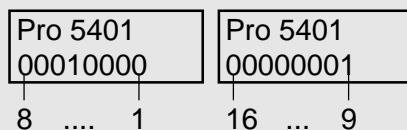
1 Euro coin is programmed in channels: 4 (normal), 8 (narrow), 11 (very narrow),

2 Euro coin is programmed in channels: 5 (normal), 9 (narrow)

All channels of the 1 Euro coin are set to "1":



All channels of the 1 Euro coin must be set to "0" and those of the 2 Euro coin to "1".



With this setting the 2 Euro and no longer the 1 Euro coin is sorted into the left tube.



Only sort coins of the same value into one tube.

*Make sure to consider **all** coin channels of a coin (normal and narrow).*

After changing the sorting, it may be necessary to adapt the tubes of the payout set to the new coin (see chap. 12 "Repairing and exchanging components").

Setting of the coin sorting to hoppers (Pro 70)



This function is only supported by MDB changers with hopper interface.

With this function one coin out of channels 1 to 16 is assigned to hopper 1 or hopper 2. It is only possible to pay out one of the coin types from the hopper, that is programmed as tube coin in the changer (see section "Setting of the coin sorting to the tubes (Pro 54–57)" in this chapter. The hopper is used, if one coin type is particularly often paid out as change.

For the coin channel of both hoppers a sub-function is assigned each (see label in chap. 4 "Design and function of the G-46" for assignment coin type – coin channel):

- Coin channel for hopper 1 Pro 7001
- Coin channel for hopper 2 Pro 7002



The hoppers must be enabled in function Pro 7101 (see next section).

Activate hoppers (Pro 71)



This function is only supported by MDB changers with hopper interface.

Pro 7101 00000000

Hopper 1 activated (1)
Hopper 2 activated (1)

9 Service functions

Structure of the SER functions

Function	Meaning	
2501	Empty left tube	
2502	Empty middle/left tube	see chap. 7
2503	Empty middle/right tube	
2504	Empty right tube	
0501	Fill tubes	see chap. 7
0601	Reset coin counter for left tube	
0602	Reset coin counter for middle/left tube	
0603	Reset coin counter for middle/right tube	
0604	Reset coin counter for right tube	

Resetting the coin counters of the tubes (Ser 06)

Before refilling the tubes (e.g. after transporting the changer), the four coin counters must be reset to zero. For this proceed as follows:

Programming step	Press key	Display
1. Select SER mode	\boxed{F} 3 times	Ser
2. Activate SER mode	\boxed{E}	Ser 01
3. Select function	\boxed{F} 3 times	Ser 06
4. Call up „left tube“	\boxed{E}	Ser 0601 032
5. Reset coin counter	\boxed{E} , $\boxed{+}$, $\boxed{-}$	Ser 0601 HHH000
6. Call up „middle/left tube“	\boxed{F}	Ser 0601 050
7. Reset coin counter	\boxed{E} , $\boxed{+}$, $\boxed{-}$	Ser 0602 HHH000
8. Repeat steps 6 and 7 for other tubes		
9. Back to standby mode	$\boxed{+}$	Display shuts down

10 Remediating faults

Solving actual problems

Problem	Cause	Remedy
coin validator rejects all coins	inhibition active	if necessary, refill machine if necessary, clear expendable material (e.g. coffee filter)
coin validator rejects single coins	coin channel inhibited	check Pro 15 and DIL switch and enable inhibited channel Read out error message via setting module (see section after next)
coins fall into cash-box and not into tubes	coins emptied without inventory before transport coin counters was not set to zero before filling the tubes	check filling levels and set display to zero reset coin counters
motor default	payout slide blocked by coin flat cable between payout slide and power supply unit not connected defective flat cable between payout slide and power supply unit sensor for final motor position defective motor control of power pack pcb defective	remove jammed coins, carry out test by means of internal keyboard connect flat cable exchange payout set (see chap. 12) exchange payout set (see chap. 12) exchange power pack pcb

Error display via the internal LED

The internal LED that indicates errors is positioned on the interface module between the top of the tubes and the coin validator. When there is no fault and the changer is ready to accept money it is flashing constantly.

Flashing	Cause	Remedy
once	defective check sum	check all programming functions
twice	machine blocks G-46	check machine
3 times	no serial communication	check connecting cable to machine and to peripheral equipment
4 times	motor default	check payout set by means of internal keyboard (see previous section).
5 times	data for machine control cannot be transferred	check connecting cable to machine

Reading out error messages via the setting module

If the setting module is connected to the changer, when a fault occurs you can read out error messages with the setting module's display. The meaning is described in the following tables.





Display	Meaning	Remedy
Ab-01	coin rejected as measured values not lie within the acceptance band	change acceptance band or insert a different coin
Ab-02	coin inhibited	check Pro 15 and DIL switch, enable if necessary
Ab-03	measuring time over as CP2 not reached	check if coin validator is dirty
Ab-04	coins were inserted too quickly	insert coins more slowly
Ab-05	CP3 and CP4 active	if necessary, clear jammed coins check CP3 and CP4
Ab-06	no CP3	if necessary, clear jammed coins check CP3
Ab-07	no CP4	if necessary, clear jammed coins check CP4
Ab-08	CP4 too long	check CP4
Ab-09	string signal	clean or exchange string sensor

The acceptance of a coin will also be indicated, which is in the form of "An x yy". Here "yy" indicates the channel number and "x" the sorting of the coins according to the following scheme:

- 0 = cash-box
- 1 = left tube
- 2 = middle/left tube
- 3 = middle/right tube
- 4 = right tube

Example:

„An 0 12“ = Coin accepted in channel 12 and sorted into the cash-box

Display	Meaning	Remedy
FE-01	motor default, left tube	press internal  -key
FE-02	motor default, middle/left tube	press internal  -key
FE-03	motor default, middle/right tube	press internal  -key
FE-04	motor default, right tube	press internal  -key
FE-13	check sum error in acceptance bands	check all programming functions using PC software "WinEMP"
FE-14	check sum error in coin values	check all programming functions using PC software "WinEMP"
FE-15	check sum error in programming data	check all programming functions using setting module or PC software "WinEMP"
FE-38	no communication with machine control	check connecting cable

The following status messages can indicate problems with the machine. Nevertheless, the changer operates without fault.

Display	Meaning	Remedy
InFo-01	return function active	check return lever
InFo-09	string sensor active, as string was recognized by the string sensor	check sensor
InFo-13	check sum error in programming functions which, despite being incorrectly adjusted, only restricts G-46 function	check corresponding functions by means of setting module or PC software "WinEMP"
InFo-80	machine blocks G-46	check machine

11 Cleaning the changer

From time to time it is necessary to clean the coin validator by using a damp cloth:



You must prevent water from running into the device. Otherwise, the pcbs will be damaged. Do not use solvents or scouring agents that can affect the plastic parts of the device.

1. Switch off machine.
2. Push lever (1) upwards and open coin validator (see fig. 9)
3. Clean coin run way in coin validator with damp cloth (ukewarm water plus detergent).
4. Close coin validator.
5. Switch on machine again.

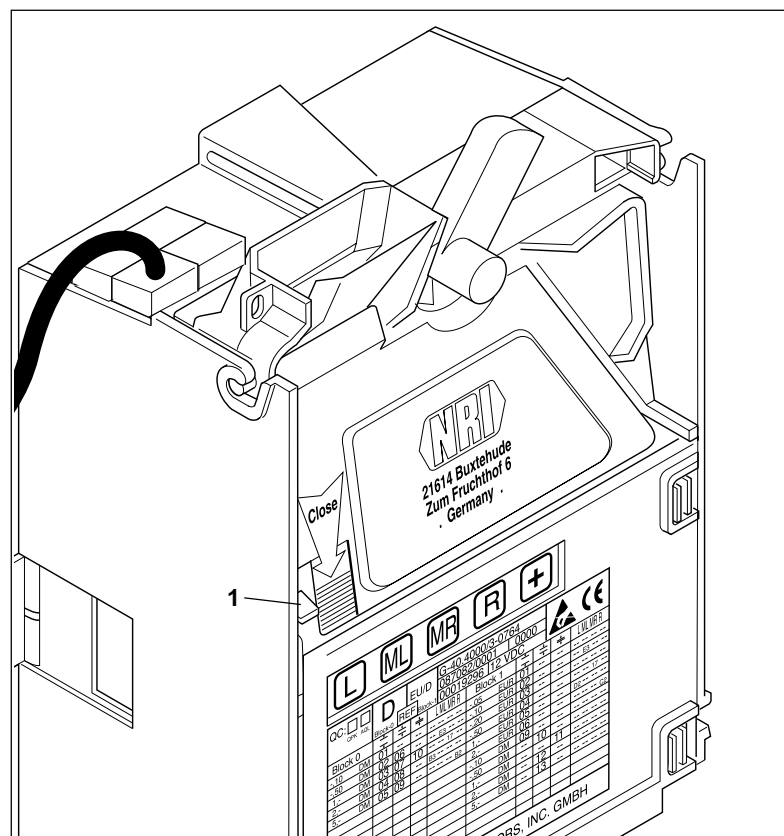


Fig. 9: Open the coin validator

12 Repairing and exchanging components

Exchanging tubes

For the removal of tubes

1. Remove coin validator (see "Installing the changer" in chap. 5).
2. Remove tube cover towards the front by means of the recesses (**1**) (see fig. 10).
3. It is recommendable to unfasten the fastening screw (**1**) for the cash-box channel on the right-hand side of the housing (see fig. 11).
4. Push one of the middle tubes downwards (**A**) and pull the tube next to it upwards (**B**) to lift the partition, now remove tube towards the front (**C**) (see fig. 12).
5. Push partition upwards with one hand (**A**) and if necessary remove the other tubes in the following order: middle, left, right (**B**) (see fig. 13).

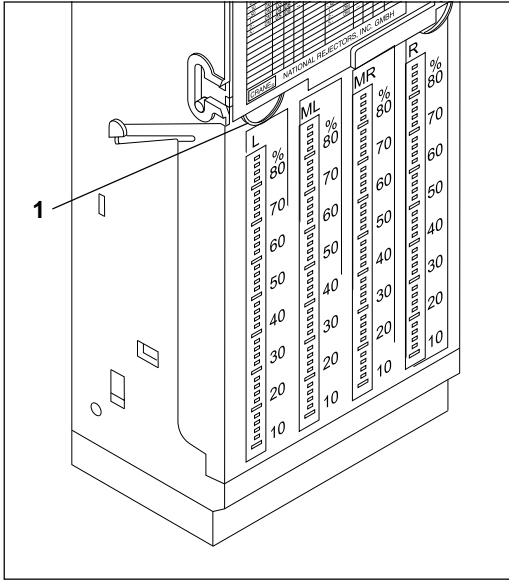


Fig. 10: Remove tube cover

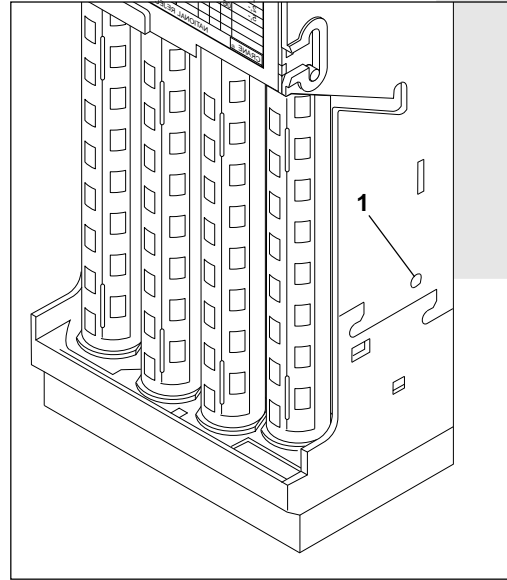


Fig. 11: Unfasten fastening screw

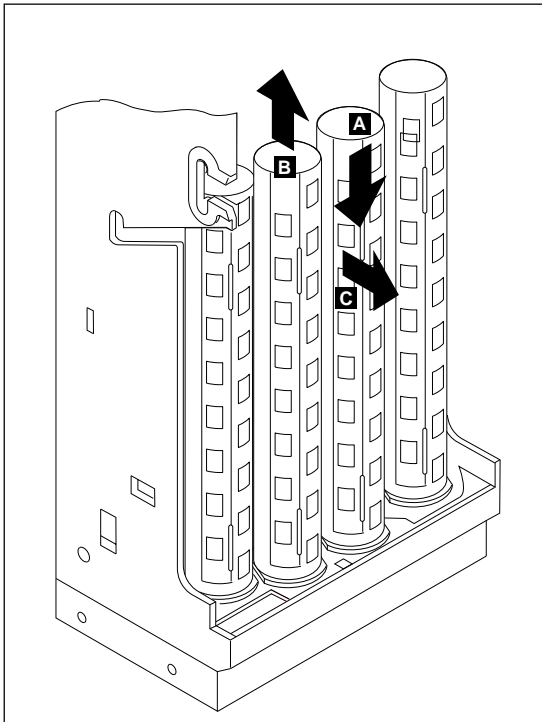


Fig. 12: Dismantle first tube

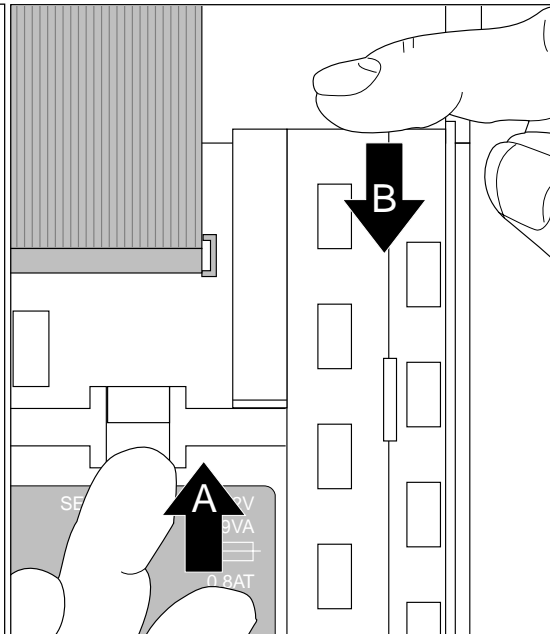


Fig. 13: Dismantle other tubes

Begin the installation with the outer tubes:

1. Insert left or right tube into payout set so that the 2 pins (1) on the bottom of the tube enter into the appropriate holes of the payout set (see fig. 14).
2. Push partition upwards and let the tube snap into the partition.
3. Do the same with the remaining tubes, first the other outer tube and then the inner ones. For the installation of the last tube the partition must be pushed upwards by pushing one of the adjacent tubes upwards.
4. Check if all tubes are snapped into position at the top and at the bottom.
5. Retighten the screw for the cash-box channel on the right-side of the housing.
6. Insert tube cover on the payout set and push it into the housing with lateral locking levers slightly pressed outwards.
7. Install changer.

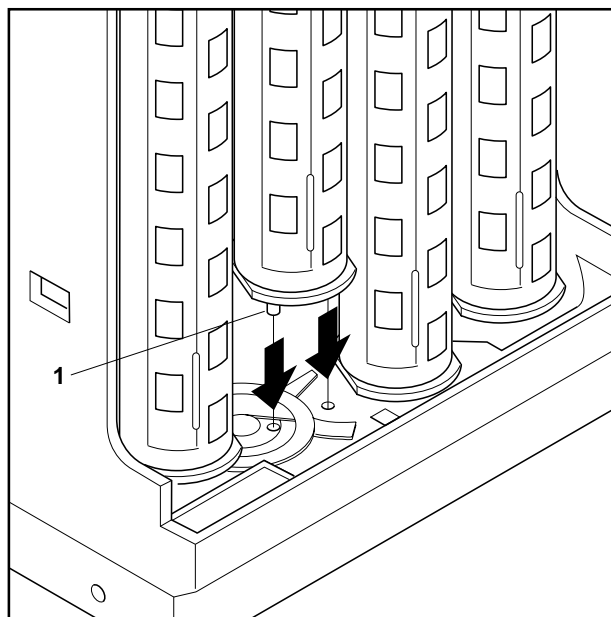


Fig. 14: Mount tubes



After each change of the tube combination, the programming functions Pro 54 and Pro 57 must always be readjusted (see section "Setting of the coin sorting to the tubes" in chap. 8).

Exchanging the payout set

For the removal of the payout set

1. Remove coin validator (see chap. 5 "Installing the changer", fig. 5).
2. Remove tubes (see "Exchanging tubes" in this chapter).
3. Push side cover on the right side of the housing outwards and remove snapped in partition (1) together with cash-box channel (see fig. 15).
4. Push side cover on the left side of the housing outwards and remove snapped in partition (1) (see fig. 16).
5. Remove partition and cash-box channel from the housing towards the front.
6. Disconnect flat cable (1) between payout set and pcb (see fig. 17).
7. Simultaneously push the right and left stop levers (2) inwards and remove the payout set (3) towards the front of the housing (see fig. 17).

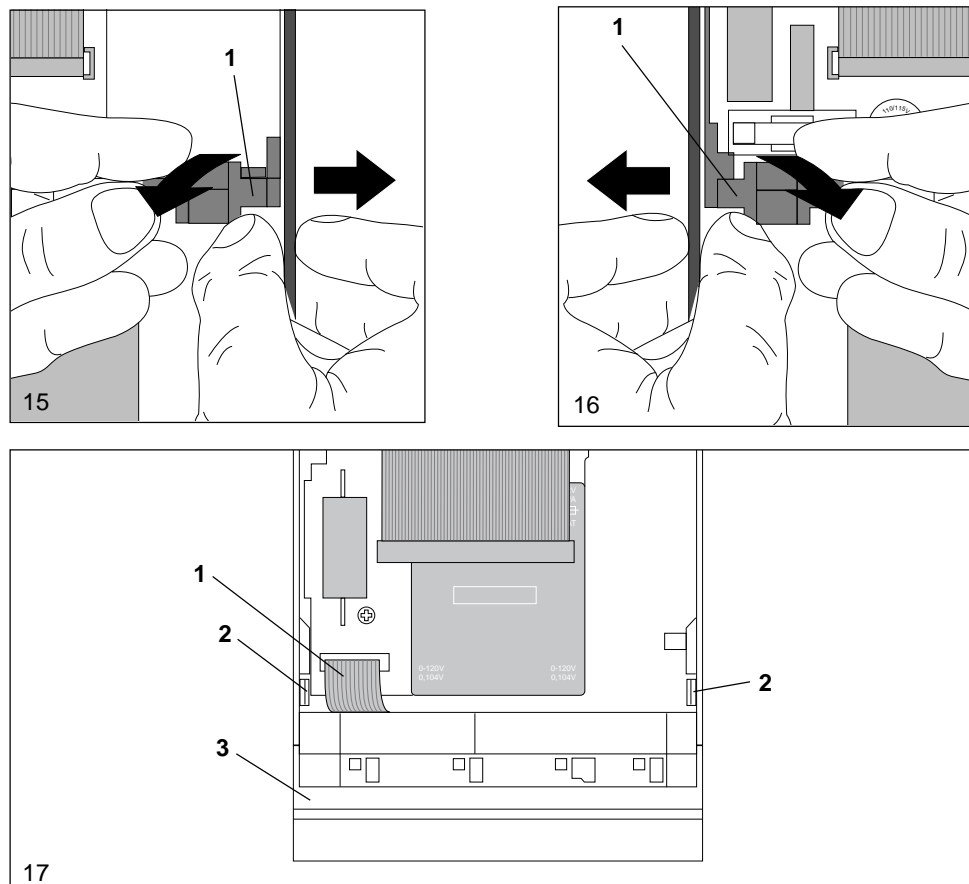


Fig. 15–17: Exchange payout set

For the installation of the new payout set

1. Connect flat cable **(1)** (see fig. 17).
2. Push payout set into housing until both stop levers **(2)** snap into position (see fig. 17).
3. Push partition and cash-box channel into housing, beginning with the left side and then the right side.

Exchanging the interface module

For the removal of the present pcb

1. Remove coin validator (see chap. 5 "Installing the changer", fig. 5).
2. Remove tubes (see "Exchanging tubes" in this chapter).
3. Remove partition and cash-box channel (see "Exchanging the payout set" in this chapter).
4. Disconnect cable from pcb.
5. If there is a dummy plug **(1)**, remove it from the housing then remove cable from cable passages in the housing towards the front (see fig. 18).
6. Remove screws **(2 + 3)** (see fig. 18).
7. Lift the pcb slightly on the right-hand side and remove it from the housing.
8. Reinstall pcb in reverse order.

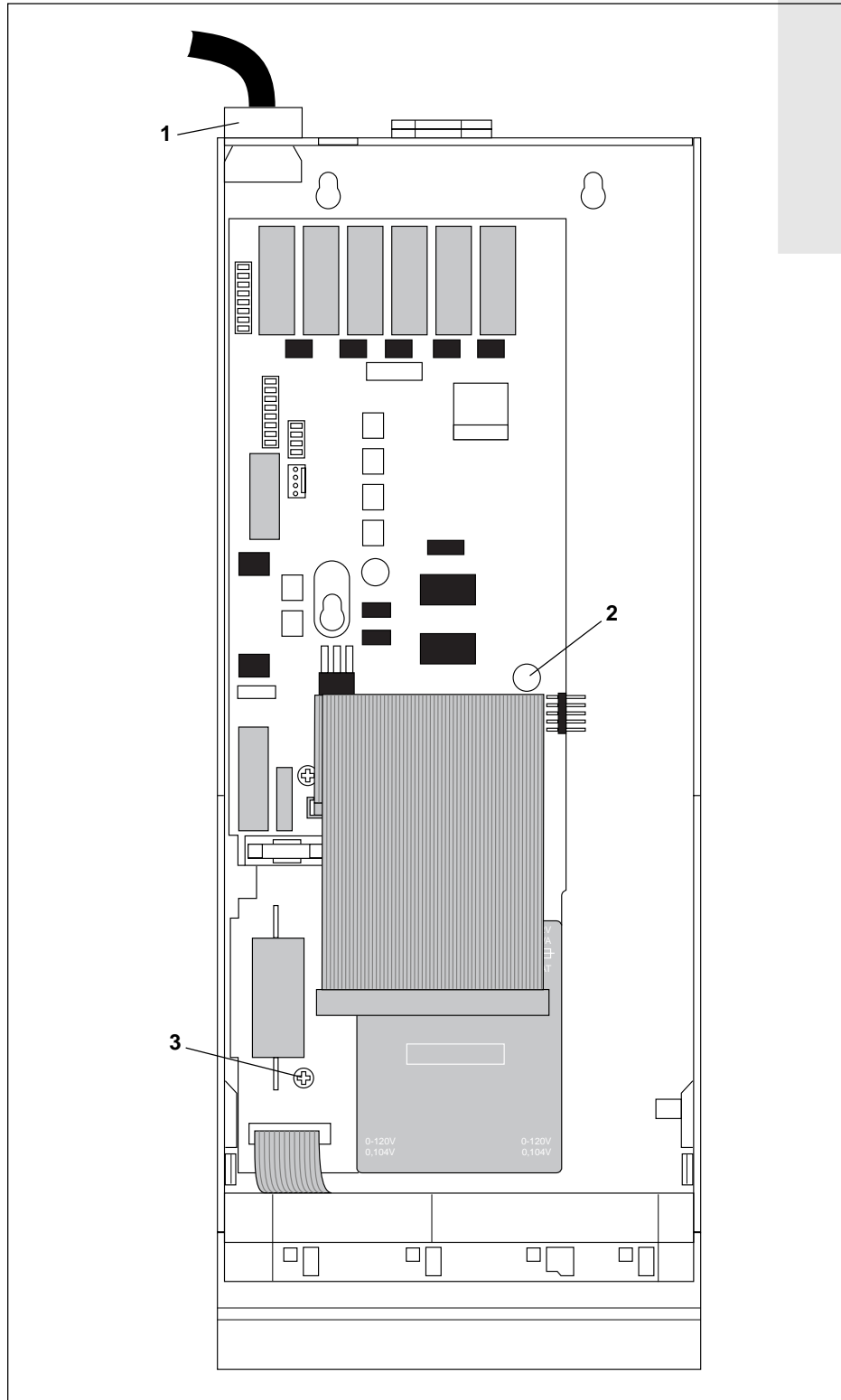


Fig. 18: Exchange interface module

13 Technical Data

Coin acceptance:	Max. 16 coin types (incl. up to 3 tokens) diameter: 15–33 mm thickness: 1.2–3.3 mm
Coin payout:	4 coin types out of tubes diameter: 15–32 mm thickness: 1.2–3.3 mm
Dimensions:	height: 380.0 mm width: 133.5 mm depth: 76.5 mm (80 mm with return lever pressed)
Mounting position:	vertical (max. deviation 2°)
Operating temperature:	-25 °C to +70 °C
Air humidity:	max. 90 %
Operating voltage:	18 Volts–40 Volts DC
Power consumption:	standby 3.5 VA, max. 15 VA
Noise immunity:	The device meets the present requirements regarding noise immunity and noise emission according to the EC guidelines (electromagnetic compatibility directive)
Safety regulations:	low voltage directive

CE Certification

The CE certificate (CE = Communautés Européennes) confirms that our products comply with specified basic requirements of the applicable directive. The CE certificate is not a quality assurance certificate in terms of the quality expected by the manufacturer but only in terms of the quality demanded legally. It is a pure administrative certificate and is intended only as proof of compliance with the directives for the monitoring authorities and not directed at clients or final customers.



Which directive(s) was/were applied can be seen in the declaration of conformity. The manufacturer must keep this declaration available for the monitoring authorities only (for a minimum period of 10 years after the last product has been introduced to the market). However, upon request we can provide copies of this declaration for our customers.

The following directives and their subsequent changes can be applied to our devices:

1. The EMV Directive (89/336/EEC)
for devices which cause electromagnetic interference or are interfered with by such.
2. The Low Voltage Directive (73/23/EEC)
for electrical operating means which are used with a nominal voltage of between 50 and 1000 V AC and 75-1500 V DC.
3. The CE Certificate Labelling Directive (93/68/EEC)
Modification directive regarding the application and use of CE labels.