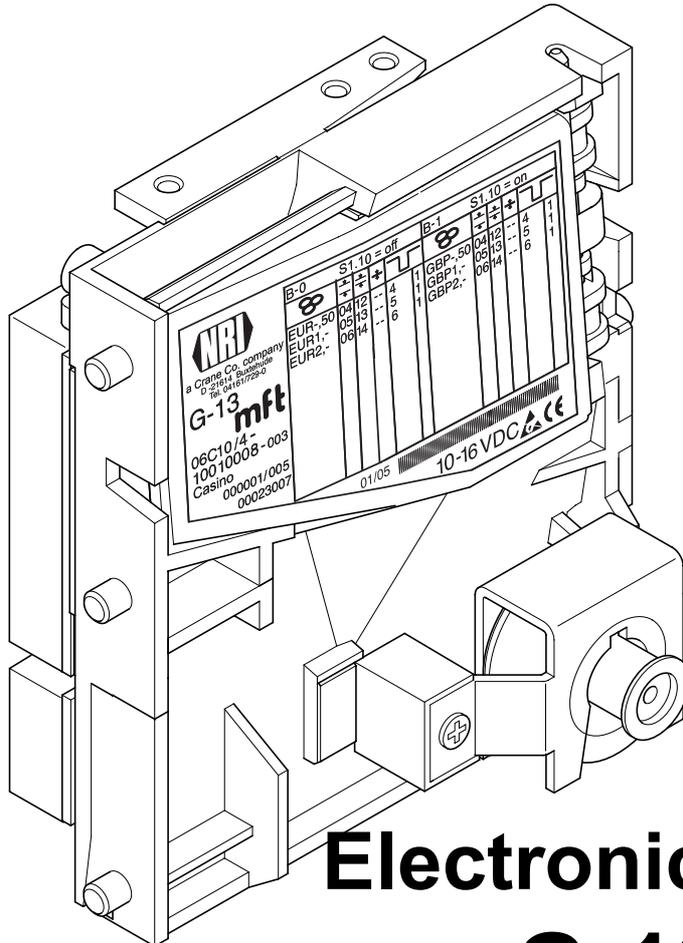




A Crane Co. Company



# Electronic Coin Validator G-13.mft parallel

Standard, Casino, SGI, BDTA and AMU model  
(from version /4)

## Operating instructions

08.06 Hns/WP/ds  
Edition 2.1  
BA.G13MFTPAR4-GB



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# 1 General information

This chapter should provide a general overview of the advantages and options regarding the coin validator G-13.mft with parallel interface (the G-13.mft totalizer model is described in separate operating instructions). 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 standard, Casino, BDTA and AMU models of the electronic coin validator G-13.mft with parallel interface. Chapters 5 und 6 explain the necessary steps for starting up and operating the coin validator. Chapter 7 explains 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 shorten the search for specific explanations.

The appended chapter "Simple Gaming Interface (SGI)" deals with the highlights of the G-13.mft SGI.

## Text conventions

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



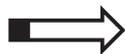
**Safety instructions, which have to be taken note of in order to protect operators and equipment.**



*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.



At the beginning of a chapter you will find a short "guide", which summarizes the content of the chapter.



Device functions which are set or prepared by the manufacturer according to customer specifications and can be set or changed using the NRI PC programming station WinEMP (see Chap. 8 "The PC programming station WinEMP" and product accessory pages on the internet ([www.nri24.com](http://www.nri24.com))).

## Additional technical documentation

Apart from these operating instructions there is the following technical documentation for the G-13.mft with parallel interface:

- WinEMP – The configuration and diagnostics program for NRI coin validators, operating instructions for the G-13.mft
- Tester G-19.0594/4 for G-13 EMP
- Electronic coin validator G-13.mft mounting dimensions
- Electronic coin validator G-13.mft parallel – 2-price totalizer, timer and TV totalizer operation



*If this documentation is not available to you, it can be downloaded at any time from the NRI homepage ([www.nri24.com](http://www.nri24.com)) in a compressed PDF format.*

## General information about the coin validator

The electronic coin validator G-13.mft (multi-frequency technology) in standardized 3 1/2" format is based on the tried and tested features of the G-13.6000. Due to its modular and compact design, the G-13.mft is ideally suited for amusement, vending and service machines.

The **multi-frequency technology** is new in the G-13.mft. It provides more flexibility for the measuring sensors, multiple scanning of the coins inserted for optimum material recognition and evaluation of 24 measuring parameters for reliable acceptance of genuine coins and rejection of false coins. Thanks to the coin validator's **flash technology**, software downloads to adapt the measuring technology, coin data and control software can be executed quickly and simply. The G-13.mft has 32 coin channels that can be data-managed, starting from device version /4 and higher, either in a single memory block or, when divided in 2 x 16 coin channels, in two memory blocks with different coin configurations.

To be able to react as quickly as possible to new false 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-13.mft.

Coins that have not been taken into consideration at the manufacturer's company can be configured in the teach mode directly at the coin validator by inserting coins.

## Models and operating modes

The G-13.mft models with parallel interface described in these operating instructions mainly differ in their machine interfaces.



*The G-13.mft with parallel interface is also available as totalizer model. This model is described in separate operating instructions.*

## Overview

The following table lists the six G-13.mft models with their most important options:

Model	Designation (label)	Casino mode (switchable)	Front plates	Sorting control	Wake-up sensor	High-voltage	Inv. Inhibit
Standard	ECV	X	X	X	X	X	X
Casino	Casino	(-)	X	X	X	X	X
SGI	SGI	(-)	X	X	-	X	X
with G-18 interface	BDTA 14	-	X	X	X	X	-
with G-40 interface	BDTA 16	-	X	X	X	X	-
AMU	AMU	-	X	X	X	X	-

## Casino applications (Casino/SGI)

The G-13.mft as SGI or as Casino model or in the Casino mode differs from all other models in a faster coin acceptance (SGI/Casino: up to 6 coins/sec.), which is essential for the use in gaming machines.



*For information on the highlights of the SGI model please refer to the appended Chapter "Simple Gaming Interface (SGI)".*

### **BDTA applications (with G-18/G-40 interface)**

The **Bundesverband der deutschen Tabakwaren-Großhändler und Automatenaufsteller** (BDTA = German tobacco association) determined the DTG standard 2 for the electrical interface to the vending machine. This standard includes the specification of the supply voltage, the coin signal lines, inhibit functions and the return signal. In addition to further standardization requirements for validators the measurement quality of validators is also specified.

For applications in the tobacco sector you can not only obtain the both NRI coin validators G-18 and G-40 but also the G-13.mft with the appropriate 14 or 16-pole BDTA interface. In order to adapt the G-13.mft to the dimensions of the G-18.mft or G-40 there is an NRI adapter housing available.

The standardized BDTA interface does not provide any inverted common inhibit signal line.

### **Applications for Spanish gaming market (AMU)**

The AMU model has been designed for the Spanish gaming market. This model mainly differs from the standard model of the G-13.mft in a specific coin signal processing and a particular pin assignment.

The AMU coin signal processing excludes a fast coin acceptance for the Casino mode.

### **Top entry and front entry applications**

All models of the G-13.mft are available with top or front entry. The G-13.mft with front entry usually has a MIDI front plate or a MINI front plate fitted to the left-hand side of the device (see Chap. 3 "Design"). The device is, however, also available as a front entry model without front plate.

## 2 Safety instructions

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

### Proper use

Series G-13.mft coin validators with a parallel interface described in these instructions are intended to be used in amusement, vending and service machines with a parallel interface and are supposed to check the coins inserted in the machine for specific coin properties.

These coin validators have been constructed in compliance with the state of the art and recognized 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 which may be damaged beyond repair by electrostatic discharge. Please observe the handling instructions for components exposed to the risk of electrostatic discharge.

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

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

Ensure the correct potential equalization in the machine.

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

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.

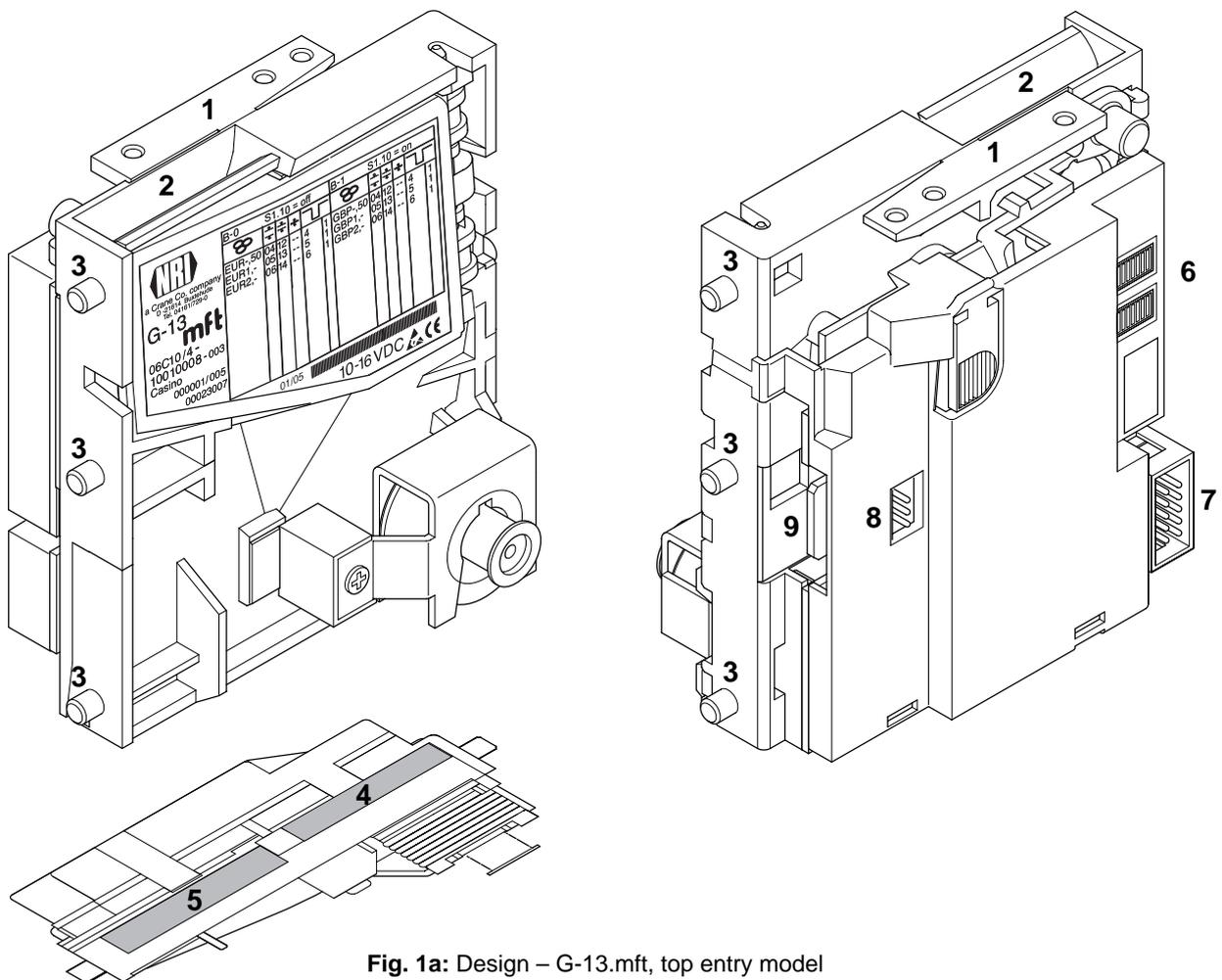
We reserve the right to make technical modifications to the device which are not covered by these instructions!

### 3 Design



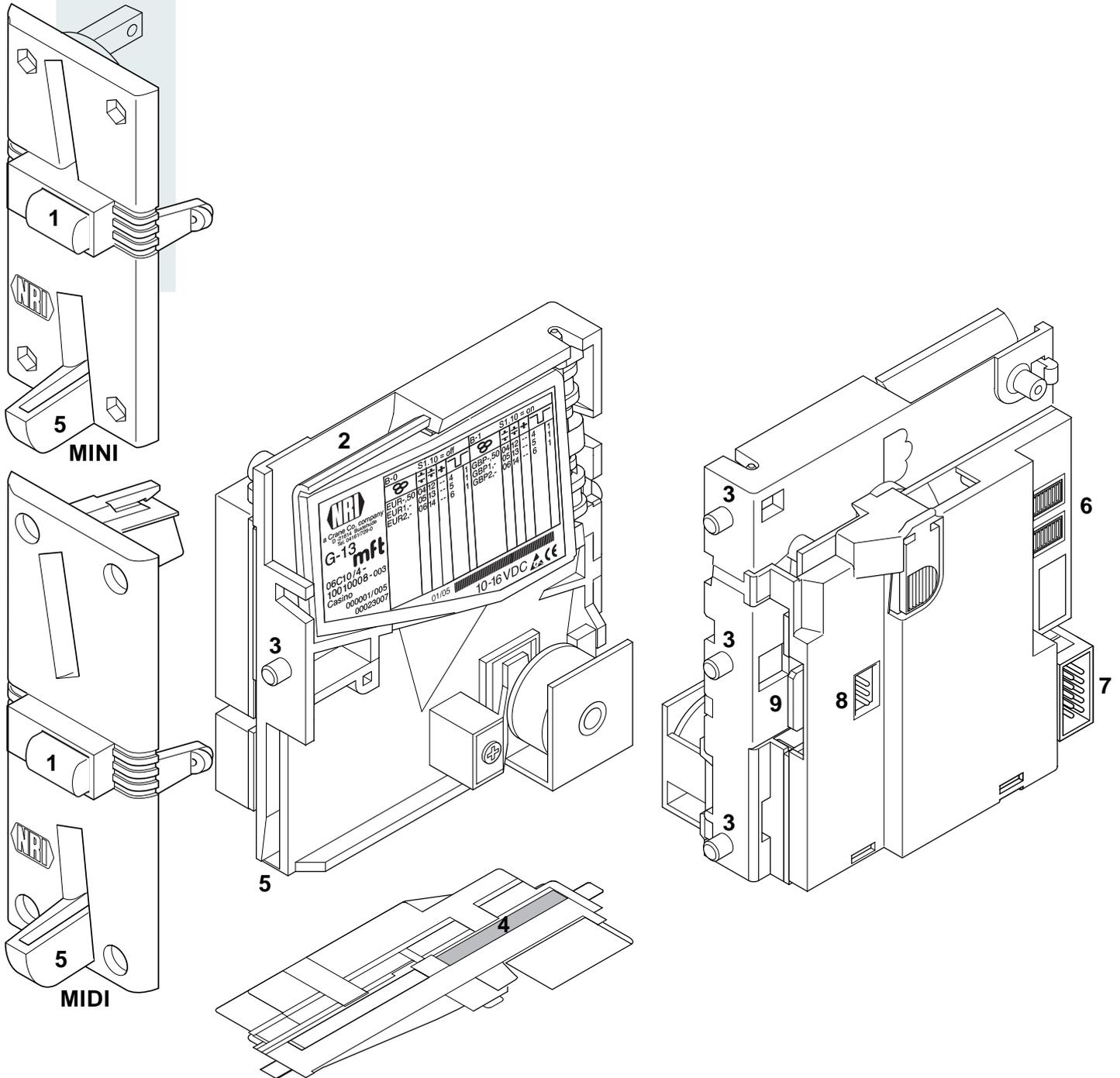
This chapter describes

- the main parts the G-13.mft consists of
- the coin route from insert funnel to cash-box/sorting chute or return area
- all parts which you need to operate the coin validator



**Fig. 1a:** Design – G-13.mft, top entry model

- |                             |   |
|-----------------------------|---|
| 1 Return lever              | 7 Interface – machine/tester (10-pole)<br>(for G-18 BDTA model 14-pole,<br>for G-40 BDTA model 16-pole) |
| 2 Coin insert funnel        | 8 Interface – external sorting (3-pole)   |
| 3 Mounting studs            | 9 Interface – PC programming station (WinEMP)   |
| 4 Coin outlet – return area |   |
| 5 Coin outlet – cash-box    |   |
| 6 Switching blocks          |   |



**Fig. 1b:** Design – G-13.mft, front entry model with front plate

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1 Return lever</li> <li>2 Coin insert funnel</li> <li>3 Mounting studs</li> <li>4 Coin outlet – cash-box</li> <li>5 Coin outlet – return area</li> <li>6 Switching blocks</li> </ul> | <ul style="list-style-type: none"> <li>7 Interface – machine/tester (10-pole)<br/>(for G-18 BDTA model 14-pole,<br/>for G-40 BDTA model 16-pole)</li> <li>8 Interface – external sorting (3-pole)</li> <li>9 Interface – PC programming station (WinEMP)</li> </ul> |
|---|---|

The coin route from insert funnel to cash-box/sorting chute or return area

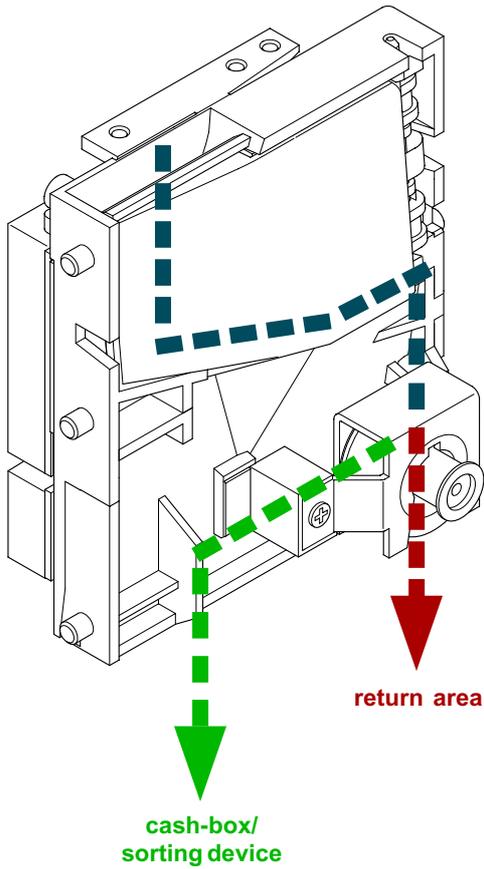


Fig. 2a: Coin acceptance and rejection path of the top entry model

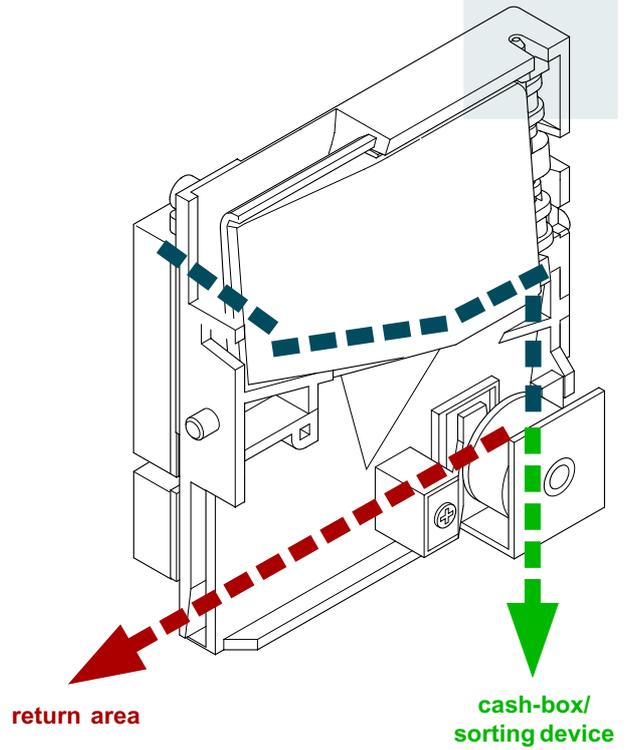
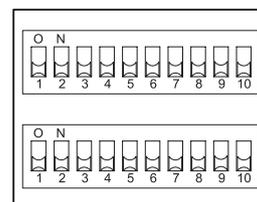


Fig. 2b: Coin acceptance and rejection path of the front entry model

## Switching blocks

On the rear, the coin validator is equipped with two switching blocks (**6**, Fig. 1) with 10 DIL switches S1.1–10 and S2.1–10 each.



The DIL switches have different functions, e.g. inhibit coin channels, select memory block. 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 and return button

The return lever (**1**, Fig. 1a) on the top of the device is operated using the return button on the machine, if the coins that have already been inserted are to be returned, or if a jam caused by, e.g., coins that have become stuck must 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.

Devices with front entry through a front plate do not have a return lever. Here the measurement and validation area is opened by pressing the return button (**1**, Fig. 1b) on the front plate.

## Label

The label of the coin validator 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 or coin signal line:

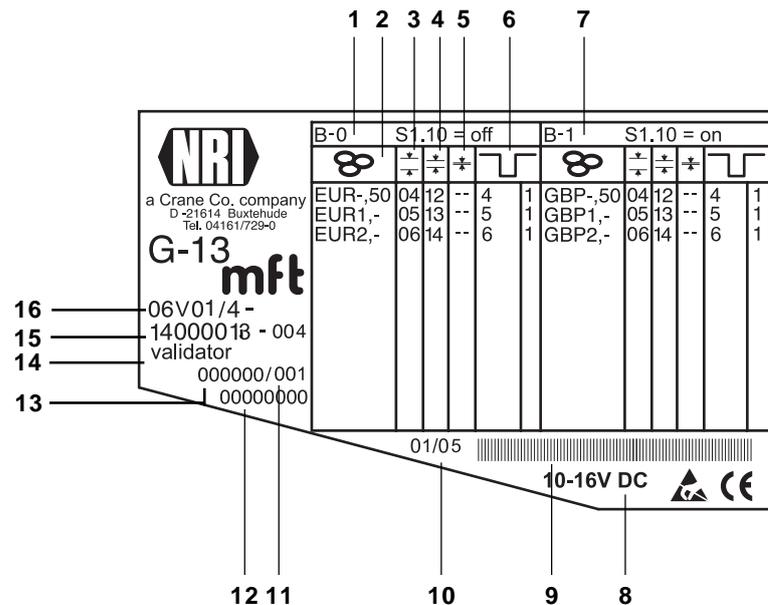


Fig. 3: Label

- |   |  |
|---|--|
| 1 Coin information – memory block 0 (if DIL switch S1.10 to OFF)          | 9 Barcode  |
| 2 Currency and coin type $\infty$ – memory block 0                        | 10 Date of manufacture   |
| 3 Channel number, normal coin channel $\frac{+}{+}$ – memory block 0      | 11 Consecutive device number per order number  |
| 4 Channel number, narrow coin channel $\frac{+}{-}$ – memory block 0      | 12 Ordering code   |
| 5 Channel number, very narrow coin channel $\frac{-}{-}$ – memory block 0 | 13 Order number  |
| 6 Coin signal line and impulse number $\square$ – memory block 0          | 14 Device model and mode<br>Validator = standard model<br>Casino = Casino model<br>AMU-Validator = AMU model<br>BDTA 14 = with G-18 BDTA interface<br>BDTA 16 = with G-40 BDTA interface |
| 7 Coin information – memory block 1 (if DIL switch S1.10 to ON)           | 15 Data block number and revision number   |
| 8 Nominal voltage (option: up to 42 V DC)                                 | 16 Device type   |

## 4 Function



This chapter describes how the coin validator works:

- Coin acceptance and coin channels
- Single or double block data-management
- Accepted coin sensors
- Coin impulses and coin signal lines
- Control for external sorting device
- Coin inhibition
- Teach mode
- Battery/low-power applications (optional)
- High-voltage up to 42 V (optional)
- Inverted common inhibit signal line (optional)

### Coin acceptance and coin channels

The coin validator has 32 "memory slots" for coin acceptance which can be assigned up to 32 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.

In order to reject false money reliably, frequently for one coin type, in addition to the normal coin channel, channels with a narrow or even very narrow acceptance band are set up (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. coin signal line and coin impulse number, inhibit information, sort information for an external sorting device.



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

The last eight coin channels 25 to 32 (or 9 to 16 with double block data-management, see section "Single or double block data-management" in this chapter) are intended to be used for the teach mode. In these coin channels new coin types can also be taught without configuration software, directly via the switching blocks on the coin validator; i.e. a coin channel is assigned a coin type or also a token (see section "Teach mode" in this chapter).

## Single or double block data-management

At the manufacturer's company, a customer-specific setting is programmed to determine whether the 32 coin channels are to be data-managed in one memory block or, when divided into 16 channels each, in two memory blocks (double block data-management).

If the double block data-management has been configured, the G-13.mft can data-manage two separately programmed (memory) blocks 0 and 1 (see label). The 16 coin channels can be assigned to each block with different coin types (also currencies), sorting information, etc. However, 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 upper switching block on the device to select the desired block (see section "Selecting memory block" in Chap. 6 "Operation").

## Accepted coin sensors

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, accepted coin sensors, positioned in front of the cash-box coin outlet check whether the inserted coin drops unhindered into the cash-box chute. A coin signal is not transmitted to the machine until the coin has passed this checking function.

If the accepted coin sensors are continuously covered, e.g. by a coin pile-up, coin acceptance is inhibited.

### Exception: Casino model/mode

Due to fast coin acceptance the Casino model of the G-13.mft cannot utilize the accepted coin sensors.

The accepted coin sensors are located in front of the cash-box coin outlet and check whether a coin is directed into the cash-box. Usually, a coin signal is only sent to the machine when the accepted coin sensors notice that a coin is being accepted and directed into the cash-box (see above). To speed up coin acceptance on the Casino model/in the Casino mode, the coin signal is sent before the coin passes the accepted coin sensors. Consequently, the acceptance gate of the coin validator is easier to tamper with, e.g. with an inserted coin attached to a string.



For a balanced protection against manipulation, an accepted coin signal independent of the coin signal can be transmitted via the return signal line to the machine.

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

By default each coin accepted by the coin validator passes on one impulse (AMU model: one pre-signal and one coin signal, see below) 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).



The assignment between coin type and coin signal line is programmed by the manufacturer according to the customers' specifications.



*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) per coin so that the machine no longer differentiates by the signal line but by the impulse number (not with AMU model). 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.



The number of coin impulses is programmed by the manufacturer according to the customers' specifications.

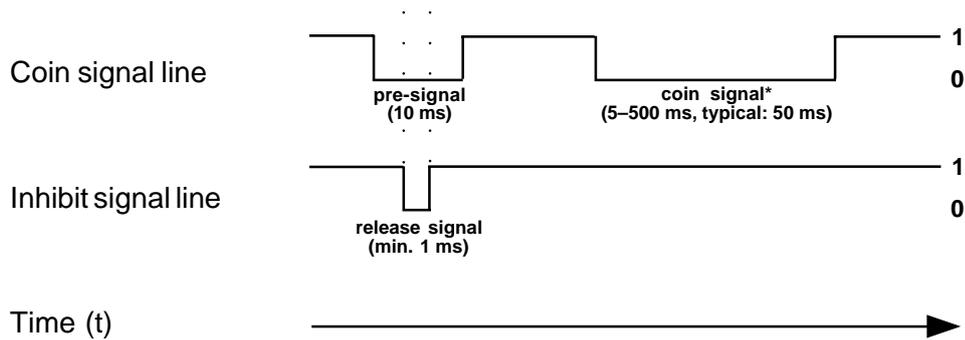
### Coin signal processing of the AMU model

After an accepted coin passed the accepted coin sensors, the G-13.mft standard model transmits a simple coin signal to the machine (see section "Accepted coin sensors" in this chapter). Whereas the AMU model divides this signal into a pre-signal and the real coin signal, so that the machine is able to inform the validator during the pre-signal whether this coin is to be accepted or not:

1. 10-ms pre-signal, transmitted after coin measurement but before coin acceptance
2. Real coin signal (pulse length can be adjusted), transmitted after the validator received the machine's release signal and the coin passed the accepted coin sensors

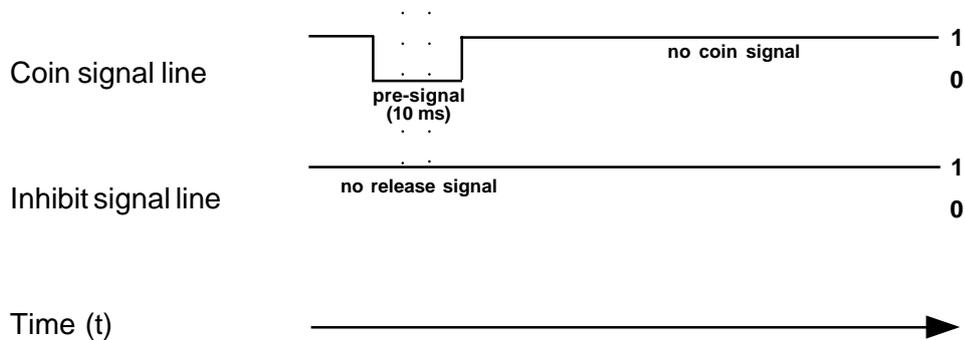
During the 10-ms pre-signal the machine control system must transmit a 1-ms release signal to the validator via the inhibit signal line (deactivate line), so that the coin can be accepted.

**Coin released by machine**



\* only if coin passed accepted coin sensors

**Coin rejected by machine**



**Coin impulse length**

The length of the coin impulses that are sent from the coin validator to the machine can be set individually to suit the machine.



Possible setting: 5 to 500 ms, default setting: 100 ms (50 ms for AMU model).



*You can also assign a different impulse length to each coin type, but in this case only one impulse will always be transmitted and not a specific higher impulse number for the purpose of differentiating the coins (see section "Transfer of coin values by means of coin impulses and via coin signal lines" in this chapter).*

## Control for external sorting device

In order to be able to guide the accepted coins into the cash-box or, e.g., into change tubes or hoppers, you can equip the coin validator with the NRI 3-fold sorting device or with another sorting device.

### Sorting principle

The sorting gates are activated via the 3-pole JST plug on the rear of the device (see Fig. 1a and 1b) and via three sorting control lines. Since these are bidirectional sorting control lines, the coin validator can also receive signals. If, for example, a connected hopper or change tube is full of coins and if they send an appropriate "Full" signal to the coin validator, all the other coins are directed into the cash-box until the hopper/change tube is emptied or an amount has been paid out.

The G-13.mft can also be set by the manufacturer so that the return signal line sends a sort signal to the machine via the 10-pole connecting cable (not with AMU model).



Assignment coin type – sorting control line/return signal line and sorting time (how long should the activating period be? 300–1000 ms).



*While the coin validator is sorting an accepted coin (= sorting time), it cannot accept any further coins.*

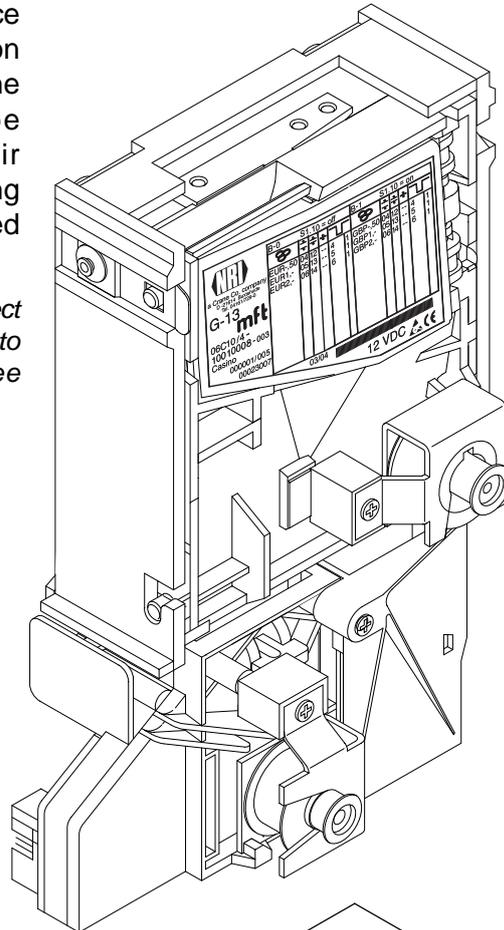
*The return signal line cannot transmit any "Full" signals.*

### Sorting with NRI sorting device

When the optional NRI sorting device is used (see also product pages on the internet ([www.nri24.com](http://www.nri24.com))), the individual coin types can be distributed regardless of their dimensions among the three sorting chutes. Each chute can be defined as a cash-box chute.

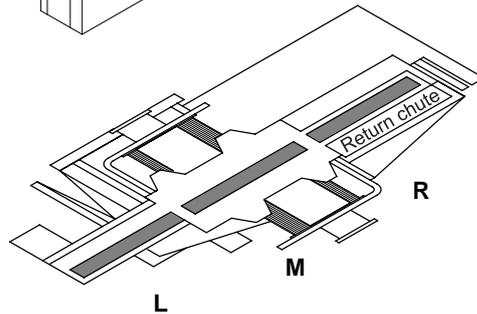


For details on how to connect the NRI sorting device to the coin validator, see Chap. 5 "Start-up".



The following table shows which sorting control line must be activated in order to sort coins into a specific sorting chute:

Sorting chute	Sorting control line
Left	1
Middle	—
Right	2



## Coin inhibition

If coins are to be no longer accepted for payment at the machine, either the entire coin acceptance can be inhibited (common inhibit) or individual types.

### External common inhibit (not AMU model)

The machine can inhibit coin acceptance via the common inhibit signal line. The coin validator no longer accepts coins (see section "Interfaces (pin assignment and connection diagrams" in Chap. 9 "Technical data").

### External inhibit of single coin types (not with G-18 BDTA interface)

As an alternative to individual inhibiting of certain coin types via the DIL switches of the coin validator the machine can inhibit coin types individually:

- Standard, Casino model, model with G-40 BDTA interface:  
up to six coin types via six external single inhibit signal lines  
The assignment of coin type and single inhibit signal line has been programmed by the manufacturer according to the customers' specifications.
- AMU model:  
each of the coins inserted via inhibit signal line (during coin acceptance) (see section "Coin signal processing of the AMU model" in this chapter)



Also see section "Interfaces (pin assignment and connection diagrams)" in Chap. 9 "Technical data".

### Internal inhibit of single coin types/coin type groups

As an alternative to individual inhibiting of certain coin types via the machine you can on-site inhibit individual coin types or even groups of coins using the DIL switches on the coin validator (see section "Inhibiting coins/activating narrow coin channels" in Chap. 6 "Operation").



Alternatively: deactivate individual coin types on a long-term basis

## Teach mode

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 coin type or even a token. The new acceptance band is generated by inserting the coins. For this you do not need to remove the validator from the machine. For the teaching procedure, the coin channels 9 to 16 of the activated memory block are available with double block data-management and coin channels 25 to 32 with single block data-management (see also section "Single or double block data-management" in this chapter and section "Teaching coin channels in the teach mode" in Chap. 6 "Operation").

## Options

The G-13.mft models can optionally be equipped for the following applications at the manufacturer.

### Battery or low-power applications (not with G-40 BDTA interface)

If the G-13.mft is to be used independent of the mains in battery-operated machines, it can optionally be fitted with a wake-up sensor (not available for retrofitting).



*If the G-13.mft is operated with the NRI MIDI front plate, you can also use an external wake-up sensor (see also product pages on the internet ([www.nri24.com](http://www.nri24.com))).*

The wake-up sensor monitors the insertion area of the coin validator. The first coin inserted wakes up the validator. The coin is measured and accepted or rejected. If no further coin is inserted during the next 3.5 seconds, the coin validator returns to sleep mode. The current consumption in sleep mode is less than 15  $\mu$ A until the unit is woken up again by insertion of a coin. (See section "Interfaces (pin assignment and connection diagrams)" in Chap. 9 "Technical data")

If the device is in teach mode, it remains awake until the coin/token is taught, i.e. the teach mode is switched off again.

At the factory the validator can optionally be set, so that it transmits a wake-up signal to the machine via the return signal line, as soon as it is woken up by insertion of a coin (not with AMU model).



*If you want the machine to wake up the validator, for this the manufacturer will also provide the return signal line. The G-13.mft with G-18 BDTA interface uses the separate wake-up signal line.*

### High-voltage applications up to 42 V

If the coin validator is to be supplied with more than 10–16 V, at the factory it can be equipped with a switching power supply which makes a supply voltage of up to 42 V possible (not available for retrofitting).

### Inverted common inhibit signal line (only standard and Casino model)

By default, the machine inhibits coin acceptance by transmitting an active-high signal via the common inhibit signal line (pin 6, standby position of the line is "Low").

The G-13.mft standard and Casino can be ordered with an inverted common inhibit signal line (common inhibit, when active-low, standby position of the line is "High") (see section "Interfaces (pin assignment and connection diagrams)" in Chap. 9 "Technical data").

## 5 Start-up



This chapter describes how to:

- start up the G-13.mft in a machine
- install the NRI sorting device

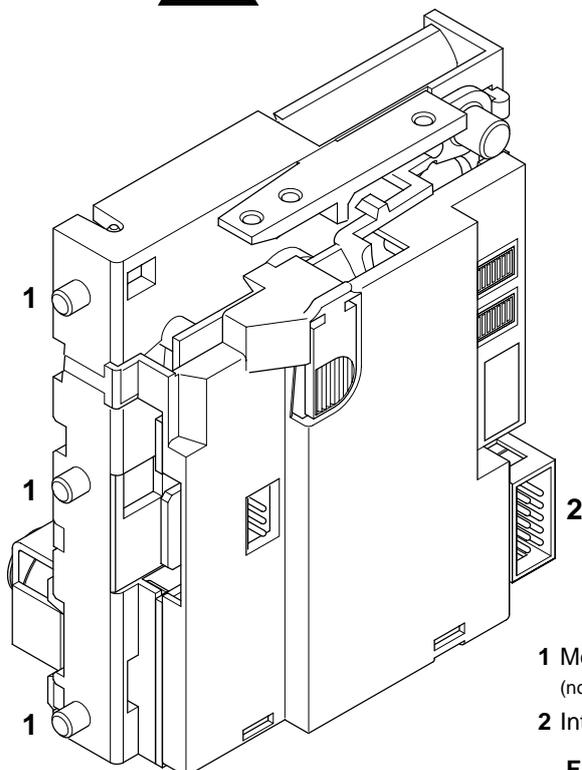
### Installing coin validator in the machine

To install the G-13.mft in a machine with parallel interface:

- 1 If necessary, install the sorting device on the coin validator (see section "Installing sorting device ..." in this chapter).
- 2 Disconnect the machine from the mains supply.
- 3 Hang the coin validator in the machine using the lateral mounting studs 1 (see Fig. 4).
- 4 Connect the coin validator to the machine using the 10-pole interface 2 and the appropriate connecting cable (see Fig. 4).
- 5 Reconnect the mains supply to the machine.



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



- 1 Mounting studs  
(not illustrated on the left-hand side of the device)
- 2 Interface – machine

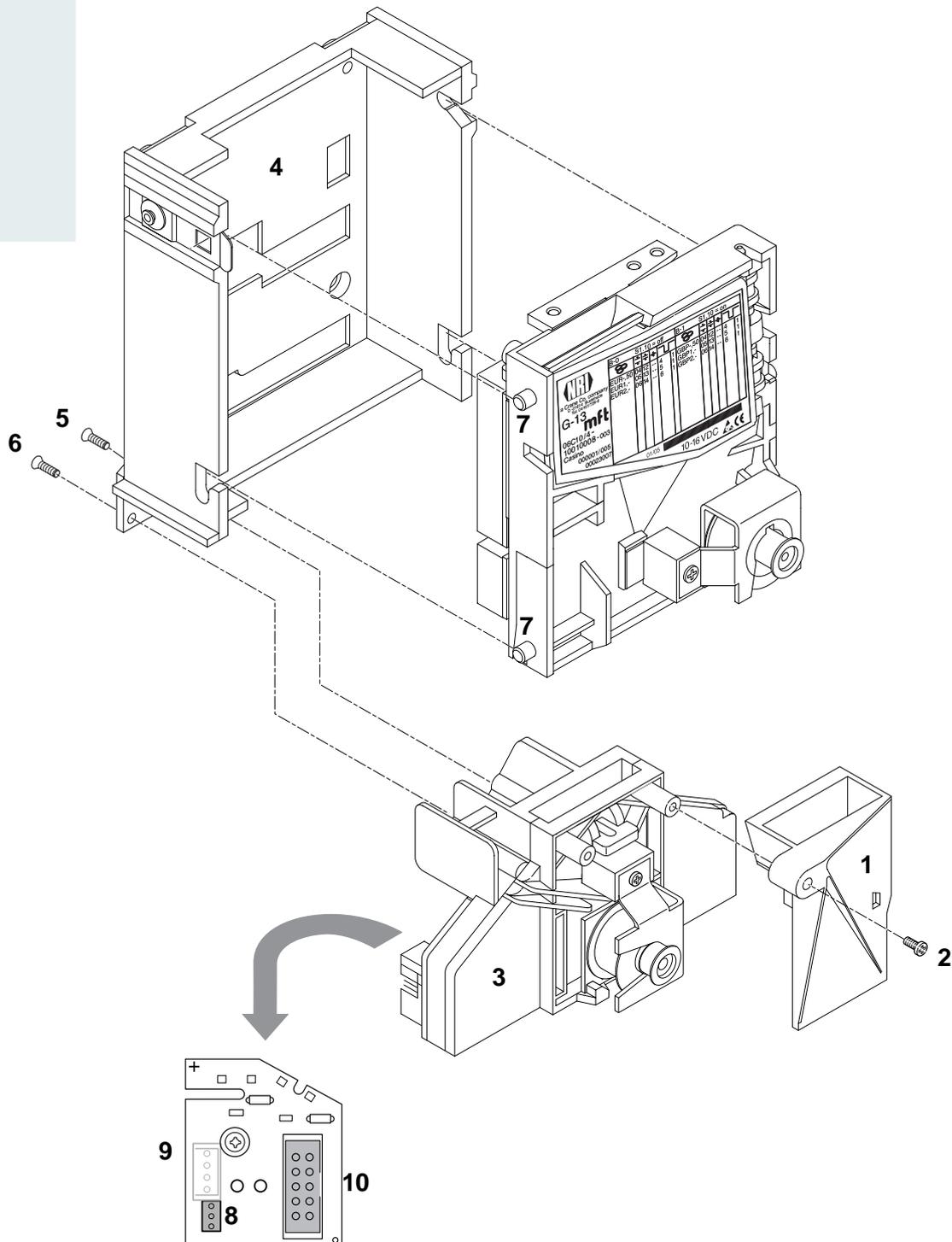
**Fig. 4:** Installation

## Installing sorting device ...

If you want to operate the G-13.mft with the NRI 3-fold sorting device, you must use a special bracket to install the sorting device on the top entry model or on the front entry model:

### ... on the top entry model

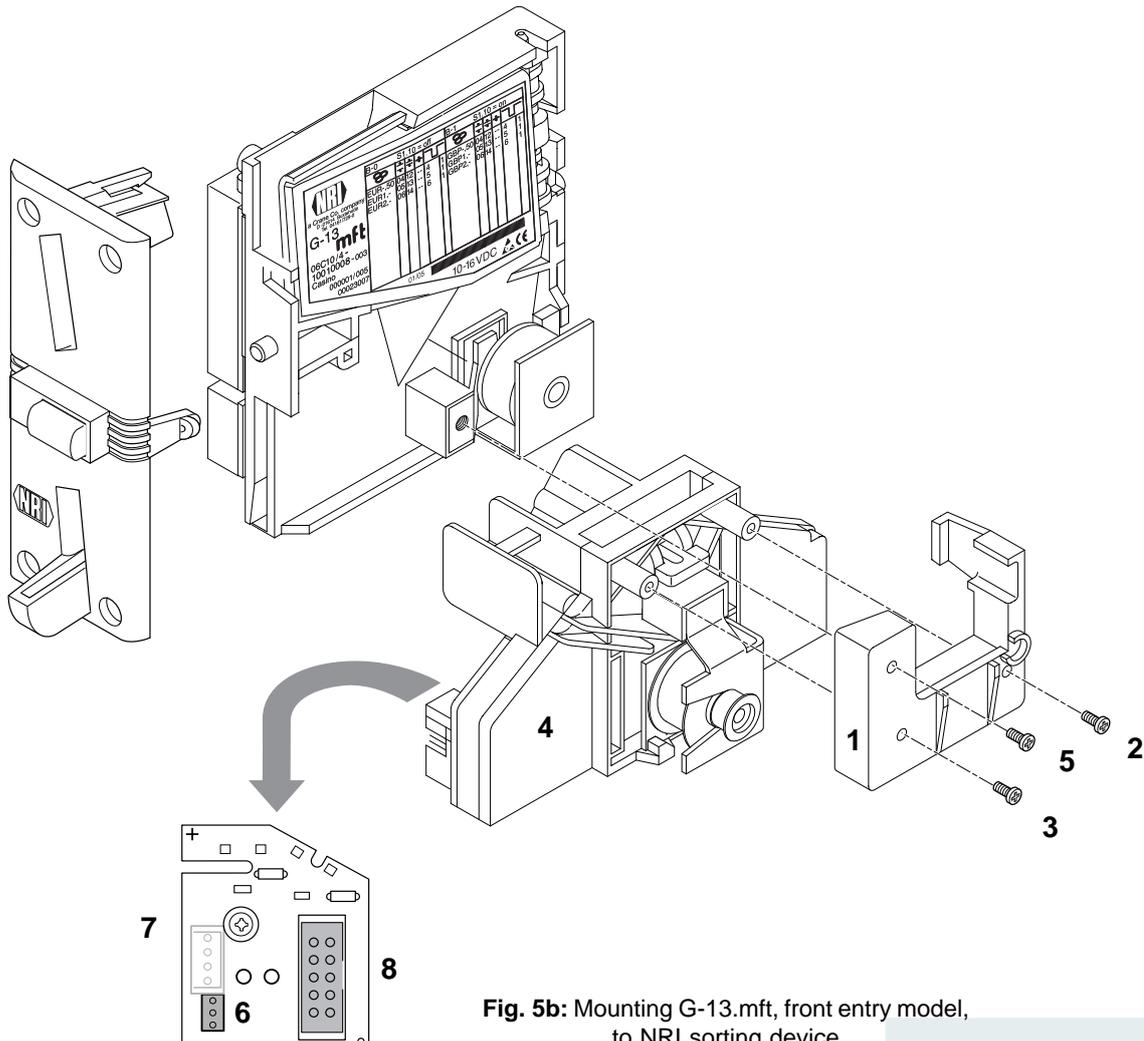
- 1** If necessary, fasten chute extension **1** with screw **2** to sorting device **3** (see Fig. 5a).
- 2** Fasten mounting frame **4** by means of screws **5** and **6** to the rear of the sorting device.
- 3** Hang the coin validator by its mounting studs **7** in the mounting frame.
- 4** Use the 3-pole sorting plug **8** on the PCB **9** and on the rear of the coin validator to connect the sorting device to the G-13.mft with the help of the appropriate sorting cable.
- 5** Use the 10-pole connection plug **10** on the PCB **9** and on the rear of the coin validator to connect the sorting device to the G-13.mft for power supply of the sorting solenoids with the help of the appropriate connecting cable.
- 6** Use the 10-pole connection plug **10** on the PCB **9** and the same connecting cable to connect the coin validator to the machine (see also section "Installing coin validator in the machine" in this chapter).



**Fig. 5a:** Mounting G-13.mft, top entry model, to NRI sorting device

**... on the front entry model**

- 1** If necessary, fasten holding plate **1** with two screws **2** and **3** to sorting device **4** (see Fig. 5b).
- 2** Remove screw **5** from coin validator.
- 3** Use the holding plate to insert the sorting device from the right-hand side onto the coin validator.
- 4** Fasten the sorting device with screw **5** to the coin validator.
- 5** Use the 3-pole sorting plug **6** on the PCB **7** and on the rear of the coin validator to connect the sorting device to the G-13.mft with the help of the appropriate sorting cable.
- 6** Use the 10-pole connection plug **8** on the PCB **7** and on the rear of the coin validator to connect the sorting device to the G-13.mft for power supply of the sorting solenoids with the help of the appropriate connecting cable.
- 7** Use the 10-pole connection plug **8** on the PCB **7** and the same connecting cable to connect the coin validator to the machine (see also section "Installing coin validator to the machine" in this chapter).



**Fig. 5b:** Mounting G-13.mft, front entry model, to NRI sorting device

## 6 Operation



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

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

The settings that are performed directly on the validator are described. To find out how to perform settings using the PC programming station WinEMP, please refer to the separate instructions (cp. also Chap. 8 "The PC programming station WinEMP" and product accessory pages on the internet ([www.nri24.com](http://www.nri24.com))).

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

### Selecting memory block (only with double block data-management)

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 upper switching block:



To select memory block 0, move DIL switch S1.10 of the upper switching block to the bottom OFF position, for memory block 1, move it to the upper ON position.

## Inhibiting coins/activating narrow coin channel ...

Depending on whether the 32 coin channels are being data-managed in one or, when divided in 16 coin channels each, in two memory blocks (B-0 and B-1, see label), the coin types are also inhibited differently.

### ... with double block data-management (B-0 and B-1)

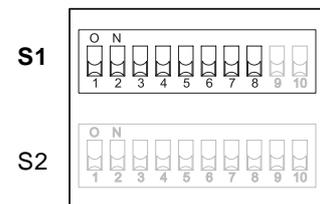
Using the two switching blocks on the coin validator each of the 16 coin channels of the activated memory block or each coin type assigned to a specific coin channel can be inhibited individually, i.e. this coin type(s) is/are not accepted for payment on the machine.

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

The first 8 DIL switches each inhibit the following coin channels:

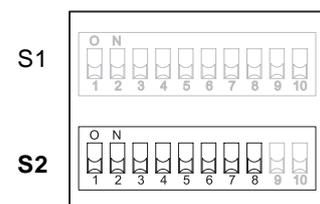
#### Switching block S1

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



#### Switching block S2

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



Please refer to the label of the device to see which coin type has been assigned to which coin channel at the factory.

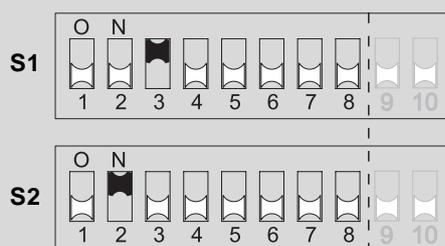


*However, this assignment could have been changed using the configuration software.*

If all coin types are to be accepted for payment by 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 accept the coin(s) assigned to coin channels 3 and 10, which means that coin channels 3 and 10 must be inhibited



**With the DIL switches in these positions, the coin validator no longer accepts the coin type(s) assigned to coin channels 3 and 10!**



*If a normal coin channel and a narrow coin channel have been programmed on the coin 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 activated, the wider acceptance band of the normal coin channel is used. If the coin type is to be inhibited, both coin channels must 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.

### ... with single block data-management

Coins can be inhibited using the first eight DIL switches S1.1–S1.8 of the upper switching block on the validator. Which coin types have been assigned to the DIL switches and can be inhibited is shown on the label. Several coin types can also be assigned to one switch. This switch will then inhibit a coin group (e.g. all coins of a currency, all acceptance bands of a coin type (normal and narrow ones)).



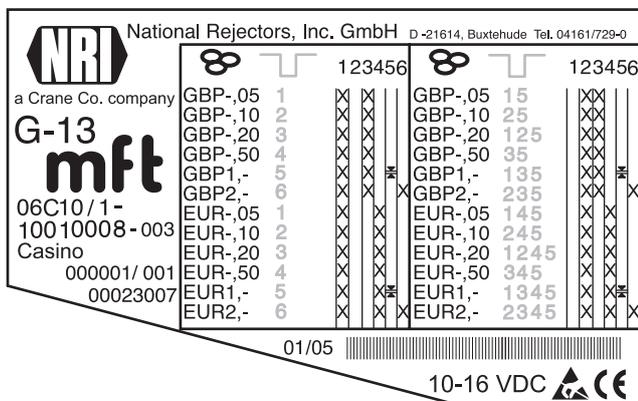
#### Assignment DIL switches – coin type/coin group

If all coin types assigned to the DIL switches are to be accepted for payment at the machine, the DIL switches S1.1–S1.8 must be in the lower position (on OFF). If you want to inhibit coins, you only need to move the respective DIL switch toward the top to ON.



*Any coin types or tokens that may have been taught in coin channels 25 to 32 are inhibited using the DIL switches of the lower switching block S2.1–8 (see section "Teaching coin channels in the teach mode" in this chapter).*

The following examples are designed to illustrate the procedure using the label. The label shows the manufacturer's assignment of coin type/coin group.



**Example – Inhibit a currency as coin group X**  
 The coin validator must only accept euros and no longer the British currency



**With this setting the coin validator only accepts euros!**

**Example – Activate narrow acceptance bands/coin channels as coin group X**  
 The coin validator must accept the 1-euro coin and the British 1-pound coin in the narrow acceptance band and not in the normal one, i.e. it must inhibit the normal acceptance band



**With this setting the coin validator accepts the coins in the narrow coin channel and not in the normal one!**

**Example – Inhibit single coin type X**  
 The coin validator must no longer accept the 2-euro coin or the British 2-pound coin



**With this setting the coin validator no longer accepts the 2-euro coin or the British 2-pound coin!**



At a coin validator with the label illustrated above it would also be possible to inhibit the euro currency via DIL switch S1.4 and choose between the left-hand and right-hand assignment of coin signal lines via DIL switches S1.1 and S1.2.



With the aid of several DIL switches more than one coin type or coin group can be inhibited simultaneously.

To inhibit coin channels on the validator:

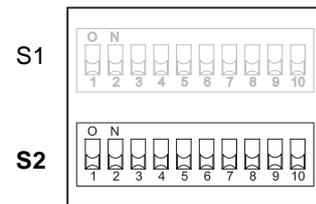
- 1** Unhook the coin validator from the machine.
- 2** Inhibit the desired coins using the DIL switches S1.1–8 (cp. example above).  
The desired coins are inhibited.
- 3** Hang the coin validator back in the machine.

## Teaching coin channels in the teach mode

In order to generate new acceptance bands you can teach up to eight coin channels using the lower switching block on the coin validator. You will need at least ten coins of the new type. There is a different switch assignment for the double and single block data-management:

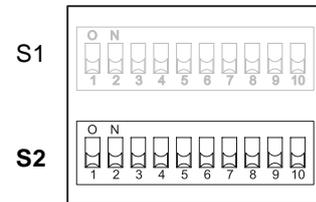
### Switching block S2 (with double block data-management)

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



### Switching block S2 (with single block data-management)

DIL switch	off	on	
S2.1	Coin channel 25	–	teach
S2.2	Coin channel 26	–	teach
S2.3	Coin channel 27	–	teach
S2.4	Coin channel 28	–	teach
S2.5	Coin channel 29	–	teach
S2.6	Coin channel 30	–	teach
S2.7	Coin channel 31	–	teach
S2.8	Coin channel 32	–	teach
S2.9	Teach mode	switch off	switch on
S2.10	Acceptance band	normal	wide



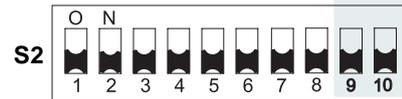
By default, the eight teach channels have been programmed, so that one coin impulse is transmitted to the machine via coin signal line 6, when a new coin is accepted.

To reassign a coin type to a coin channel, please proceed as follows:

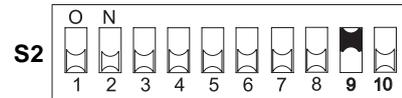


*If you are using the lower switching block to inhibit individual coins, remember the current switch settings so that you can restore them easily for the normal operating mode at the end.*

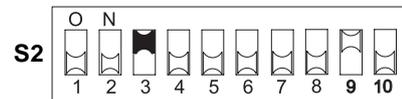
- 1** Set all DIL switches 1–10 toward the bottom to OFF.



- 2** Set DIL switch S2.9 toward the top to ON.  
Now the device is in teach mode to teach the coin channels.



- 3** Release the coin channel to be taught (9–16 or 25–32, here: 11 or 27) by setting the appropriate DIL switch (S2.1–8, here: S2.3) toward the top to ON.



- 4** Insert at least 10 coins of the new coin type/token into the coin validator or machine.  
After the 10<sup>th</sup> coin has been inserted, the acceptance gate is operated once (brief clacking sound). Additional coins can be inserted.



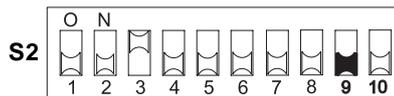
*You must insert at least 11 coins in devices with a wake-up sensor, as the first coin is only used to wake-up the validator and is not valued.*

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:

- 5a)** 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, for example, the acceptance band of the coins inserted and the acceptance band of an already programmed coin channel overlap.



*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.*

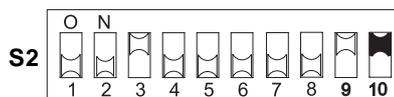
To save with a wide acceptance band:

- b)** Set DIL switch S2.10 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, for example, the acceptance band of the coins inserted and the acceptance band of an already programmed coin channel overlap.



*To abort the operation, first set the DIL switch of the respective coin channel (here: S2.3) as well as DIL switch S2.10 and then DIL switch S2.9 toward the bottom to OFF.*

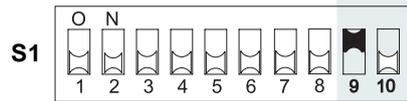
- 6** If necessary, set DIL switches S2.1–8 for the normal operating mode (see section "Inhibiting coins/activating narrow coin channel" in this chapter).

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

## Selecting Casino mode (only standard model)

If you would like to select the Casino mode, you can easily change the operating mode by means of the upper switching block:

Set DIL switch S1.9 toward the top to ON.  
The device now operates in Casino mode with quick coin acceptance of five to six coins per second.



Attracting time of the acceptance gate, accepted coin sensors' signal via return signal line, etc.

Casino model: switchable standard operation

## 7 Maintenance and service



In this chapter you will find out how to

- clean the G-13.mft and
- remedy the cause of a malfunction.

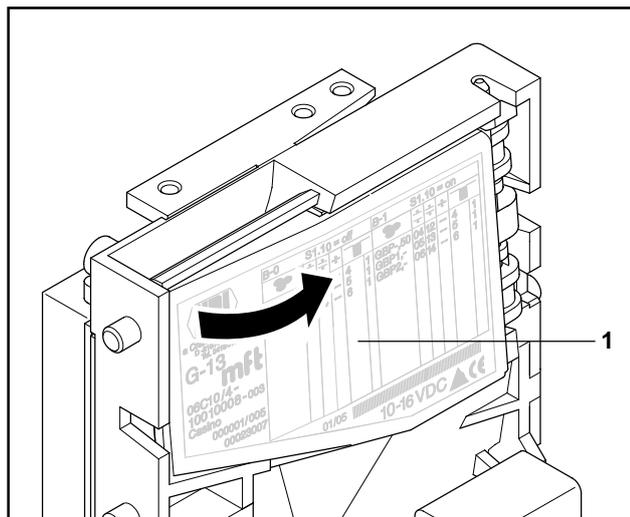
### Cleaning coin validator

The coin validator must only be wiped clean from time to time with a damp cloth (lukewarm water with some detergent). Beyond that, no further maintenance work is required.



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

- 1 Pull the machine's mains plug.
- 2 Carefully open the flight deck 1 on the left-hand side and hold it open (see Fig. 6).
- 3 Use a cloth to wipe off the coin runway inside the coin validator.
- 4 Close the flight deck again.
- 5 Reconnect the machine to the mains supply.



**Fig. 6:** Opening the flight deck of the validator

## 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	<ul style="list-style-type: none"> <li>• Connect ribbon cable to coin validator and machine correctly</li> <li>• Supply machine with voltage</li> </ul>
	Return lever/button pressed/got stuck	Make sure, that return lever/button is not inadvertently pressed
	Coin runway dirty	Open flight deck and clean coin runway (see section "Cleaning coin validator" in this chapter)
	Coin inhibited	<ul style="list-style-type: none"> <li>• Make sure that (common) inhibit signal line (pin 6) is not activated by machine (see section "Interfaces (pin assignment and connection diagrams)" in Chap. 9 "Technical data")</li> <li>• Make sure that the single inhibit signal 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 "Interfaces (pin assignment and connection diagrams)" in Chap. 9 "Technical data")</li> <li>• 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")</li> </ul>

<b>Problem</b>	<b>Possible causes</b>	<b>Remedy, hints</b>
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 tester

- 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 remedy other faults please contact our service technicians.

## 8 The PC programming station WinEMP



This chapter provides general information concerning the PC programming station, the WinEMP software and the G-13.mft functions that can be configured with the help of these tools.

### Function

The PC programming station 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](http://www.nri24.com))):

- WinEMP PC software
- Card reader G-19.0647 incl. chip card with authorization licences
- Voltage supply and PC interface for validator:
  - Tester G-19.0594/4 (for 220/230 V mains supply)/  
Tester G-19.0651 (für 110/115 V mains supply) +  
adapter package G-19.0640,  
if also the machine interface is to be tested, or
  - PC interface G-55.0359, if the machine interface is not to be tested



*If you already have the NRI tester G-19.0641, you can use this tester instead of the PC interface G-55.0359 mentioned above.*

*Devices with internal wake-up sensor can only be configured in WinEMP by means of the PC interface G-55.0359.*

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 false coins)
- Attraction time of the acceptance gate
- Coin value via assignment of coin channel to
  - coin signal line
  - coin impulse number
  - coin impulse length
- Output signal definition for coin rejection
- Sorting via
  - assignment of coin channel to sorting control line/return signal line
  - sorting time
- Inhibition of coins via assignment of coin channel to
  - single inhibit signal line (external inhibition, not with AMU model and model with G-18 BDTA interface)
  - DIL switches S1.1–8 (internal inhibition, only single block data-management)
- Deactivation/activation of coins on a long-term basis
- Deactivation/activation of teach mode/teach channels
- Disabling of return signal
- New coins/tokens (creating a new acceptance band and assigning the coin signal data)
- Data block download for current coin and device data
- Operating mode standard/Casino

## 9 Technical data



This chapter provides information about

- all relevant G-13.mft data
- the CE certification
- the machine and sorting interfaces
- ordering codes for the G-13.mft accessories

### Device data

<b>Supply voltage</b>	10 V to 16 V DC, optionally up to 42 V DC (High-voltage option)
<b>Current consumption</b>	Standby mode: approx. 30 mA Measuring mode: approx. 100 mA Coin acceptance: approx. 100 mA + approx. 3 W
<b>Battery model</b>	Sleep mode: $\leq 15 \mu\text{A}$ Standby mode: approx. 30 mA (wake-up mode) Measuring mode: approx. 100 mA Coin acceptance: approx. 100 mA + approx. 3 W
<b>Electric strength</b> Inputs/outputs	Max. 35 V
<b>Current-carrying capacity</b> , outputs	Max. 150 mA (open collector)
<b>Temperature range</b>	-25 °C to 70 °C
<b>Temperature change</b>	Max. 0.2 °C/min.
<b>Rel. humidity</b>	Up to 93 %
<b>Condensation</b>	Not permitted
<b>Machine interfaces</b> Standard/Casino	6 coin signal parallel outputs (open collector)/6 individual inhibit inputs (active low) Common inhibit input (active high) Return output (active low)
BDTA 14	4 coin signal parallel outputs (open collector) (active low) Common inhibit input (active high) Return output (active low) Wake-up input/output (active low) String output (active low)

BDTA 16	6 coin signal parallel outputs (open collector) (active low) 6 individual inhibit inputs (active high) Common inhibit input (active low) Return output (active low)
AMU	7 coin signal parallel outputs (open collector) (active low) Inhibit input (active high) For pin assignment see section "Interfaces (pin assignment and connection diagrams)" in this chapter
<b>Sorting interface</b>	Company: JST, <a href="http://www.jst.com">www.jst.com</a> Type: ZH connector; 1.5 mm
<b>Coin acceptance</b>	32 coin types max. in 2 x 16 or 1 x 32 channels Coin diameter: 15–31.5 mm (optionally up to 32.5 mm) Coin thickness: 1.5–2.5 mm (optionally bis 3.3 mm) Speed: 2 coins/sec. (Casino: 5–6 coins/sec.)
<b>Device dimensions</b>	Height: 102 mm Width: 89 mm Depth: 52 mm (For mounting dimensions, see separate documentation)
<b>Mounting position</b>	Vertical, max. deviation: $\pm 2^\circ$
<b>Mark of conformity</b>	CE (see next section)

## 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 equipment which is 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.

## Interfaces (pin assignment and connection diagrams)



On the following pages you will find interface descriptions, pin assignments and connection diagrams for the connection of the G-13.mft to

- the machine
- an external sorting device

### G-13.mft standard/Casino model – machine

#### Pin assignment

Pin 1	–	Ground (GND)	
Pin 2	–	Operating voltage $U_o = +12\text{ V}$ (10 V–16 V DC)	
Pin 3	OUT/IN	Coin line 5: active low/ single inhibit line 5: active low	
Pin 4	OUT/IN	Coin line 6: active low/ single inhibit line 6: active low	
Pin 5	OUT	Return/coin acceptance/sorting/wake-up line: active low	
Pin 6	IN	Common inhibit line: active high	



*With the G-13.mft model for the Australian market (G-13.mft 6xV) the common inhibit line is inverted (active low).*

Pin 7	OUT/IN	Coin line 1: active low/single inhibit line 1: active low
Pin 8	OUT/IN	Coin line 2: active low/single inhibit line 2: active low
Pin 9	OUT/IN	Coin line 3: active low/single inhibit line 3: active low
Pin 10	OUT/IN	Coin line 4: active low/single inhibit line 4: active low



*All signals must be debounced from the input side.*

#### Interface description

##### Coin lines/single inhibit lines

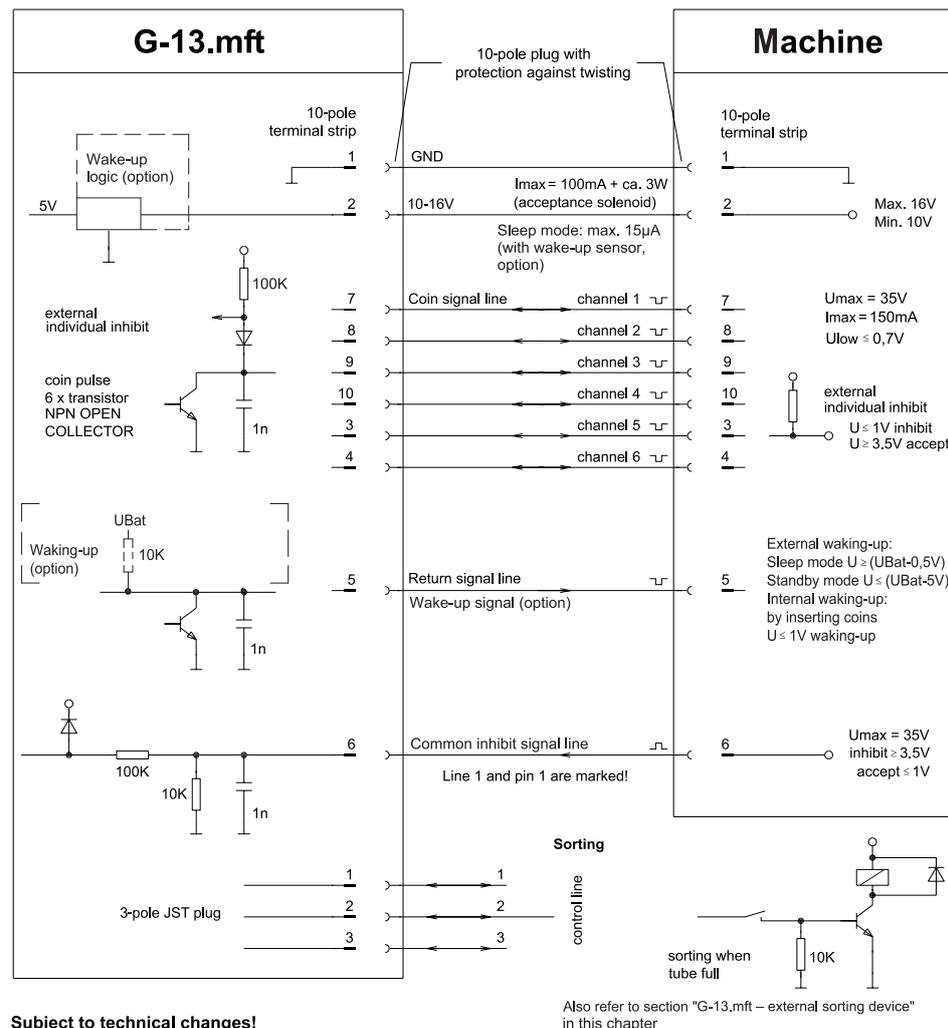
- Coin validator signals coin accepted in the corresponding coin channel (usually with one impulse, if there are insufficient lines with multiple impulses)
- Machine inhibits coin recognized in the respective coin channel

**Return line/coin acceptance line/sorting line/wake-up line (alternatives)**

- After the return button has been pressed, the coin validator signals the opening of the measurement and validation area
- Coin validator signals coin recognized has passed accepted coin sensors (option for Casino model)
- Coin validator sends a signal to external sorting device, as the coin accepted in the coin channel assigned is to be sorted (alternative to sorting control lines for standard model)
- Coin validator wakes up machine (option for device with wake-up sensor)

**Common inhibit line**

Machine inhibits coin acceptance

**Connection diagram**

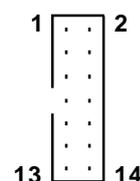
Subject to technical changes!

**Fig. 7a:** Connection diagram for G-13.mft standard/Casino

## G-13.mft with G-18 BDTA interface – machine

### Pin assignment

Pin 1	–	Ground (GND)
Pin 2	–	Operating voltage $U_o = +12\text{ V}$ (10 V–16 V DC)
Pin 3	OUT	String line: active low
Pin 4	OUT/IN	Wake-up line (internal and external): active low
Pin 5	OUT	Return line: active low
Pin 6	IN	Common inhibit line: active high
Pin 7	OUT	Coin line 4: active low
Pin 8	OUT	Coin line 7: active low
Pin 9	OUT	Coin line 6: active low
Pin 10	OUT	Coin line 2: active low
Pin 11	OUT	Coin line 5: active low
Pin 12	OUT	Coin line 3: active low
Pin 13	OUT	Coin line 1: active low
Pin 14	OUT	Coin line 8: active low



*All signals must be debounced from the input side.*

### Interface description

#### Coin lines

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

#### Return line

After the return button has been pressed, the coin validator signals the opening of the measurement and validation area

#### Common inhibit line

Machine inhibits coin acceptance

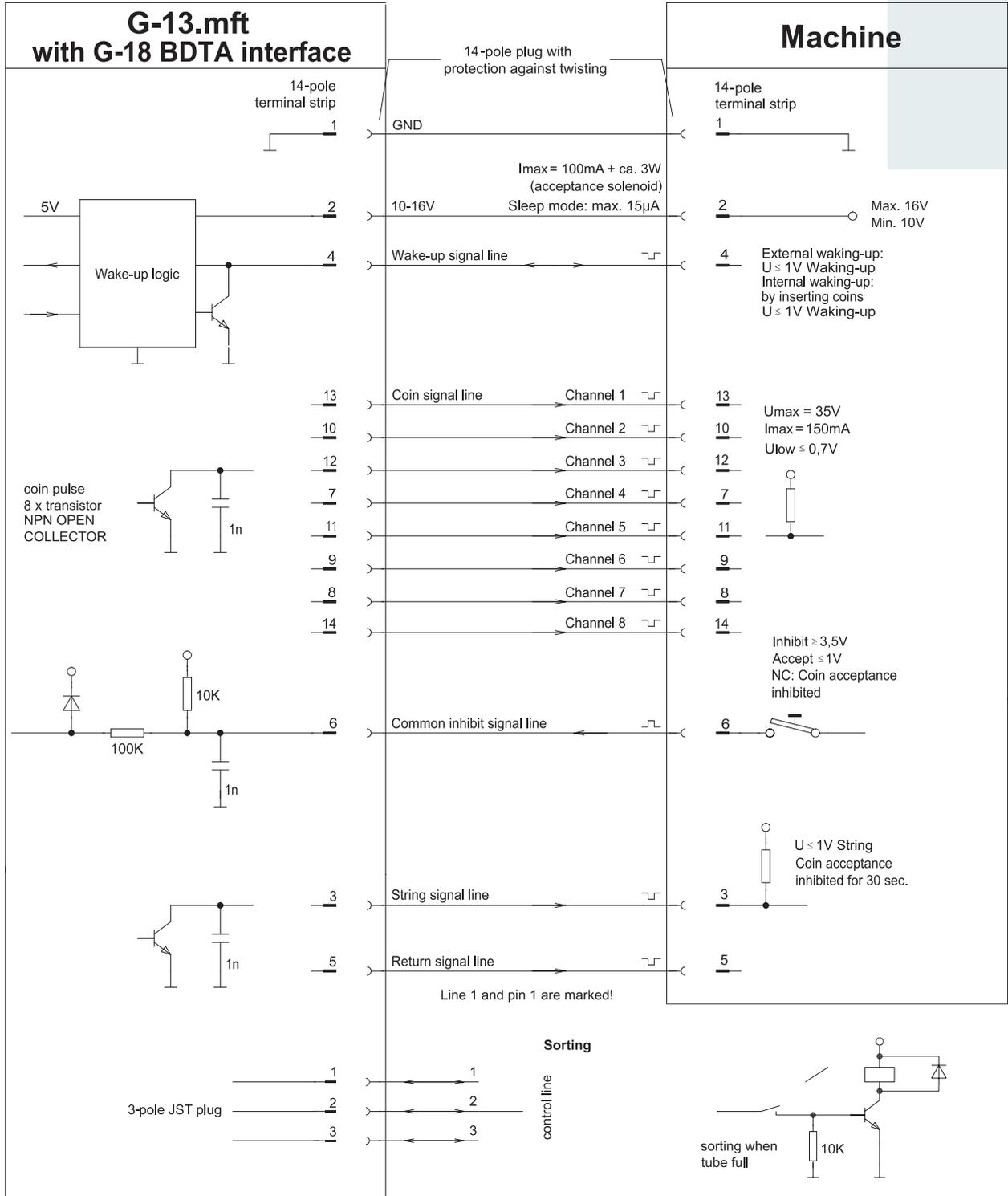
#### Wake-up line

- Coin validator wakes up machine, after being woken up by coin insertion, and remains active, until inserted coin has been processed (internal waking up)
- Machine wakes up coin validator (active until inserted coin has been processed) (external waking up)

#### String line

Coin validator signals manipulation attempt, e.g., a coin pulled back by a string, and inhibits coin acceptance for 30 seconds

Connection diagram



Subject to technical changes!

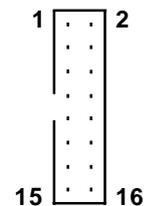
Also refer to section "G-13.mft – external sorting device" in this chapter

Fig. 7b: Connection diagram for G-13.mft with G-18 BDTA interface

## G-13.mft with G-40 BDTA interface – machine

### Pin assignment

Pin 1	IN	Single inhibit line 4: active high
Pin 2	IN	Single inhibit line 5: active high
Pin 3	IN	Single inhibit line 2: active high
Pin 4	IN	Single inhibit line 6: active high
Pin 5	OUT	Return line: active low
Pin 6	IN	Common inhibit line: active low
Pin 7	OUT	Coin line 4: active low
Pin 8	–	Ground (GND)
Pin 9	OUT	Coin line 6: active low
Pin 10	OUT	Coin line 2: active low
Pin 11	OUT	Coin line 5: active low
Pin 12	OUT	Coin line 3: active low
Pin 13	OUT	Coin line 1: active low
Pin 14	IN	Single inhibit line 3: active high
Pin 15	IN	Single inhibit line 1: active high
Pin 16	–	Operating voltage $U_o = +12\text{ V}$ (10 V–27 V DC)



*All signals must be debounced from the input side.*

### Interface description

#### Coin lines

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

#### Return line

After the return button has been pressed, the coin validator signals the opening of the measurement and validation area

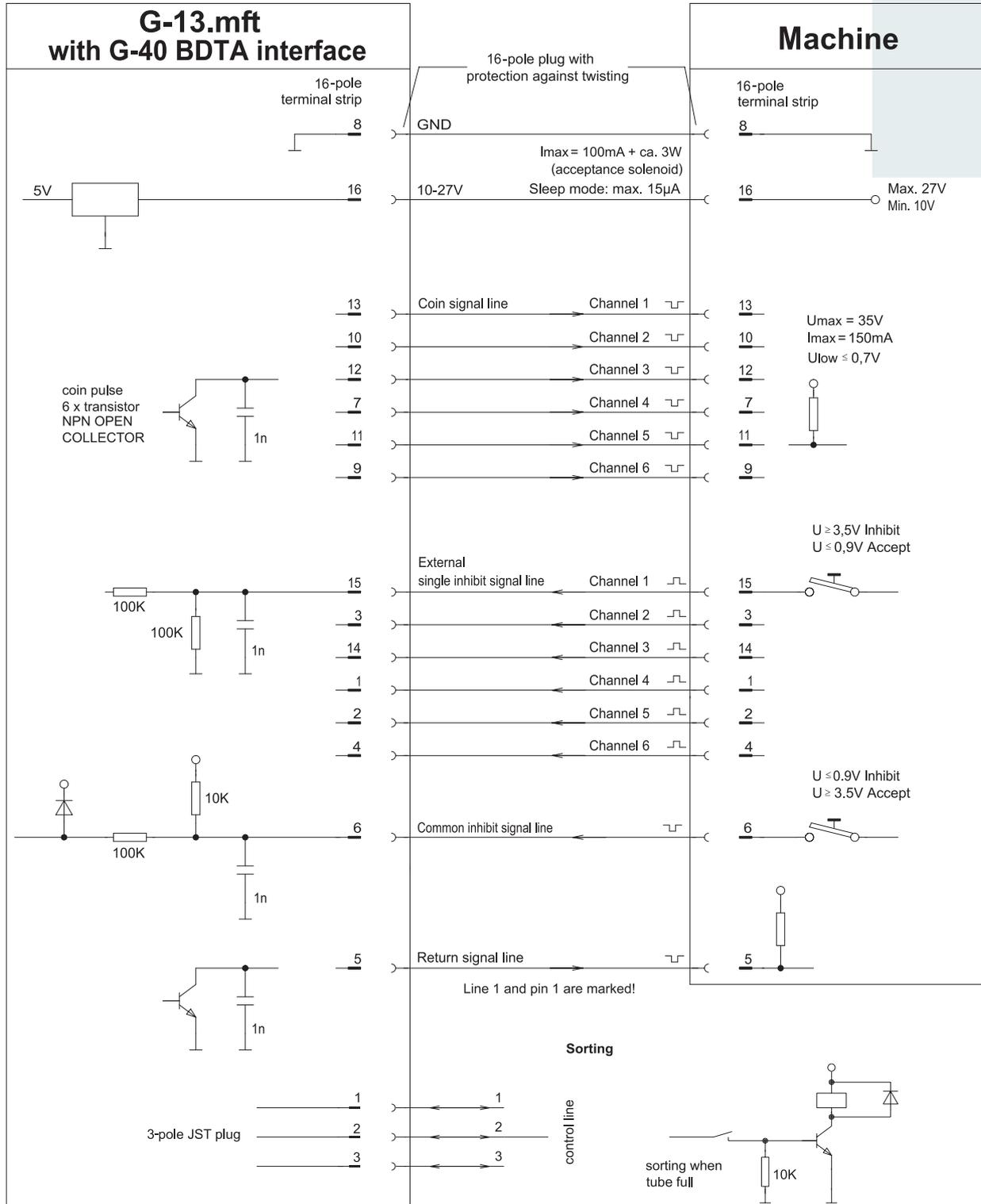
#### Common inhibit line

Machine inhibits coin acceptance

#### Single inhibit lines

Machine inhibits coin assigned to the signal line

Connection diagram



Subject to technical changes!

Also refer to section "G-13.mft – external sorting device" in this chapter

Fig. 7c: Connection diagram for G-13.mft with G-40 BDTA interface

## G-13.mft AMU model – machine

### Pin assignment

Pin 1	–	Operating voltage $U_o = +12\text{ V}$ (10 V–16 V DC)	
Pin 2	–	Ground (GND)	
Pin 3	OUT	Coin line 5: active low	
Pin 4	OUT	Coin line 6: active low	
Pin 5	OUT	Coin line 7: active low	
Pin 6	IN	Inhibit line: active high (internal pull-up)	
Pin 7	OUT	Coin line 1: active low	
Pin 8	OUT	Coin line 2: active low	
Pin 9	OUT	Coin line 3: active low	
Pin 10	OUT	Coin line 4: active low	



*All signals must be debounced from the input side.*

### Interface description

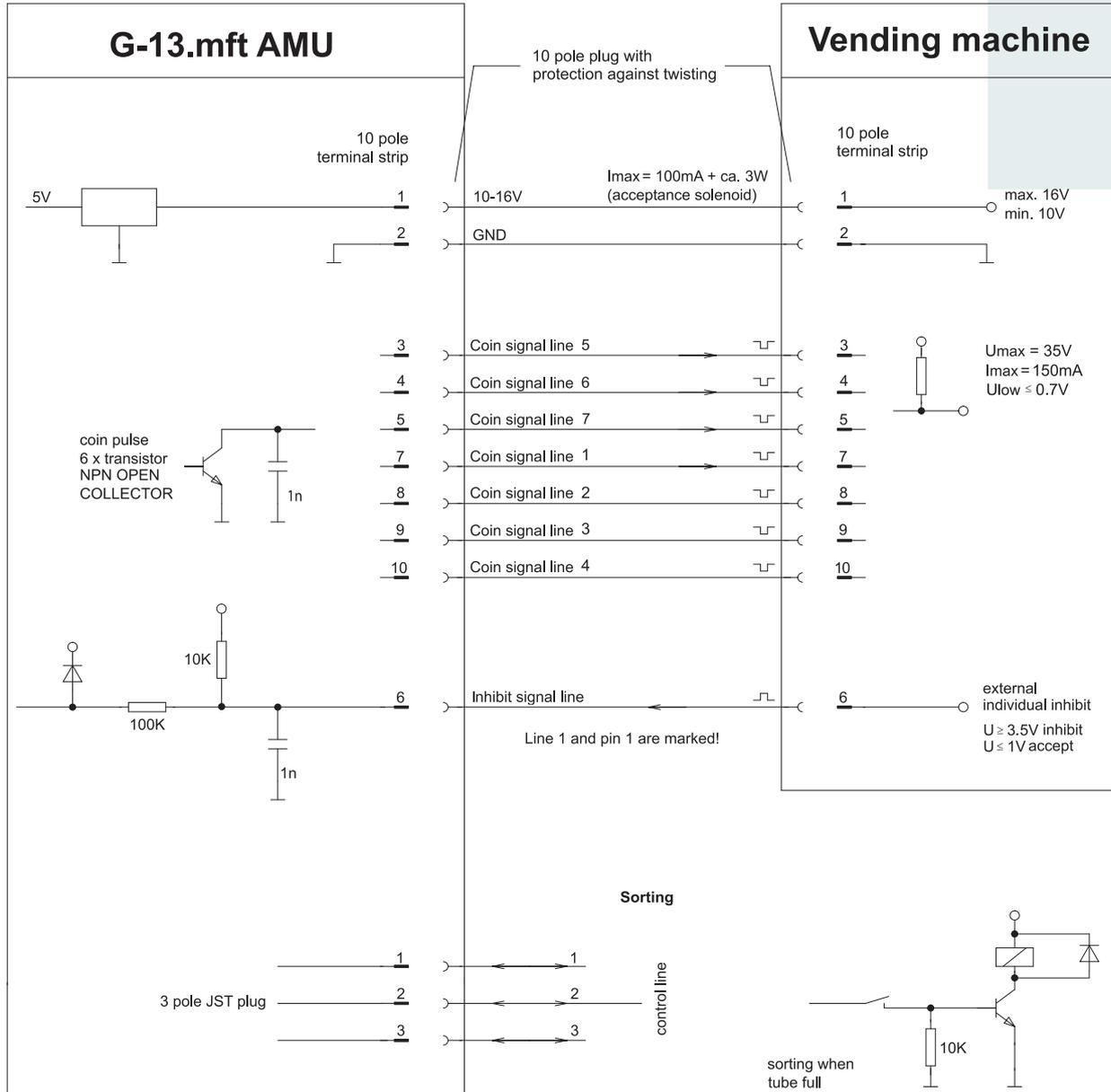
#### Coin lines

Coin validator signals coin recognized in the corresponding coin channel by sending a pre-signal and a coin signal

#### Inhibit line

Machine can release each coin signalled as "recognized" by the coin validator during the pre-signal by switching the inhibit line to "Low". If the inhibit line is not switched, the coin is rejected

Connection diagram



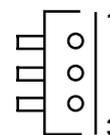
Subject to technical changes!

Also refer to section "G-13.mft – external sorting device" in this chapter

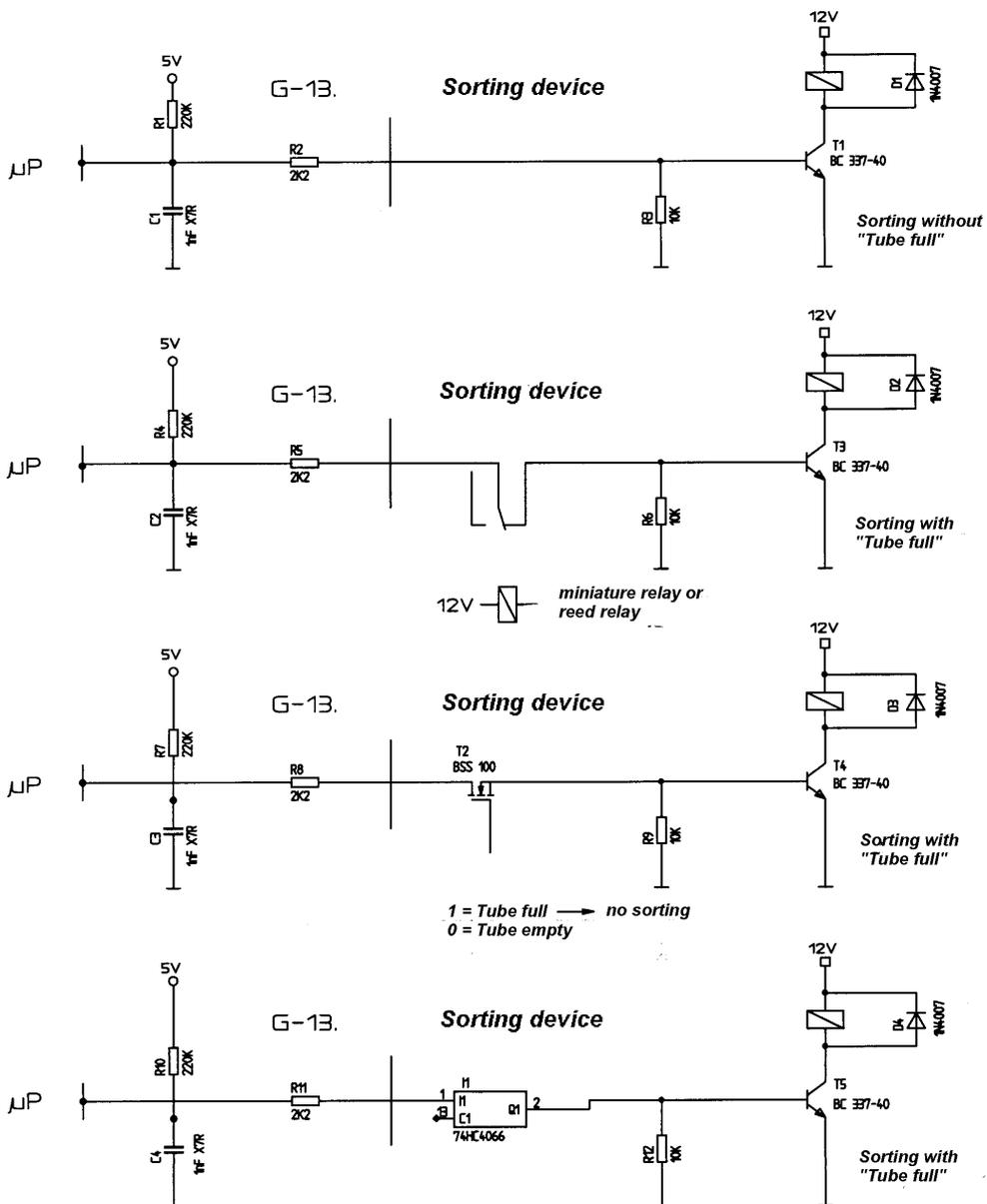
Fig. 7d: Connection diagram for G-13.mft AMU

**G-13.mft – external sorting device**

Pin 1	OUT	Sorting control line 1
Pin 2	OUT	Sorting control line 2
Pin 3	OUT	Sorting control line 3



**Examples for controlling a sorting device**



*If higher current is necessary, Darlington transistor possible  
Without "Tube full" binary coding of the 3 outputs possible*

**Fig. 7e:** Connection diagram for external 3-fold sorting device

## Accessories

In order to test the G-13.mft or adapt it to your individual needs, you can acquire the following accessories from NRI:

### Front plates

For all details regarding the MINI and MIDI front plates (also with external wake-up sensor) please refer to our web pages for the product G-13.mft on the internet ([www.nri24.com](http://www.nri24.com)).

### Sorting device

For all details regarding the 3-fold sorting device please refer to our web pages for the product G-13.mft on the internet ([www.nri24.com](http://www.nri24.com)).

### External wake-up sensor

For all details regarding the external wake-up sensor to be mounted on the MIDI front plate please refer to our web pages for the product G-13.mft on the internet ([www.nri24.com](http://www.nri24.com)).

### Adapter housing for BDTA models

Accessory	Ordering code
5" adapter housing for G-13.mft with G-18/G-40 BDTA interface .....	13704

### Testers

Accessory	Ordering code
Tester G-19.0594/4 for 220/230 V mains connection	11801
G-19.0651 for 110/115 V mains connection ...	21410
Tester G-55.0359	
(only as power supply for coin acceptance test) + .....	26125
12 V wall power supply (400 mA)	
(with international adapter) .....	26482

### WinEMP PC programming station

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](http://www.nri24.com)).

## Simple gaming interface (SGI)



This appended chapter should explain the highlights of the G-13.mft SGI model. Apart from the additional pilot lights and the particular pin assignment the G-13.mft SGI, that is especially designed for the gaming industry, is working just like the G-13.mft Casino model described in detail in these instructions.

### What is the difference between the G-13.mft SGI and the G-13.mft Casino

- Different machine interfaces for high compatibility
- Pilot lights for monitoring operation

### Pilot lights (not with G-13.mft SGI 100)

The both pilot lights on the left-hand side of the G-13.mft SGI indicate the operating state or a malfunction:

- Green LED ●**  
G-13.mft ready to operate
- Green LED ☀**  
Configuration mode (programming station connected)
- Red LED ●**  
G-13.mft ready to operate, but coin acceptance inhibited
- Green LED ● and red LED ☀**  
Malfunction, can be remedied by cleaning or eliminating a coin pile-up
- Green LED ☀ and red LED ☀**  
Error (service case)

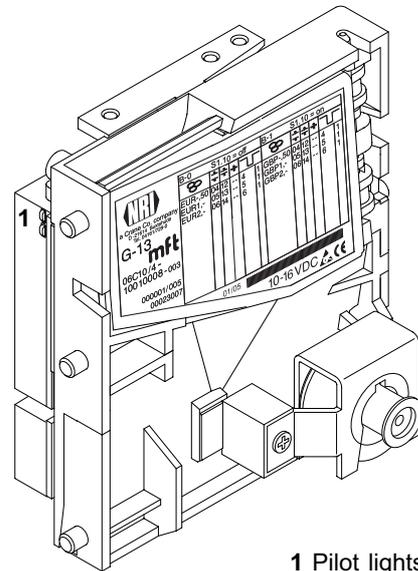


Fig. 8: Pilot lights on the G-13.mft SGI

## Machine interfaces

### Pin assignment and compatibility

G-13.mft term	SGI 16 A	SGI 16 B	SGI 40 A	SGI 46 A	SGI 62 A/AS	SGI 33 A	SGI 80 A	SGI 100 A
Connector type	JST	JST	JST	Molex	Molex	JST	JST	10-pole terminal strip
<b>Pin assignment</b>								
Pin 1	Inhibit (active high) 1K to GND	Inhibit (active high) 10K to 5 V	Tilt (active low)	Inhibit (active high) 10K to 5 V	GND	12 V DC*	GND	GND
Pin 2	Sense (active low)	Sense (active low)	Inhibit (active high) 10K to 5 V	Tilt (active low)	Sense (active low)	Sense (active low)	Inhibit (active high) 10K to 5 V	12 V DC
Pin 3	nc*	nc	Credit (active low)	Credit (active low)	Tilt (active low)	GND	Ready (active low)	Credit 5 (active low)
Pin 4	nc*	nc*	nc*	Sense (active low)	Credit (active low)		Tilt (active low)	Sense (active low)
Pin 5	12 V DC	12 V DC	12 V DC	12 V DC	nc		Credit (active low)	Tilt (active low)
Pin 6	GND	GND	GND	GND	12 V DC		Sense (active low)	Inhibit (active high) 10K to GND
Pin 7					Inhibit (active high) 10K to 5 V		12 V DC	Credit 1 (active low)
Pin 8						nc	Credit 2 (active low)	
Pin 9							Credit 3 (active low)	
Pin 10							Credit 4 (active low)	
Compatible with	CC16	CC16	CC40	CC46	CC62	CC33	Defender 3	–

\* Deviation from Casino standard

### Interface description

#### Credit

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

#### Inhibit

Machine inhibits coin acceptance

#### Sense

Coin validator signals valid coin (measurement system passed), also with "Inhibit"

#### Tilt

Error (see section "Error diagnosis" in this chapter)

## Error diagnosis

Error cause	Impulse length
Supply voltage too high (~18 V)/ too low (~8 V)	Error duration
Checksum error (device defective)	Error duration
Coin pile-up	Error duration
Sensor error (covered/dirty/defective)	Error duration
String recognition (coin acceptance inhibited for 30 sec.)	30 sec.
Inhibited coin accepted (acceptance gate permanently open)	Coin impulse length (is outputted together with coin signal)
Non-programmed coin accepted (acceptance gate permanently open)	Coin impulse length
Coin too slow, could not be measured	Coin impulse length

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## Glossary

<b>Acceptance band</b>	A range of acceptable measured values of one → <i>coin type</i> (with specific → <i>coin properties</i> ) defined by an upper and lower limit value.
<b>Acceptance gate</b>	The acceptance gate diverts the inserted coins into the acceptance or return area of the coin validator.
<b>Accepted coin sensors</b>	The accepted coin sensors are positioned in front of the cash coin outlet of the coin validator and check whether accepted coins fall unhindered into the cash-box chute (Casino model cannot utilize accepted coin sensors).
<b>AMU model</b>	G-13.mft model especially for the Spanish gaming industry. The AMU model differs from the standard model in another coin signal processing and pin assignment.
<b>Attraction time</b>	The attraction time is used to specify the period of time for which the solenoid is to attract the → <i>acceptance gate</i> in order to guide the accepted coins to the cash-box or an external sorting device.
<b>BDTA</b>	<b>B</b> undesverband der <b>d</b> eutschen <b>T</b> abakwaren-Großhändler und <b>A</b> utomatenaufsteller (German tobacco association). Responsible for standardizing the electrical interface between coin validator and machine for the tobacco vending sector.
<b>Block</b>	→ <i>Memory block</i>
<b>Channel</b>	→ <i>Coin channel</i>
<b>Coin acceptance band</b>	→ <i>Acceptance band</i>
<b>Coin channel</b>	Coin channels are used to describe → <i>coin types</i> using their different → <i>coin properties</i> (alloy, size, etc.). The required coin properties of a coin type are defined in → <i>acceptance bands</i> which are assigned to the coin channels for further processing along with other coin information.

<b>Coin impulse length</b>	<p>By specifying a certain coin impulse length, with which the signals are transferred to the machine, the coin validator can be adjusted to the specific processing time of the respective machine.</p> <p>If coin impulses of different lengths are assigned to the individual → <i>coin channels</i> in order to differentiate among the coin types, the → <i>coin impulse number</i> is always equal to one and cannot be varied.</p>
<b>Coin impulse number</b>	<p>Every coin accepted by the coin validator passes on an impulse to the machine control system via the appropriate → <i>coin signal line</i>. An impulse tells the machine control system that a coin has been accepted. In principle, 255 impulses per coin can be assigned to the → <i>coin channel</i> that is assigned to a coin (not with AMU model). However, it only makes sense to assign more than 1 if the machine control does not have sufficient coin signal lines and if higher-value coins have to be simulated by a multiple of coin impulses, i.e. when e.g. a 2-euro coin is inserted, 4 coin impulses would be sent to the machine control via the coin signal line allocated to the 50-cent coin.</p>
<b>Coin properties</b>	<p>Coin properties which are measured when a coin is inserted into the coin validator. These are e.g. material, thickness, volume, minting, diameter, mass, hardness, etc.</p>
<b>Coin signal line</b>	<p>Coin signal lines are used to transmit the → <i>coin value</i> of a → <i>coin type</i> to the machine.</p>
<b>Coin type</b>	<p>One coin type includes all coins for which the → <i>coin properties</i> agree.</p>
<b>Coin value</b>	<p>The value of a → <i>coin type</i> that is transmitted as (a) coin impulse(s) via → <i>coin signal lines</i> to the machine.</p>
<b>Common inhibit signal line</b>	<p>With the standard and Casino model as well as the model with the → <i>G-18</i>/→ <i>G-40</i> BDTA interface the machine control system can block acceptance of all coins using this signal line. The validator will no longer accept any coins.</p>
<b>Data block update</b>	<p>When updating a data block (set) (2 data blocks) using WinEMP, 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 → <i>memory block 0</i> (and memory block 1). The new data blocks contain different coin and device configurations, e.g. current limit values of the → <i>acceptance bands</i> for a currency or new inhibiting or sorting information.</p>

<b>ECV</b>	Electronic <b>Coin Validator</b>
<b>G-18 interface</b>	14-pole → <i>BDTA</i> interface, taken over from the NRI coin validator G-18.mft for battery applications in the tobacco vending sector.
<b>G-40 interface</b>	16-pole → <i>BDTA</i> interface, taken over from the NRI coin validator G-40.5000 for mains applications in the tobacco vending sector.
<b>Impulse length</b>	→ <i>Coin impulse length</i>
<b>Impulse number</b>	→ <i>Coin impulse number</i>
<b>Inhibit signal line</b>	<p>With the AMU model the machine control system uses the inhibit signal line to inhibit each of the coins inserted during acceptance operation (after the coin has been measured and before the coin will pass the accepted coin sensors). The coin inserted will not be accepted.</p> <p>→ <i>Single inhibit signal line</i> → <i>Common inhibit signal line</i></p>
<b>Memory block</b>	<p>Memory of the coin validator. At the manufacturer's company, a customer-specific setting is programmed to determine whether the 32 → <i>coin channels</i> of the G-13.mft are to be data-managed in one memory block (single block data-management) or, when divided into 16 channels each, in two memory blocks (double block data-management). Two (memory) blocks 0 and 1 can be used to data-manage two independent configurations of coin/device data (e.g. two currencies). However, for coin validator operation, only one memory block with 16 channels can be active at a time; the other block is inhibited.</p> <p>The memory block(s) can be updated using WinEMP or (→ <i>data block download</i>).</p>
<b>Return signal line</b>	<p>When operating the return lever/button on the coin validator, a return signal is transmitted to the return signal line (not with AMU model). The coin validator then releases all the coins and foreign bodies inside the device.</p> <p>The return signal line can also be used to transmit a sorting signal or a coin acceptance signal (only for Casino model, instead of → <i>accepted coin sensors</i>).</p>

<b>Single inhibit signal line</b>	Signal line between the machine control system and the G-13.mft standard and Casino model as well as the model with the G-40 BDTA interface which is used to block the acceptance of individual → <i>coin types</i> (one coin type and several coin types). For single inhibiting with the → <i>AMU model</i> , see → <i>inhibit signal line</i> .
<b>Sorting control line</b>	To sort the cash-box coins with an external sorting device, the coin validator has three sorting control lines. The → <i>return signal line</i> can also be used as an alternative for sorting.
<b>Sorting gate</b>	The 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 coin return or coin outlet towards the cash-box or external sorting device.
<b>Sorting time</b>	The sorting time specifies the switching times of an external sorting device.
<b>Switching blocks</b>	The two switching blocks are located on the rear of the coin validator and incorporate 10 DIL switches each. Each switch has a specific function, e.g. inhibiting individual or grouped → <i>coin channels</i> .
<b>Teach mode</b>	In the teach mode, the last eight → <i>coin channels</i> can be assigned new → <i>coin types</i> or → <i>tokens</i> on site at the machine without any configuration tools by inserting the new coins, which means that these newly configured coins are accepted in the respective coin channel for payment.
<b>Token</b>	Tokens are accepted for payment at machines instead of coins in a currency.
<b>Wake-up sensor</b>	Optional sensor positioned behind the coin insert funnel which monitors the insertion area and wakes up the coin validator after the first coin insertion. The coin inserted is measured and accepted or rejected. If no further coin is inserted during the next 3.5 seconds, the coin validator returns to sleep mode. Coin validators with wake-up sensor are used in battery and low- power applications, as they are most of the time in sleep mode with a very low power consumption (max. 15 µA).