Technical Documentation

Electronic Coin Validator
G-13.mft parallel
Standard, Casino and AMU Models
(from Version /4)

Operating instructions

Table of contents

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 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 and Casino 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. The index and glossary shorten the search for specific explanations.

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

- **Safety instructions**, which have to be taken note of in order to protect operators and equipment, have been written in bold and given the pictogram ⚠.
- Special *notes*, which are to facilitate the use of the coin validator, have been written in italics and also been given a pictogram ☞.
- `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.

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
- PalmEMP – Operating instructions for configuration of the coin validator G-13.mft
- Tester G-19.0594/4 for G-13 ECVs
- Electronic coin validator G-13.mft – Mounting dimensions

> ☞ *If this documentation is not available to you, it can be downloaded at any time from the NRI homepage (www.nri.de) in a compressed PDF format.*

General information about the coin validator G-13.mft with parallel interface

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 the tester G-19.0594/4. With the aid of the Palm handheld software "PalmEMP" you can configure the coin validator directly at the machine independently of the PC.

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

Advantages

- Acceptance speed of 2 coins per second
  (Casino model: 5-6 coins/sec.)
- Coin channels that can be inhibited individually or in groups
- Teach mode for 8 coin channels
- Easy to convert standard model into Casino model
- Operating and manipulation safety thanks to optical accepted coin sensors and sorting control in coin outlet area
- Interface for connection to a programming station or Palm handheld which makes immediate reaction to the use of false coins possible
- Multi-frequency technology for reliable coin recognition
- Flash-Technology for uncomplicated and time-saving firmware updates
- Optional wake-up sensor for battery and low-power application
- Optional sensor for increased protection against manipulation in the cash-box chute
- Supply voltage up to 42 V DC (option)

Models

The G-13.mft with parallel interface is available as a **standard** model and – for quick coin acceptance (e.g. in gambling machines) – as a **Casino** model.

The standard model can also be operated as a Casino device simply by throwing a switch (see Chap. 6 "Operation").

The **AMU** model was especially developed for the Spanish amusement market and differs from the standard and Casino model of the G-13.mft above all in a particular coin signal processing and pin assignment.

All of the three 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 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 vending 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 vending machine.

Never pull the connecting cable of the coin validator from the vending 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

Fig. 1a: Design – G-13.mft, top entry model
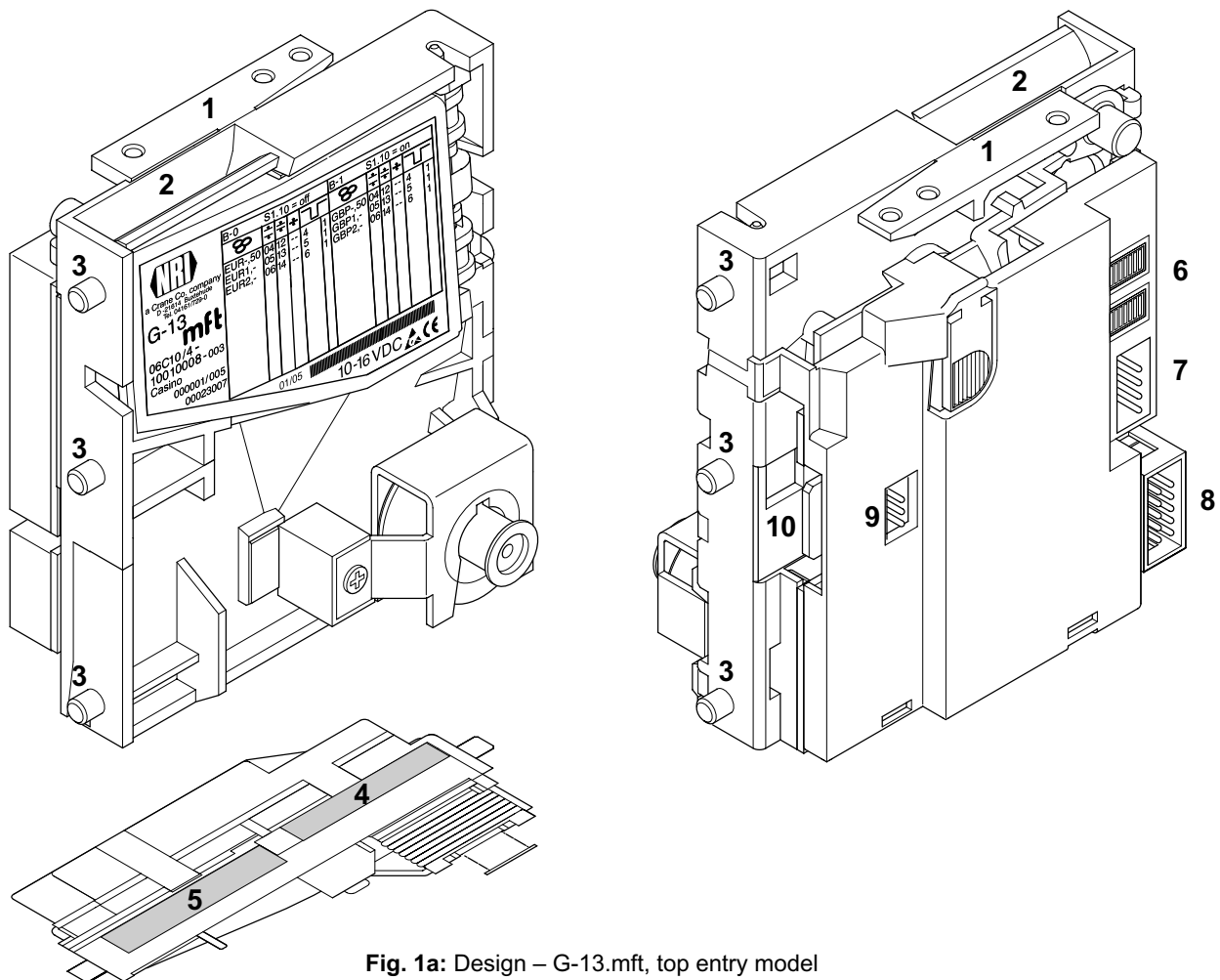
1 Return lever
2 Coin insert funnel
3 Mounting studs
4 Coin outlet – return area
5 Coin outlet – cash-box
6 Switching blocks

8 Interface – vending machine/tester
9 Interface – external sorting
10 Interface –
PC programming station (WinEMP)/
Palm handheld (PalmEMP)

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

1 Return button
2 Coin insert funnel
3 Mounting studs
4 Coin outlet – cash-box
5 Coin outlet – return area
6 Switching blocks

7 Interface – vending machine, serial (not assigned)
8 Interface – vending machine/tester
9 Interface – external sorting
10 Interface –
PC programming station (WinEMP)/
Palm handheld (PalmEMP)

Coins inserted into the coin validator pass through the coin insert funnel **2** into the measurement and validation area of the device, in which their coin properties are compared with the values of the stored acceptance bands. Coins rejected by the coin validator pass into the return area **4**, Fig. 1a/ **5**, Fig. 1b, and coins accepted for sale leave the device through the coin outlet **5**, Fig. 1a/**4**, Fig. 1b, and are fed into the cash-box or an external sorting device. (See Fig. 1a and 1b)

On the rear , the coin validator is equipped with an interface **8** to the vending machine (tester) and with an interface **9** to an external sorting device, and on the side with an interface **10** to the card reader of the PC programming station (WinEMP) or to the Palm OS® handheld (PalmEMP) (see Fig. 1a and 1b).

Using the switching blocks **6**, which are also located on the rear of the device, individual settings, such as inhibiting various coin types, can be made (see Fig. 1a and 1b).

Switching blocks

On the rear, the coin validator is equipped with two switching blocks with 10 DIL switches S1.1-10 and S2.1-10 each.
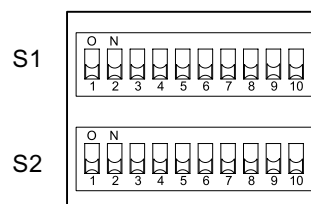
Depending whether your device was programmed for coin data-management according to a factory-made setting for one or two memory blocks (B-0 and B-1, see label), the DIL switches will have different functions (see also section "Single or double block data-management" in Chap. 4 "Function").

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

Switch assignment with double block data-management (B-0 and B-1)

Coin channels or the coin types assigned to the coin channels can be individually inhibited using the first eight DIL switches of the upper switching block S1 and the lower switching block S2 (see section "Inhibit coin channels" in Chap. 6 "Operation").

The ninth DIL switch of the upper switching block S1 can be used to convert the standard model of the G-13.mft to the Casino model (see section "Convert standard model to Casino model" in Chap. 6 "Operation"). With the Casino and AMU models, this switch S1.9 does not have any function.

The tenth DIL switch of the upper switching block S1 is used to select the memory block (see section "Select memory block" in Chap. 6 "Operation").

The lower switching block S2 is used to teach coin types or tokens in the teach mode (see section "Teach mode" in Chap. 6 "Operation").

Switch assignment with single block data-management

Coin channels or the coin types assigned to the coin channels can be inhibited using the first eight DIL switches of the upper switching block S1. To do this the DIL switches are assigned a coin channel randomly. A group of selected coin channels can be assigned to a switch to inhibit a number of coin channels (see section "Inhibit coin channels" in Chap. 6 "Operation").

The ninth DIL switch of the upper switching block S1 can be used to convert the standard model of the G-13.mft to the Casino model (see section "Convert standard model to Casino model" in Chap. 6 "Operation"). With the Casino and AMU models, this switch S1.9 does not have any function.

The tenth DIL switch of the upper switching block S1 does not have any function with single block data-management.

The lower switching block S2 is used to teach coin types or tokens in the teach mode (see section "Teach mode" in Chap. 6 "Operation") and to inhibit these taught coins in the normal operating mode.

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 vending 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.

Interfaces

At the bottom right-hand side of the rear of the coin validator there is a 10-pole connecting plug to the machine (tester) whilst on the left at the centre there is a 3-pole JST plug for connecting an external sorting device. On the left-hand side, there is an interface to the programming station or to the Palm OS® handheld. (See Fig. 1a and 1b)

Interface – vending machine

The coin validator is connected to the vending machine (tester) via the parallel interface **8** (Fig. 1a and 1b) and via a 10-pole cable.

Please refer to the section "Pin assignment and connection diagrams" in Chap. 9 "Technical data" for more details on the assignment of individual plugs (pins).

Coin signal lines/external Inhibit signal lines

Usually the coin validator transmits one coin impulse for every accepted coin to the vending machine via one of six coin signal lines (signal: low = active) (AMU model: four coin signal lines). Since a specific coin type is assigned to a specific coin signal line or also to a combination of lines, the vending machine can identify which type of coin has been inserted. Which coin type generates an impulse on which signal line is set at the factory in accordance with the customers' specifications and can be re-configured with the WinEMP PC software or PalmEMP at any time.

With the standard and Casino models coin types can be inhibited from the vending machine via the coin signal lines (coin signal lines = external inhibit signal lines). Which of the six external inhibit signal lines inhibits which coin type is set at the factory in accordance with the customers' specifications, but it can also be defined in WinEMP or PalmEMP.

Return signal line (only standard and Casino models)

When the return lever/return button is operated, the coin validator transmits a return signal to the vending machine via the return signal line. By opening the measurement and validation area the coins or objects in the coin validator are returned via the return area.

The return signal line can also be used to sort inserted coins (see section "Control for external sorting of accepted coins" in Chap. 4 "Function") or to transmit a wake-up signal to the vending machine (see section "Wake-up sensor" in Chap. 4 "Function").

External inhibit signal line

If the common inhibit signal line from the machine is activated (signal: high = active), coin acceptance of the standard and Casino models is blocked. No coin is accepted.

Each coin type can be inhibited individually or in groups using the DIL switches (see section "Inhibit coin channels" in Chap. 6 "Operation").

The inhibit signal line of the AMU model is permanently activated by the vending machine. Only if the line is briefly deactivated by the vending machine during the coin validator pre signal of the coin acceptance processing, is the coin accepted (see section "Coin acceptance and coin rejection" in Chap. 4 "Function").

Interface – configuration (WinEMP/PalmEMP)

To configure the coin validator the device is connected to a PC or a mobile Palm OS® handheld. For this purpose, the G-13.mft has on the right-hand side a 10-pole PCB direct plug **10** (Fig. 1a and 1b), which can be used to connect the coin validator to the PC using the adapter and card reader or to a handheld (see Chap. 5 "Starting up"). The device is set by means of the configuration and diagnostics software WinEMP or PalmEMP (see separate software instructions).

Please refer to the section "Pin assignment and connection diagrams" in Chap. 9 "Technical data" for more details on the assignment of individual plugs (pins).

Interface – external sorting device

On the rear of the device, there is a 3-pole JST plug **9** (Fig. 1a and 1b). This plug can be used to control sorting gates for sorting inserted coins (see sections "Control for external sorting of accepted coins" in Chap. 4 "Function" and "Pin assignment and connection diagrams" in Chap. 9 "Technical data").

The 3-pole sorting plug is made by the JST company and has the type designation "ZH connector", 1.5 mm. You can obtain further information about the plug at the Internet address www.JST.com.

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. 2: Label – Casino model

1 Coin information – memory block 0 (if DIL switch S1.10 on OFF)

2 Currency and coin type ∞ – memory block 0

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

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

5 Channel number, very narrow coin channel ⬚ – memory block 0

6 Coin signal line and impulse number ⊓ – memory block 0

7 Coin information – memory block 1 (if DIL switch S1.10 on ON)

8 Nominal voltage (option: up to 42 V DC)

9 Barcode

10 Date of manufacture

11 Consecutive device number per order number

12 Ordering code

13 Order number

14 Device model

Validator = standard model

Casino = Casino model

15 Data block number and revision number

16 Device type

0XV = **Standard coin validator**
 X = 6 = Top entry model
 X = 7 = Front entry model with MIDI front plate
 X = 8 = Front entry model with MINI front plate
 X = 9 = Front entry model without front plate

0XV25/ = **Standard coin validator with internal wake-up sensor**

6XV = **Standard coin validator with inverted inhibit signal line**
 X = 6 = Top entry model
 X = 7 = Front entry model with MIDI front plate
 X = 8 = Front entry model with MINI front plate
 X = 9 = Front entry model without front plate

06C = **Casino top entry model**

7XA = **AMU model** (with different pin assignment, see section "Pin assignment and connection diagrams" in Chap. 9 "Technical data")
 X = 6 = Top entry model
 X = 7 = Front entry model with MIDI front plate
 X = 8 = Front entry model with MINI front plate
 X = 9 = Front entry model without front plate

4 Function

This chapter describes how the coin validator works, using the route which an inserted coin takes in the coin validator:

- Coin acceptance and coin rejection
- Coin channels
- Single or double block data-management
- Accepted coin sensor
- Coin impulses and coin signal lines
- Control for external sorting device
- Inhibit coin acceptance
- Wake-up sensor (option)

Coin acceptance and coin rejection

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

The limit values of the acceptance bands are programmed by the manufacturer according to the customers' specifications, but can be adjusted with the WinEMP PC configuration software or PalmEMP.

Coin signal processing of the AMU model

After an accepted coin passed the accepted coin sensor, the G-13.mft standard model transmits a simple coin signal to the vending 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 vending 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 vending machine's release signal and the coin passed the accepted coin sensors

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

Coin released by vending machine

Coin signal line
                 Pre-signal   **Coin signal***
                 (10 ms)   **(5–500 ms, typical: 50 ms)**   1 / 0

Inhibit signal line
             Release signal
             (min. 1 ms)   1 / 0

Time (t)
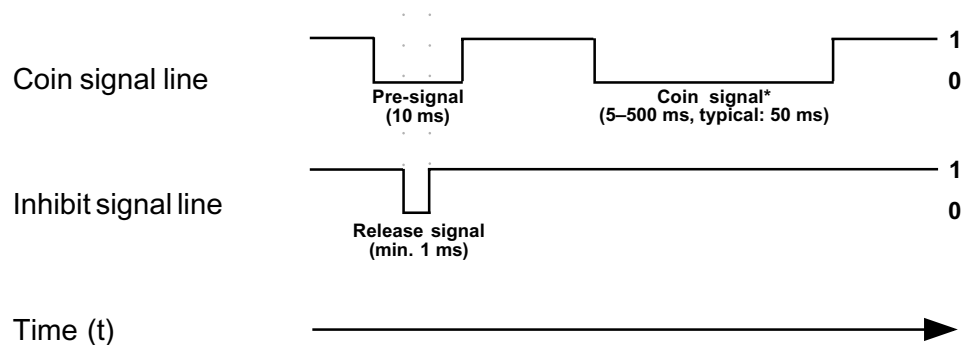
*   only if coin passed accepted coin sensor

Coin rejected by vending machine

Coin signal line   **no coin signal**   1 / 0
                Pre-signal
                (10 ms)

Inhibit signal line   **no release signal**   1 / 0

Time (t)
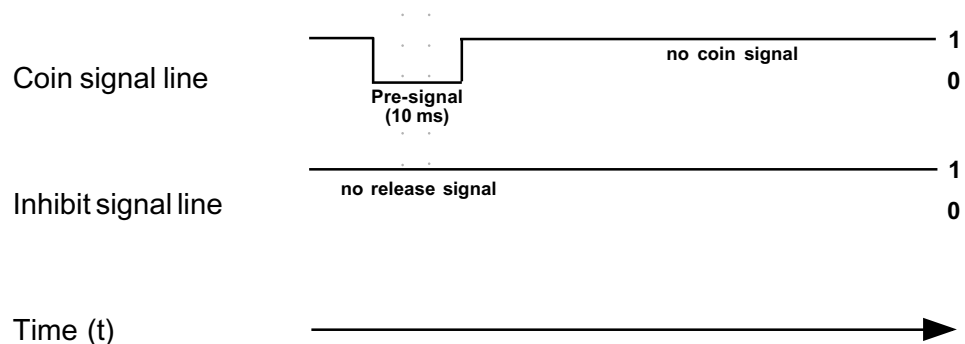
Coin channels

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. 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 WinEMP PC configuration software or PalmEMP. 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 lower switching block on the coin validator; i.e. a coin channel is assigned a coin type or also a token (see section "Teach mode" in Chap. 6 "Operation").

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 with different coin types (also currencies), sorting information, etc. can be assigned to each block. 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 "Select memory block" in Chap. 6 "Operation").

Accepted coin sensor ...

Unlike the standard and AMU model, the Casino model cannot utilize the accepted coin sensor due to the fast coin acceptance. This section is therefore divided into two sub-sections.

... with the standard amd AMU model

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

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

... with the Casino model

The accepted coin sensor is located in front of the cash coin outlet and checks whether a coin is directed into the cash-box. Usually, a coin signal is only sent to the machine when the accepted coin sensor notices that a coin is being accepted and directed into the cash-box (see above). To speed up coin acceptance on the Casino model, the coin signal is sent before the coin passes the accepted coin sensor. Consequently, the acceptance gate of the coin validator is easier to tamper with, e.g. with an inserted coin attached to a string. The Casino model cannot utilize the accepted coin sensor.

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 vending machine (adjustable using the WinEMP PC configuration software or PalmEMP).

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 (AMU model: one pre-signal and one coin signal) to the vending machine control system on the coin signal line assigned to that coin. An impulse tells the vending 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, but can be changed with the WinEMP PC configuration software or PalmEMP.

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 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. The number of coin impulses is programmed by the manufacturer according to the customers' specifications, but can be changed with the WinEMP PC configuration software or PalmEMP.

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 within a range of 0.5 to 524 ms.

The length of the coin impulses is programmed to a default value of 100 ms but it can be changed with the WinEMP PC configuration software or PalmEMP.

With the standard and AMU model, you can also assign a different impulse length to each coin type, but then 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 of accepted coins (not with the Casino model)

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 sorting device or with another sorting device.

No external sorting device can be connected to the Casino model due to the fact that the signal to sort the coins prevents quick coin acceptance.

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. In this case, the coin validator cannot receive any signals from an external sorting device.

Which coin type is to be sorted via which of the three sorting control lines or the return signal line is programmed by the manufacturer according to the customers' specifications but can be changed or configured with the WinEMP PC configuration software or PalmEMP.

While the coin validator is sorting an accepted coin (= sorting time, see section "Sorting time of an external sorting device" in this chapter), it cannot accept any further coins.

Sorting with NRI sorting device

When the optional NRI sorting device is used (see also "Accessories" in Chap. 9 "Technical data"), 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 "Starting 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
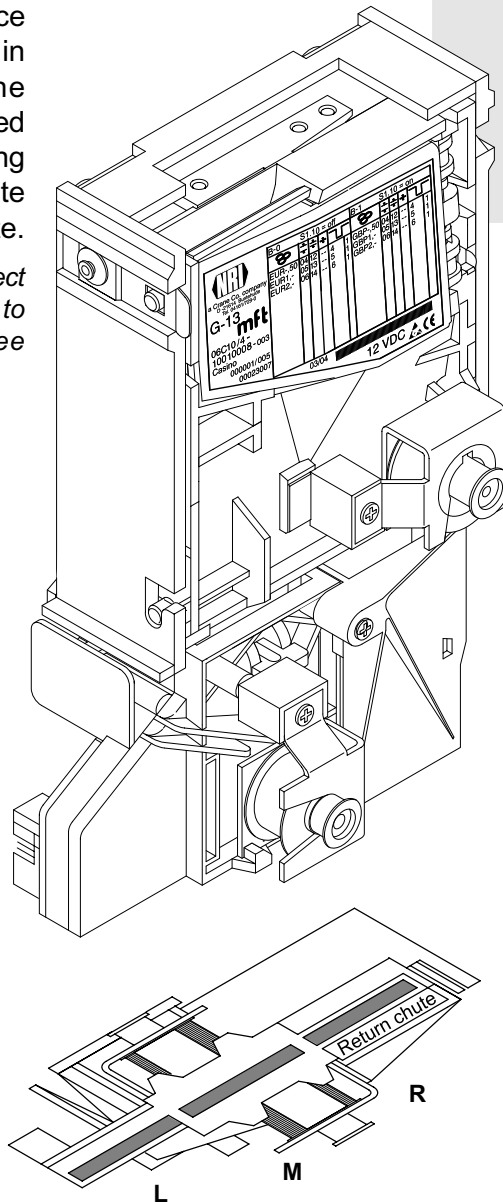
Sorting time of an external sorting device

For the switching time of an external sorting device, you can set a sorting time using the WinEMP PC configuration software or PalmEMP.

Do not accept coin types

If coins are to be no longer accepted for payment at the machine, either the entire coin acceptance process can be inhibited (common inhibit) or individual types, e.g., if there is no more change in an external payout device or a coin type is very frequently replaced by false coins.

External common inhibit

The machine can inhibit coin acceptance of the standard and Casino model via the inhibit signal line. The coin validator no longer accepts coins (see section "Pin assignment and connection diagrams" in Chap. 9 "Technical data").

External inhibit of single coin types

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 and Casino model:
  up to six coin types via six external single inhibit signal lines (= coin signal lines); which coin type or which coin channel is to be inhibited via which signal line is defined by the manufacturer according to the customers' specifications but can be changed with the WinEMP PC configuration software or PalmEMP

- AMU model:
  each of the coins inserted via inhibit signal line (during coin acceptance) (see section "Coin acceptance and coin rejection" in this chapter)

Also see section" 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 "Inhibit coin channels" in Chap. 6 "Operation").

If individual coin types have to be inhibited in the long term, with WinEMP or PalmEMP you have the option of deactivating the relevant coin channels by using the coin validator software.

Wake-up sensor (option, only for standard model)

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

The wake-up sensor monitors the insertion area of the coin validator. The first coin inserted by the customer wakes up the coin validator, which then starts its processor and checks the coin by measuring. 3.5 seconds after accepting the coin and transmitting the coin signal to the vending machine or after rejecting the coin and directing it to the return area, the coin validator returns to sleep mode with a power consumption of less than 10 µA.

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.

By means of the configuration software WinEMP/PalmEMP the coin validator can optionally be set, so that it transmits a wake-up signal to the vending machine using the return signal line, as soon as it is woken up by insertion of a coin.

5   Starting up

The G-13.mft is either

- started up in a machine
- connected up to an NRI tester, which simulates the machine, for a performance test or
- connected for configuration of the device with the NRI software
  – WinEMP to a PC programming station or
  – PalmEMP to a Palm handheld (in the machine).

In the last section of this chapter, you can find out how to fit the NRI sorting device to the G-13.mft before you install the device in the vending machine.
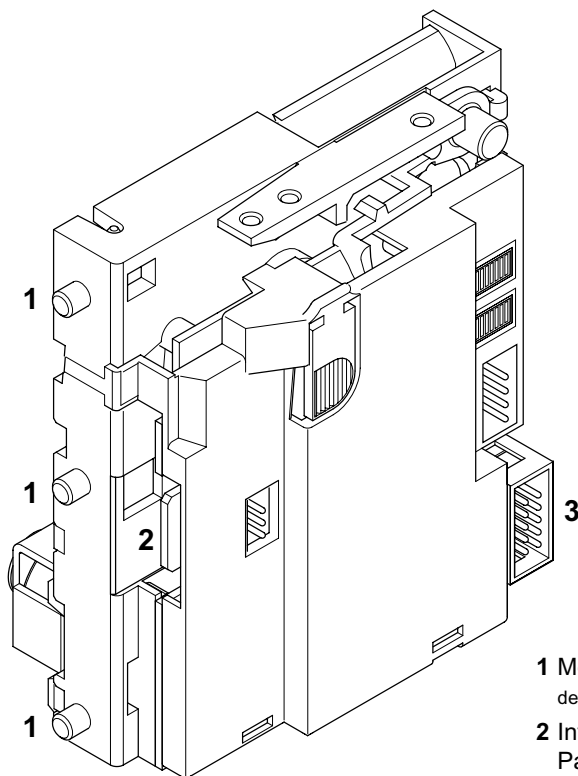
Starting up in the machine

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

1 If necessary, install the sorting device on the coin validator (see section "Installation of the 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. 3).

4 Connect the coin validator to the machine using the 10-pole interface **3** provided and the appropriate connecting cable (see Fig. 3).

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 – PC programming station (WinEMP)/ Palm handheld (PalmEMP)

3 Interface – vending machine/tester

Fig. 3: Installation

Starting up at the tester

The functions of the G-13.mft can be tested using the NRI tester G-19.0594 (ordering code: 11801).

For details on how to connect the G-13.mft to the tester and operate the tester, please refer to the separate operating instructions for the tester.

WinEMP PC programming station

If you want the G-13.mft to be set on the PC using the diagnostics and configuration software WinEMP, the following device environment is connected to the PCB direct plug **2** of the coin validator (see Fig. 3 and section "Accessories" in Chap. 9 "Technical data"):

•   Tester G-19.0594

•   Adapter pack G-19.0640

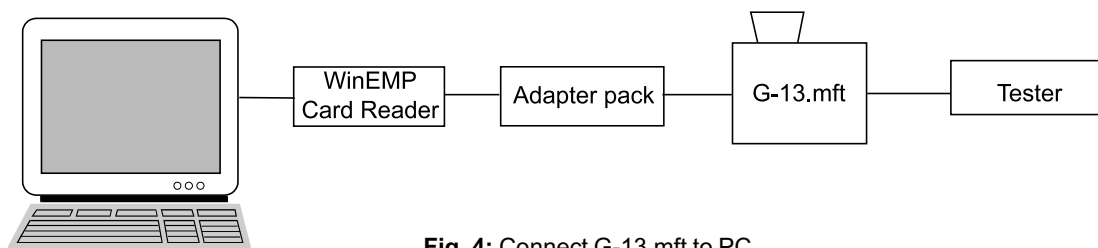•   Card reader G-19.0647 incl. chip card

Fig. 4: Connect G-13.mft to PC

For details on how to connect this device environment to your PC, please refer to the separate operating instructions for the WinEMP software "WinEMP – The configuration and diagnostics program for NRI coin validators" (refer also to Chap. 8 "Which functions can be set using WinEMP/PalmEMP?").

Connection to Palm OS® handheld (PalmEMP)

With a Palm OS® handheld and the NRI software PalmEMP the G-13.mft can be directly configured on-site inside the machine. The PalmEMP program is available on the NRI homepage. To be able to connect your handheld to the coin validator, you need an NRI dongle (see section "Accessories" in Chap. 9 "Technical data"). A connecting cable is part of the scope of delivery.

Should you wish the memory blocks of the G-13.mft to be updated and for this a data block download to be performed, a WinEMP basic and download licence as well as a PalmEMP download licence must be additionally ordered (see above and the section "Accessories" in Chap. 9 "Technical data"). The new data blocks can thus be loaded initially from your PC's internal hard disk into the handheld using WinEMP, and then from the handheld into the coin validator.

For details on how to connect the handheld to the PCB direct plug **2** (see Fig. 3) and how to install and operate PalmEMP, please refer to the separate operating instructions for the software (refer also to Chap. 8 "Which functions can be set using WinEMP/PalmEMP?").

Installation of the sorting device ...

If you want to operate the G-13.mft with the NRI sorting device, you must use a special bracket to install the NRI 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 vending machine (see also section "Starting up in the vending machine" in this chapter).
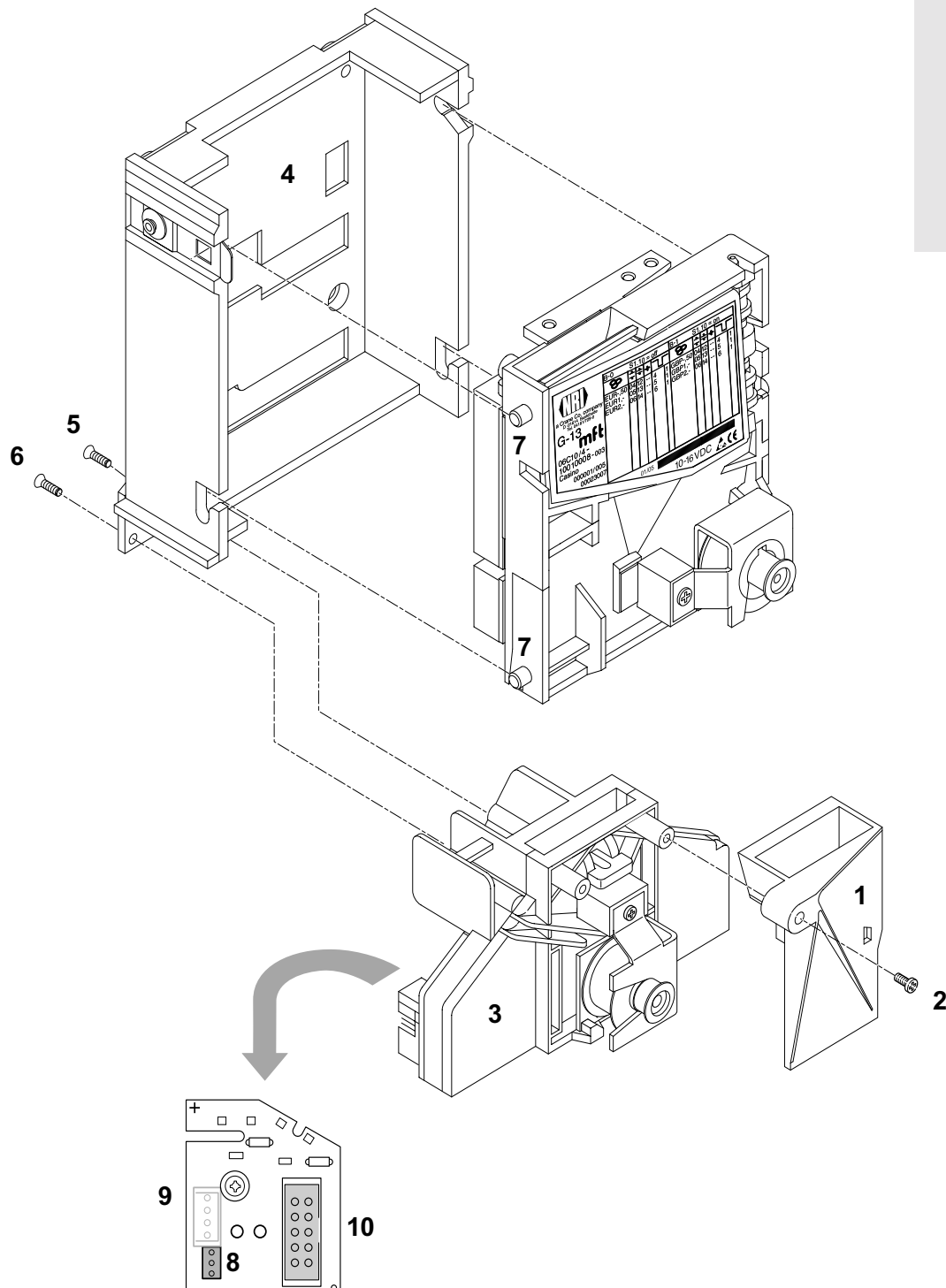
Fig. 5a: Connect G-13.mft, top entry model, to NRI sorting device

... 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 vending machine (see also section "Starting up in the vending machine" in this chapter).
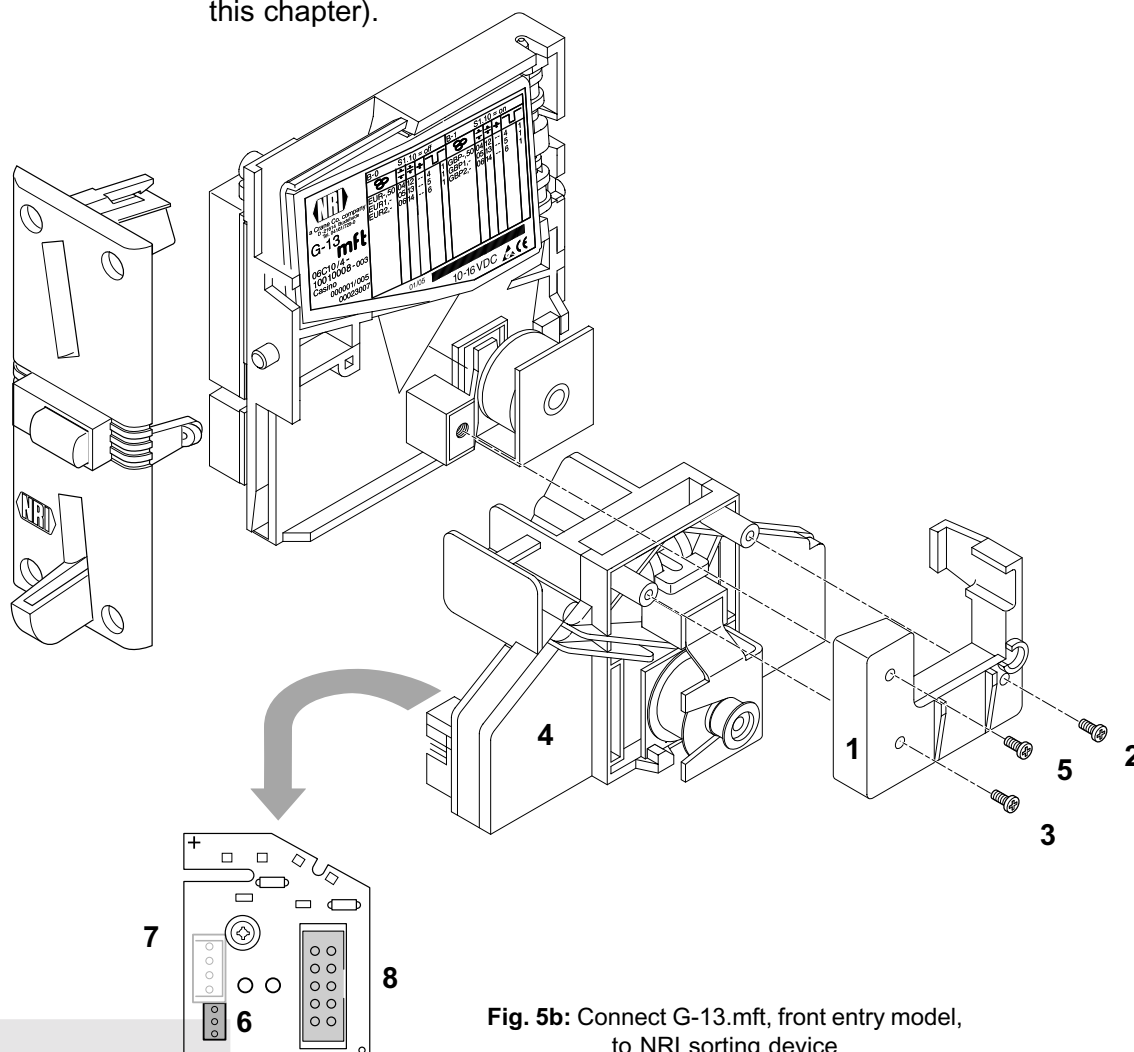

Fig. 5b: Connect G-13.mft, front entry model, to NRI sorting device

6 Operation

In this chapter you will find out how to:

- Inhibit coin types or their coin channels
- Teach coin types in teach mode
- Select the desired memory block 0 or 1
- Turn a standard model into a Casino model

Inhibit coin channels ...

Depending 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 first eight DIL switches of the two switching blocks S1 and S2 on the rear of the coin validator each of the 16 coin channels or each coin type assigned to a specific coin channel can be inhibited individually, i.e. this coin type is not accepted for payment on the vending machine.

The 16 DIL switches inhibit the following coin channels:

Switching block S1

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

Switching block S2

| DIL switch		off	on
1	Coin channel 9	free	inhibited
2	Coin channel 10	free	inhibited
3	Coin channel 11	free	inhibited
4	Coin channel 12	free	inhibited
5	Coin channel 13	free	inhibited
6	Coin channel 14	free	inhibited
7	Coin channel 15	free	inhibited
8	Coin channel 16	free	inhibited
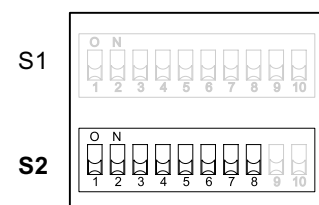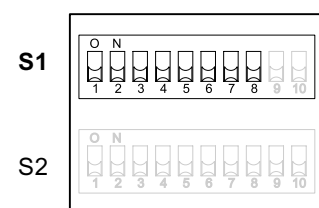
Please refer to the label of the device to see which coin type has been assigned to which coin channel at the factory. However, this assignment can be changed at any time using the WinEMP PC configuration software or PalmEMP.

If all coin types are to be accepted for payment by the vending 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)
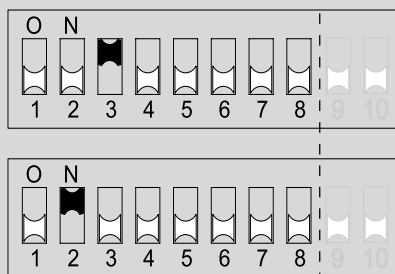
With the DIL switches in these positions, the coin validator no longer accepts the coin type(s) assigned to coin channels 3 and 10!

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.

... with single block data-management

Coin channels can be inhibited using the first eight DIL switches S1.1–S1.8 of the upper switching block on the rear of the device. To do this the DIL switches are assigned a coin channel randomly. Several coin channels can also be assigned to one switch. This switch will then inhibit a coin group (e.g. all coin channels of a currency, all coin channels of a coin type (normal and narrow coin channels)).

The assignment of DIL switches to coin type/coin group is programmed at the factory on a customer-specific basis. However, this setting can be changed with the WinEMP PC configuration software or PalmEMP.
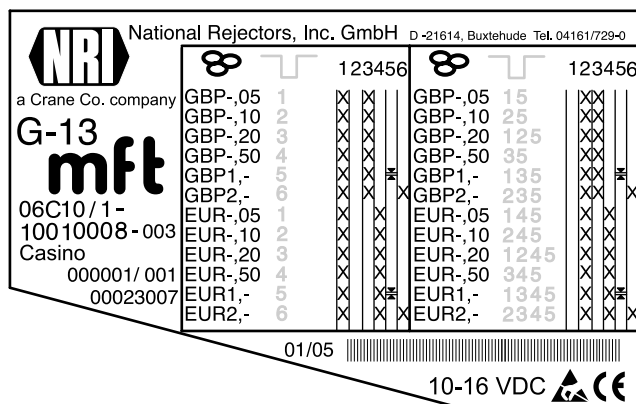
If all coin types assigned to the DIL switches are to be accepted for payment at the vending machine, the DIL switches must be in the lower position (on OFF).

If you want to inhibit a coin channel, you only need to move the respective DIL switch toward the top to ON.

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

Any coin types or tokens that may have been taught in coin channels 25 to 32 are inhibited in the assignment according to which they were taught (see section "Teach mode" in this chapter).

National Rejectors, Inc. GmbH D-21614, Buxtehude Tel. 04161/729-0

NRI
a Crane Co. company
G-13 mft
06C10/1-
10010008-003
Casino
000001/001
00023007

123456

		123456			
GBP-,05	1	GBP-,05	15		
GBP-,10	2	GBP-,10	25		
GBP-,20	3	GBP-,20	125		
GBP-,50	4	GBP-,50	35		
GBP1,-	5	GBP1,-	135		
GBP2,-	6	GBP2,-	235		
EUR-,05	1	EUR-,05	145		
EUR-,10	2	EUR-,10	245		
EUR-,20	3	EUR-,20	1245		
EUR-,50	4	EUR-,50	345		
EUR1,-	5	EUR1,-	1345		
EUR2,-	6	EUR2,-	2345		

01/05

10-16 VDC CE

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

O N
1 2 3 4 5 6 7 8 9 10

With this setting the coin validator only accepts euros!

Example – Activate narrow acceptance bands/coin channels as coin group ⯮
(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)

O N
1 2 3 4 5 6 7 8 9 10

With this setting the coin validator accepts 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)

O N
1 2 3 4 5 6 7 8 9 10

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 described 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.*

Teach mode

Coin channels can also be taught directly without configuration software via the lower switching block on the coin validator, i.e. a coin channel is assigned a coin type or a token without it being necessary to remove the coin validator from the vending machine. For the teaching procedure, 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 Chap. 4 "Function").
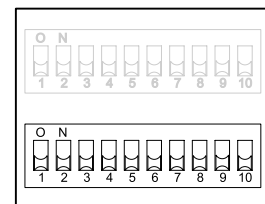
Switch assignment with double block data-management (in teach mode)

Switching block S2

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

Switch assignment with single block data-management (in teach mode)

Switching block S2

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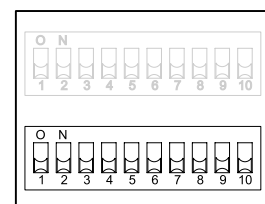
Teach coin channels

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

☞ *If you want to use the lower switching block to inhibit individual coins with double block data-management, remember the current switch settings so that you can restore them easily for the normal operating mode at the end.*
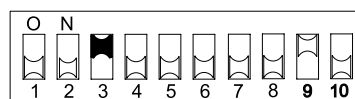
1 Set all DIL switches 1–10 of the lower switching block toward the bottom to OFF.

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 vending machine.
After the 10th coin has been entered, the acceptance gate is operated once (solenoid attraction sound). Additional coins can be inserted.

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 but would like to program greater tolerance limits.

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, if, for example, the acceptance band of the coins inserted and the acceptance band of an already programmed coin channel overlap.
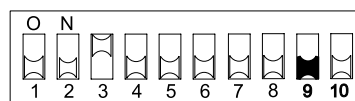
☞ *To abort the operation, first set the DIL switch of the respective coin channel (here: S2.3) and then DIL switch S2.9 toward the bottom to OFF.*

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, if, for example, the acceptance band of the coins inserted and the acceptance band of an already programmed coin channel overlap.
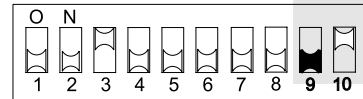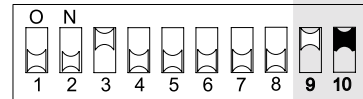
To abort the operation, first set the DIL switch of the respective coin channel (here: S2.3) as well as DIL switch S2.10 and then DIL switch S2.9 toward the bottom to OFF.

6 Set DIL switch S2.1–8 (here: S2.3) and S2.10, if necessary, for the normal operating mode (see section "Inhibit coin channels" in this chapter).

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

Teach channels are prepared using a factory-made standard setting with one coin impulse on coin signal line 6.

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

If the 32 coin channels are being data-managed in two memory blocks (B-0 and B-1, see label), when divided in 16 coin channels each, they are independently programmed by the manufacturer according to the customers' specifications. The data of the two blocks 0 and 1 differ when the device is being used, e.g. by the acceptance of different currencies, such as national currency and euro. Only one block can be active at a time and be used for the coin measurement and for further coin processing.

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 ON position.
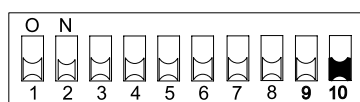
Memory block 0 selected   **Memory block 1 selected**

Convert standard model to Casino model

If you have been operating your G-13.mft as a standard model and would now like to use it as a Casino model, you can easily convert the device by means of the upper switching block:

Set DIL switch S1.9 of the upper switching block S2 toward the top to ON.
The device now operates as a Casino model with quick coin acceptance of five to six coins per second.

> *With the aid of WinEMP or PalmEMP you have the opportunity to configure the Casino model in detail (attraction duration of the acceptance gate, accepted coin sensor via return line, etc.)*
>
> *If you have had an external sorting device connected to the G-13.mft, this external sorting device cannot be used any longer due to the fact that the signal to sort the coins will prevent quick coin acceptance.*
>
> *You cannot turn a factory-programmed Casino model into a standard model using the switching block; instead, you will require the configuration software WinEMP or PalmEMP.*

7   Cleaning

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 vending machine's mains plug.

2 Carefully open the flight deck **1** on the left-hand side and hold it open (Fig. 6).

3 Use a cloth to wipe off the coin runway inside the coin validator.

4 Close the flight deck again.

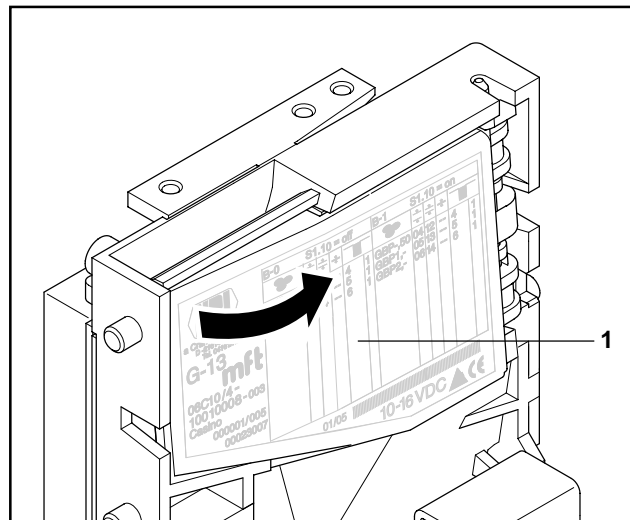**5** Reconnect the vending machine to the mains supply.

Fig. 6: Open the flight deck of the coin validator.

8   Which functions can be set using WinEMP/PalmEMP?

The software WinEMP or PalmEMP is used for diagnostics purposes and for the configuration of NRI coin validators as well as for the purpose of updating the data blocks in the device memory. **WinEMP** is PC software and part of a programming station for the workshop. **PalmEMP** is software stored on a Palm OS® handheld as additional application. If the handheld is linked to the coin validator using an NRI dongle, the G-13.mft can be directly configured on-site inside the machine. For more information, please see the section "Accessories" in Chap. 9 "Technical data".

Both programs identify the connected coin validator and the device's own data and present them on the screen of your PC or on the handheld display.

Apart from the device functions listed below, you can also use WinEMP/ PalmEMP to change the device model (standard/Casino only) (see separate software instructions).

- Coin impulse length
- Attraction duration
- Sorting time (only with standard and AMU model)
- Wake-up signal via return signal ling (only with wake-up sensor)
- Assignment
  - Coin signal line – coin type
  - Coin impulse number – coin type
  - Coin impulse length – coin type
  - External individual inhibit signal line – coin type (only with standard and Casino model)
  - DIL switch – coin type (internal inhibit, only with single block data-management)
  - Sorting control line – coin type (only with standard and AMU model)
- Coin acceptance band after the insertion of
  - genuine coins
  - false coins
- Teach coin channels
- Deactivate coin channels individually using coin validator software
- Data block update for current coin information

☞   *For the data block update, an additional module must be ordered in addition to the WinEMP software's basic module (see section "Accessories" in Chap. 9 "Technical data").*
If you wish to perform data block updates using the handheld, you need the WinEMP software with the PalmEMP download rights, which are stored on the WinEMP chip card (see section "Accessories" in Chap. 9 "Technical data").

9   Technical data

Supply voltage	10–16 V DC
Power consumption	Standby mode: approx. 30 mA Measuring mode: approx.100 mA + approx. 3 W (acceptance gate)
Power consumption (with wake-up sensor, option)	Sleep mode: ≤ 10 µA Measuring mode: approx.100 mA + approx. 3 W (acceptance gate)
Electric strength Inputs/Outputs	max. 35 V
Current-carrying capacity Outputs	max. 150 mA (open collector)
Temperature range	-25 to +70 °C (temperature change max. 0.2 °C/min)
Rel. humidity	15 to 93 %
Condensation	not permitted
Dimensions	Height: 102 mm Width: 89 mm Depth: 52 mm (for mounting dimensions, see separate documentation)
Installation tilt	± 2°
Coin dimensions	Ø 15–31.5 mm (optionally up to 32.5 mm) thickness 1.5–2.5 mm, optionally 1.5–3.3 mm
Coin acceptance	32 coin channels, 6 coin signal lines (AMU model: 4 coin signal lines)
Acceptance speed	2 coins/sec (Casino: 5–6 coins/second)
Vending machine interface	Standard/Casino model: 6 parallel outputs (open collector)/6 inhibit inputs (low active) Common inhibit input (active high) Return signal line (active low) AMU model: 4 parallel outputs (open collector) (low active) inhibit input (active high)
Sorting interface	Company: JST, www.jst.com Type: ZH connector; 1.5 mm

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.

Pin assignment and connection diagrams

On the following pages you will find connection diagrams and pin assignment
for the connection of the G-13.mft to

- the vending machine
- the programming station (WinEMP) or handheld (PalmEMP)
- an external sorting device

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

Pin 1   Ground (GND)

Pin 2   Supply voltage (10–16 V DC)

Pin 3   Coin signal line 5: active low
          external inhibit signal line 5: active low

Pin 4   Coin signal line 6: active low
          external inhibit signal line 6: active low

Pin 5   Return signal line (/accepted coin signal/sorting signal): active low
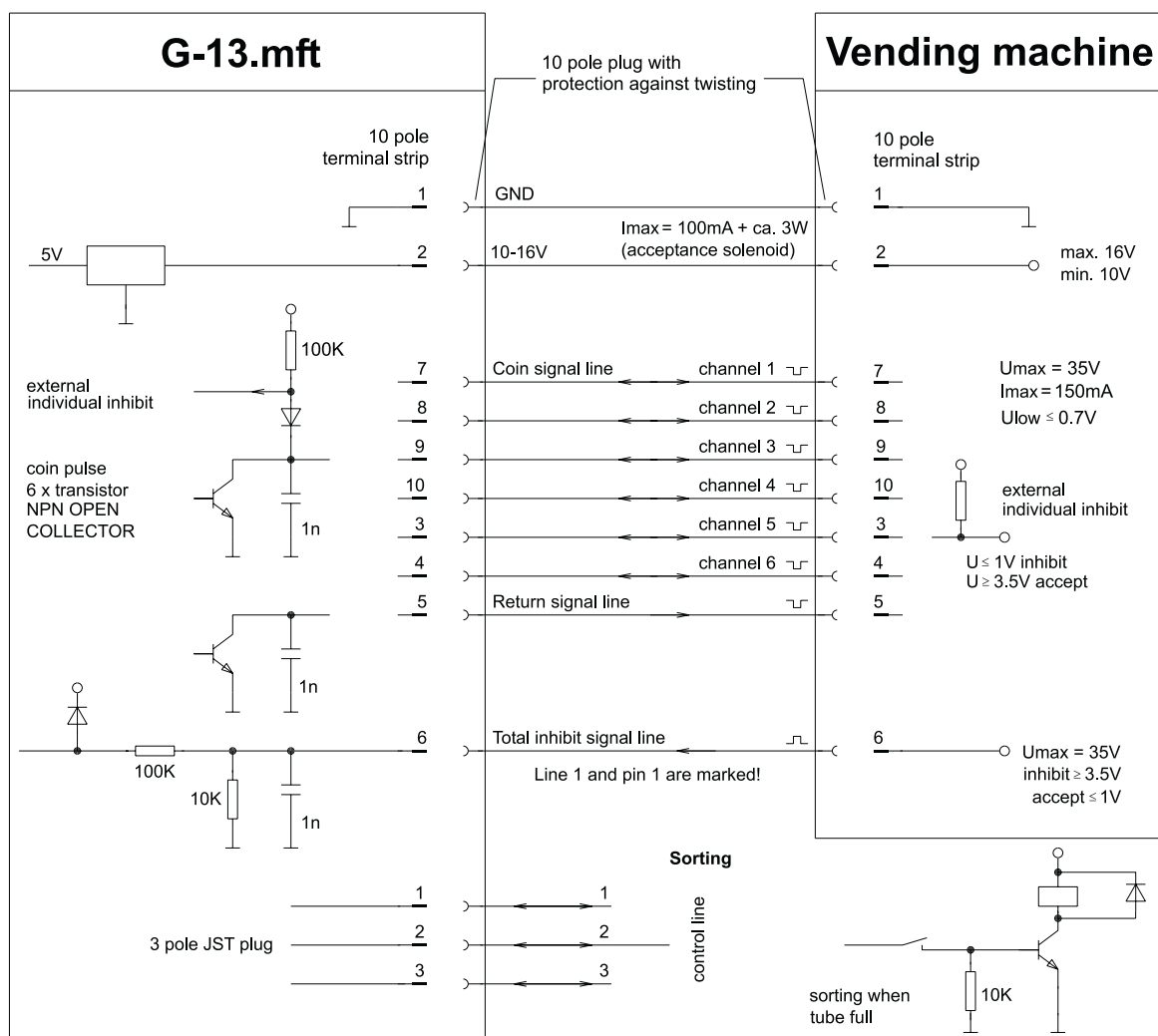
Pin 6   Common inhibit signal line: active high
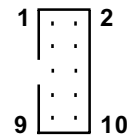
> *For the Australian market the common inhibit signal line of the
> Casino model is inverted (active low).*

Pin 7   Coin signal line 1: active low
          external inhibit signal line 1: active low

Pin 8   Coin signal line 2: active low
          external inhibit signal line 2: active low

Pin 9   Coin signal line 3: active low
          external inhibit signal line 3: active low

Pin 10   Coin signal line 4: active low
          external inhibit signal line 4: active low
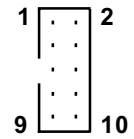
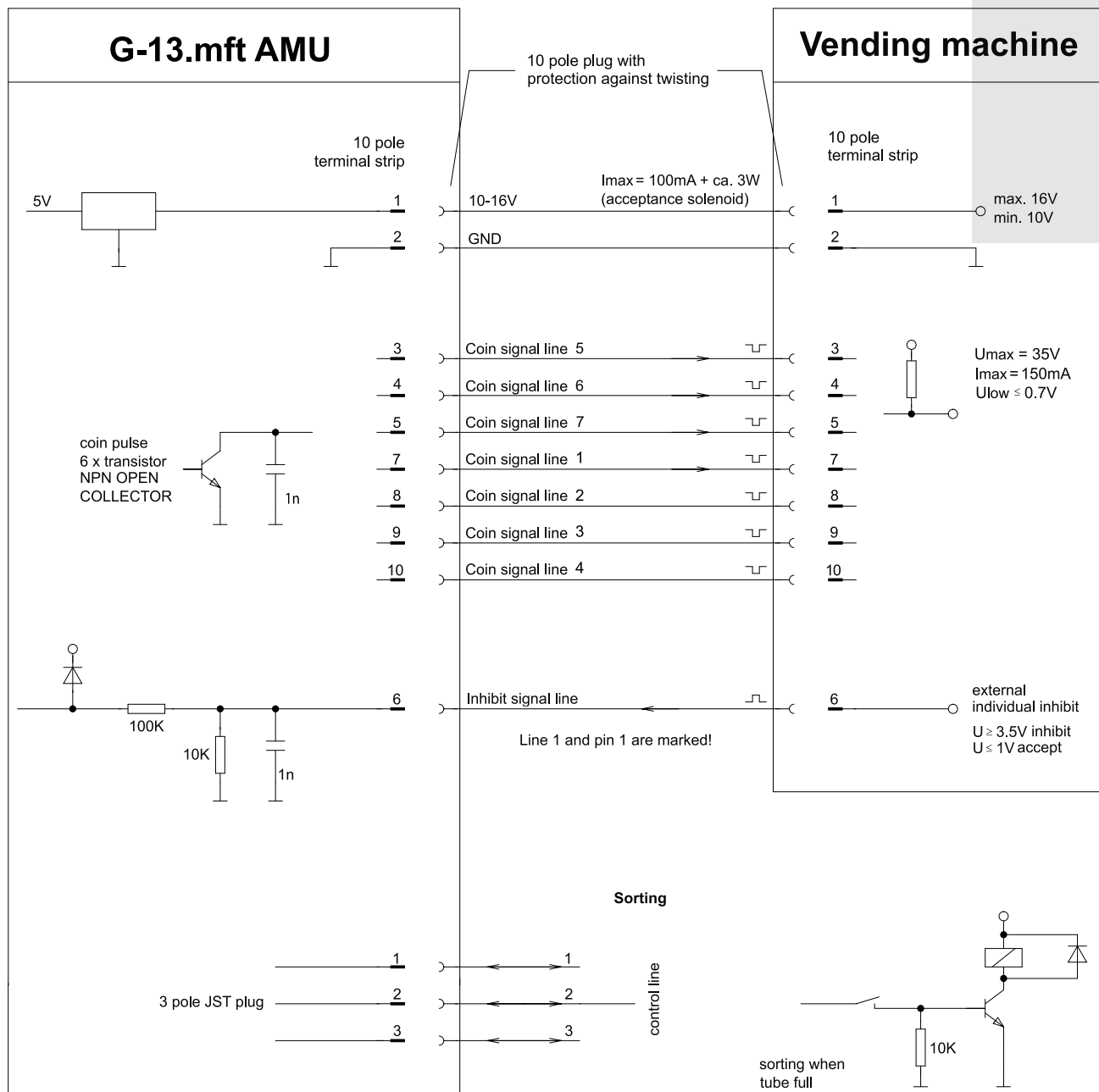> *All signals must be debounced from the input side.*

G-13.mft

10 pole plug with
protection against twisting

Vending machine

10 pole
terminal strip

10 pole
terminal strip

G-13.mft side	Signal	Vending machine side
1	GND	1
2	10-16V	2 max. 16V min. 10V

$I_{max} = 100mA + ca. 3W$
(acceptance solenoid)

5V

100K

external
individual inhibit

coin pulse
6 x transistor
NPN OPEN
COLLECTOR

1n

	Coin signal line	channel 1	
7		channel 1	7
8		channel 2	8
9		channel 3	9
10		channel 4	10
3		channel 5	3
4		channel 6	4
5	Return signal line		5

$U_{max} = 35V$
$I_{max} = 150mA$
$U_{low} \leq 0.7V$

external
individual inhibit

$U \leq 1V$ inhibit
$U \geq 3.5V$ accept

1n

100K

10K

1n

6   Total inhibit signal line   6

Line 1 and pin 1 are marked!

$U_{max} = 35V$
inhibit $\geq 3.5V$
accept $\leq 1V$

Sorting

control line

|	1		1
	2		2
	3		3

3 pole JST plug

10K

sorting when
tube full

Subject to technical changes!

Also refer to section "Pin assignment and connection diagrams,
G-13.mft – external sorting device"

## G-13.mft AMU model – vending machine

Pin 1   Supply voltage (10–16 V DC)

Pin 2   Ground (GND)

Pin 3   Coin signal line 5: active low

Pin 4   Coin signal line 6: active low

Pin 5   Coin signal line 7: active low

Pin 6   Inhibit signal line: active high

Pin 7   Coin signal line 1: active low

Pin 8   Coin signal line 2: active low

Pin 9   Coin signal line 3: active low

Pin 10   Coin signal line 4: active low

All signals must be debounced from the input side.

G-13.mft AMU

Vending machine

10 pole plug with
protection against twisting

10 pole
terminal strip

10 pole
terminal strip

5V

| 1 | 10-16V | $I_{max} = 100mA + ca. 3W$ (acceptance solenoid) | 1 | max. 16V min. 10V |

| 2 | GND | | 2 | |

3	Coin signal line 5		3	
4	Coin signal line 6		4	$U_{max} = 35V$ $I_{max} = 150mA$ $U_{low} \leq 0.7V$
5	Coin signal line 7		5	
7	Coin signal line 1		7	
8	Coin signal line 2		8	
9	Coin signal line 3		9	
10	Coin signal line 4		10	

coin pulse
6 x transistor
NPN OPEN
COLLECTOR

1n

| 6 | Inhibit signal line | | 6 | external individual inhibit $U \geq 3.5V$ inhibit $U \leq 1V$ accept |

100K

10K

1n

Line 1 and pin 1 are marked!

Sorting

1		1
2		2
3		3

3 pole JST plug

control line

10K

sorting when
tube full

Subject to technical changes!

Also refer to section "Pin assignment and connection diagrams,
G-13.mft – external sorting device"

G-13.mft – programming station (WinEMP)/Palm OS® handheld (PalmEMP)

Pin 1   12 V DC supply

Pin 2   reserved

Pin 3   Ground (GND)

Pin 4   reserved

Pin 5   reserved

Pin 6   reserved

Pin 7   RxD

Pin 8   reserved

Pin 9   TxD

Pin 10 Reset (active low)
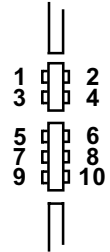
G-13.mft – external sorting device

Pin 1   Sorting control line 1

Pin 2   Sorting control line 2

Pin 3   Sorting control line 3
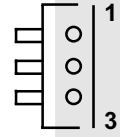
Examples for controlling a sorting device
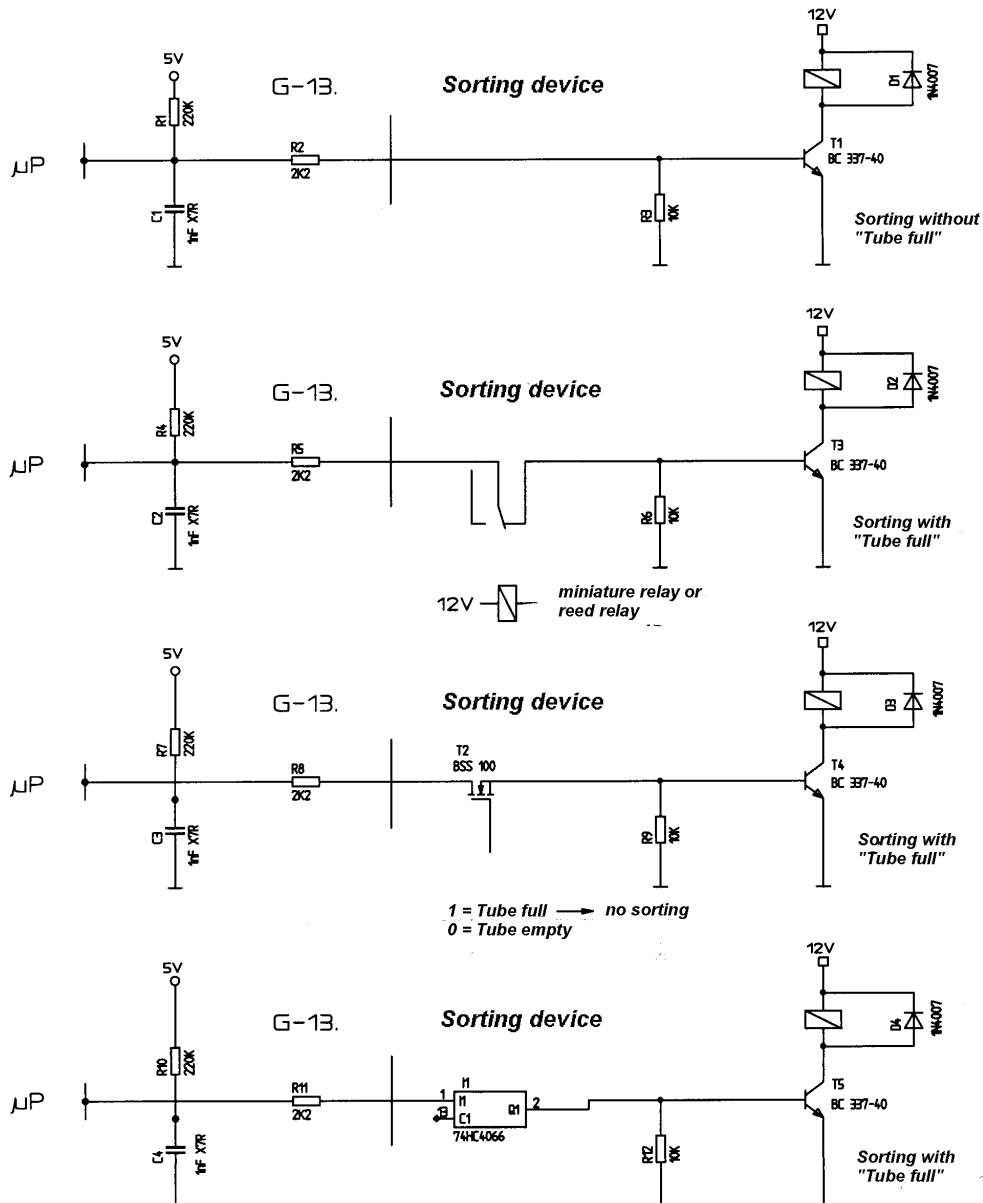
If higher current is necessary, Darlington transistor possible

Without "Tube full" binary coding of the 3 outputs possible

Accessories

In order to test the coin validator or adapt it to your individual needs, you can acquire the following accessories from NRI:

Front plates

Accessories		Ordering code
MIDI front plate with	white return button	5508
	black return button	19329
MINI front plate with	white return button	22569
	black return button	23097

Sorting device

Accessories	Ordering code
Sorting device for top entry model + ...	26307
Mounting frame	24157
Sorting device for front entry model + ...	25725

Tester

Accessories	Ordering code
Tester G-19.0594/4 for 220/230 V mains connection	11801
G-19.0651 for 110/115 V mains connection ...	21410

WinEMP PC programming station

The WinEMP basic module differs depending on the PC interface (USB/COM), and for a COM PC interface depending on the mains connection (Euro plug/international adapter):

Accessories   **Ordering code**

PC programming station consisting of:
- WinEMP basic module (USB) with 26353
  - WinEMP software
  - Chip card with basic licence for individual configuration of all NRI coin validators
  - Card reader for chip card with USB PC interface
- WinEMP basic module (COM, Euro plug) with 20119
  - WinEMP software
  - Chip card with basic licence for individual configuration of all NRI coin validators
  - Card reader for chip card with COM PC interface
  - Power pack
- WinEMP basic module (COM, international) with 23691
  - WinEMP software
  - Chip card with basic licence for individual configuration of all NRI coin validators
  - Card reader for chip card with COM PC interface
  - Power pack + international adapter
- Power supply device and PC interface for G-13.mft
  - Tester G-19.0594/4, 220/230V mains connection + . 11801
    Adapter pack G-19.0640 12041
    (also for checking signal lines) <u>or</u>
  - Tester G-19.0651, 110/115 V mains connection + 21410
    Adapter pack G-19.0640 12041
    (also for checking signal lines) <u>or</u>
  - PC interface G-55.0359 26125

You can also use tester G-19.0641 instead of PC interface G-55.0359.
For the AMU model you must use the PC interface G-55.0359 or the tester G-19.0641 and cannot use any other tester .

Additional licences for chip card:
- Download licence for data block download 20169
- PalmEMP licence for data block download with PalmEMP   23649
- DDL licence for series configuration 25851

For the last two additional licences you will also need the download licence.

Palm OS® handheld application "PalmEMP"

Accessories   **Ordering code**

PalmEMP software + ... Freeware
(www.nri.de)

Dongle with software licence:
  • for Palm™ handheld m100/m105 23761
  • for Palm™ handheld m125–m525
    Tungsten T/T2/T3, Zire 71, Treo 600 23760
  • for Palm OS® handheld with Palm Universal
    Connector and connection using serial
    HotSync cable (www.palmone.com) 23764
  • Licence for data block download, see accessories
    "WinEMP PC programming station"

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.
Accepted coin sensor	The accepted coin sensor is positioned in front of the cash coin outlet of the coin validator and it checks whether accepted coins fall unhindered into the → *acceptance gate* (Casino model cannot utilize accepted coin sensors).
AMU model	G-13.mft model especially for the spanish amusement market. The AMU model differs from the standard model above all in a particular coin signal processing and pin assignment.
Attraction direction	The attraction duration is used to specify the period of time for which the solenoid is to attract the → *acceptance gate* in order to guide the accepted coins to the cash-box or an external sorting device.
Block	→ *Memory block*
Channel	→ *Coin channel*
Coin acceptance band	→ *Acceptance band*
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 for further processing along with other coin information.
Coin impulse length	By specifying a certain coin impulse length, with which the signals are transferred to the vending machine, the coin validator can be adjusted to the specific processing time of the respective vending machine. If coin impulses of different lengths are assigned to the individual → *coin channels* in order to differentiate among the coin types, the → *coin impulse number* is always equal to one and cannot be varied.

Coin impulse number	Every coin accepted by the coin validator passes on an impulse to the vending machine control system via the appropriate → *coin signal line*. An impulse tells the vending machine control system that a coin has been accepted. In principle, 255 impulses per coin can be assigned to the → *coin channel* that is assigned to a coin. However, it only makes sense to assign more than 1 if the vending machine control does not have sufficient coin signal lines and if higher-value coins are inserted, these coins have to be simulated for the vending machine control system by a number of coin impulses, i.e. when e.g. a 2-euro coin is inserted, 4 coin impulses would be sent to the vending machine control via the coin signal line allocated to the 50-cent coin.
Coin properties	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.
Coin signal line	Coin signal lines are used to transmit the → *coin value* of a → *coin type* to the vending machine.
Coin type	One coin type includes all coins for which the → *coin properties* agree.
Coin value	The value of a → *coin type* that is transmitted as a coin impulse(s) via → *coin signal lines* to the machine.
Common inhibit signal line	With the standard and Casino model the vending machine control system can block acceptance of all coins using this signal line. The validator will no longer accept any coins. With the AMU model the vending machine control system can 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.
Data block update	When updating a data block (set) (2 data blocks) using WinEMP or PalmEMP, 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 configurations of → *coin channel* data e.g. current limit values of the → *acceptance bands* for a currency or new inhibiting or sorting information.

ECV	**E**lectronic **C**oin **V**alidator
Impulse number	→ *Coin impulse number*
Impulse length	→ *Coin impulse length*
Individual inhibit signal line	Signal line from the vending machine control system to the G-13.mft standard and Casino model which is used to block the acceptance of individual → *coin types* (one coin type and several coin types). For individual ihibiting with the AMU model, see → *Common inhibit signal line*.
Memory block	Memory of the coin validator. At the manufacturer's company, a customer-specific setting is programmed to determine whether the 32 → *coin channels* 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 channel 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. The memory block(s) can be updated using WinEMP or PalmEMP (→ *data block download*).
Return signal line	When operating the return lever on the coin validator, a return signal is transmitted to the return signal line (only with standard and Casino model). The coin validator then releases all the coins and foreign bodies inside the device.
Sorting control line	To sort the cash coins with an external sorting device, the coin validator has three sorting control lines. The → *return signal line* can also be used as an alternative for sorting.
Sorting gate	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.
Sorting time	The sorting time specifies the switching times of an external sorting device.
String sensor	The coin validator's optional sensor recognizes a coin inserted with a piece of string attached to it. The coin is not accepted for the selling operation.

Switching blocks 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 → *coin channels*.

Teach mode In the teach mode, the last eight → *coin channels* can be assigned new coin types or tokens on site at the vending machine without any configuration tools, which means that these newly configured coins are accepted in the respective coin channel.

Token Tokens are accepted for payment at machines instead of coins in a currency.

Wake-up sensor Optional sensor positioned behind the coin insert funnel which monitors the insertion area and wakes up the coin validator for 3.5 seconds after the first coin insertion. 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. 10 µA).