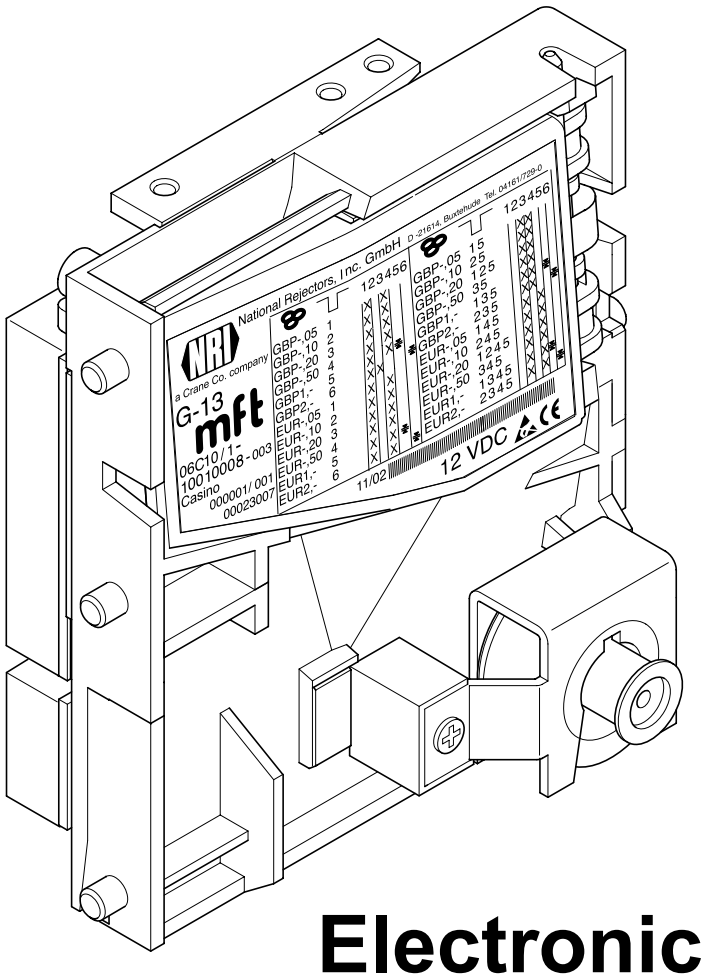
Technical documentation



Electronic Coin Validator

G-13.mft (ECV and MDB model)

Operating instructions

11.03 Wis/ds
Edition 1.1
BA.G13MFTEMPMDB-GB

CRANE

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Table of contents

1 Introduction

General information about these instructions

These operating instructions describe the design and operation of the ECV and MDB models of electronic coin validator G-13.mft. Chapters 5 und 6 explain the necessary steps for starting and operating the coin validator. The index and glossary reduce 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 used within 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 given sequential numbers (1., 2., 3. etc.).

To configure and test the coin validator reference is made to the separate operating instructions of the NRI PC software "WinEMP" and the NRI Palm Handheld software "PalmEMP" (refer also to Chap. 7 "What functions can be set using WinEMP/PalmEMP"):

- WinEMP – The configuration and diagnostics program for NRI coin validators, operating instructions for the G-13.mft
- PalmEMP2 – Operating instructions for configuration of coin validator G-13.mft
- Tester G-19.0594/4 for G-13 ECVs

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

General information about the coin validator G-13.mft

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 separating out 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 which are managed in a single memory block.

To be able to react as quickly as possible to new false coins and to enable you to make your individual adjustments, in future the coin validator will 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 (for ECVs) or G-55.0338 (for MDB). With the aid of the Palm Handheld software "PalmEMP2" you can configure the coin validator directly at the machine independently of the PC.

Old currency and new coins being added to a currency which have not been taken into consideration at the manufacturer can be programmed in the optional teach mode directly at the coin validator by inserting coins.

Advantages

- Acceptance speed of 2 coins per second
  (Casino model: 6 coins/sec.)
- 32 coin channels which can be inhibited individually or in groups
- Teach mode for 6 coin channels
- Operating and manipulation safety thanks to optical accepted coin sensor and sorting control in coin outlet area
- Interface for connection to a programming station 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 software adjustments

Models

The G-13.mft is available as an ECV (**e**lectronic **c**oin **v**alidator) and as an MDB (**m**ulti **d**rop **b**us) model. A totalizer model is being developed. Of the ECV model you have at your disposal the proven standard and casino variant.

ECV model

The G-13.mft as an ECV model communicates with the machine via a parallel interface. It is used whenever coins inserted into a machine have to be checked for certain coin properties.

Coins inserted into the coin validator pass inductive and optical sensors which check the coins and there they generate individual measurement values. Due to a special construction and arrangement of the sensors, each coin is checked for its material properties and dimension. If the measurements of the coins inserted agree with the values stored in the coin validator, the coin is accepted for payment; if they do not agree, they are rejected.

The ECV model is available as

- Standard ECV and
- Casino variant for fast coin acceptance (e.g. gambling machines)

MDB model

The G-13.mft as an MDB model communicates with the machine, as opposed to the ECV, via a serial MDB interface. The machine operates as a master and the G-13.mft as a slave. The G-13.mft MDB is used whenever coins inserted in a machine have to be checked for certain coin properties, exactly like the ECV model.

The measuring and validating principle is the same as that of the ECV model.

Top and Front entry

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

2 Safety instructions

Series G-13.mft coin validators are for use in the amusement, vending, and service machines. They have been constructed in compliance with the state of the art and the recognized safety regulations. Nevertheless this equipment can be a source of danger. Therefore please observe the following safety regulations.

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

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

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

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

Apply the correct supply voltage to the coin validator (refer to 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.

Before installing the coin validator for the first time, please read these instructions carefully at least once.

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

3 Construction

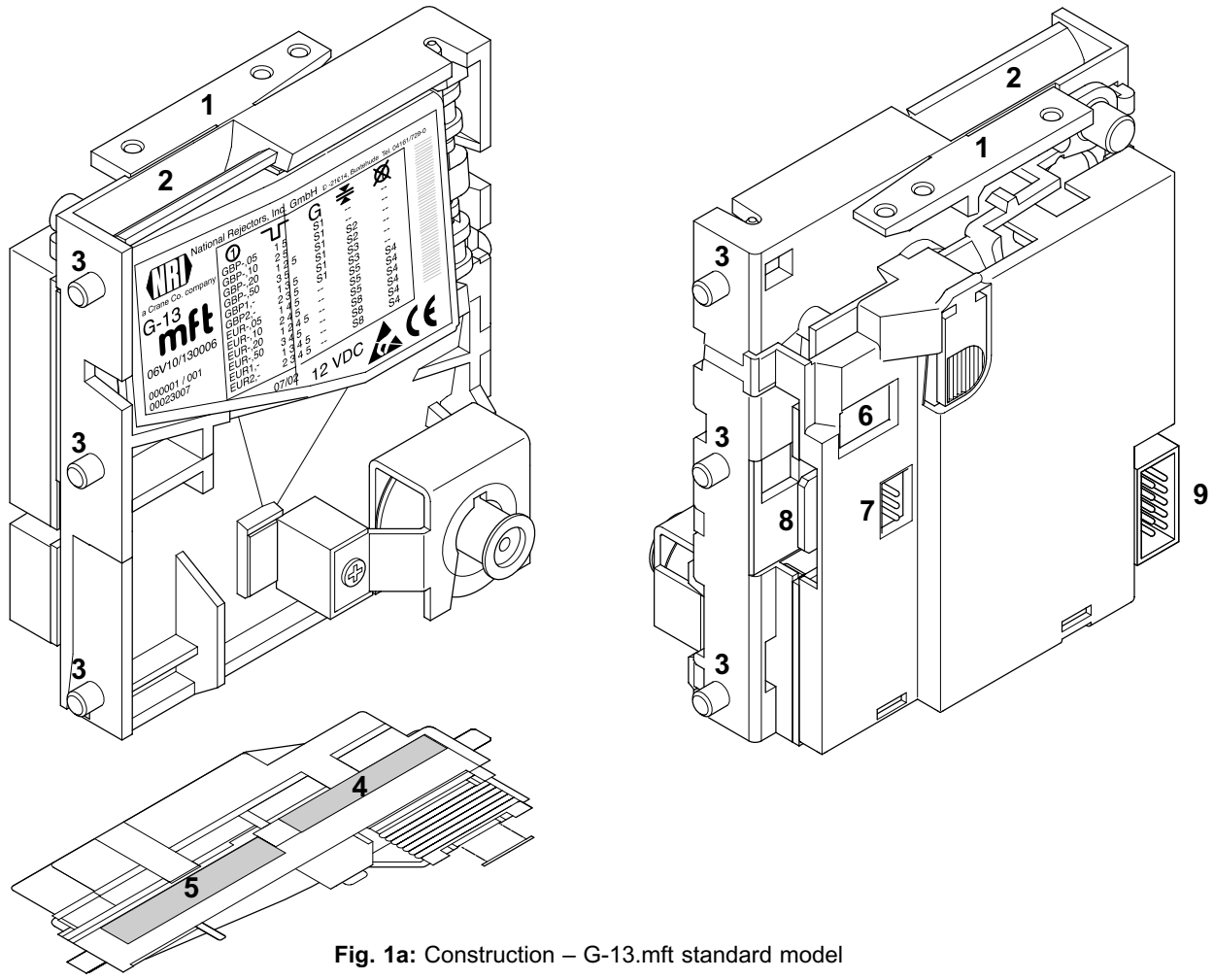


Fig. 1a: Construction – G-13.mft standard model

1 Return lever
2 Coin insert funnel
3 Mounting studs
4 Coin outlet – return area
5 Coin outlet – cash-box
6 Switching block
7 Interface – external sorting device
8 Interface – PC programming station (WinEMP)/ Palm Handheld (PalmEMP2)
9 Interface – machine/tester

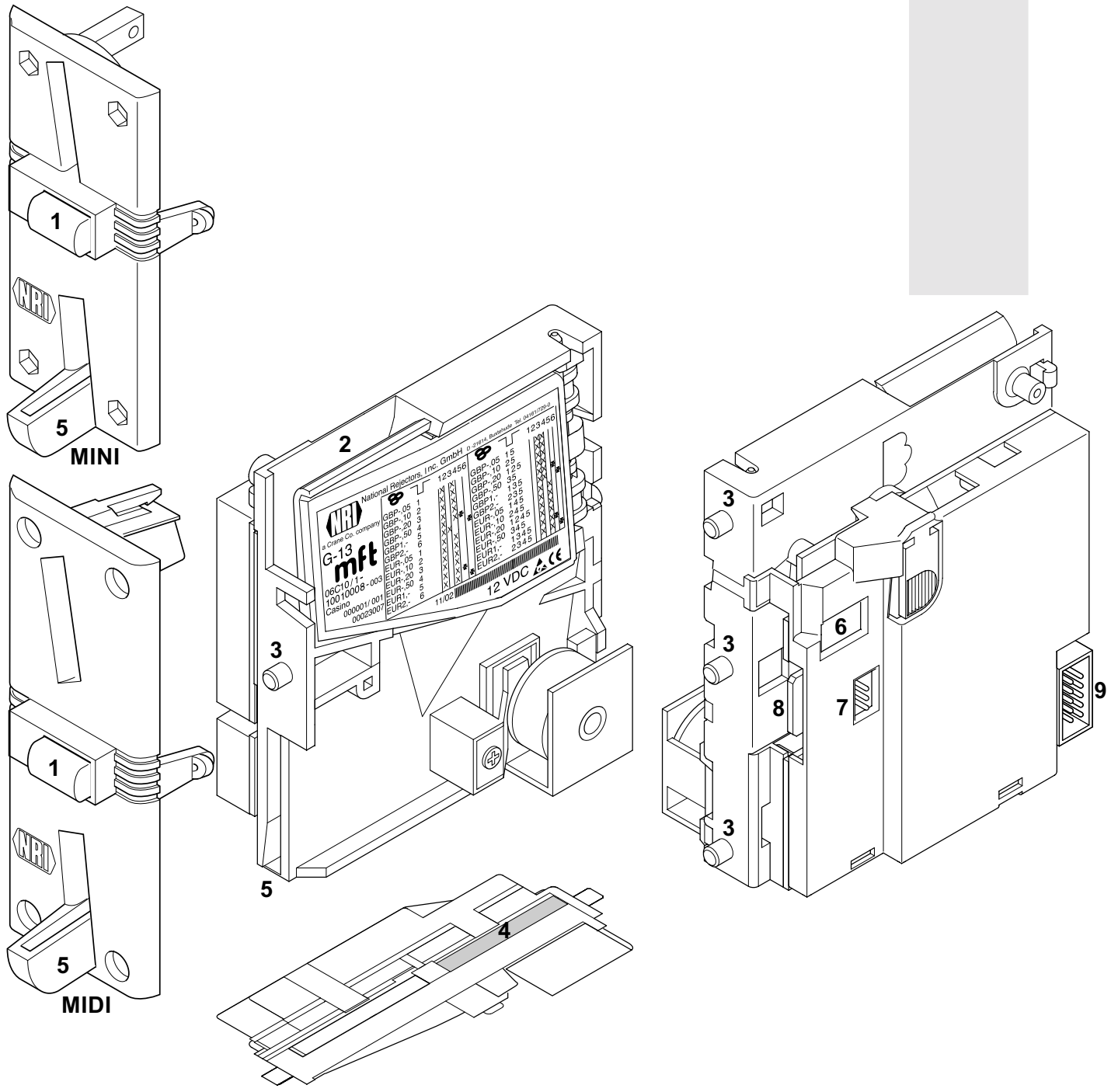


Fig. 1b: Construction – G-13.mft front plate model with front plate

1 Return button
2 Coin insert funnel
3 Mounting studs
4 Coin outlet – cash-box
5 Coin outlet – return area
6 Switching block
7 Interface – external sorting device
8 Interface – PC programming station (WinEMP)/ Palm Handheld (PalmEMP2)
9 Interface – machine/tester

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 Figs. 1a and 1b)

At the rear the coin validator has an interface **9** with the machine (tester) and an interface **7** with an external sorting device, at the side via an interface **8** with the card reader of the PC programming station (WinEMP) or the Palm Handheld (PalmEMP2) (see Figs. 1a and 1b).

Individual settings such as inhibiting various coin types can be made using the switching block **6** on the rear of the device (see Fig. 2).

Switching block

The coin validator has a switching block with eight DIL switches S1–8 on the rear (see Fig. 2).

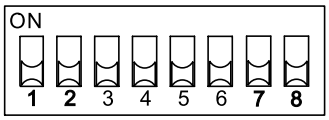


Fig. 2: Switching block

DIL switch	off	on
S1	Coin channel (group) free	Coin channel (group) inhibited
S2	Coin channel (group) free	Coin channel (group) inhibited
.		
.		
S6	Coin channel (group) free	Coin channel (group) inhibited
S7	Operating mode	Teach mode
S8	Normal acceptance band (in the teach mode)	Wide acceptance band (in the teach mode)

Coin channels or the coin types assigned to the coin channels can be inhibited via the first six DIL switches of the switching block. 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 chapter 6 "Operation").

The seventh and eighth DIL switch is used to program coin types or tokens in teach mode (see section "Teach mode" in chapter 6 "Operation").

Return lever

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 which have already been inserted are to be returned or a jam caused by coins which have become stuck needs to be removed. Operating the return lever opens the measurement and validation area of the coin validator so that all objects in the coin validator are transported into the return area.

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 with the programming station or Palm Handheld. (See Figs. 1a and 1b)

Interfaces ECV model – machine

The coin validator is connected to the machine (tester) via the parallel interface and a 10-pole cable.

Please refer to the section "Pin allocation and connection diagrams" in chapter 8 "Technical data" for more details on pin allocation.

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). As a certain coin type is assigned to a certain coin signal line, 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 PalmEMP2 at any time.

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 PalmEMP2.

Return signal line

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 chute.

The return signal line can also be used to sort inserted coins (see section "Control for external sorting of accepted coins" in chapter 4 "Function").

External common inhibit signal line

If the common inhibit signal line from the machine is activated (signal: high = active), coin acceptance is blocked. No coins are accepted.

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

Interface MDB model – machine

The coin validator is connected to the machine via the serial MDB interface and a 10-pole cable via which it can receive information from the machine or send information to the machine. The machine operates as a master and the G-13.mft as a slave. The master can communicate with several slaves (e.g. coin and bill validator). To ensure unambiguous communication each device has its own MDB address. The address of the G-13.mft is "01".

The G-13.mft as an MDB model does not fulfil the MDB specification on two counts, i.e. a specified voltage range and electrical isolation of the communication lines.
If a supply voltage of 42 V max. and electrical isolation are desirable, an MDB converter G-55.0360 can be ordered from NRI (ordering code 23627).

You can obtain further information about the MDB interface

- in the "NAMA document MDB/ICP 2.0" (www.vending.org) and
- in the NRI specification for the G-13.mft "G-13.mft MDB Communication Interface", which we will be pleased to place at your disposal on request.

Please refer to the section "Pin allocation and connection diagrams" in chapter 8 "Technical data" for more details on pin allocation.

Interface – configuration (WinEMP/PalmEMP2)

To configure the coin validator the device is connected to a PC or a mobile Palm Handheld. To do this the back of the G-13.mft has on the right-hand side a 10-pole interface (see Figs. 1a and 1b) which can be used to connect the coin validator to the PC using cable, adapter, card reader and connecting cable, or to a Palm Handheld via a connecting cable. The device is set by means of the configuration and diagnostics software WinEMP or PalmEMP2 (see separate software instructions).

Please refer to the section "Pin allocation and connection diagrams" in chapter 8 "Technical data" for more details on pin allocation.

Interface – external sorting device

There is a 3-pole JST plug (see Figs. 1a and 1b) in the middle on the left on the rear of the device. This plug can be used to control sorting gates for sorting inserted coins (see section "Pin allocation and connection diagrams" in chapter 8 "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 variant as well as customer specific default values such as coin type or coin signal line:

For the MDB model of the G-13.mft there is no assignment of coin signal lines to the coin types.

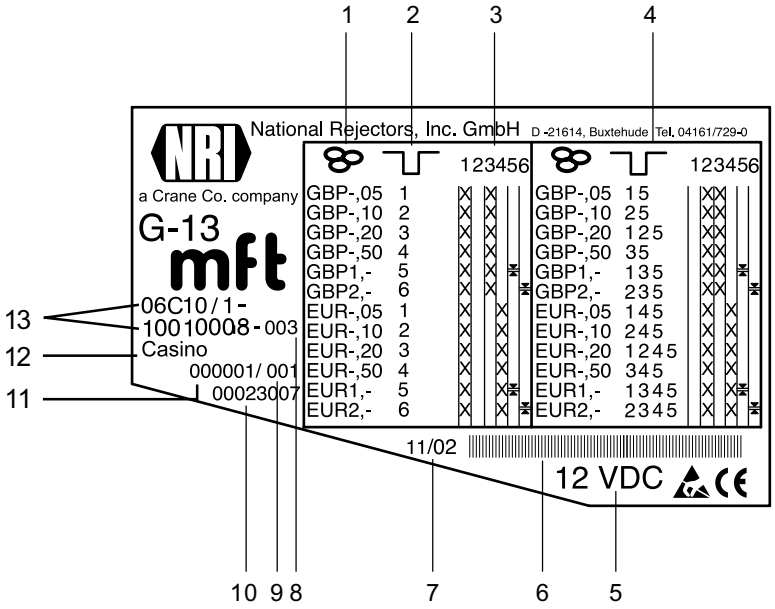


Fig. 3: Label – Casino variant

1 Currency and Coin type

2 Coin signal line of the coin type

3 DIL switch assignment:
Inhibit coin type X
Activate channel with narrow acceptance band

4 Other coin types with individual assignments

5 Nominal voltage

6 Barcode

7 Date of manufacture

8 Data block number

9 Serial device number per order number

10 Ordering code

11 Order number

12 Device variant
Validator = ECV, Standard
Casino = ECV, Casino
MDB = MDB model

13 Device type
9V = Front entry wt. front plate for ECV, Standard
9B = Front entry wt. front plate for MDB model
8V = Front entry w. front plate MINI for ECV, Standard
8B = Front entry w. cover plate MINI for MDB model
7V = Front entry w. front plate MIDI for ECV, Standard
7B = Front entry w. front plate MIDI for MDB model
6V = Top entry for ECV, Standard
6C = Top entry for Casino variant
6B = Top entry for MDB model

4 Function

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

- Measuring principle and coin acceptance
- Coin channels
- Accepted coin sensors
- Coin impulses and signal lines (not with the MDB model)
- Control external sorting device
- Inhibit coin acceptance

Measuring principle of the coin validator and coin acceptance

Coins inserted into the coin validator pass inductive and optical sensors which check the coins and there they generate individual measurement values. Due to a special construction and arrangement of the sensors, each coin is checked for its material properties and 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 PalmEMP2.

The casino variant also accepts coins which are inserted very quickly one after the other. Depending on the length of the coin impulse, the insertion speed can be up to 6 coins per second without errors occurring or incorrect signals being transmitted. At the same time as the coin impulses are triggered the acceptance gate is controlled so that the next coin can be checked without delay (there may be a continuous signal at the acceptance gate, but this is not a problem).

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 "Construction"). The limits of these coin channels are closer to one another so that false coins with similar measurements are rejected. However, narrow and very narrow coin channels reject genuine coins more frequently.

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

However, a coin channel is not only assigned the acceptance band of one coin type but also other coin information which defines further processing of the coin after its acceptance: e.g. coin value or coin signal line and 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 the desired further information at any time using the WinEMP PC configuration software or PalmEMP2. Existing configurations can be changed.

The last six coin channels 27 to 32 are intended for teach mode. In these coin channels new coin types can also be taught without configuration software, directly via the switching block on the coin validator; i.e. a coin channel is re-assigned a coin type or also a token) (see section "Teach mode" in Chap. 6 "Operation").

Accepted coin sensor

The Casino variant cannot utilise the accepted coin sensor owing to the fast coin acceptance as opposed to the ECV standard variant and MDB model. This section is therefore divided into two sub-sections.

ECV standard variant and MDB model

To ensure that accepted coins actually arrive in the cash-box or external sorting device and acceptance has not been tampered with, accepted coin sensors check before cash coin outlet whether the inserted coin drops unhindered into the acceptance chute. Only when the coin has passed this checking function is a coin signal sent to the machine.

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

Casino variant

The accepted coin sensors are located in front of the cash coin outlet and check whether a coin is directed into the cash-box. By default a coin signal is only sent to the machine when the accepted coin sensors establish that a coin is being accepted and directed into the cash-box (see above). To speed up coin acceptance on the Casino variant, 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. The Casino variant cannot utilise the accepted coin sensors.

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

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.

Transfer of coin values by means of coin impulses via coin signal lines (not with the MDB model)

By default every coin accepted by the coin validator passes on one impulse to the vending machine control on the coin signal line assigned to it. An impulse tells the vending machine control that a coin has been accepted.

To enable coins to be accepted more quickly, the Casino variant does not use the accepted coin sensors. This means that the coin impulse is transmitted to the machine control even if the coin is not directed to the cash-box in the case of manipulation.

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 PalmEMP2.

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 PalmEMP2.

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.

Coin impulse length (not with the MDB model)

The length of the coin impulses which can be 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 PalmEMP2.

Controlling external sorting of accepted coins (not with Casino variant)

There is a 3-pole JST plug (see Figs. 1a and 1b) in the middle on the left on the rear of the device. This connector can be used to actuate sorting gates in order to sort inserted coins which must not be directed into the cash-box. Since the sorting gates are addressed via bidirectional lines, the coin validator can also receive signals. If, for example, a connected hopper or change tube is full of coins and if the latter 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 as an ECV model 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.

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 it can be changed or re-configured with the WinEMP PC configuration software or PalmEMP2.

Whilst the coin validator is sorting an accepted coin it cannot accept any further coin.

***No** external sorting device can be connected to the Casino variants as the signal to sort the coins is present for too long for fast coin acceptance.*

Sorting time of an external sorting device

For the switching time of an external sorting device you can set a sorting time of 10 to 1,000 ms with the WinEMP PC configuration software or PalmEMP2.

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.

The inhibiting of coin acceptance is different for the ECV and MDB models. This section is therefore divided into two sub-sections.

ECV model

External common inhibit

The machine can inhibit coin acceptance via the common inhibit signal line (signal: high = active). The coin validator no longer accepts coins (see section "Pin allocation and connection diagrams" in Chap. 8 "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 up to six coin types individually via six external individual inhibit signal lines (= coin signal lines) (see section" Pin allocation and connection diagrams" in Chap. 8 "Technical data").

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 it can be changed with the WinEMP PC configuration software or PalmEMP2.

Internal inhibit of single coin types/coin type groups

As an alternative to individual inhibiting of certain coin types via the machine and the external individual inhibit signal lines you can inhibit individual coin types or even groups of coin types on-site 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 PalmEMP2 you have the option of inhibiting the relevant coin channels by using the coin validator software.

MDB model

External inhibit of all/single coin types

The machine can inhibit all coin acceptance. Then the coin validator no longer accepts coins. However, the machine can also inhibit only certain coin types. For details on how these functions are programmed please refer to "NAMA document MDB/ICP 2.0" or the NRI specification for the G-13.mft "G-13.mft MDB Communication Interface", which we will be pleased to place at your disposal on request.

Internal inhibit of single coin types/coin type groups

As an alternative to coin inhibiting via the machine you can locally inhibit individual coin types or even groups of coin types 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 PalmEMP2 you have the option of inhibiting the relevant coin channels by using the coin validator software.

5 Starting up

The G-13.mft is either

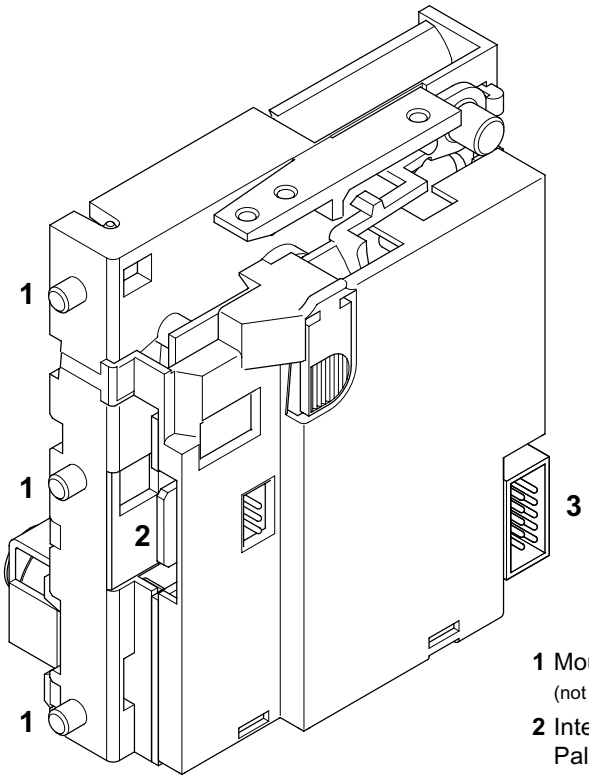
- started up in a machine
- connected up to an NRI tester, which simulates the machine, for a performance test or
- connected up to
  – a PC and to an NRI tester for configuration of the device with NRI software WinEMP or
  – to a Palm Handheld for configuration of the device with NRI software PalmEMP2 in the machine

Starting up in the machine

Install the ECV model of the G-13.mft in machines with an ECV interface and the MDB model in machines with an appropriate MDB interface.

1. Disconnect the vending machine from the mains supply.
2. Attach coin validator G-13.mft at its lateral mounting studs **1** in the machine mount (see Fig. 4).
3. Connect the coin validator to the machine using the appropriate 10-pole interface **3** and the appropriate connecting cable (see Fig. 4).
4. Restore mains supply to the vending machine.

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



1 Mounting stud
(not illustrated on the left-hand side of the device)

2 Interface – PC programming station (WinEMP)/ Palm Handheld (PalmEMP2)

3 Interface – machine/tester

Fig. 4: Installation

Starting up at the tester (not with the MDB model)

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

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

Installation at the PC

The device environment necessary for configuration is different for the two G-13.mft models.

For details of 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. 7 "Which functions can be set using WinEMP/PalmEMP2?").

Device environment for ECV model

- Tester G-19.0594 (ordering code: 11801)
- Connecting cable (coin validator – tester) (scope of delivery for ECV)
- Adapter pack G-19.0640 (ordering code: 12041)
- Card reader G-19.0647 incl. chip card (WinEMP, o. c. 20119)
- Connecting cable (card reader – PC) (WinEMP, o. c. 20119)
- 9 V power pack (WinEMP, o. c. 20119)

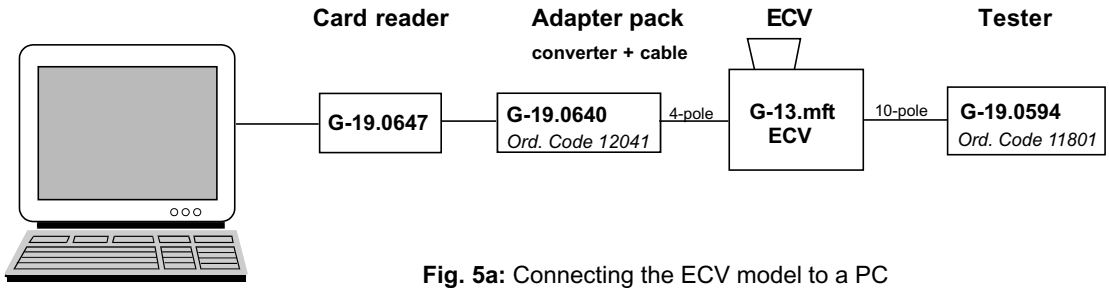


Fig. 5a: Connecting the ECV model to a PC

Device environment for MDB model

- Tester G-55.0338 (ordering code 15967)
- Connecting cable (coin validator – tester) (scope of delivery for c. v.)
- Card reader G-19.0647 incl. chip card (WinEMP, o. c. 20119)
- Connecting cable (card reader – PC) (WinEMP, o. c. 20119)
- 9 V power pack (WinEMP, o. c. 20119)

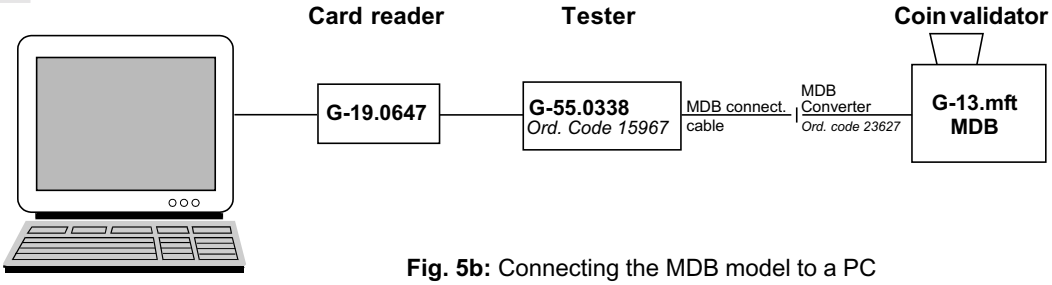


Fig. 5b: Connecting the MDB model to a PC

Connection to a Palm Handheld

With a Palm Handheld and NRI software PalmEMP2 the G-13.mft can be directly configured locally inside the machine. You receive a connecting cable enclosed with the PalmEMP2 program. For details of how to connect the Palm Handheld, install and operate PalmEMP2, please refer to the separate operating instructions "PalmEMP2 – Operating instructions for configuration of the coin validator G-13.mft (refer also to Chap. 7 "Which functions can be set using WinEMP/PalmEMP2?").

6 Operation

This chapter describes how to inhibit and teach coin types using the switching block.

Inhibit coin channels

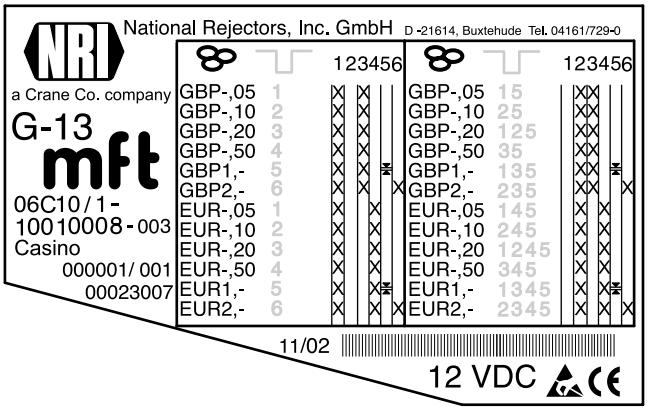
The first six DIL switches S1–S6 on the switching block at the rear of the coin validator can be assigned individual coin types or coin groups (or their coin channels). With these DIL switches it is possible to inhibit the respective coin channels, i.e. the coin type(s) of the channel(s) is/are not accepted for payment at the vending machine.

Assignment of DIL switches to coin type/coin group is factory-set according to the customers' specifications. However, this setting can be changed with the WinEMP PC configuration software or PalmEMP2.

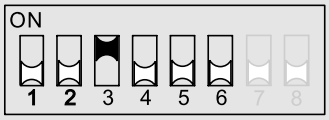
If all coin types which are assigned to the DIL switches are to be accepted for payment at the vending machine, DIL switches 1–6 must be in the lower position (on OFF).

If you wish to inhibit a coin channel, the associated DIL switch only has to be moved into the upper ON position.

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

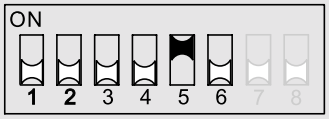


Example – Inhibit a currency as coin group
(the coin validator must only accept euros and no longer the British currency)



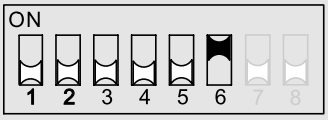
With this setting the coin validator only accepts euros.

Example – Activate narrow acceptance bands/coin channels as coin group
(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 coins in the narrow coin channel and not in the normal one.

Example – Inhibit single coin type
(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 described above it would also be possible to inhibit the euro currency via DIL switch 4. With the ECV model you can aditionally choose between the left and right-hand assignment on coin signal lines via DIL switches 1 and 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 switching block on the coin validator, i.e. a coin channel is assigned a coin type or even a token. This is also possible if the coin validator is installed in a vending machine. It is also possible to extend the acceptance band for the selected channel so that the rejection of genuine coins is reduced. Coin channels 27–32 are available to be taught.

To teach coin channels, the coin validator must be programmed by the manufacturer.

Assignment of DIL switches to coin channel (in teach mode)

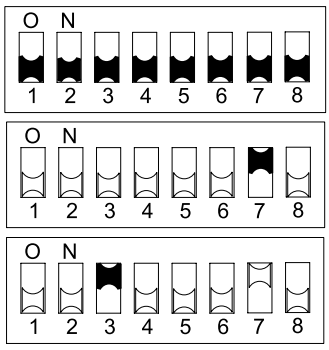
DIL switch	
S1	Coin channel 27
S2	Coin channel 28
S3	Coin channel 29
S4	Coin channel 30
S5	Coin channel 31
S6	Coin channel 32

Teach coin channels

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

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 1–8 into the lower OFF position.
2. Set DIL switch 7 upwards to ON.
   The device is in teach mode for teaching the coin channels.
3. Release the coin channel to be taught (27-32, here: 29) by setting the appropriate DIL switch (1–6, here: 3) up into the ON position.

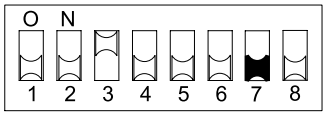


4. Insert at least 10 coins of the new coin type/token into the coin validator or vending machine.
   After the 10th coin has been entered, the acceptance gate is operated once (solenoid attraction sound). Additional coins can be inserted.

Now you can save the measured values generated by the inserted coins in either a normal (a) or a wide (b) acceptance band. By extending the acceptance band, the rejection of genuine coins is reduced but at the same time the acceptance of false coins may be increased.

To save with the normal acceptance band:

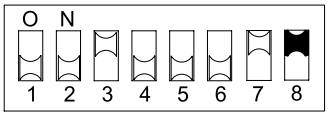
5. a) Set DIL switch 7 into the lower OFF position.
Successful saving is signalled by the acceptance gate attracting once, an error when saving is indicated by the acceptance gate attracting twice, if for example the acceptance band of the coins inserted and the acceptance band of the already programmed coin channels overlap.



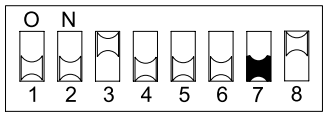
To cancel the process first move the DIL switch of the appropriate coin channel down into the OFF position and then DIL switch 7, too.

To save with the wide acceptance band:

b) Set DIL switch 8 up into the ON position.
The acceptance band has been extended.



Now you can set DIL switch 7 into the lower OFF position.
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 the already programmed coin channels overlap.



To cancel the process first move the DIL switch of the appropriate coin channel as well as DIL switch 8 down into the OFF position and then DIL switch 7, too.

6. Set DIL switch (1–6, here: 3) and 8 if necessary for 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.

7 Which functions can be set using WinEMP/PalmEMP2?

The software WinEMP and PalmEMP2 are used for diagnosis and configuration of NRI coin validators and for updating the data block in the device memory.

WinEMP is PC software designed for a device environment consisting of:

- the G-13.mft incl. connecting cable (coin validator – tester)
- The tester
  – G-19.0594 (for ECVs) (ordering code: 11801)
  – G-55.0338 (for MDB models) (ordering code: 15967)
- Adapter pack G-19.0640 (ordering code: 12041)
  (not necessary with the MDB model)
- Card reader G-19.0647 incl. chip card (scope of delivery WinEMP)
- Connecting cable (card reader – PC) (scope of delivery WinEMP)
- 9 V power pack (scope of delivery WinEMP)

The basic module of the software WinEMP can be obtained from NRI by quoting ordering code 20119. The module for data block updates must be ordered separately under ordering code 20169.

PalmEMP2 is software stored on a Palm Handheld as an additional application. If the Palm Handheld is linked to the coin validator via a connecting cable (enclosed with the software), the G-13.mft can be directly configured in-site inside the machine.

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

Apart from the device functions listed below you can use WinEMP/PalmEMP2 to also change the two variants within the ECV model (standard/Casino) (see separate software instructions):

ECV model

- Coin impulse length
- Attraction duration
- Sorting time (only standard variant)
- Allocation
  - Coin signal line – coin type
  - Coin impulse number – coin type
  - External single inhibit signal line – coin type
  - DIL switch – coin type (internal inhibit)
  - Sorting control line – coin type (only standard variant)
- Coin acceptance band after the insertion of
  - genuine coins
  - false coins
- Teach coin channels
- Inhibit coin channels individually using coin validator software
- Data block update for current coin information

MDB model

- Attraction duration
- Sorting time
- Allocation
  - Coin value – coin channel
  - DIL switch – coin type (internal inhibit)
  - Sorting control line – coin type
- Coin acceptance band after the insertion of
  - genuine coins
  - false coins
- Teach coin channels
- Inhibit coin channels individually using coin validator software
- Data block update for current coin information

8 Technical data

Supply voltage	10–16 V DC
Power consumption	approx. 55 mA + approx. 3 W (acceptance gate)
Electric strength Inputs/Outputs	max. 35 V
Current-carrying capacity Outputs	max. 150 mA (open collector)
Transmitter (MDB) (active low)	Output current$_{max}$ (active): 30 mA at 1V Residual current$_{max}$ (inactive): 30 µA
Receiver (MDB) (active high)	Input current$_{max}$ (active): 100 µA at 4V Input current$_{max}$ (inactive): 30 µA
Temperature range	-25 to +70 °C (temperature change max. 0.2 °C/min)
Rel. humidity	15 to 93 $^{+2}_{-3}$ %
Condensation	not allowed
Dimensions	Height: 102 mm Width: 89 mm Depth: 52 mm
Installation tilt	± 2°
Coin dimensions	Ø 15–31.5 mm (optionally up to 33 mm) thickness 1.5–2.5 mm, optionally 1.5–3.3 mm
Coin acceptance	32 coin channels, 6 coin signal lines
Acceptance speed	2 coins/sec (Casino: 6 coins/sec.)
Sorting plug	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 allocation and connection diagrams

ECV model

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

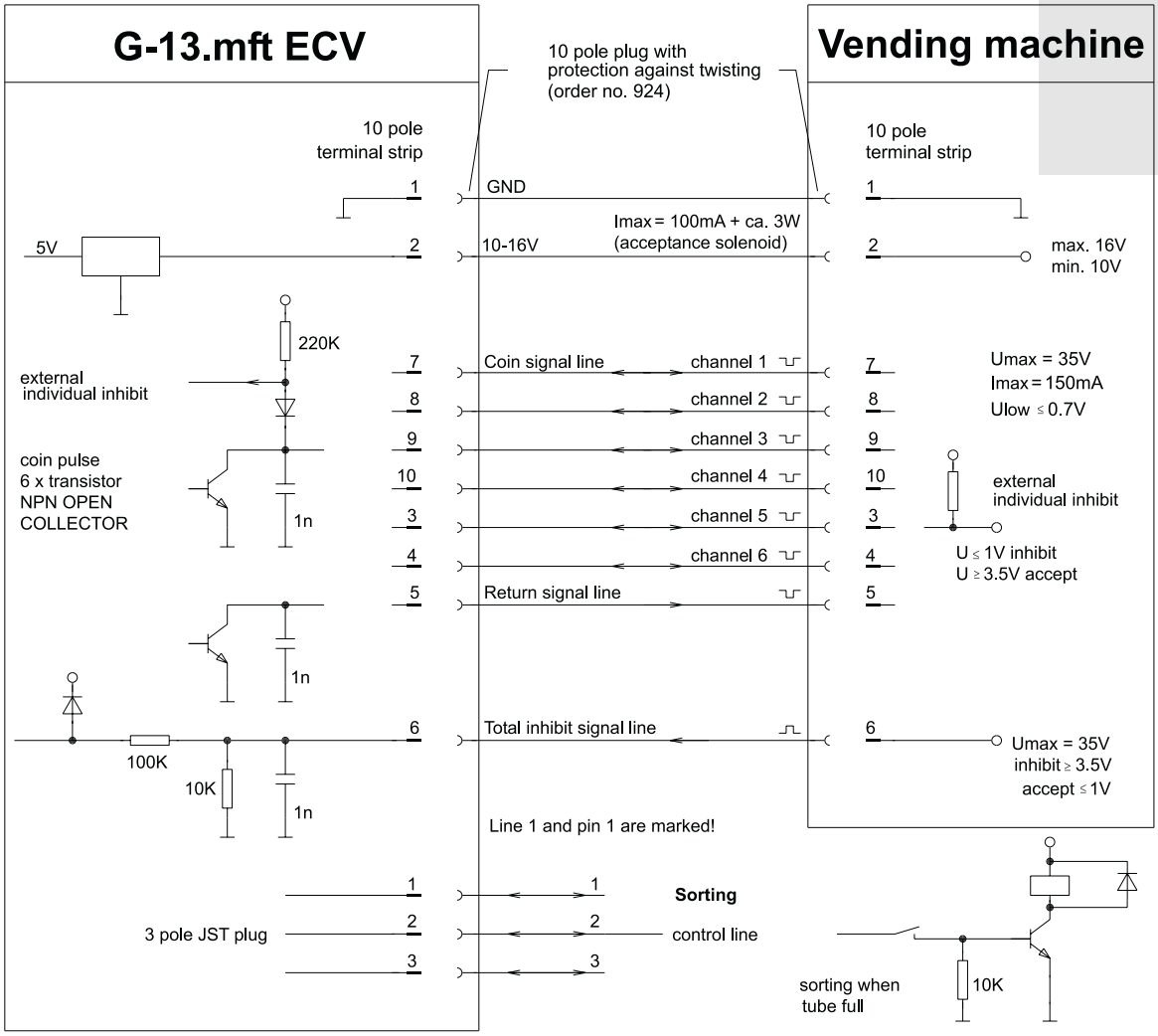
Pin 7 Coin signal line 1: active low
external inhibit signal line 1: active low

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.

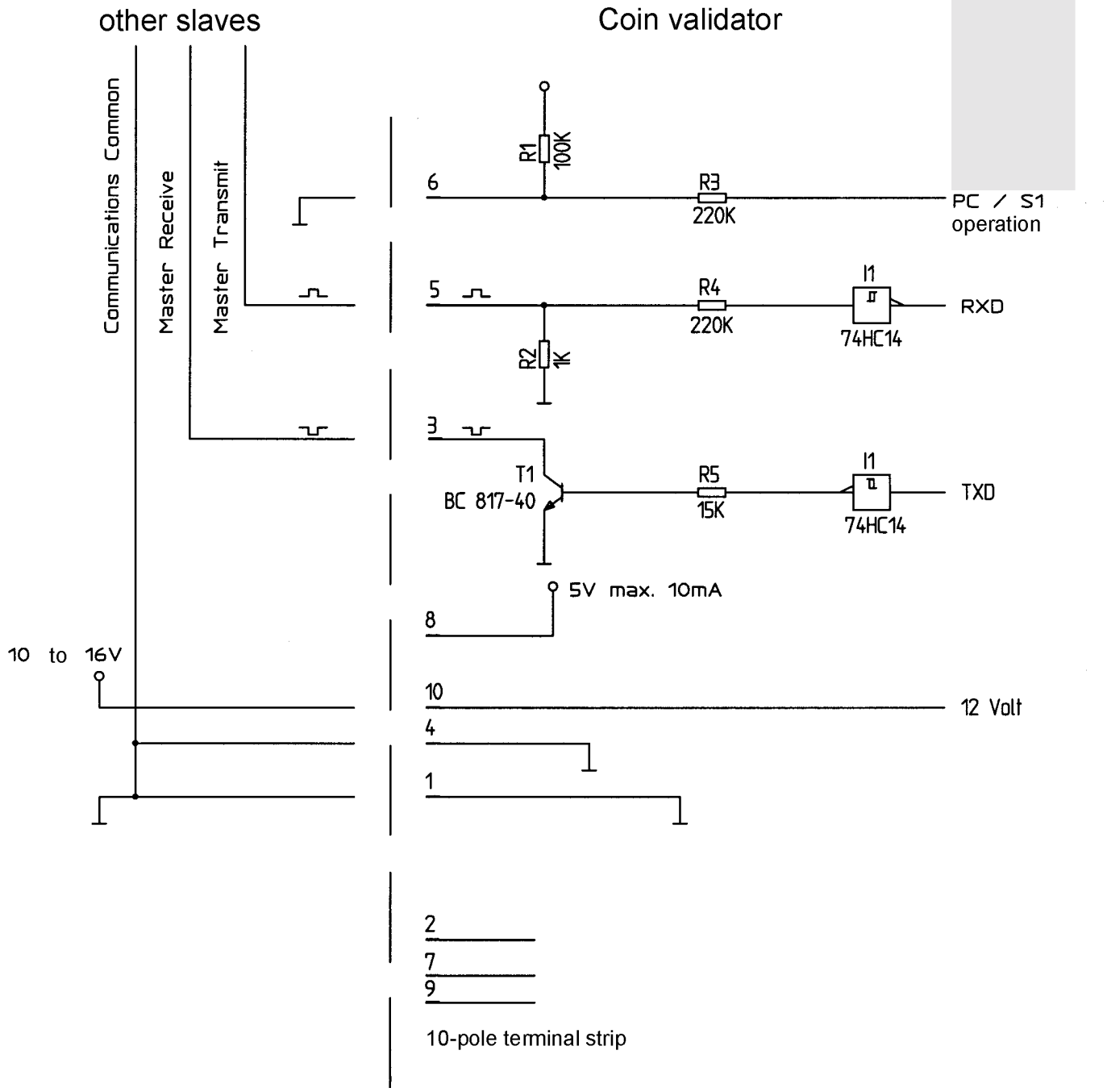


Subject to technical changes!

Also refer to section “Connection diagrams, G-13.mft – external sorting”

MDB model

Pin 1	Ground (GND)
Pin 2	Reserved
Pin 3	Master receive
Pin 4	Reserved
Pin 5	Master transmit
Pin 6	Reserved
Pin 7	Reserved for wake-up line
Pin 8	Reserved
Pin 9	Reserved
Pin 10	10–16 V DC supply

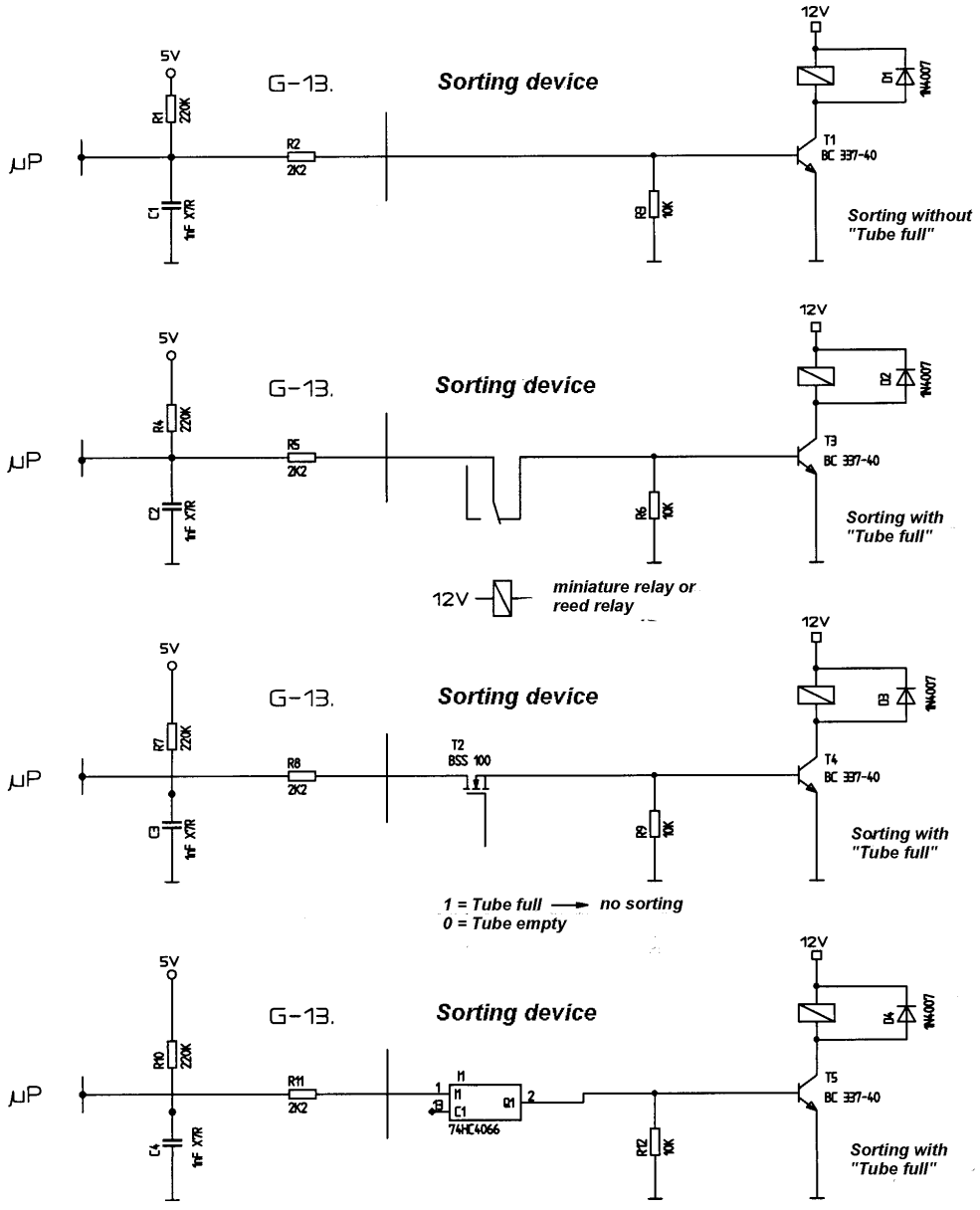

other slaves
Coin validator
Communications Common
Master Receive
Master Transmit
R1
100K
6
R3
220K
PC / S1
operation
5
R4
220K
I1
74HC14
RXD
R2
1K
3
T1
BC 817-40
R5
15K
I1
74HC14
TXD
5V max. 10mA
8
10 to 16V
10
12 Volt
4
1
2
7
9
10-pole terminal strip

Programming plug

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

Examples for controlling a sorting device

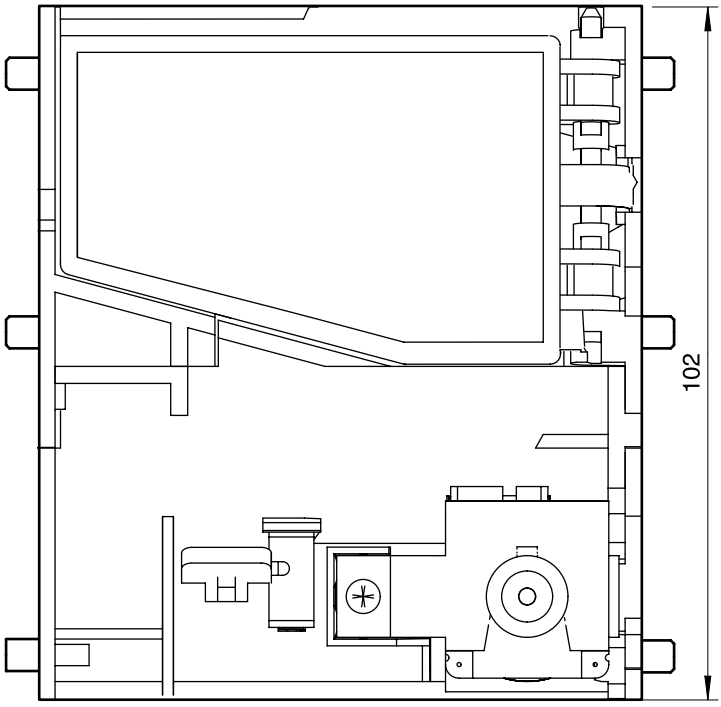


If higher current is necessary, Darlington transistor possible
Without "Tube full" binary coding of the 3 outputs possible

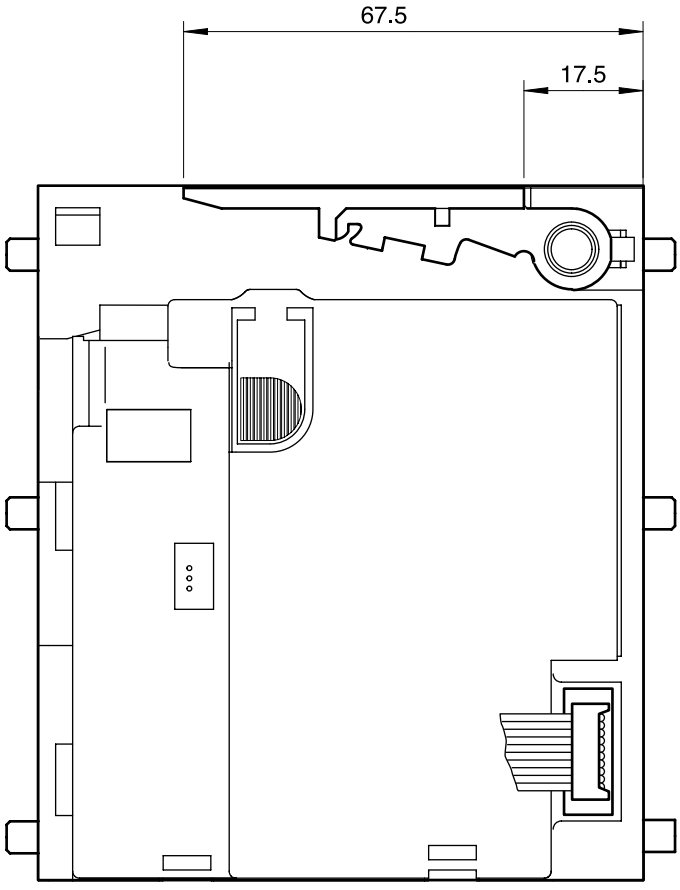
Mounting dimensions

Standard model

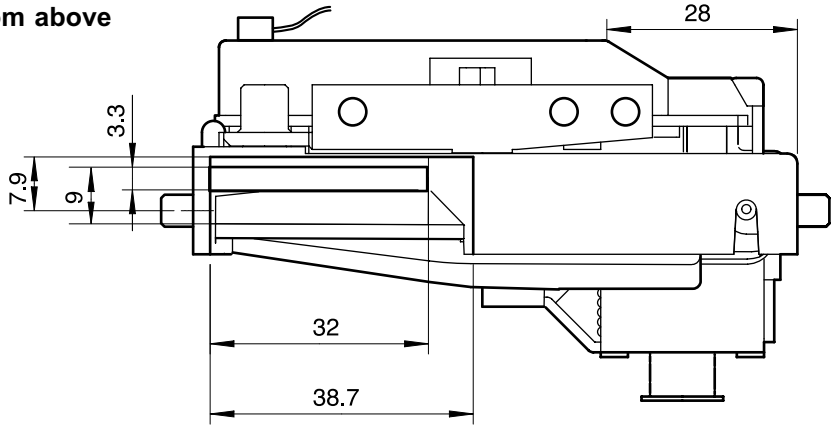
View from front



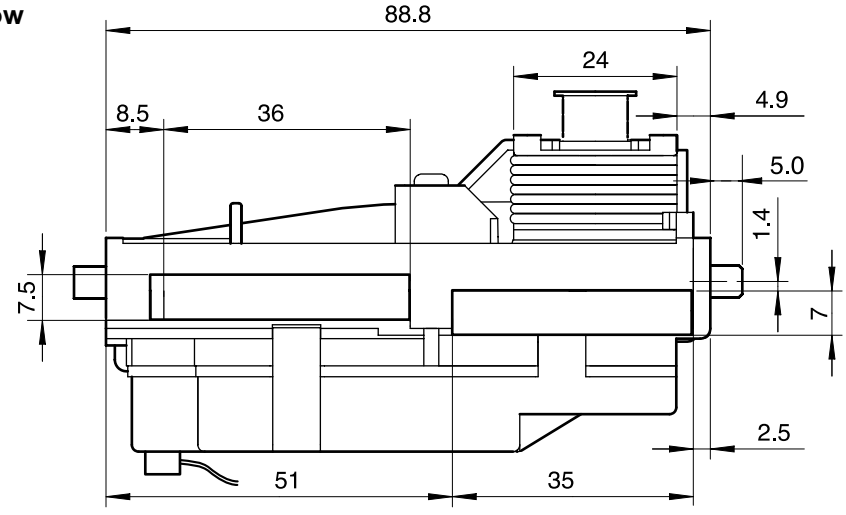
View from rear



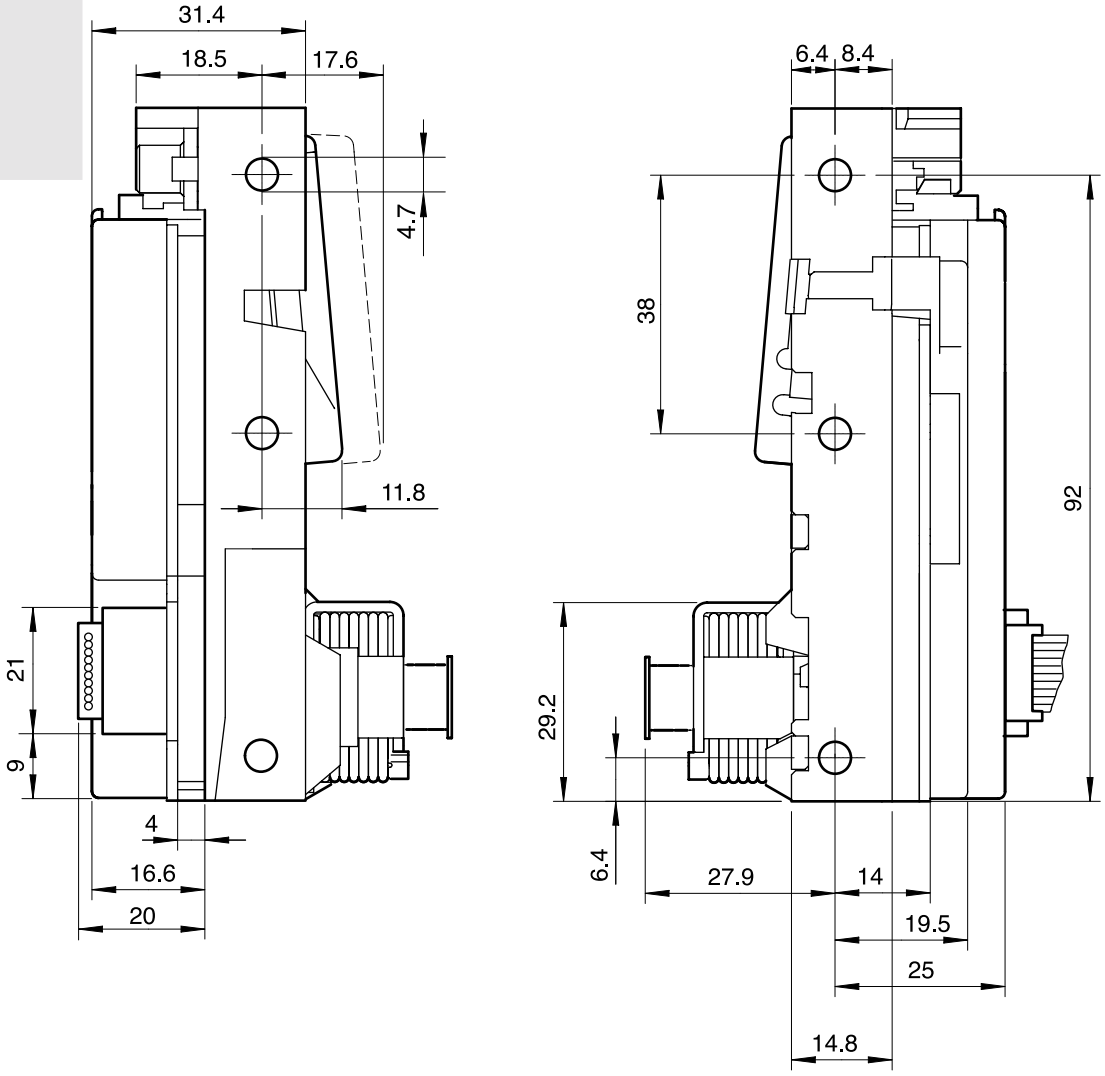
View from above



View from below

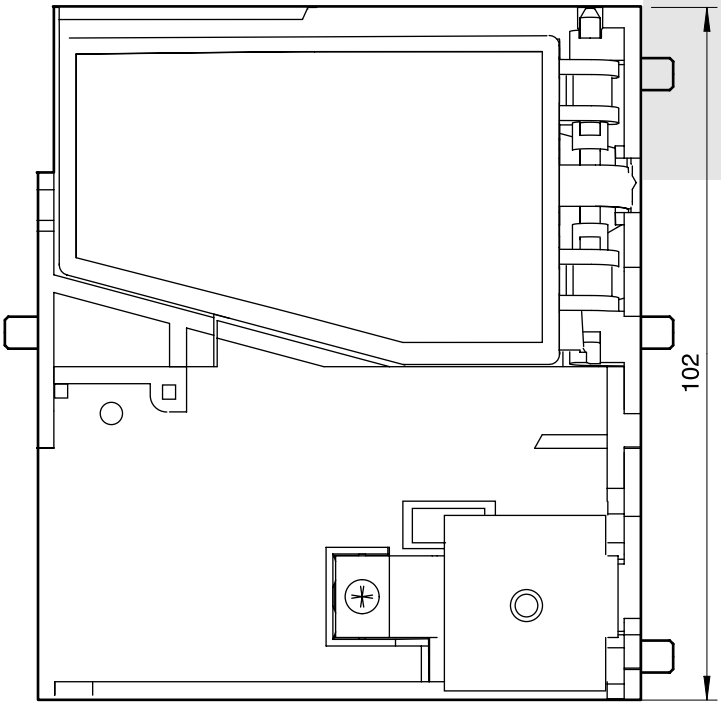


View from the side

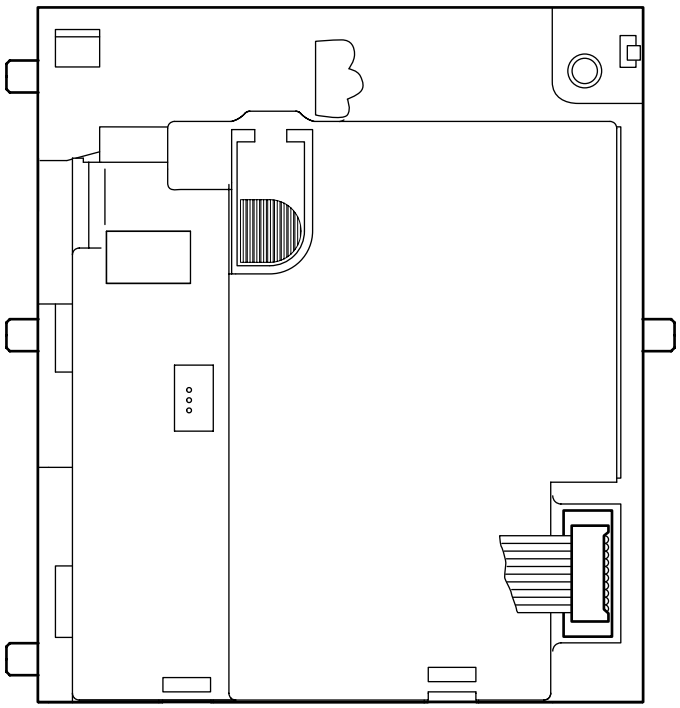


Front plate model without front plate

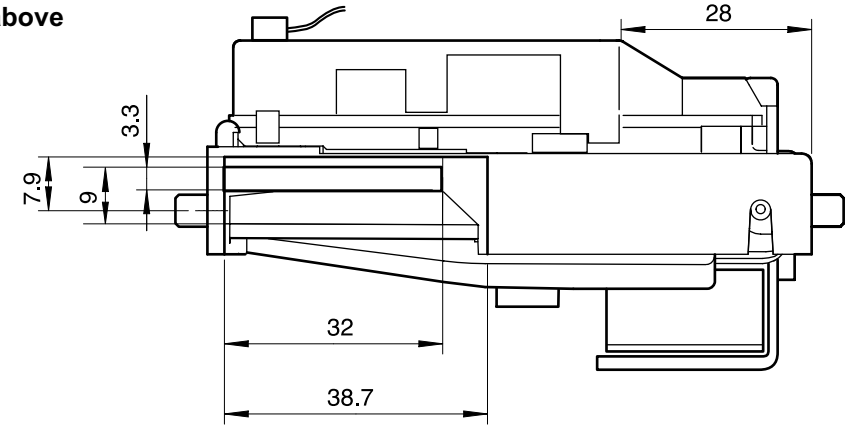
View from front



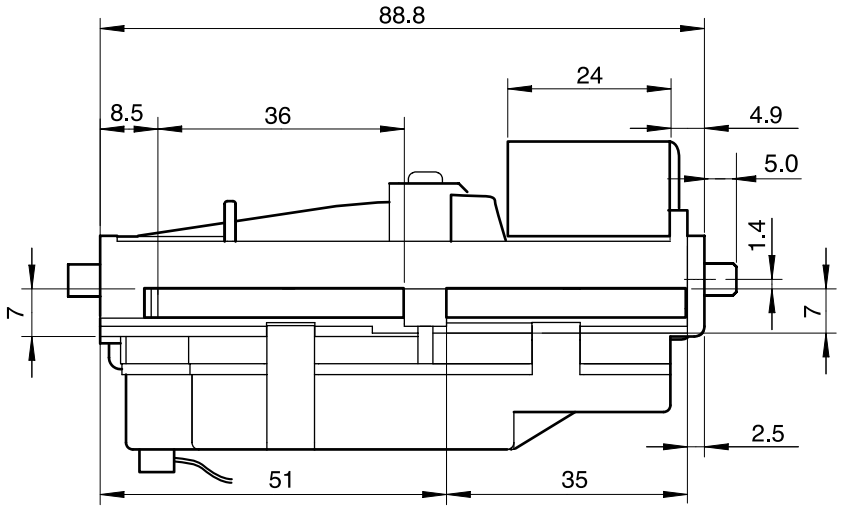
View from rear



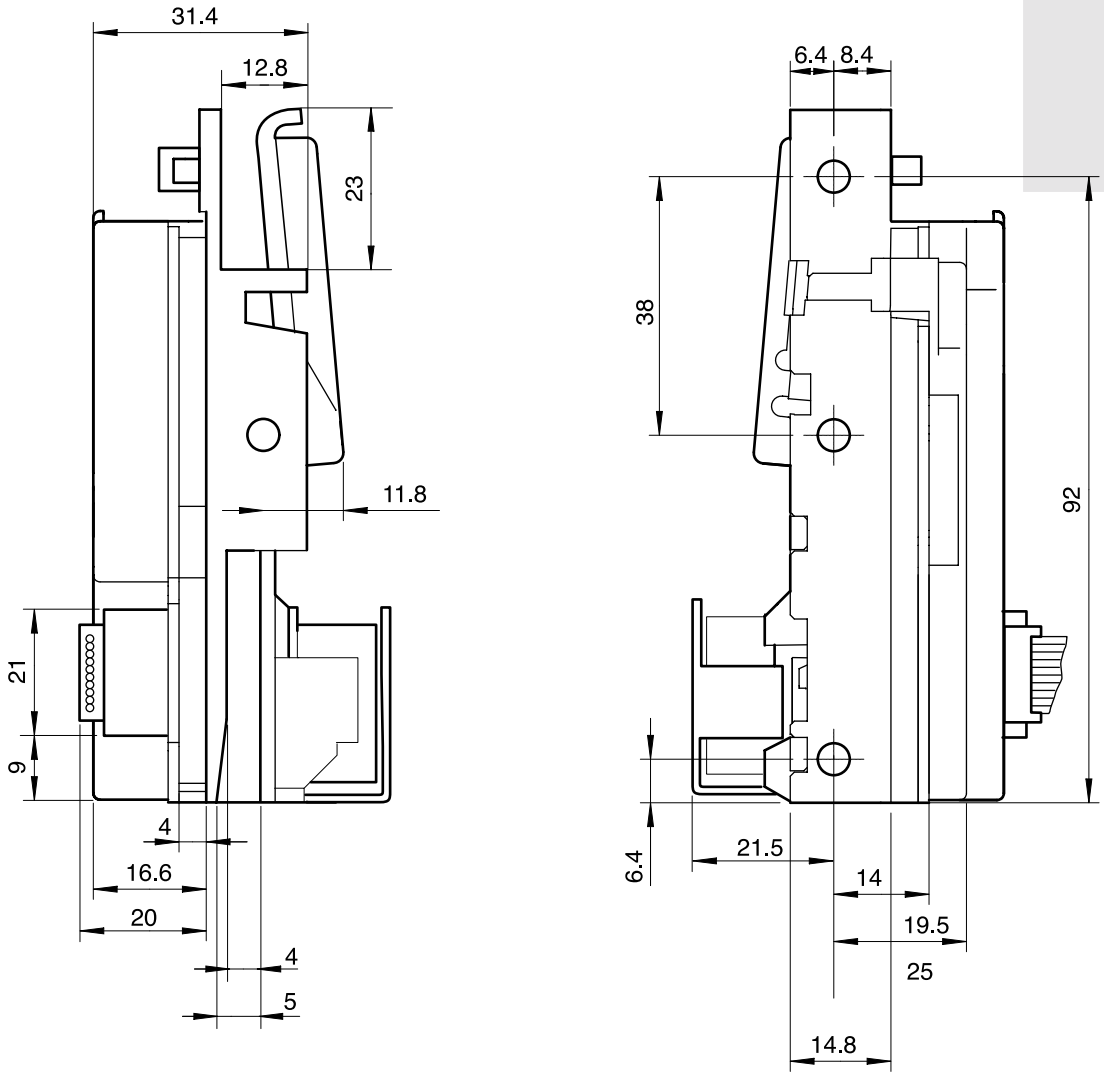
View from above



View from below

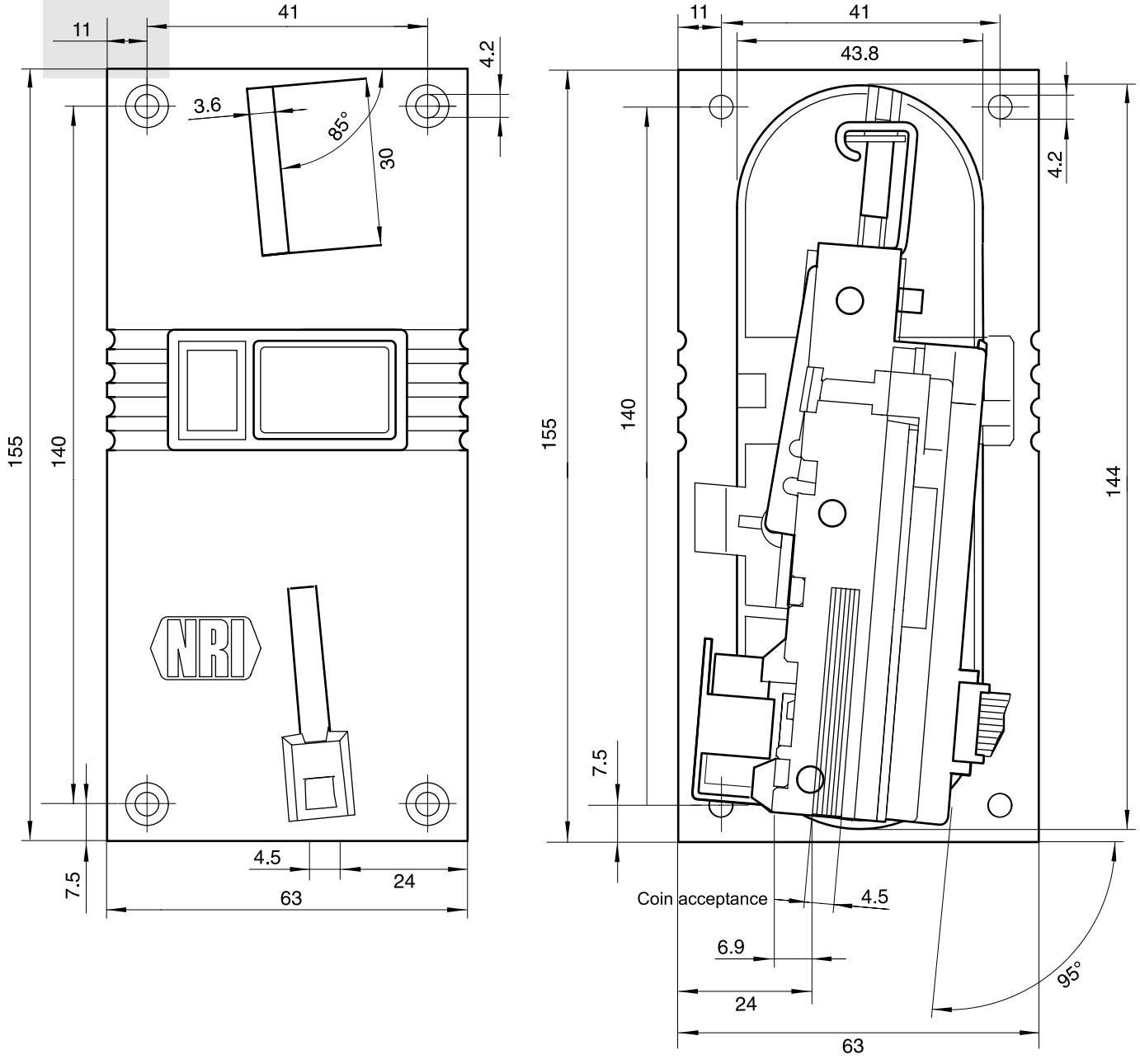


View from the side

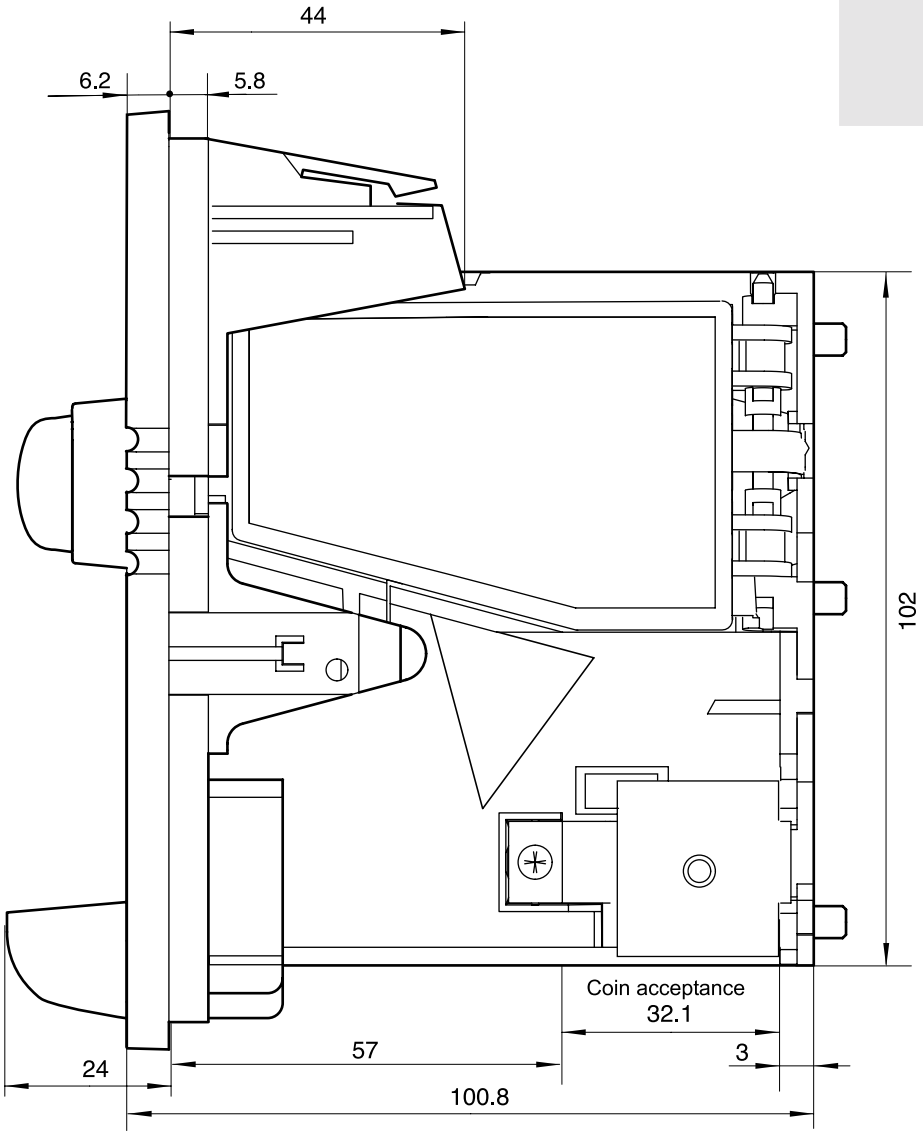


Front plate model with MIDI front plate

View from front and rear

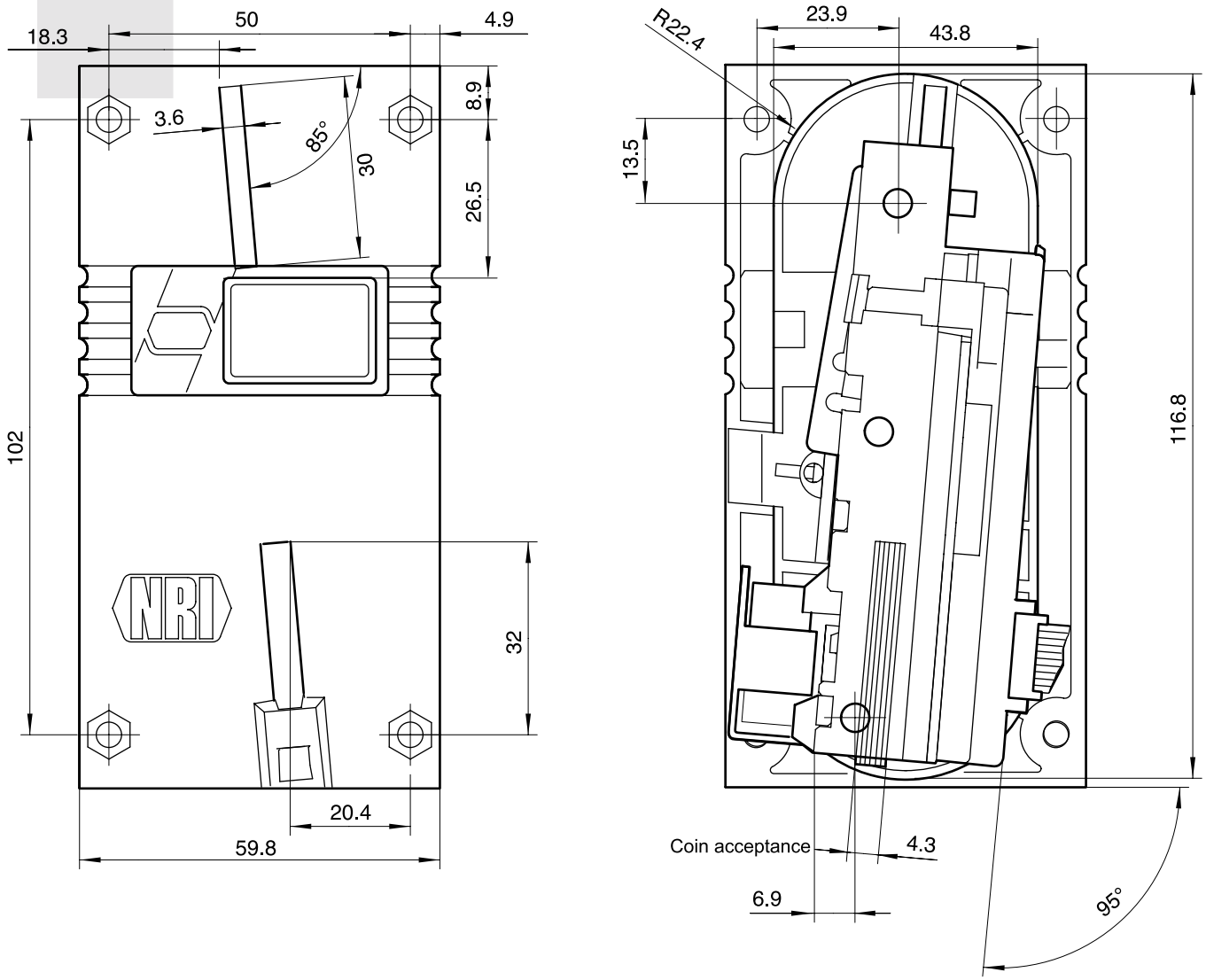


View from right

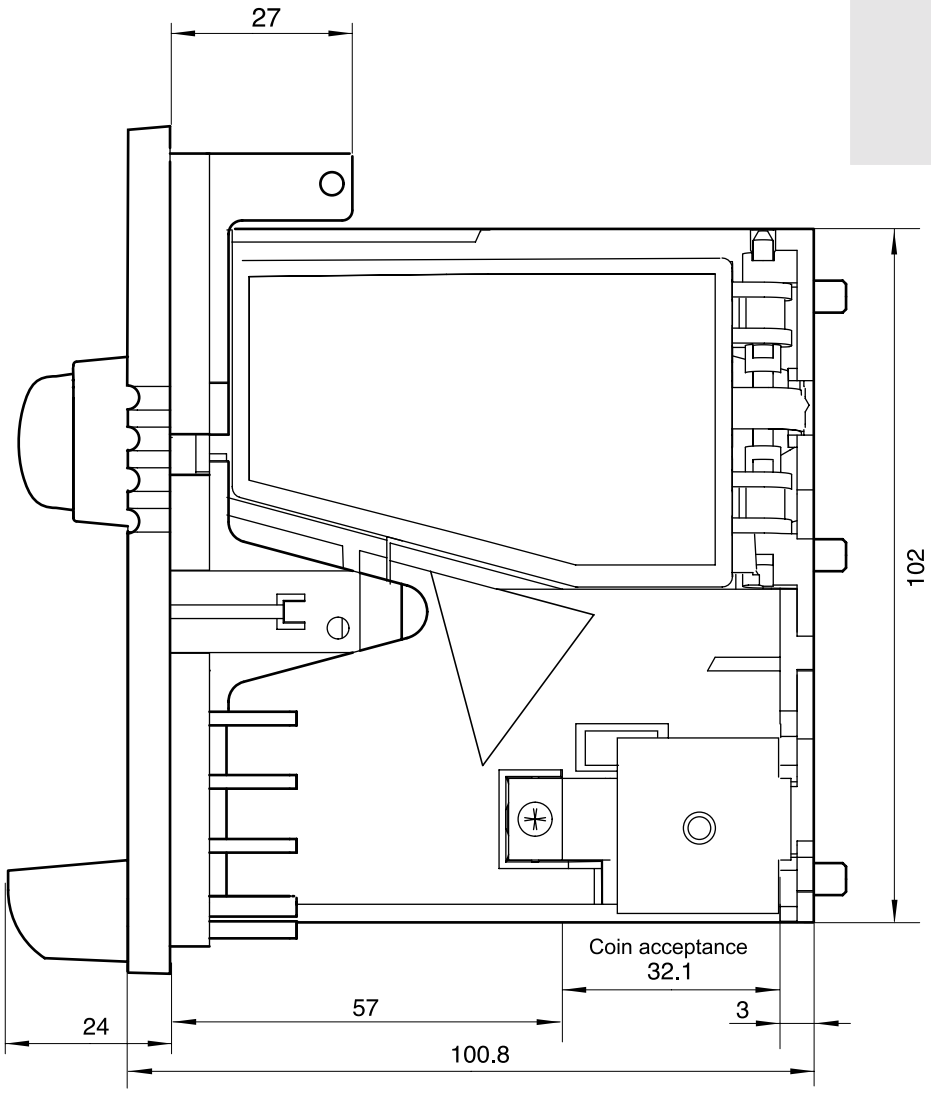


Front plate model with MINI front plate

View from front and rear



View from right



Cleaning

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

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

1. Pull the vending machine's mains plug.
2. Carefully open the flight deck **1** on the left-hand side and keep it open (Fig. 6).
3. Wipe the coin runway inside the coin validator clean.
4. Close the flight deck again.
5. Reconnect the vending machine to the mains supply.

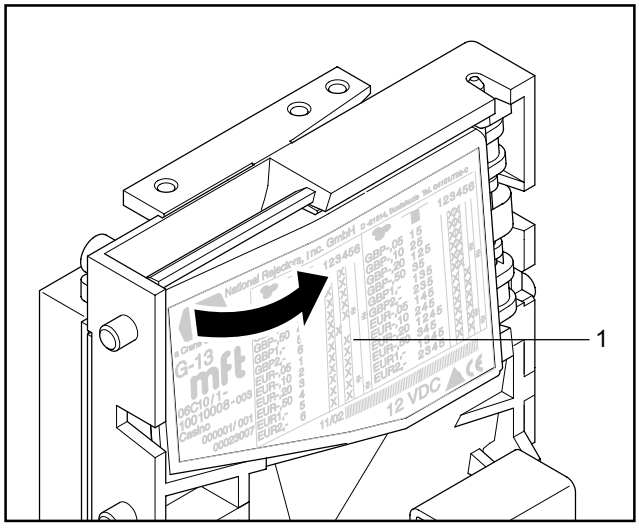


Fig. 6: Open the coin validator's flight deck

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Glossary

Acceptance band A range of acceptable measured values of one →*coin type* defined by an upper and lower limit value and with specific → *coin properties*.

Acceptance gate The acceptance gate diverts the inserted coins into the acceptance or return area.

Accepted coin sensors The accepted coin sensors are positioned in front of the cash coin outlet of the coin validator and they check whether accepted coins fall unhindered into the acceptance chute (casino variant cannot utilise accepted coin sensors).

Attraction duration 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.

Channel → *Coin channel*

Coin acceptance band → *Acceptance band*

Coin channel Coin channels are used to describe → *coin types* by means of 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 defining a certain impulse length with which the coin impulses are sent from the coin validator to the machine, the coin validator can be matched to the specific processing time of the relevant machine (only ECV model).

Coin impulse number Each coin accepted by the coin validator sends a pulse to the vending machine control on the appropriate → *coin signal line* (only ECV model). An impulse tells the vending machine control that a coin has been accepted. In principle, 255 impulses per coin can be assigned to the → *coin channel* allocated 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 in the case of the introduction of new coins with a greater value, these coins have to be simulated for the vending machine control by a number of coin impulses, i.e. when e.g. a 2 euro coin is inserted, 4 coin impulses would be passed onto 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 transmit the values of a → *coin type* to the vending machine (only ECV model).

Coin type One coin type includes all coins for which the → *coin properties* agree.

Coin value The value of a → *coin type*

Common inhibit signal line Signal line between vending machine control and coin validator via which the machine can block acceptance of all coins (only ECV model).

ECV **E**lectronic **C**oin **V**alidator

Impulse length → *Coin impulse length*

Impulse number → *Coin impulse number*

Individual coin inhibit signal line Signal line between vending machine control and the coin validator (only ECV model) via which the machine can block the acceptance of (one or more) individual → *coin types*.

MDB

Multi **D**rop **B**us. The abbreviation MDB defines the interface specification for an internal communication protocol. This protocol is specified in "NAMA document MDB/ICP 2.0" (www.vending.org).
The serial bus provides master-slave communication, and whereby a master (machine control unit) can communicate with several slaves (coin and bill validators, etc.). To ensure unambiguous communication between the devices each slave has its own MDB address (coin validator G-13.mft = 01).

Return signal line

When operating the return lever on the coin validator, a return signal is transmitted to the return signal line. 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. On the ECV model the → *return signal line* can 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.

Switching block

The switching block is located on the rear of the coin validator and incorporates 8 DIL switches. Each switch has a specific function, e.g. inhibiting individual or grouped → *coin channels*.

Token

Token which is accepted for payment at machines instead of coins in a currency.