Technical Documentation

NRI

A Crane Co. Company

Electronic coin validator
G-40 FT BACTA
G-40.64xx, G-40.74xx, G-40.84xx

Operating instructions

RoHS ✓

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Table of contents

1   General information

This chapter should provide a general overview of the advantages and options regarding the coin validator G-40 FT with parallel BACTA interface. The first section, however, is designed to help you navigate easily within these operating instructions.

General information about these instructions

These operating instructions describe the design and operation of the electronic coin validator G-40 FT with parallel BACTA interface. Chapters 5 and 6 explain the necessary steps for starting up and operating the coin validator. Chapter 7 explicates how to clean the coin validator and remedy the cause of a malfunction.

Chap. 9 "Technical data" as well as the appended "Index" and "Glossary" reduce the search for specific explanation.

Text conventions

To make it easier for you to navigate within these instructions and to operate the device, the following accentuations were made in the text:

Safety instructions, which you must observe in order to protect operators and equipment.

Notes which you must observe in order to protect the environment.

Special notes, which are to facilitate the use of the coin validator.

1 2 3 ...   Requests to perform an action are numbered in another typeface.

[**1/2**]   Reference to a figure. The number before the slash refers to the figure number, the number behind the slash to the item number within the figure.

At the beginning of a chapter you will find a short "guide", which summarises the contents of the chapter.

WinEMP   Device functions, which are set or prepared by the manufacturer according to customer specifications and can be set or changed using the NRI PC configuration software (see Chap. 8 "WinEMP programming station for the workshop/WinEMP compact for on-site configuration" and web pages for product accessories on the internet (www.nri24.com)).

Additional useful technical documentation

Apart from the operating instructions you already have there is further documentation for the G-40 FT, e.g., about spare parts, testing and configuration. All documentation is available in a compressed PDF format at www.nri24.com (⇨ Download).

General information about the coin validator G-40 FT BACTA

The electronic coin validator G-40 FT with parallel BACTA interface in the standardised 5" format is based on the tried and tested validation and measurement properties of the G-40 standard. The coin validator communicates with the machine control system using the BACTA standardised 15 or 17-pole connector. Due to this interface and its compact design the G-40 FT BACTA is used in AWP and SWP gaming machines.

For the purpose of coin acceptance the G-40 FT BACTA has 32 coin channels, which are divided into 2 x 16 coin channels and can thus be data-managed and activated as two memory blocks with different coin configurations.

To be able to react as quickly as possible to new fraud coins and to enable you to make your individual adjustments, the coin validator can be connected to a PC programming station which is made up of the configuration and diagnostics software "WinEMP" (including card reader and licence chip card) and an NRI tester for power supply of the G-40 FT (see Chap. 8 „WinEMP programming station for the workshop/WinEMP compact for on-site configuration" and product accessory pages on the internet (www.nri24.com)).

Coins that have not been taken into consideration at the manufacturer's company can be programmed in the optional teach mode directly at the coin validator by inserting coins and without any configuration software.

The G-40 FT BACTA features

- Operating and manipulation safety thanks to optical accepted coin sensor and sorting control in coin validation area
- Acceptance speed of two coins per second
- 16 coin channels which can be blocked individually for each of the both memory blocks which have different configurations and can be selected depending on application area
- Parallel or binary operation selectable via control system
- Optional teach mode for eight channels
- Optional 4/5-fold sorting mechanism with full signal override
- Optional string sensor
- Top or front entry, front or bottom return
- Optional 4-fold sorting adapter, can be used individually by means of routing plug (jumper block) and full-signal sorter override interface
- Selection from four different return levers depending on machine type
- Interface for connection to WinEMP PC configuration software which makes immediate reaction to the use of fraud coins possible

Models

The G-40 FT BACTA is available in different models. The difference is in where the coin insert and the return area are positioned and whether the coin validator is equipped with an internal 4/5-fold sorting mechanism or not.

Top entry and bottom return (G-40.64xx)

With this model of the G-40 FT BACTA, the coins are inserted into the device from the top and, if they are not accepted, returned via the return area at the bottom.
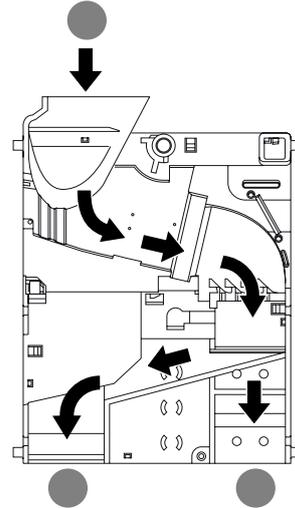
Front entry and bottom return (G-40.74xx)

With this model of the G-40 FT BACTA, the coins are inserted into the device from the side and, if they are not accepted, returned via the return area at the bottom. The coin validator with front entry generally has an NRI front plate fitted to the left-hand side of the device (see section "Accessories" in Chap. 9 "Technical data"). However, this model is also available without a front plate.
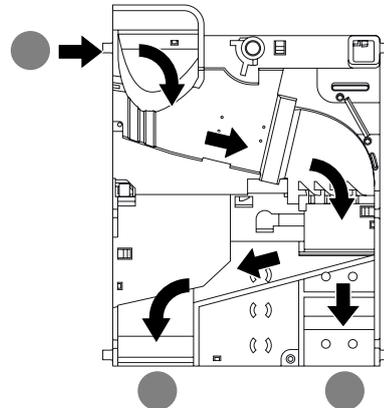
Front entry and front return (G-40.84xx)

With this model of the G-40 FT BACTA, the coins are inserted into the device from the side and, if they are not accepted, returned via the return area also situated on the side. The coin validator with front entry and front return generally has an NRI front plate fitted to the left-hand side of the device (see section "Accessories" in Chap. 9 "Technical data"). However, this model is also available without a front plate.
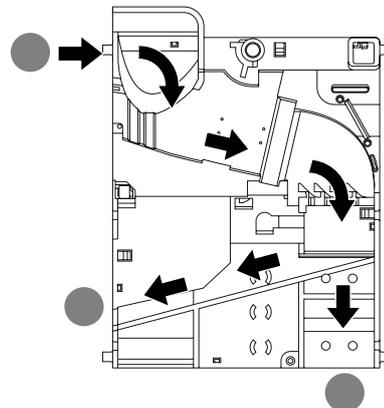
Internal 4/5-fold sorting mechanism

In order to be able to sort the accepted coins into the cash-box or, e.g., into change tubes or hoppers, the G-40 FT BACTA is also available on an optional basis with an internal 4/5-fold sorting mechanism (see section "Sorting of accepted coins" in Chap. 4 "Function").

2   Safety instructions

Before operating the device for the first time, please read these operating instructions carefully at least once, and most importantly the safety instructions. This is to ensure you have understood the contents of this manual as well as how to operate the coin validator.

Proper use

The electronic coin validator G-40 FT (G-40.64xx/G-40.74xx/G-40.84xx) with parallel BACTA interface is intended to be used in gaming machines with a parallel BACTA interface and is supposed to check the coins inserted into the machine for specific properties. Only use the coin validator for this purpose. Under no circumstances can the manufacturer be held liable for any damage or loss resulting from improper use of the device.

The coin validator has been constructed in compliance with the state of the art and recognised safety regulations. Nevertheless this equipment can be a source of danger. Therefore please observe the following safety regulations.

Protecting yourself and equipment

The coin validator may only be connected by a qualified electrician.

Only use the coin validator according to proper use. Under no circumstances can the manufacturer be held liable for any damage or loss resulting from improper use of the device.

The coin validator PCB is fitted with components that can be damaged by electrostatic discharge. Please observe the handling instructions for components exposed to the risk of electrostatic discharge.

Select the correct voltage for the coin validator (see label).

Ensure the correct potential equalisation in the machine.

Never pull the connecting cable of the coin validator from the machine when a voltage is applied.

Pull out the machine's mains plug before you install, clean or remove the coin validator.

Contact NRI if you wish to alter the construction of the device to a greater extent than that described in these instructions.

Keep water and other liquids away from the coin validator.

If the device is no longer required, please dispose of it correctly.

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

3   Design

This chapter describes
- the main parts the G-40 FT BACTA consists of, and
- all parts which you need to operate the coin validator.
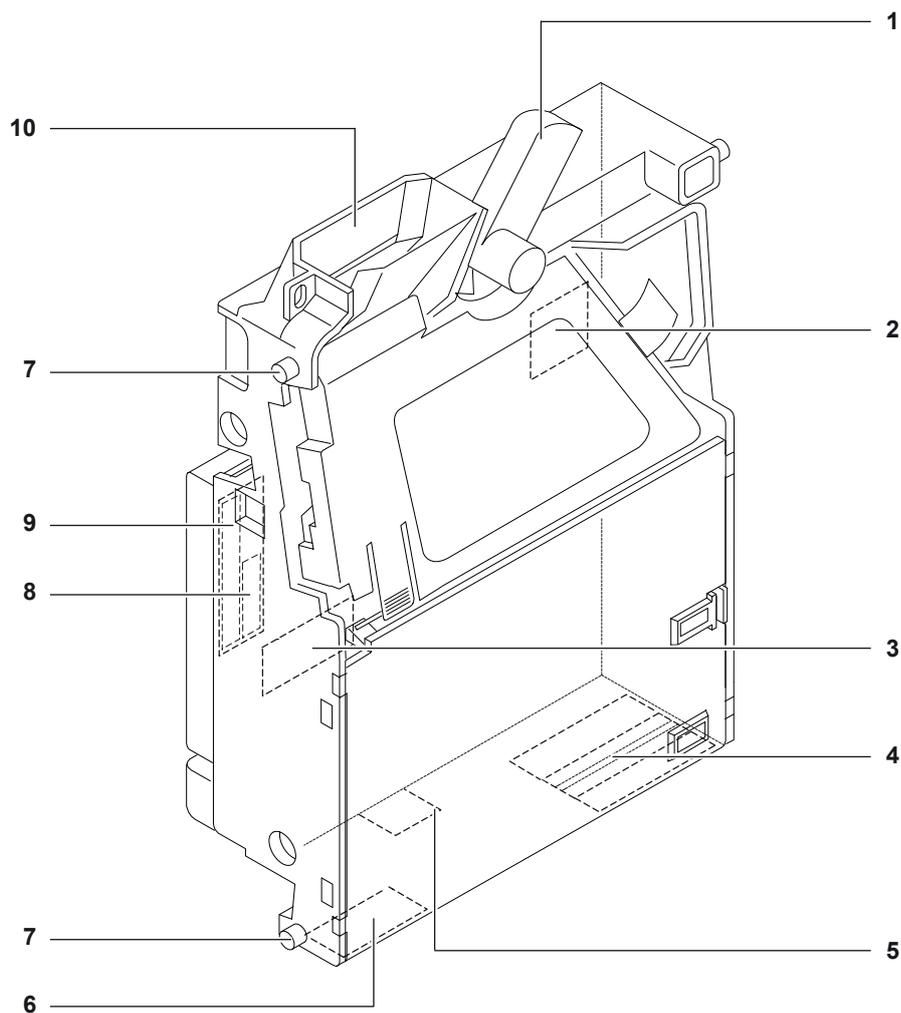
Fig. 1: Design

1 Return lever

2 Switching blocks S1 and S2

3 Interface – routing plug (jumper block)

4 Coin outlet – Cash-box/sorting

5 Interface – PC configuration software (WinEMP)

6 Coin outlet – Return area (with bottom return model, for front return model see section "Models" in Chap. 1 "General information")

7 Mounting studs

8 Interface – Sorter override

9 Interface – Machine/tester (BACTA)

10 Coin insert funnel

Switching blocks

On the rear, the coin validator is equipped with two switching blocks [**1**/**2**], the upper one with eight DIL switches S1.1–8 and the lower one with ten S2.1–10. Using the DIL switches you can adjust certain device functions:

Switching block S1

DIL switch		off	on
S1.1	Coin channel 1	accepts	inhibited
S1.2	Coin channel 2	accepts	inhibited
S1.3	Coin channel 3	accepts	inhibited
S1.4	Coin channel 4	accepts	inhibited
S1.5	Coin channel 5	accepts	inhibited
S1.6	Coin channel 6	accepts	inhibited
S1.7	Coin channel 7	accepts	inhibited
S1.8	Coin channel 8	accepts	inhibited

Switching block S2

| DIL switch		off	on
S2.1	Coin channel 9	accepts	inhibited
S2.2	Coin channel 10	accepts	inhibited
S2.3	Coin channel 11	accepts	inhibited
S2.4	Coin channel 12	accepts	inhibited
S2.5	Coin channel 13	accepts	inhibited
S2.6	Coin channel 14	accepts	inhibited
S2.7	Coin channel 15	accepts	inhibited
S2.8	Coin channel 16	accepts	inhibited
S1.9	Mode	normal operation	teach mode
S1.10	Memory block	0	1
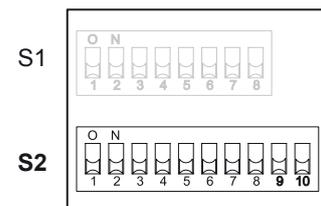
For details on how to use the switching blocks to set the individual functions, see Chap. 6 "Operation".

On the rear of the device you will find a brief description of the individual switch functions.

Return lever

The return lever [**1**/**1**] on the top of the coin validator is operated using the return button on the machine, if the coins which have already been inserted are to be returned or a jam caused by coins, e.g., which have become stuck needs to be removed. Operating the return lever opens the measurement and validation area of the coin validator so that all objects in the coin validator are transported into the return area.

The coin validator G-40 FT BACTA can be equipped, depending on the dimensions of the machine, with four different return levers (see section "Mounting dimensions" in Chap. 9 "Technical data").

Interfaces

For details of the interfaces [**1**/3, **8**, **9**] please refer to Chap. 4 "Function" and Chap. 9 "Technical data".

Label

The label contains all the data defining the device such as device series, device type and device operation as well as customer-specific default values such as coin type and appropriate channels, signal lines and sorting chutes:

Fig. 2: Label

1 Coin information – memory block 0
(if DIL switch S2.10 to OFF)

2 Date of manufacture

3 Currency – memory block 0

4 Currency – memory block 1

5 Coin information – memory block 1
(if DIL switch S2.10 to ON)

6 Device type

7 Data block number

8 Nominal voltage

9 Bar code

10 Ordering code (8-digit),
order number (6-digit),
consecutive device number per order number (4-digit)

11 Sorting chute ▤ – memory block 0
(here: 3 = without internal sorting mechanism, if the validator has an sorting mechanism, always the main sorting chute is indicated and not the up to 3 override sorting chutes)

12 Coin signal line ⊓⌐ – memory block 0

13 Channel number, very narrow coin channel ÷ – memory block 0

14 Channel number, narrow coin channel ÷ – memory block 0

15 Channel number, normal coin channel ÷ – memory block 0

16 Coin type – memory block 0
(TK = teach channels programmed for teach mode)

4   Function

This chapter describes the functional principle of the coin validator:
- Coin acceptance and coin channels
- Memory blocks
- Accepted coin sensor and sorting control
- Coin oulet into cash-box/sorting device or return area
- Two assignments ot the BACTA machine interface
  (binary and parallel mode)
- Coin impulses and signal lines
- Sorting of accepted coins (option)
- Coin inhibit/Activation of narrow coin channels
- Teach mode (option)
- Manipulation and string recognition (option)

Coin acceptance and coin channels

For the purpose of coin acceptance, the coin validator possesses 16 „memory slots" that can be assigned up to 16 different coin types or tokens. These „memory slots" are termed 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 normal coin channel (see section „Label" in Chap. 3 „Design"). The limit values of these coin channels are closer to one another so that false coins with similar measured values are rejected, if the normal coin channel is inhibited (see section „Inhibiting coins/activating narrow coin channel" in Chap. 6 „Operation"). Narrow and very narrow coin channels, however, also possess a lower acceptance rate.

In addition, it is possible to allocate coins with different measured values but identical coin values to different coin channels. This is how the coin validator can, for example, accept old and new coins of the same type.

However, a coin channel is not only assigned the acceptance band of a coin type but also other coin information which defines further processing of the coin after its acceptance: e.g. signal lines, coin impulse number or sorting information for a sorting device.

WinEMP   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 types and the desired further information at any time using the PC configuration software WinEMP. Existing configurations can be changed.

The last eight coin channels 9–16 are intended to be used for the teach mode. In these coin channels new tokens/coin types can also be taught without configuration software, directly on the coin validator using the switching blocks; i.e. a coin channel is assigned a coin type or also a token (see section "Teach mode" in this chapter).

Memory blocks

The G-40 FT BACTA data-manages two separately programmed (memory) blocks 0 and 1 (see label). In each block different coin types (also currencies), sorting information, etc. can be assigned to the 16 coin channels. Only one block can be active at a time and be used for the coin measurement and for further coin processing. You can use the lower switching block on the device to select the desired block (see section „Selecting memory block" in Chap. 6 „Operation").

Accepted coin sensor and sorting control

To ensure that accepted coins actually arrive in the cash-box or in an external sorting device and that coin acceptance has not been tampered with, an accepted coin sensor (light barrier) and a sorting control (light barrier) check whether the inserted coin drops unhindered through the coin outlet in the direction of the cash-box or sorting device. A coin signal or in case of manipulation a foul signal is not transmitted to the machine until the coin has passed this checking function (see section "Transfer of coin values by means of coin impulses and via coin signal lines in binary and parallel mode" and "Foul signal" in this chapter).

Coin oulet into cash-box/sorting device or return area

WinEMP   Accepted coins or tokens may also be directed to the return area and not into the cash-box or an external sorting device.

Two assignments of the BACTA machine interface (binary and parallel mode)

In order to be able to run the parallel or binary mode, two different functions are assigned to the 17 pins of the BACTA machine interface on the rear of the coin validator, except for the select line (pin 8). This double assignment enables the coin validator to operate in parallel or binary mode with a special pin assignment, depending on how the machine control system switches the select line (see section "Interface" in Chap. 9 "Technical data").

Binary mode (only via 17-pole interface)

The binary mode is characterised by a tamper-proofness which prevents the credit from being increased through improper connection or aimed manipulation. The coin signal is only transmitted to the machine if the so-called strobe line is active and the checksum is correct.

The coin validator operates in binary mode, if it is connected to the machine using a 17-pole connecting cable and if the machine control system switches the select line to "low".

Parallel mode

The coin validator operates in parallel mode, if the machine control system switches the select line to "high".

Transfer of coin values by means of coin impulses and via coin signal lines

Usually, each coin accepted by the coin validator passes on one impulse to the machine control system on the coin signal line assigned to that coin. An impulse tells the machine control system that a coin has been accepted.

Depending on the coin signal line selected the machine knows what the coin type is (what coin value).

WinEMP   The assignment between coin type and coin signal line is customised by NRI.

You can also assign a certain combination of signal lines, i.e. several signal lines, to a coin type in order to be able to differentiate.

Multiple impulses

You can also assign a certain combination of signal lines, i.e. several signal lines, to a coin type in order to be able to differentiate.

If more coin types should be programmed than signal lines available, coin types can also be assigned several coin impulses (multiple impulses, max. 255) per coin so that the machine no longer differentiates by the signal line but by the impulse number. In such a case, coin types with a higher denomination are assigned a multiple of a smaller coin, i.e. if, for example, a 2-euro coin was inserted, the machine control unit would be sent two coin impulses on the coin signal line assigned to the 1-euro coin.

WinEMP   The number of coin impulses is customised by NRI.

By default the pulse-pause ratio is programmed with 1:1 but can also be programmed with a longer pause of 500ms.

Coin impulse length

The coin impulse length is programmed to a standard value of 100ms. However, it can be programmed between 30 and 300ms upon customer request, e.g. shorter impulses for multiple impulses.

Sorting of accepted coins (option)

In order to guide the accepted coins into either the cash-box or an external sorting device, such as change tubes or hoppers, the coin validator can be equipped with five sorting chutes at the coin outlet. The chutes are controlled via a flap sorting system constructed using three solenoids.

In case a payout unit transmits a full signal to the coin validator for each coin programmed three override sorting chutes may be specified in addition to the main sorting chute. Coins are sorted into these override chutes whenever the payout unit is full (see section "Sorter override for tube-full signal" in this chapter).

WinEMP

If all sorting chutes specified for a coin signal "tube full", the coin will be directed into the default sorter chute customised by NRI (in many cases the cash-box chute).

For the purpose of splitting-up and for better further transport of the coins to be sorted, an NRI 4-fold sorting adapter (manifold) can be installed on the coin outlet of the coin validator.

Standard sorting

The individual coin types can be distributed across the four or five chutes independently of their size. Each chute can be defined as a cash-box chute.

WinEMP

Which coin type is sorted into which of the five chutes that are arranged one behind the other, is customised by NRI (see label, section "Label" in Chap. 3 "Design").

For sorting chute 4 the coin validator cannot receive any tube-full signal via the sorter override interface (see section "Sorter override for tube-full signal" in this chapter).
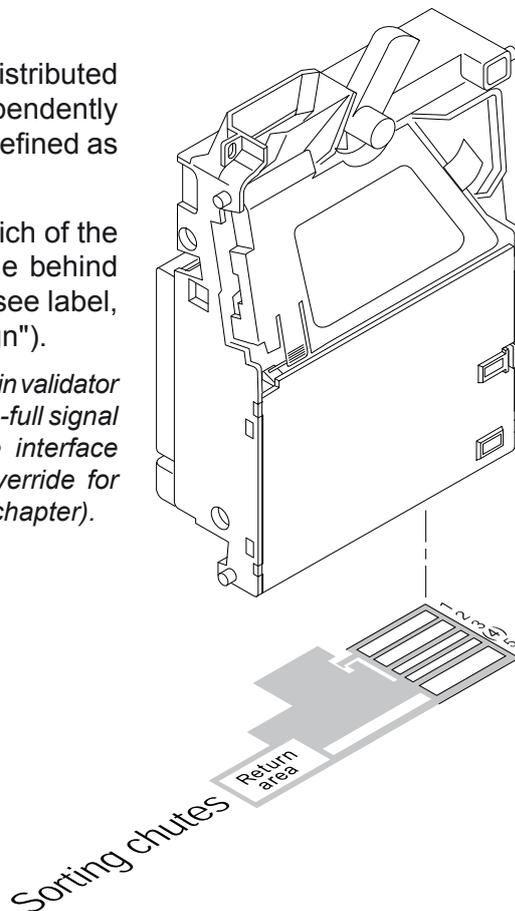
Sorting with NRI sorting adapter (manifold)

If the NRI manifold is installed, four sorting chutes are available (see also section "Accessories" in Chap. 9 "Technical data").

WinEMP

Which coin is to be sorted into which of the up to four manifold chutes is customised by NRI (see label, section "Label" in Chap. 3 "Design").
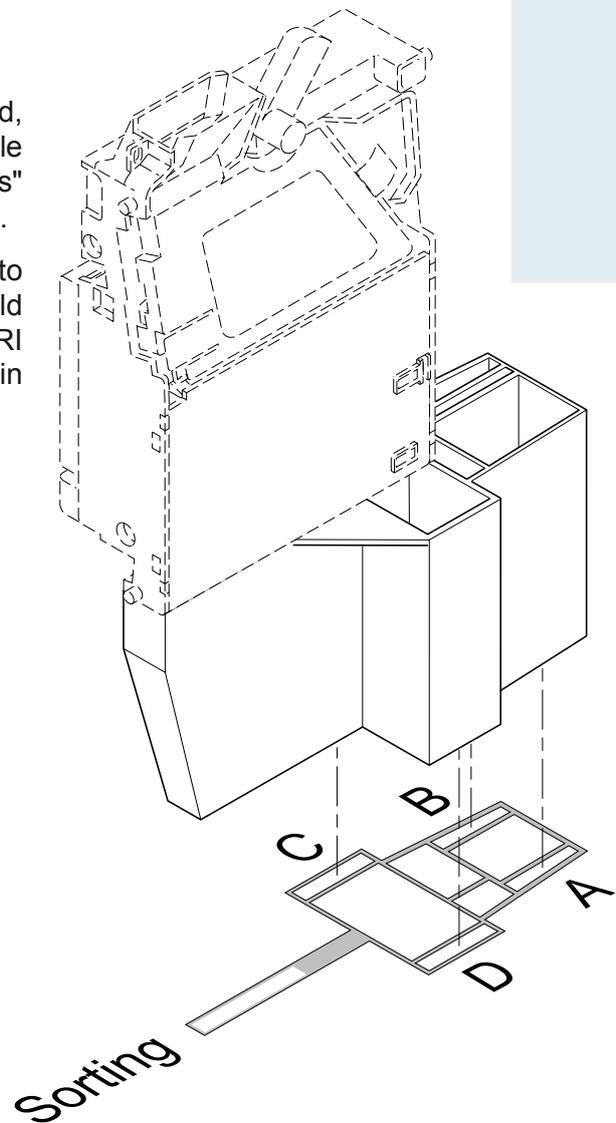
The following table lists which manifold chute corresponds to which coin validator chute:

Manifold chute	Validator chute
A	3
B	2
C	1
D	5

Sorting with NRI manifold and routing plug (jumper block)

In case the coins to be sorted are not supposed to be sorted into the sorting chutes of the NRI manifold programmed in the coin validator, or you do not want to use the override sorting chutes programmed, you may also use the the 18-pole routing plug on the rear of the coin validator to by-pass the programmed coins in one or several chutes of the NRI manifold.

For this, the routing plug has six sorting pathes, which can be connected to the four manifold chutes using a (multiple) jumper.

The sorting pathes (SP) and manifold chutes are assigned to the following routing plug pins:

	nc	nc	nc	SP1	SP2	SP3	GND	SP4	SP5	
Pin	2	4	6	8	10	12	14	16	18	Pin
Pin	1	3	5	7	9	11	13	15	17	Pin
	(A)	nc	GND	D	nc	GND	C	B	SP6	

WinEMP

Which coins are to be sorted via which sorting path is customised by NRI.

So, if sorting path 1 is assigned to a coin, the coin could be by-passed to manifold chute B, C or D by means of a jumper placed from pin 8 to pin 15, 13 or 7.

In contrast to the BACTA standard you can also by-pass to or from manifold chute A (pin 1).

If you want to connect two sorting pathes to one manifold chute, you must use decoupling diodes (cathodes to sorting).

For the case of a tube-full signal you can also by-pass one coin to several manifold chutes (see section „Sorter override for tube-full signal" in this chapter). If several chutes are selected, the following sorting priority is valid: D → C → B → A.

Sorter override for tube-full signal

The 10-pole sorter override interface on the rear of the coin validator is used to receive a tube-full signal for the four coin validator chutes 1, 2, 3 and 5 or the four manifold chutes A, B, C and D, so that coins to be sorted in a full payout unit can be by-passed in the cash-box or in an alternative payout unit (see section "Interface" in Chap. 9 "Technical data"). The sorter override interface also considers those manifold chutes connected by means of the routing plug (jumper block).

It depends on the relevant sorting equipment and configuration into which alternative chute the coins are sorted, if the coin validator receives a full-signal.

Default sorting chute (cash-box chute)

WinEMP

The default sorting chute customised by NRI is used on the one hand for cash-box coins, and on the other hand for coins to be sorted whenever the payout units of the override sorting chutes signal "full" using the sorter override interface.

Sorter override for sorting with NRI manifold and routing plug (jumper block)

If the coins to be sorted are directed into the NRI manifold using the routing plug, the following sorting priority is valid, if a tube-full signal is received:

- If a coin is by-passed to <u>one</u> manifold chute using a jumper, it is sorted
  1. into the manifold chute that would be controlled, if there is no jumper placed (factory setting or WinEMP configuration), then
  2. into the default sorting chute.
- If a coin is by-passed to <u>several</u> manifold chutes using a jumper, it is sorted first of all
  1. according to sorting priority (D $\rightarrow$ C $\rightarrow$ B $\rightarrow$ A), then
  2. into the manifold chute that would be controlled, if there is no jumper placed (factory setting or WinEMP configuration) and finally
  3. into the default sorting chute.

Coin inhibition/Activation of narrow coin channels

If coins are no longer to be accepted for payment at the machine, you can inhibit either

- all coin channels of a certain coin type so that this coin is no longer accepted or
- the normal coin channel of a certain coin type so that this coin is only accepted in the narrow coin channel.

External inhibit of single coin channels

As an alternative to inhibit of certain coin types via the DIL switches of the coin validator the machine can inhibit coins or wide coin channels via six single inhibit lines (see section "Interface" in Chap. 9 "Technical data").

WinEMP
Which coin type or which coin channel is to be inhibited via which signal line is customised by NRI.

Internal inhibit of single coin channels

As an alternative to inhibit of certain coin channels via the machine you can on site inhibit individual coins or wide coin channels using the switching blocks on the coin validator (see section "Inhibiting coins/activating narrow coin channel" in Chap. 6 "Operation").

Manipulation detection

In case manipulation is detected while a coin is being accepted the coin validator emits a foul signal and a string signal as an option.

Foul signal

The coin validator reports a manipulation of the acceptance gate by transmitting a foul signal (pulse length: at least 600ms) via all signal lines in the parallel mode (in the binary mode via all lines except for the strobe line). Coin acceptance is inhibited.

String sensor (option)

To ensure that coins which are suspended by a string are not accepted by the coin validator and to ensure that the acceptance gate cannot be manipulated, the coin validator can be equipped with an optical sensor in the acceptance area which recognises both tight and loose strings (not available for retro-fitting).

If the sensor recognises a string, in the parallel mode all signal lines and in the binary mode all lines except for the strobe line transmit a string signal and the coin is not accepted (see section "Interface" in Chap. 9 "Technical data"). As a start coin acceptance is inhibited for 30 seconds. If the string is not removed within this period of time and the sensor continues to recognise it, coin acceptance remains inhibited and in addition, all "jammed coins" are released automatically.

WinEMP   Sensibility of the string sensor

In order that the functioning of the string sensor can be tested quickly coin acceptance is not inhibited during diagnostics. In this case actuating the string sensor will only trigger a string signal.

If your coin validator operates in G-18 mode to control e.g. external sorting via the coin signal, manipulation protection is impaired as this requires a coin signal at the end of the coin acceptance signal.

Teach mode (option)

If the G-40 FT BACTA has been prepared at the factory accordingly, coin channels can be taught directly in the teach mode without configuration software via the lower switching block on the coin validator, i.e. a coin channel is reassigned a token or even a coin type. The new acceptance band is generated by inserting the tokens/coins. For this you do not need to remove the validator from the machine. For the teaching procedure, the last eight coin channels 9–16 (teach channels) of the activated memory block are available (see section "Teaching coin channels in the teach mode" in Chap. 6 "Operation").

5   Start-up

To install the G-40 FT BACTA in a machine with parallel 15 or 17-pole BACTA interface:

1 If necessary, carry out individual validator settings using the switching blocks (see Chap. 6 "Operation").

2 Disconnect the machine from the power supply.

3 Connect the validator to the machine using the 15/17-pole interface [**3**/**1**] and the appropriate connecting cable.

4 If necessary, connect 18-pole routing plug [**3**/**2**] to the sorting mechanism or machine control system.

5 If necessary, connect 10-pole sorter override interface [**3**/**3**] to the sorting mechanism or machine control system.

6 Hang the coin validator in the machine mount using the lateral mounting studs [**3**/**4**].

7 Reconnect the power supply to the machine.

⚠ **Make sure the correct supply voltage is connected (see label).**

1 Interface – Machine
2 Interface – Routing plug (jumper block)
3 Interface – Sorter override
4 Mounting studs
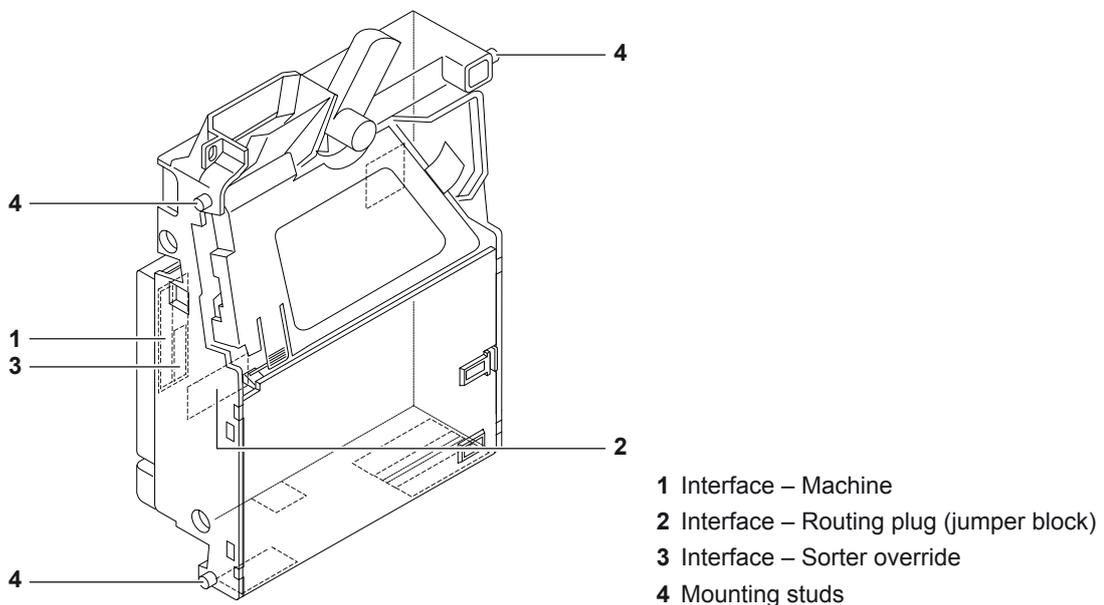
Fig. 3: Installation

6 Operation
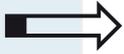
This chapter describes the operation, i.e. the setting of specific functions on the coin validator itself:

- Selecting memory block
- Inhibiting coins/activating narrow coin channel
- Teaching coin channels in the teach mode (option)

The settings that are performed directly on the validator are described. To find out how to perform settings using the PC configuration software WinEMP, please refer to the separate WinEMP instructions (cp. also Chap. 8 "WinEMP programming station/WinEMP compact for on-site configuration" and web pages for product accessories on the internet (www.nri24.com)).

Chapter 4 "Function" describes the function of the adjustable device options.

Selecting memory block

If the coin validator is to access the other memory block and, e.g., accept euro coins instead of national currency coins, the correct block can be selected using the lower switching block:

1 Unhook the coin validator from the machine.

2 Set DIL switch S2.10 upward to ON to select memory block 1 or downward (to OFF) to select memory block 0.
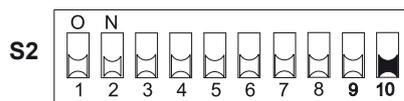
Memory block 0 selected   Memory block 1 selected
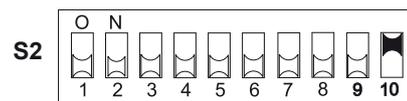
3 Hang the coin validator back in the machine.

4 Turn the power off and then on again.
   The required memory block is activated.

5 Check coin acceptance of the new memory block.

Inhibiting coins/activating narrow coin channel

Using the two switching blocks on the coin validator each of the 16 coin channels of the activated memory block or each coin type/token assigned to specific coin channels can be inhibited individually on site, i.e. the inhibited coin channels will no longer be used for payment on the machine.

To activate a narrow coin channel the normal coin channel must be inhibited. If both channels are enabled, the wider acceptance band of the normal coin channel is used.

The 16 DIL switches inhibit the following coin channels:

Switching block S1

DIL switch		off	on
S1.1	Coin channel 1	accepts	inhibited
S1.2	Coin channel 2	accepts	inhibited
S1.3	Coin channel 3	accepts	inhibited
S1.4	Coin channel 4	accepts	inhibited
S1.5	Coin channel 5	accepts	inhibited
S1.6	Coin channel 6	accepts	inhibited
S1.7	Coin channel 7	accepts	inhibited
S1.8	Coin channel 8	accepts	inhibited
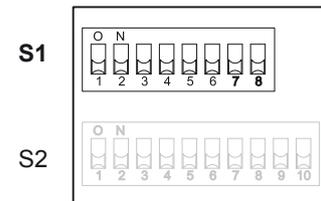
Switching block S2

DIL switch		off	on
S2.1	Coin channel 9	accepts	inhibited
S2.2	Coin channel 10	accepts	inhibited
S2.3	Coin channel 11	accepts	inhibited
S2.4	Coin channel 12	accepts	inhibited
S2.5	Coin channel 13	accepts	inhibited
S2.6	Coin channel 14	accepts	inhibited
S2.7	Coin channel 15	accepts	inhibited
S2.8	Coin channel 16	accepts	inhibited

Please refer to the label on the device to see which coin type/token has been assigned to which coin channel(s) by the manufacturer.

However, this assignment could have been changed using the configuration software.

If all coin types/tokens are to be accepted for payment at the machine, the DIL switches S1.1–S1.8 and S2.1–S2.8 of the two switching blocks are in the lower position (on OFF). If you want to inhibit a coin channel, you only need to move the respective DIL switch toward the top to ON.

Example
The coin validator is no longer supposed to use coin channels 3 and 10 for coin acceptance, which means that coin channels 3 and 10 must be inhibited
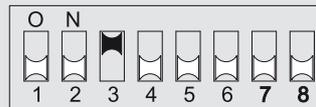
With the DIL switches in these positions, the validator no longer accepts coins in coin channels 3 and 10!

If a normal coin channel and a narrow coin channel have been programmed on the validator for one coin type, the normal coin channel must be inhibited as described above in order to activate the narrow coin channel. If both channels are enabled, the wider acceptance band of the normal coin channel is used. If the coin type is to be inhibited, both coin channels must also be inhibited.

To inhibit coin channels on the validator:

1 Unhook the coin validator from the machine.

2 Inhibit the desired coin channels using the DIL switches S1.1–8 and S2.1–8 (cp. example above).
The desired coin channels are inhibited.

3 Hang the coin validator back in the machine.

Teaching coin channels in the teach mode (option)

If the G-40 FT BACTA has been programmed at the factory accordingly, up to eight coin channels (teach channels) can be taught using the lower switching block on the coin validator to generate new acceptance bands. You will need at least ten coins of the new type. The following DIL switches have the following functions:

Switching block S2

DIL switch		off	on
S2.1	Teach channel 9	–	teach
S2.2	Teach channel 10	–	teach
S2.3	Teach channel 11	–	teach
S2.4	Teach channel 12	–	teach
S2.5	Teach channel 13	–	teach
S2.6	Teach channel 14	–	teach
S2.7	Teach channel 15	–	teach
S2.8	Teach channel 16	–	teach
S2.9	Teach mode	off	on

WinEMP
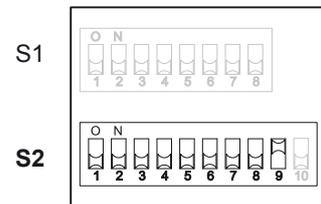
By default, the eight teach channels have been programmed, so that one coin impulse is transmitted to the machine via coin line 5, when a new coin is accepted.

To re-assign a coin type/token to a coin channel, please proceed as follows:

1 Unhook the coin validator from the machine.

Remember the current settings of the DIL switches so that you can restore them easily for the normal operating mode at the end.

2 Set DIL switches S2.1–9 downward to OFF.
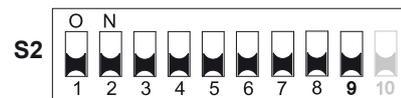
3 Set DIL switch S2.9 upward to ON. Now the device is in teach mode to teach the coin channels.
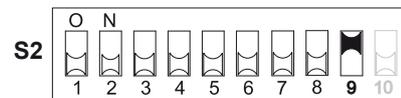
4 Release the coin channel to be taught (9–16, here: 11) by setting the appropriate DIL switch (S2.1–8, here: S2.3) toward the top to ON.
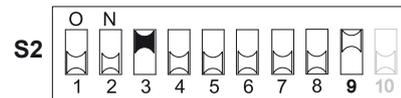
5 Insert at least 10 coins of the new coin type/token into the coin validator or machine.
After the 10th coin has been inserted, the acceptance gate is operated once (brief clacking sound). Additional coins can be inserted.

If there is no signal after the 10th coin has been inserted, the coins inserted could not be used.

Now you can save the measured values generated by the inserted coins in either a normal (a) or a wide (b) acceptance band. A wide acceptance band is an appropriate choice when you only have a limited selection of coins at your disposal for the purpose of teaching tokens.

To save with the normal acceptance band:

**6a)** Set DIL switch S2.9 toward the bottom to OFF.
Successful saving is signalled by the acceptance gate attracting once, an error when saving is indicated by the acceptance gate attracting twice (brief clacking sounds), if, e.g., the acceptance band of the coins inserted and the acceptance band of an already programmed coin channel overlap, or the measured values differ that much that the tolerances would be too large.
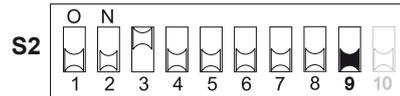
To abort the operation, first set the DIL switch of the respective coin channel (here: S2.3) and then DIL switch S2.9 toward the bottom to OFF.

To save with a wide acceptance band:

6b) Set an additional DIL switch S2.1–8 (here: S2.1) toward the top to ON.
The acceptance band has been widened.
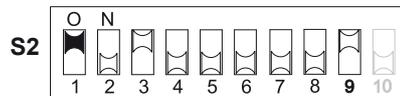
Now you can set DIL switch S2.9 toward the bottom to OFF.
Successful saving is signalled by the acceptance gate attracting once, an error when saving is indicated by the acceptance gate attracting twice (brief clacking sounds), if, e.g., the acceptance band of the coins inserted and the acceptance band of an already programmed coin channel overlap, or the measured values differ that much that the tolerances would be too large.
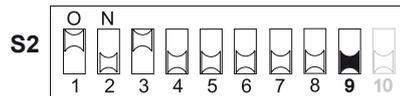
To abort the operation, first set the DIL switch of the respective coin channel (here: S2.3) as well as additional DIL switch (here: S2.1) and then DIL switch S2.9 toward the bottom to OFF.

7 Adjust DIL switches S2.1–8 again for normal operation.

The new coin type/token will now be accepted for payment by the coin validator.

7 Maintenance and service
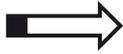
In this chapter you will learn how to
- clean the G-40 FT BACTA, and
- remedy the cause of a malfunction.

Cleaning coin validator

Only the coin validator's flight deck must be wiped clean from time to time with damp cloth (luke warm water with some washing up liquid). Over and above there is no further maintenance work to do.

⚠ **Under no circumstances may the cloth be so wet that fluid runs into the device. Other the PCB will be damaged. Do not use any solvents or scouring agents which attack the plastic of the device.**

1 Pull the machine's mains plug.

2 Press lever [**4**/**1**] downwards and open the coin validator.

3 Wipe the coin runway inside the coin validator clean.

4 Press "Close" arrow [**4**/**2**], so that the metal spring engages behind lever [**4**/**1**] in order to close the coin validator.

5 Reconnect the machine to the mains supply.
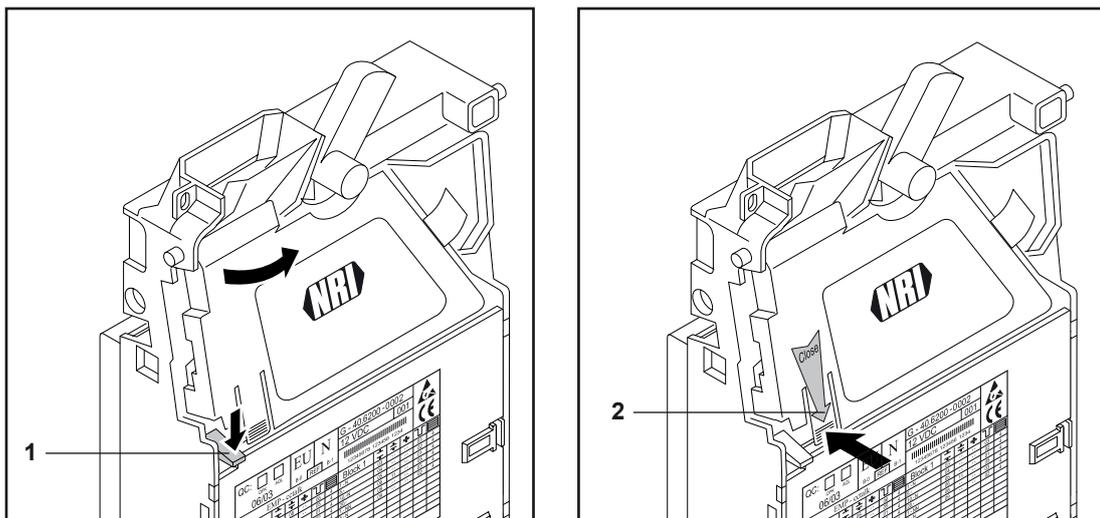
Fig. 4: Open up the coin validator flight deck and close

Troubleshooting

Malfunctions can occur in all electronic devices. These do not always have to be faults in the device. In many cases the reason is improper connections or incorrect settings. Therefore: please first of all check, whether the malfunction can simply be remedied using the following table.

Problem	Possible causes	Remedy, hints
Coin validator does not accept coin	No power supply	• Connect cable to coin validator and machine correctly • Supply machine with voltage
	Return lever pressed/got stuck	Make sure, that return lever is not inadvertently pressed
	Coin runway dirty	Open flight deck and clean coin runway (see section "Cleaning coin validator" in this chapter)
	Flight deck is not locked	Make sure, that spring is engaged behind lever (see section "Cleaning coin validator" in this chapter)
	Coin inhibited	• Make sure, that the single inhibit line assigned to the coin is not activated by the machine or the correct single inhibit line is assigned (if necessary, correct with WinEMP) (see section "Interface" in Chap. 9 "Technical data") • Make sure, that the coin is not inhibited using the DIL switches on the rear of the device or not only the narrow coin channel is enabled and the normal one is inhibited (see section "Inhibiting coins/activating narrow coin channel" in Chap. 6 "Operation")
Coin validator accepts coin, but no credit is given	Coin does not exit the device	Make sure, that the coin outlet is not jammed by foreign objects or devices connected to the bottom of the coin validator

If the malfunction cannot be remedied, you can use the NRI testers
- G-19.0594 (for power supply of 220/230 V, ordering code 11801)/
- G-19.0651 (for power supply of 110/115 V, ordering code 21410)

to test the signal lines of the connecting cable.

To connect the coin validator to a tester you need the AWP adapter G-55.0342 (ordering code 15556).

To remedy other faults please contact our service technicians.

8   WinEMP programming station for the workshop/WinEMP compact for on-site configuration
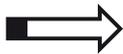
This chapter provides gerenal information concerning the WinEMP configuration software and the G-40 BACTA functions that can be configured with the help of this tool.

Function

The PC software WinEMP serves the purpose of diagnosis and individual configuration of NRI coin validators as well as the updating of the complete coin and device configuration using data blocks currently provided by NRI (data block download).

The WinEMP software identifies the coin validator connected to the PC and the device-own data and presents that data on the screen of your PC.

Composition

The **PC programming station** for the workshop consists of (see also product accessory pages on the internet (www.nri24.com)):

*   WinEMP PC software
*   Chip card (ID-1 format, credit card size) with basic licence for the purpose of diagnostics and individual configuration of all NRI coin validators
*   Card reader "License Card Module"
*   USB connecting cable card reader – PC
*   Tester G-55.0359 as power supply unit and PC interface + power pack

For details on how to connect this device environment to your PC and how to use WinEMP, please refer to the separate operating instructions for the WinEMP software.

WinEMP compact for on-site configuration consists of (see also product accessory pages on the internet (www.nri24.com)):

- WinEMP PC software
- SimLock card reader „License Card Module" with integrated chip card (ID-000 format, SIM card size) with basic licence for the purpose of diagnostics and individual configuration of all NRI coin validators
- USB connecting cable card reader – laptop
- 12V power pack

For details on how to connect this device environment to your PC and how to use WinEMP, please refer to the separate operating instructions for the WinEMP software.

Which functions can be set?

- Acceptance of genuine coins and rejection of false coins
- (acceptance band adjustment following the insertion of genuine coins and fraud coins)
- Coin value via assignment of coin channel to
  – coin signal line
  – coin impulse number
- Sorting via
  – assignment of coin channel to main and override sorting chutes
  – assignment of coin channel to routing plug sorting path
  – definition of a default sorting chute
- Inhibition of coins via assignment of coin channel to single inhibit line
- String sensor sensitivity
- Routing of accpted coin to return area
- New coins/tokens (creating a new acceptance band and assigning the coin signal data)
- Data block download for current coin and device data

9 Technical data

This chapter contains information about

- all relevant G-40 BACTA data
- the CE certification
- the machine and sorting interfaces
- G-40 BACTA accessories

Device data

Supply voltage	10V to 28V DC

Current consumption

$U_{nom} = 12V$

Standby mode:	approx. 40mA
Measuring mode:	approx. 65mA (for approx. 220ms)
Coin acceptance	
... without sorting:	approx. 350mA (for approx. 30ms)
	approx. 130mA (for approx. 90ms)
... with sorting:	approx. 600mA max.

$U_{nom} = 24V$

Standby mode:	approx. 40mA
Measuring mode:	approx. 65mA (for approx. 220ms)
Coin acceptance	
... without sorting:	approx. 310mA (for approx. 30ms)
	approx. 120mA (for approx. 90ms)
... with sorting:	approx. 550mA max.

Electric strength Inputs/outputs	Max. 28V
Current-carrying capacity, outputs	Max. 10mA (open collector)
Temperature range	0°C to 60°C
Temperature change	Max. 0.2°C/min.
Rel. humidity	Up to 93%
Condensation	Not permitted
Machine interface	5/6 coin signal outputs (push-pull, PNP/NPN transistor) (acitve high, VCOM pos./active low VCOM neg.) 6 single inhibit inputs (TTL-compatible, standby: high (5V)) ($\geq 3.7V$ (acceptance $\leq 0.9V$)) For pin assignment see section "Interface" in this chapter

Coin acceptance	32 coin types in 2 x 16 channels
	Coin diameter: 15–31mm (option: up to 32mm, with thickness of max. 2.4mm)
	Coin thickness: 1.5–2.4mm (option: up to 3.4mm)
	Speed: 2 coins/sec.
Device dimensions	Height: 181.3mm
	Width: 127.0mm (+ 2 x 4.5mm for mounting studs)
	Depth: 64.0mm
	(For mounting dimensions see section "Mounting dimensions" in this chapter)
Mounting position	Vertical, max. deviation: ± 2°
Mark of conformity	CE (see next chapter)

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 directives 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 partially applied to our devices:

1. The EMC 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 1000V AC and 75–1500V DC.
3. The CE Certificate Labelling Directive (93/68/EEC)
   Modification directive regarding the application and use of CE labels.

Interfaces

On the following pages you will find the interface description and pin assignment for connecting the G-40 FT BACTA to
- the machine
- a sorting device

G-40 FT BACTA – machine

Pin assignment

For AWP and SWP coin validators in the gambling machine area a parallel interface is used mainly which is established in the BACTA standard. To transmit coin and inhibit signals a 15-pole (older machines) or a 17-pole connector can be used. The functions of the 17-pole connector for binary mode differ from the pin functions in parallel mode:

Binary mode

Pin	Dir	Description
Pin 1	OUT	Identification line
Pin 2	OUT	Coin line 5: VCOM active high/low
Pin 3	–	VCOM (coin validator output high/low)
Pin 4	OUT	Coin line 1: VCOM active high/low
–	–	Polarising key
Pin 6	OUT	Coin line 2: VCOM active high/low
Pin 7	OUT	Coin line 3: VCOM active high/low
Pin 8	IN	Parallel-binary select line
Pin 9	OUT	Strobe line: active high
Pin 10	IN	Single inhibit line 4: active high
Pin 11	–	Operating voltage U_O = +10V–24V DC
Pin 12	–	Ground (GND)
Pin 13	IN	Single inhibit line 3: active high
Pin 14	IN	Single inhibit line 2: active high
Pin 15	IN	Single inhibit line 1: active high
Pin 16	IN	Single inhibit line 5: active high
Pin 17	IN	Single inhibit line 6: active high

1
17

All signals must be debounced from the input side.

In case of manipulation all lines except for the strobe line are active when transmitting a foul signal as well as a string signal.

Parallel mode

Pin 1		OUT	Coin line 6: VCOM active high/low	**1**
Pin 2	Pin 1	OUT	Coin line 5: VCOM active high/low	
Pin 3	Pin 2	–	VCOM (coin validator output high/low)	
Pin 4	Pin 3	OUT	Coin line 1: VCOM active high/low	
–	–	–	Polarising key	
Pin 6	Pin 5	OUT	Coin line 2: VCOM active high/low	
Pin 7	Pin 6	OUT	Coin line 3: VCOM active high/low	
Pin 8	Pin 7	IN	Parallel-binary select line	
Pin 9	Pin 8	OUT	Coin line 4: VCOM active high/low	
Pin 10	Pin 9	IN	Single inhibit line 4: active high	
Pin 11	Pin 10	–	Operating voltage U_O = +10V–24V DC	**17**
Pin 12	Pin 11	–	Ground (GND)	
Pin 13	Pin 12	IN	Single inhibit line 3: active high	
Pin 14	Pin 13	IN	Single inhibit line 2: active high	
Pin 15	Pin 14	IN	Single inhibit line 1: active high	
Pin 16	Pin 15	IN	Single inhibit line 5: active high	
Pin 17		IN	Single inhibit line 6: active high	

All signals must be debounced from the input side.

In case of manipulation all lines are active when transmitting a foul signal as well as a string signal.

Interface description

Coin lines
Coin validator signals coin accepted in the coin channel assigned (usually with one impulse, if there are insufficient lines with multiple impulses)

Single inhibit line
Machine inhibits coin to be accepted in the coin channel assigned

Parallel-binary select line
Machine demands binary mode (active low) or parallel mode (active high)

Identification line
Coin validator acknowledges binary mode with permanently active line

Strobe line
Coin validator activates line permanently, if there is no manipulation or improper connection recognised by means of checksums

When transmitting a foul signal and an optional string signal (coin suspended by a string) in the parallel mode all signal lines and in the binary mode all signal lines except for the strobe line are active.

G-40 FT BACTA – sorter override interface

Pin 1 –   Ground (GND)
Pin 2 –   Polarising key
Pin 3 –   not connected (nc)
Pin 4 –   not connected (nc)
Pin 5 –   not connected (nc)
Pin 6 IN Full-signal line, manifold chute A/coin validator chute 3
Pin 7 IN Full-signal line, manifold chute B/coin validator chute 2
Pin 8 IN Full-signal line, manifold chute C/coin validator chute 1
Pin 9 IN Full-signal line, manifold chute D/coin validator chute 5
Pin 10 –   Operating voltage U_O = +10V–24V DC

G-40 FT BACTA – routing plug (jumper block)

	nc	nc	nc	SP1	SP2	SP3	GND	SP4	SP5	
Pin	2	4	6	8	10	12	14	16	18	Pin
Pin	1	3	5	7	9	11	13	15	17	Pin
	(A)	nc	GND	D	nc	GND	C	B	SP6	

SP = Sorter pathes 1–6 of routing plug

A–D = Chutes of manifold

Mounting dimensions

Top entry model

View from front

View from rear

National Rejectors, Inc. GmbH, Buxtehude
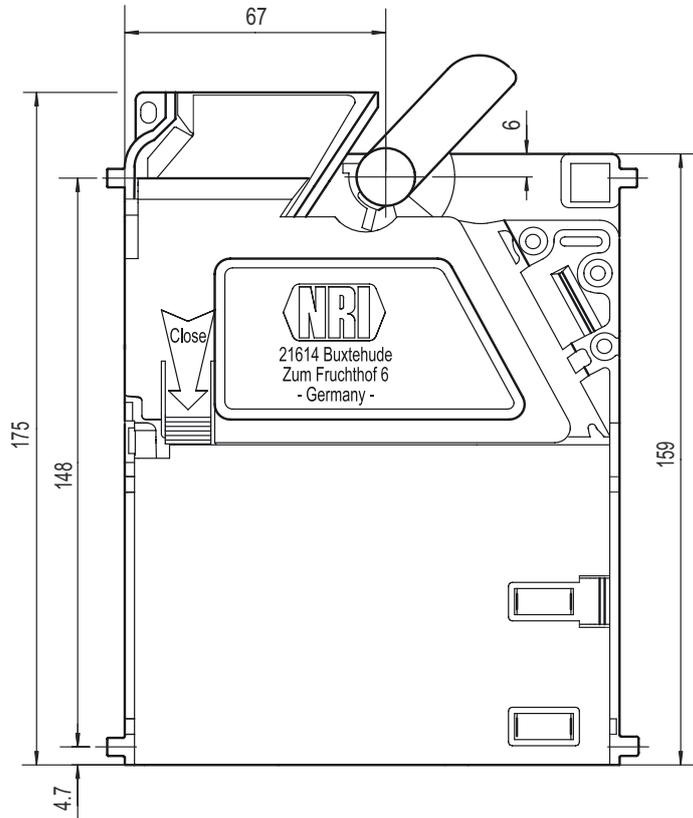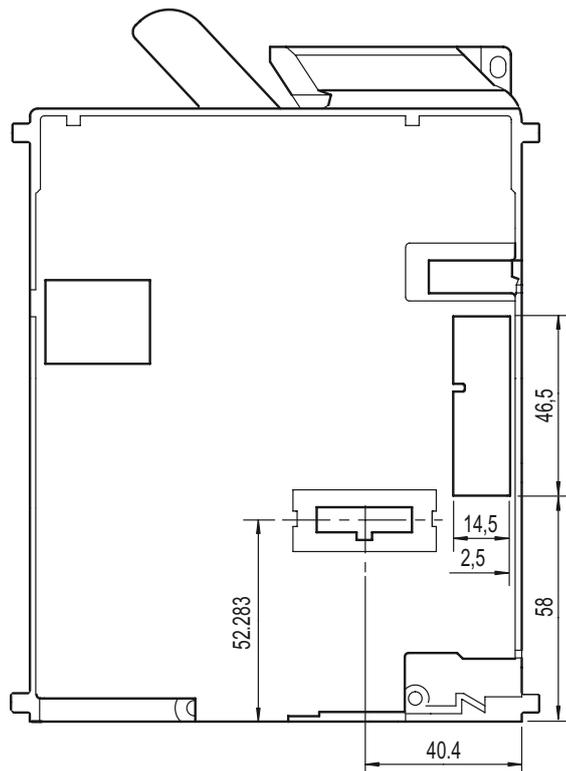
View from above   **Centre of insert funnel**
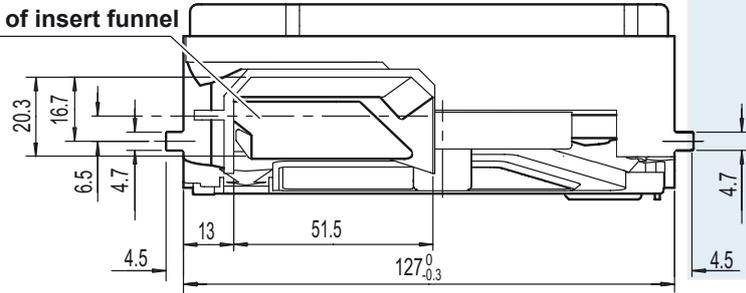
View from below
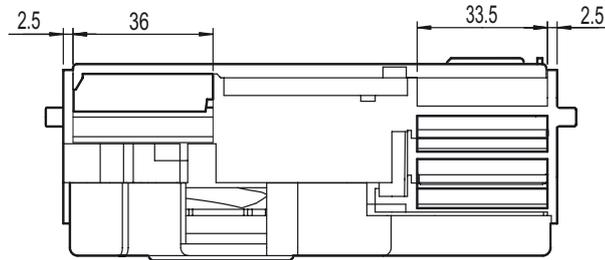
Sorting chutes

Top view

Axis of mounting studs
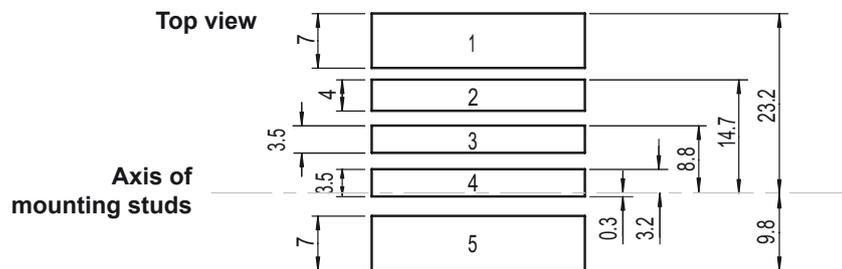
**Sorting chute 3
(standard: cash-box)**

View from the side

**For dimension "X"
see section
"Return levers" in
this chapter**

X

7.5

**Space for open
flight deck**

25.4

13.5   36

15

Return levers

38

17,3

Top edge of device

Depth "X" = 20

29,3

1,8

Depth "X" = 20

33,3

25,5

Top edge of device

Depth "X" = 9.5

26

39,4

Depth "X" = 20

Front entry model

View from front

View from below

Section A–A

**Sorting chute 3
(standard: cash-box)**

**Return area with
bottom return
model**

National Rejectors, Inc. GmbH, Buxtehude

View from the side

Insert funnel

*

***Return area with front return model
(this coin outlet of the bottom return
model is closed by corresponding
sorting cover)**

Manifold

View from front
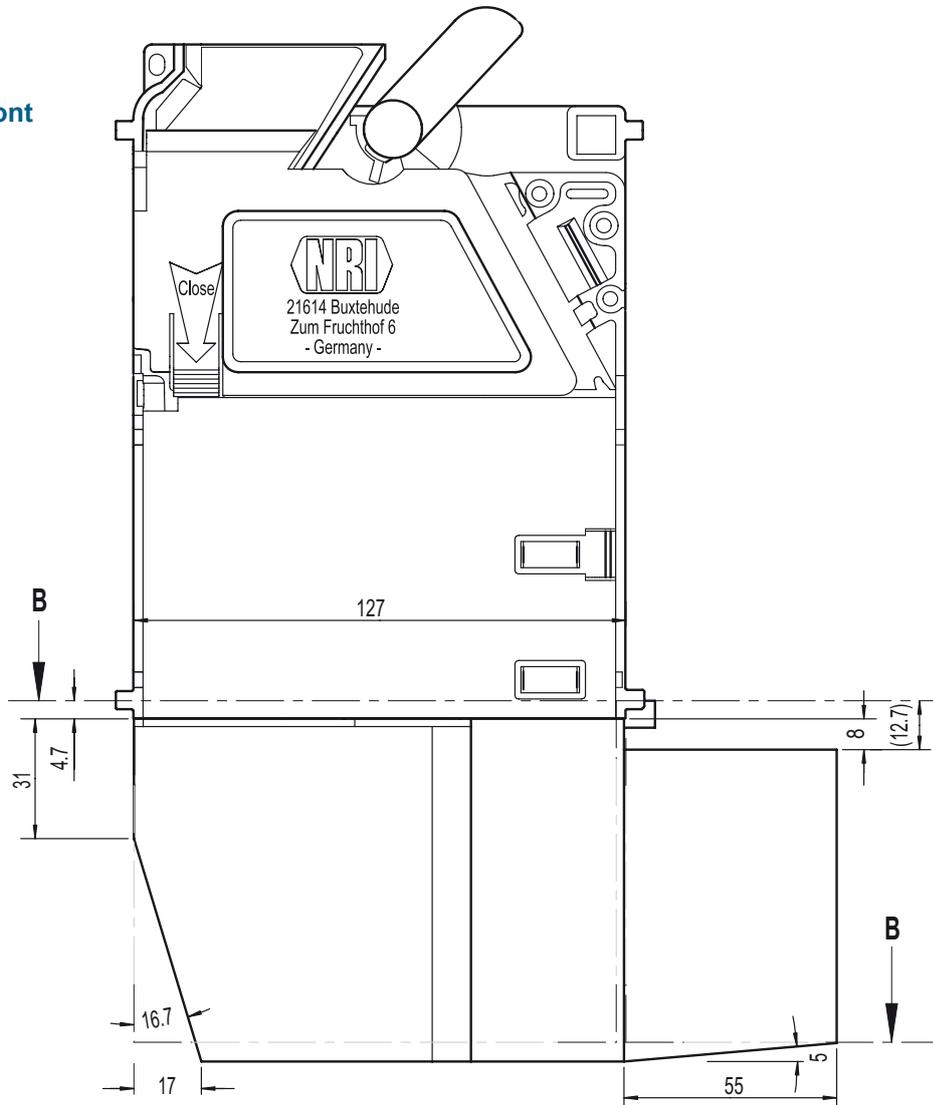
View from below
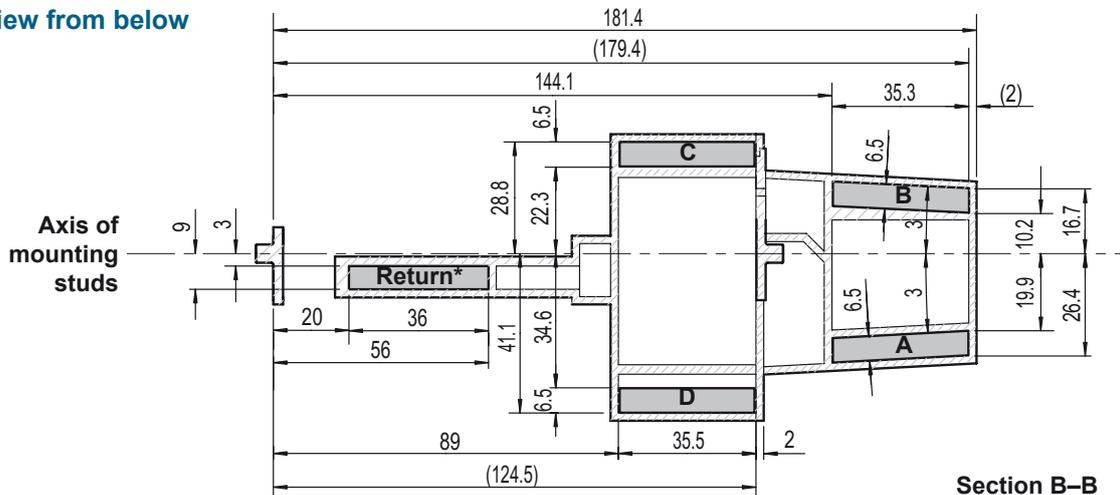
Section B–B

*with bottom return
model

View from the side
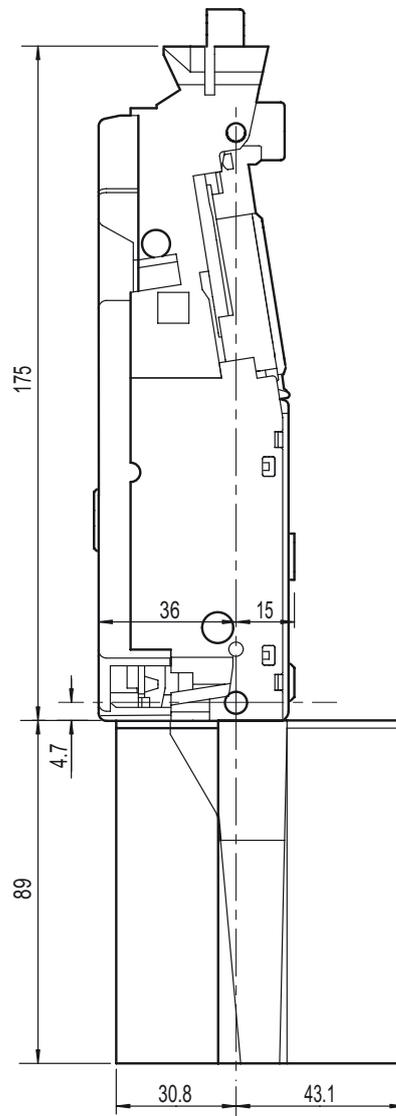
Accessories

In order to test the G-40 FT BACTA or adapt it to your individual needs, you can acquire the following accessories from NRI:

Front plates

Accessories	Ordering code
Front plate G-42.4002 for front entry and bottom return	12918
Front plate G-42.4001 for front entry and front return	10897

Manifold

Accessories	Ordering code
4-manifold	10402

Tester

For all details regarding the NRI testers please refer to our web pages for the product accessories on the internet (www.nri24.com).

WinEMP PC programming station/WinEMP compact

For all details regarding the WinEMP PC programming station please refer to our web pages for the product accessories on the internet (www.nri24.com).

Index

Glossary

Acceptance band	A range of acceptable measured values of one → *coin type* (with specific → *coin properties*) defined by an upper and lower limit value.
Acceptance gate	The acceptance gate diverts the inserted coins into the acceptance or return area of the coin validator.
Acceptance limit	The upper and lower acceptance limit values define the → *acceptance band*.
Accepted coin sensor	The accepted coin sensor is positioned in front of the coin outlet of the coin validator and checks whether accepted coins fall unhindered into the cash-box/sorting chute.
AWP	Amusement With Prizes. Regarding the classic gambling industry (e.g. British fruit machines).
BACTA	British Amusement Catering Trade Association. Forms the largest British trade association in the gaming market, the only association to represent the pay-to-play leisure industry.
Block	→ *Memory block*
Change tube	A payout unit with up to 4 or 5 change tubes can be installed on the coin validator, into which certain → *coin types* are sorted. If necessary, these coins are directed back to the customer as change via the return area.
Channel	→ *Coin channel*
Coin acceptance band	→ *Acceptance band*
Coin acceptance limit	→ *Acceptance limit*
Coin channel	Coin channels are used to describe → *coin types* using their different → *coin properties* (alloy, size, etc.). The required coin properties of a coin type are defined in → *acceptance bands* which are assigned to the coin channels, together with other coin information, for further processing.
Coin properties	Coin properties are measured when a coin is inserted into the coin validator. These are e.g. material, thickness, volume, minting, diameter, mass, hardness, etc.
Coin line	The coin value of a → *coin type* is transmitted via coin lines.

Coin tube	→ *Change tube*
Coin type	One coin type includes all coins for which the → *coin properties* agree.
Data block download	A data block download comes into question, if you want to update the complete coin validator configuration using WinEMP and data blocks currently provided by NRI instead of set single validator functions individually. When updating a data block (set) (2 data blocks), the data blocks for the connected coin validators are loaded quickly and easily from the internal hard disk of your PC into the coin validator. By doing this, a new data block is loaded into → *memory block* 0 and memory block 1. The new data blocks contain different coin and device configurations, e.g. current limit values of the → *acceptance bands* for a currency or new inhibiting or sorting information.
ECV	Electronic coin validator
G-18 mode	If the coin validator is in G-18 mode, the coin signal for e.g. to switch an external sorting is transmitted at the beginning of the coin acceptance signal (CP3). However, G-18 mode impairs manipulation protection when coins are inserted as this requires a coin signal at the end of the coin acceptance signal.
Hopper	Payout unit (coin collector), can be installed on the coin validator for sorting purposes, into which → *coin types* are collected. If necessary, these coins are then directed back to the customer as change via the return area.
Line	→ *Coin line*
Memory block	Memory of the coin validator. The coin validator has two (memory) blocks 0 and 1 and thus can data-manage two independent configurations of coin data (e.g. two currencies). However, for coin validator operation, only one memory block with 16 → *coin channels* can be active at a time, the other block is inhibited. The memory blocks can be updated using WinEMP (→ *data block download*).
Single inhibit line	Signal line from the machine control system to the coin validator which is used to block the acceptance of individual → *coin types*.

Sorting gate	The optional sorting gates are activated in the coin validator depending on the run time of accepted coins and direct the coins to be sorted into the return area or coin outlet towards the cash-box or sorting device.
String sensor	The coin validator's optional sensor recognises a coin inserted with a piece of string attached to it. The coin is not accepted for payment.
String signal	The → *string sensor* recognices a string and transmits a string signal to the control unit.
Strobe	Continuously repeated scanning impulse.
Switching blocks	The two switching blocks are located on the rear of the coin validator and incorporate eight or ten DIL switches. Each switch has a specific function, e.g. inhibiting individual → *coin channels*.
SWP	Skill With Prizes. Special type of slot machines, in which the payout a player receives is dependent on a game of skill rather just luck (e.g. answering quiz questions).
Teach mode	In the teach mode, the → *coin channels* 9 to 16 can be assigned new → *coin types* or → *tokens* on site at the machine without configuration software, which means that these newly configured coins are accepted in the respective coin channel for payment.
Token	Tokens are accepted for payment at machines instead of coins in a currency.
Tube	→ *Change tube*