

# Operating Instructions



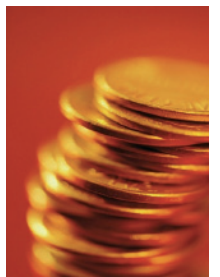
## 5" Coin Validator **v<sup>2</sup> eagle**

with BDTA interface

08.11 Hns/GS/Roe  
BA\_v2\_eagle\_BDTA\_EN\_1-1



Crane Payment Solutions GmbH | Zum Fruchthof 6 | 21614 Buxtehude | Germany  
Web: [info@craneps.com](mailto:info@craneps.com) | [www.craneps.com](http://www.craneps.com) | Phone: +49 (0) 41 61-729-0 | Fax: +49 (0) 41 61-729-115





## Table of Contents

<b>1</b>	<b>Revision protocol</b>	<b>7</b>
<b>2</b>	<b>About ...</b>	<b>8</b>
2.1	About these operating instructions	8
2.1.1	Text conventions	8
2.1.2	Additional useful technical documentation	9
2.2	About the v <sup>2</sup> eagle	9
2.2.1	The v <sup>2</sup> -eagle features	9
2.2.2	Models	10
2.2.2.1	Coin entry and return area	10
2.2.2.2	Internal 5-fold sorting	10
<b>3</b>	<b>Safety instructions</b>	<b>11</b>
3.1	Proper use	11
3.2	Protecting persons and equipment	11
<b>4</b>	<b>Design</b>	<b>12</b>
4.1	Overview	12
4.2	Coin path	13
4.3	Label	14
4.3.1	Model number decoding	15
4.3.2	Data block decoding	15
4.4	Switch blocks	16
4.4.1	Switch functions – switch block S1	16
4.4.2	Switch functions – switch block S2	16
4.5	Coin return lever	17
4.6	Interfaces	17

<b>5</b>	<b>Function</b>	<b>18</b>
5.1	Coin acceptance and coin channels	18
5.2	Memory blocks	19
5.3	Accepted coin sensor and sorting control	19
5.4	Transmission of coin values via coin pulses and coin signal lines	20
5.4.1	Multiple pulse	20
5.4.2	Coin pulse length	20
5.5	Coin inhibition/activation of narrow coin channels	21
5.5.1	Inhibiting all coins via the machine control system (common inhibit/blocking)	21
5.5.2	Inhibiting individual coins/coin channels via the machine control system (individual inhibit/blocking)	21
5.5.3	Inhibiting individual coins/coin channels via the switch blocks	21
5.6	Sorting accepted coins (option)	22
5.6.1	Sorting principle of 5-fold longitudinal sorting (Ex8xP4. ...)	22
5.6.1.1	Sorting with NRI 4-fold sorting adapter (option)	23
5.6.2	Activation of a cash-box/spare sorting chute (option)	24
5.7	Teach mode (option)	25
5.8	String recognition (option)	25
<b>6</b>	<b>Start-up</b>	<b>26</b>
<b>7</b>	<b>Operation</b>	<b>27</b>
7.1	Selecting the memory block ...	27
7.1.1	... using the switch block on the coin validator	27
7.1.2	... via machine control (single inhibit signal line 6, option)	27
7.2	Inhibiting coins/activating narrow coin channel	28
7.2.1	Inhibit functions – switch block S1	28
7.2.2	Inhibit functions – switch block S2	28
7.3	Teaching coin channels in teach mode (optional)	30

<b>8</b>	<b>Maintenance and service</b>	<b>32</b>
8.1	Cleaning the coin runway	32
8.2	Troubleshooting	33
<b>9</b>	<b>What subsequent settings can be made?</b>	<b>34</b>
9.1	Service and configuration tools	34
9.1.1	PC configuration software heartbeat	34
9.1.2	On-site service tool HENRI+	34
9.2	Which device functions can be set?	34
<b>10</b>	<b>Technical data</b>	<b>35</b>
10.1	Device data	35
10.2	Machine interface	36
10.2.1	Pin assignment	36
10.2.2	Interface description	37
10.2.3	Connection diagram	38
10.3	Accessories	39
10.3.1	Front plates	39
10.3.2	Sorting adapter	39
<b>11</b>	<b>Index</b>	<b>40</b>



# 1 Revision protocol

Version	Revision	Chapters/sections concerned
_1-1	Figure in example added	7.2 "Inhibiting coins/activating narrow coin channel"

## 2 About ...



This chapter is intended to provide a general overview of the advantages and options of the coin validator v<sup>2</sup> eagle with parallel BDTA interface. The first section, however, is designed to help you navigate easily within these operating instructions.

### 2.1 About these operating instructions

These operating instructions describe the design and operation of the electronic 5" coin validator v<sup>2</sup> eagle with parallel BDTA interface. Afterwards, chapters 6 and 7 explain the necessary steps for starting up and operating the coin validator. Chapter 7 describes how to clean the coin validator and remedy the cause of any malfunction.

Chap. 10 "Technical data" and the appended "Index" reduce the search for specific explanations.

#### 2.1.1 Text conventions

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



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



*Special notes intended to facilitate the use of the coin validator.*



At the beginning of each chapter you will find a short "guide" which summarizes the contents of the chapter.



Device functions which are set or prepared by the manufacturer according to customer specifications and can be set or changed using our service and configuration tools (cf. Chap. 9 What subsequent settings can be made?, p. 34).

**1 2 3 ...**

**Requests to perform an action are numbered in another typeface.**

**[Fig. 1/2]**

Reference to a figure. The number preceding the slash indicates the number of the figure, the number following the slash is the number of the item in the figure.



### 2.1.2 Additional useful technical documentation

Apart from the operating instructions you already have, further documentation is available for the v<sup>2</sup> eagle, e.g. documentation concerning configuration. All documentation can be downloaded from the NRI homepage ([www.nri.de](http://www.nri.de)) as pdf file.

## 2.2 About the v<sup>2</sup> eagle

The v<sup>2</sup>-eagle coin validator with parallel BDTA interface in the standardized 5" format uses the patented multi-frequency technology (MFT) for reliable coin validation. Communication with the vending machine control system takes place via the 16-pin BDTA connecting plug. Due to its modular, compact design the v<sup>2</sup> eagle is ideally suited for slot and vending machines.

For coin acceptance the coin validator has 32 coin channels which – divided into 2 x 16 coin channels – can be managed in two memory blocks with different coin configurations and selected individually.

Depending on the application the coin validator can optionally be equipped with 5-fold sorting.

To be able to react as quickly as possible to new false coins and to make your individual settings, the coin validator can be configured on site in the machine using a service tool or in the workshop via a PC programming station.

Any coins or tokens not taken into account by the manufacturer can be programmed in the optional teach mode directly on the coin validator without any configuration software by inserting the coins.

### 2.2.1 The v<sup>2</sup>-eagle features

- Reliable acceptance of genuine coins and rejection of false coins due to MFT multiple sensing of the coins inserted and evaluation of 24 measuring parameters
- Operating and manipulation safety provided by optical accepted coin sensors and sorting control in the coin validation and coin outlet area
- Acceptance speed of two coins per second
- 32 coin channels managed in two independently configured and individually selectable memory blocks (2 x 16 coin channels)
- Service interface for PC programming station or on-site service tool
- Flash technology for easy and time-saving firmware updates (CXflash))
- Options
  - teach mode for eight coin channels
  - string sensor
  - top or front entry, front or bottom return
  - front plate
  - 5-fold longitudinal sorting
  - four different return levers depending on machine type

## 2.2.2 Models

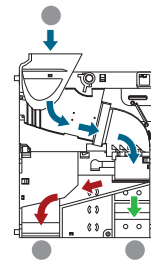
The v<sup>2</sup> eagle is available in different models. They mainly differ

- in the coin insert and return area
- in the sorting mechanism.

### 2.2.2.1 Coin entry and return area

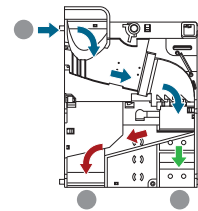
- Top entry and bottom return (E1xxP4. ./E2xxP4. ..)

The coin is inserted into the device from the top and returned, if not accepted, via the return area at the bottom.



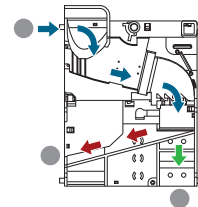
- Front entry and bottom return (E3xxP4. ..)

The coin is inserted into the device from the side and returned, if not accepted, via the return area at the bottom. The coin validator with front entry generally has an NRI front plate fitted to the left-hand side of the device (cf. Chap. 10.3 Accessories, p. 39). However, this model is also available without front plate.



- Front entry and bottom return (E4xxP4. ..)

The coin is inserted into the device from the side and returned, if not accepted, via the return area also located on the side. The coin validator with front entry and front return generally has an NRI front plate fitted to the left-hand side of the device (cf. Chap. 10.3 Accessories, p. 39). However, this model is also available without front plate.



### 2.2.2.2 Internal 5-fold sorting

In order to sort the accepted coins into the cash-box or e.g. change tubes or hoppers, the v<sup>2</sup> eagle can optionally be equipped with an internal 5-fold sorting system (cf. Chap. 5.6 Sorting accepted coins (option), p. 22):

- 5-fold longitudinal sorting (Ex8xP4. ..)
- Fixed sorting chute in longitudinal sorting system (without sorting) (Ex1xP4. ./Ex2xP4. ./Ex3xP4. ./Ex4xP4. ./Ex5xP4. ..)

## 3 Safety instructions

Before starting up the device for the first time, please read these instructions and in particular the safety instructions carefully at least once. This is to ensure that you have understood the contents of this manual and how to operate the coin validator.

### 3.1 Proper use

The electronic 5" coin validator v<sup>2</sup> eagle with parallel BDTA interface is intended for use in slot and vending machines with parallel BDTA interface and is designed to check the coins inserted into the machine for specific properties and to accept (and sort) or reject them. Use the coin validator exclusively for this purpose. Under no circumstances can the manufacturer be held liable for any damage or loss resulting from improper use of the device.

The coin validator has been built in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, this equipment can constitute a source of danger. Please observe therefore the following safety instructions.

### 3.2 Protecting persons and equipment



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

**Use the coin validator only in accordance with its 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 discharges. Please observe the handling instructions for components exposed to the risk of electrostatic discharge.**

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

**Pay attention to correct equipotential bonding in the vending machine.**

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

**Pull the mains plug of the machine before installing, cleaning or removing the coin validator.**

**Contact NRI if you want to modify the device beyond the scope of the modifications or attachments described here.**

**Keep water and other liquids away from the coin validator.**

**Please dispose of the device correctly at the end of its service life.**

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



## 4 Design



This chapter describes

- the main parts the v<sup>2</sup> eagle consists of, and
- all parts required for the operation of the coin validator.

### 4.1 Overview

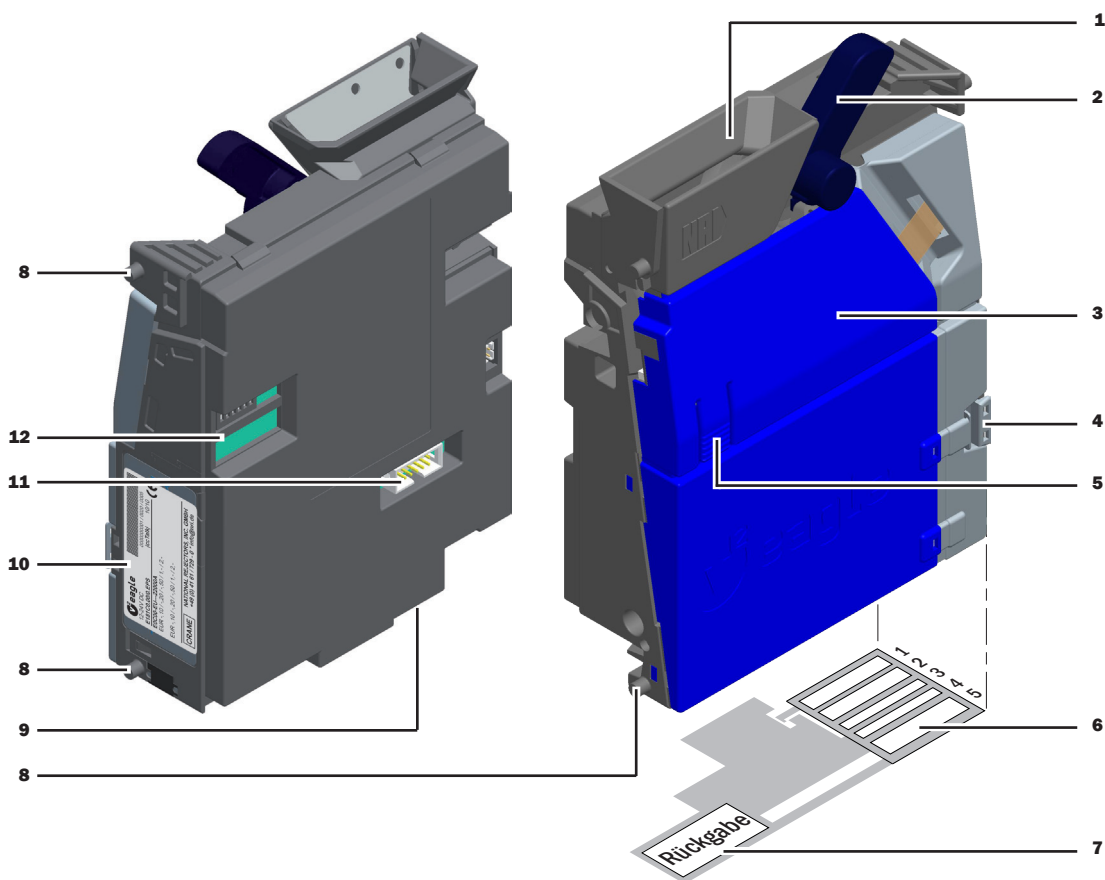


Fig. 1: Design

- |  |   |
|--|---|
| 1 Coin insert funnel<br>(front entry model, open on the side (cf. Chap. 4.2<br>Coin path, p. 13) | 7 Coin outlet – return (cf. Chap. 4.2 Coin path, p. 13) |
| 2 Coin return lever (option)   | 8 Mounting stud   |
| 3 Flight deck  | 9 Interface – service/configuration                     |
| 4 Locking lever for sorting cover  | 10 Label  |
| 5 Closing device for flight deck   | 11 Interface – machine (BDTA)                           |
| 6 Coin outlet – cash-box/sorting   | 12 Switch blocks  |

## 4.2 Coin path

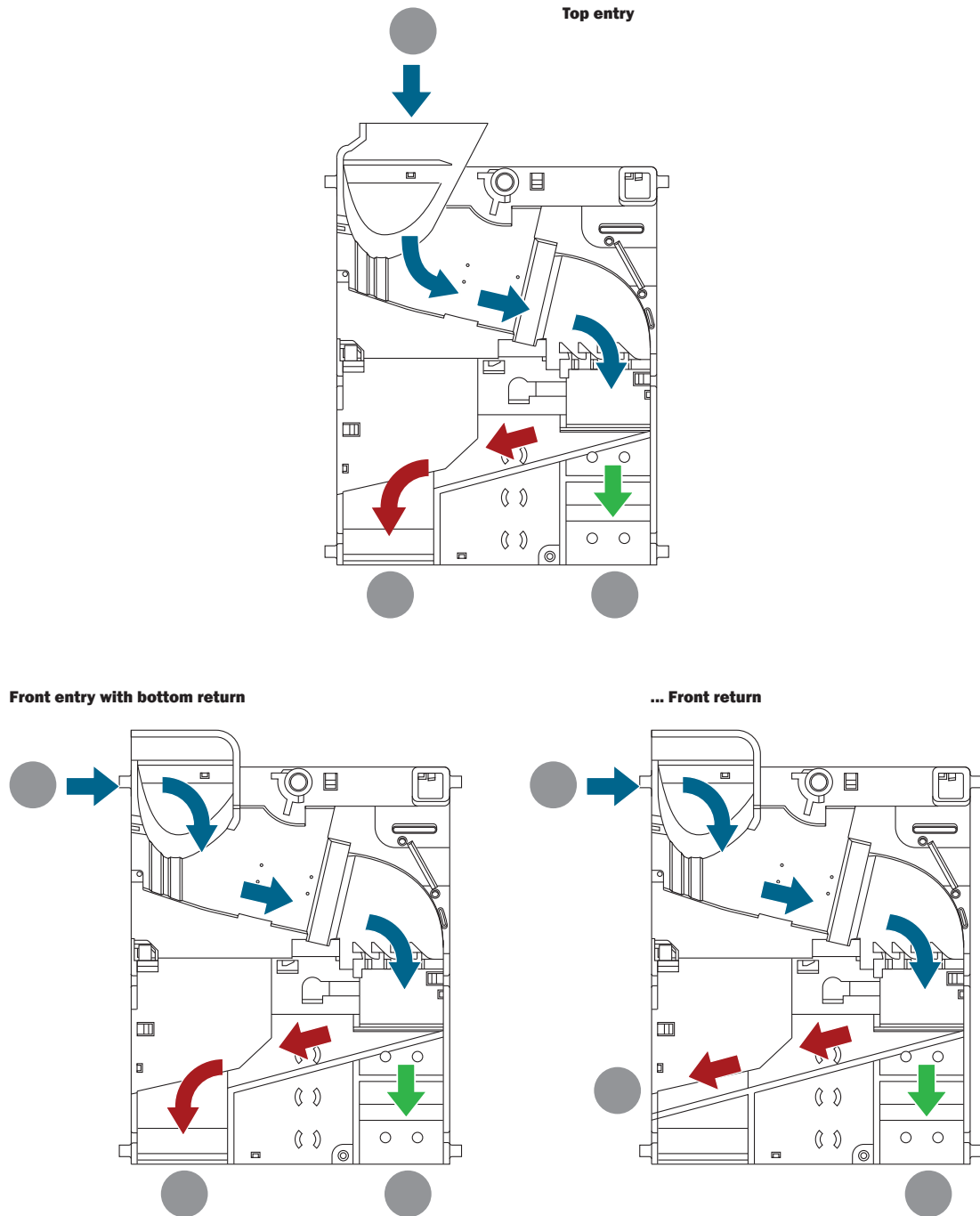


Fig. 2: Coin path

## 4.3 Label

The label of the coin validator [Fig. 1/10] contains all data defining the device, such as device number and type, operating voltage and customer-specific currency and coin programming:

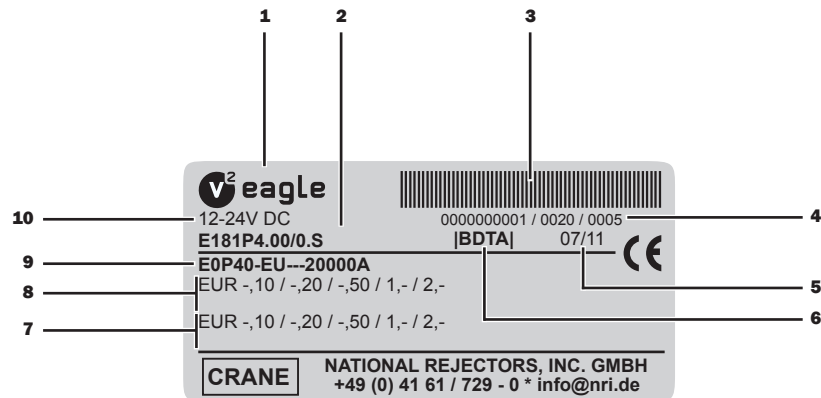


Abb. 3: Label

- |  |  |
|--|--|
| 1 Device type  | 7 Coin programming – memory block 1<br>(if DIL switch S1 set to ON)  |
| 2 Model number (see next section)  | 8 Coin programming – memory block 0<br>(if DIL switch S1 set to OFF) |
| 3 Bar code   | 9 Data block number (cf. Chap. 4.3.2 Data block<br>decoding, p. 15)  |
| 4 Ordering code (10-digit),<br>order number (4-digit),<br>device serial number (4-digit) | 10 Nominal voltage   |
| 5 Date of manufacture  |  |
| 6 Machine interface  |  |

### 4.3.1 Model number decoding

## v<sup>2</sup> eagle MODEL NUMBER DECODING



EXXX XX .XXX .XXX

Options – Diverter interface (currency d<sup>2</sup>), Encryption, Hardness sensor, Jam sensor, Narrow coin entry, Opto sensor, P = Write protection, String detection, Water protected, X = Interface for external balance

Options

Manufacturing process – internal option code & revision

Machine interface – C0 = ccTalk, C1 = ccTalk with USB interface, P4 = BDTA, S1, U0 = USBa

Machine interface

Coin return lever – 0 = no lever 1–4 = rf. table, 5 = rf. table, #1, bracketed dimensions, 6 = rf. table, #1, yellow, 7 = rf. table, #1, white

Sorting – 1..5 = Longitudinal sorting with fixed sorter chute 1..5, 8 = Longitudinal sorting, 9 = Cross sorting

Coin entry/outlet – 1 = Top entry, 2 = Top entry, 4<sup>th</sup> sorter chute narrowed (BDTA), 3 = Front entry/bottom return, 4 = Front entry & return

Equipment

v<sup>2</sup> family – E eagle

Coin return lever #	1	2	3	4
Front view				
Top view				
Actuating angle	47°	36°	36°	21°

Top edge of device

08/11 Hns/Roe  
Version 1.3  
K.V2E-EN

### 4.3.2 Data block decoding

## v<sup>2</sup> eagle DATA BLOCK NUMBER DECODING



EXXXX -XXXX -XXXXXX

Data block revision A–Z

3-digit consecutive number

Write protection – 0 = No protection, 1 = ACMI, 2 = VDAI, 9 = dll remote configuration

Memory block/Coin channels – 1 = 1 x 32 coin channels, 2 = 2 x 16 coin channels

Configuration

Second currency – XX = First 2 digits of ISO4217 currency code, -- = no 2<sup>nd</sup> currency, +2 = 2<sup>nd</sup> & 3<sup>rd</sup> currency, +3 = 2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> curr.

Currency

Main currency – XX = First 2 digits of ISO4217 currency code (EU = Euro, CH = Swiss franc, US = US dollar)

Hardware relevant to coin acceptance – 0 = Standard

Machine interface – C0 = ccTalk, C1 = ccTalk with USB interface, P4 = BDTA, S1, U0 = USBa

Hardware

Measurement variant – V0, V1

v<sup>2</sup> family – E eagle

## 4.4 Switch blocks

The coin validator has two switch blocks [Fig. 1/12] with ten DIL switches each (S1.1-10 and S2.1-10) on the rear of the device. The DIL switches can be used to set certain device functions:

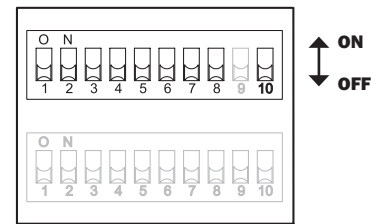
For details on how to use the switch blocks to set the individual functions, see *Chap. 7 Operation*, p. 27.



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

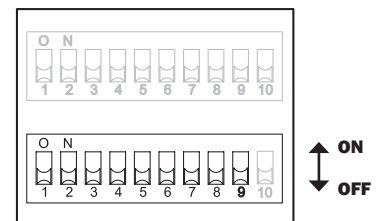
### 4.4.1 Switch functions – switch block S1

DIL switch	Function	OFF	ON
S1.1	Coin channel 1	enabled	inhibited
S1.2	Coin channel 2	enabled	inhibited
S1.3	Coin channel 3	enabled	inhibited
S1.4	Coin channel 4	enabled	inhibited
S1.5	Coin channel 5	enabled	inhibited
S1.6	Coin channel 6	enabled	inhibited
S1.7	Coin channel 7	enabled	inhibited
S1.8	Coin channel 8	enabled	inhibited
S1.9	not used	–	–
S1.10	Memory block	0	1



### 4.4.2 Switch functions – switch block S2

DIL switch	Function	OFF	ON
S2.1	Coin channel 9	enabled	inhibited
S2.2	Coin channel 10	enabled	inhibited
S2.3	Coin channel 11	enabled	inhibited
S2.4	Coin channel 12	enabled	inhibited
S2.5	Coin channel 13	enabled	inhibited
S2.6	Coin channel 14	enabled	inhibited
S2.7	Coin channel 15	enabled	inhibited
S2.8	Coin channel 16	enabled	inhibited
S2.9	Operating mode	Normal mode	Teach mode
S2.10	not used	–	–





## 4.5 Coin return lever

The return lever [Fig. 1/2] on the top of the device is operated using the return button on the machine when coins which have been inserted are to be returned or e.g. a jam caused by coins which have become stuck needs to be removed. Actuation of the return lever opens the measurement and validation area of the coin validator so that all objects in the coin validator are directed to the return area.

The v<sup>2</sup> eagle can be equipped with different return levers, depending on the dimensions of the machine (cf. Chap. 4.3.1 Model number decoding, p. 15).

## 4.6 Interfaces

For details of the machine interface [Fig. 1/11] please refer to Chap. 10 Technical data, p. 35.

## 5 Function



This chapter describes how the coin validator works:

- Coin acceptance and coin channels
- Memory blocks
- Accepted coin sensor and sorting control
- Coin pulses and signal lines
- Coin inhibition/activation of narrow coin channels
- Sorting accepted coins (option)
- Teach mode (option)
- String recognition (option)

### 5.1 Coin acceptance and coin channels

For coin acceptance the coin validator has 32 "memory slots" to which up to 32 different coin types or tokens can be assigned. These "memory slots" are called coin channels. The acceptance band of one coin type/token is assigned to each coin channel and the respective coin type/token is accepted in this channel.

To enable reliable rejection of false coins, channels with a narrow or even very narrow acceptance band are frequently set up for a coin type in addition to the normal coin channel. The limit values of these coin channels are closer to one another so that false coins with similar measured values are rejected, if the normal channel is inhibited (*cf. Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 28*). Narrow and very narrow coin channels, however, also feature a lower acceptance rate.

In addition, it is possible to assign coins with different measured values but identical coin values to different coin channels. In this way the coin validator can accept e.g. old and new coins of the same denomination.

In addition to the acceptance band of a coin type, further coin information which defines further processing of the coin after its acceptance is assigned to a coin channel: e.g. the coin signal line and pulse number or sorting information for a sorting device.



Since in most cases not all coin channels are assigned by customized factory programming, further coin types and the desired information can be assigned to these free channels at any time using the NRI configuration and service tools. Existing configurations can be changed.

Eight coin channels are intended to be used for the teach mode. In these teach channels new tokens/coin types can be taught also without configuration and service tools, directly on the coin validator using the switch blocks. I.e. a new coin or token is assigned to a channel (*cf. Chap. 5.7 Teach mode (option), p. 25*).

## 5.2 Memory blocks

The v<sup>2</sup> eagle manages two separately programmed (memory) blocks 0 and 1 (cf. Chap. 4.3 Label, p. 14). 16 coin channels with different coin types (also currencies), sorting information etc. can be assigned to each block. Only one block at a time can be active and used for coin measurement and further coin processing. You can use the switch block on the device to select the desired block (cf. Chap. 7.1 Selecting the memory block ..., p. 27).



*On request, the respective other memory block can also be loaded via the machine. This requires that the coin validator is programmed in the factory in such a way that the single inhibiting line 6 (pin 4) can no longer be used for inhibiting but for block switching. In this case coin line 1 (pin 13) is not only available for transmitting coin pulses, but also for the feedback to block switching (cf. Chap. 7.1 Selecting the memory block ..., p. 27) and (cf. Chap. 10.2 Machine interface, p. 36).*

## 5.3 Accepted coin sensor and sorting control

To ensure that accepted coins actually arrive in the cash-box or sorting device and that acceptance has not been tampered with, an accepted coin sensor (light barrier) and a sorting control (light barrier) check whether the inserted coin drops unhindered through the coin outlet towards the cash-box or sorting device. Only when the coin has passed these checking devices a coin signal or, in case of manipulation, an error code is transmitted to the machine.

## 5.4 Transmission of coin values via coin pulses and coin signal lines

By default each coin accepted by the coin validator sends a pulse to the machine control via the coin signal line assigned to it. A pulse signals to the machine control that a coin has been accepted.

Six coin signal lines are available to the coin validator. Depending on the signal line activated the machine knows the coin denomination (coin value) concerned.



Assignment of coin denomination and coin signal line is determined by customized factory programming.



*For distinction you also can assign a certain combination of signal lines, i.e. several signal lines, to a coin denomination.*

### 5.4.1 Multiple pulse

If the number of coin denominations programmed exceeds the number of signal lines available, several coin pulses (multiple pulses, 255 max.) per coin can be assigned to the coin denominations, so that the machine distinguishes the coin denominations not by the signal line but by the number of pulses. In this case a multiple of a small coin is assigned to higher value coins, e.g. if a 2 Euro coin is inserted two coin pulses would be sent to the vending machine control via the coin signal line assigned to the 1 Euro coin.



The number of coin pulses is determined by customized factory programming.

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

### 5.4.2 Coin pulse length

By default the coin pulse length is programmed to 100 ms. On request, however, it can be programmed shorter, e.g. for multiple pulses (possible programming: 30–300 ms).

## 5.5 Coin inhibition/activation of narrow coin channels

If coins are no longer to be accepted for payment on the machine you can either

- inhibit coin acceptance completely,
- inhibit all coin channels of a certain coin to ensure that this coin is no longer accepted, or
- inhibit the normal coin channel of a certain coin so that this coin is accepted only in the narrow channel.

### 5.5.1 Inhibiting all coins via the machine control system (common inhibit/blocking)

The machine can inhibit coin acceptance via the common inhibit/blocking signal line. In this case the coin validator does not accept any coins (*cf. Chap. 10.2 Machine interface, p. 36*).

### 5.5.2 Inhibiting individual coins/coin channels via the machine control system (individual inhibit/blocking)

For inhibiting a coin six single inhibit signal lines are available to the machine to

- inhibit all coin channels of a certain coin, e.g. if there is no more change in an external payout unit or in case of high fraud hazard.
- inhibit the normal coin channel of a certain coin so that this coin is accepted only in the narrow channel.

(*cf. Chap. 10.2 Machine interface, p. 36*).



The coin type or coin channel and the signal line via which it is to be inhibited are determined by customized factory programming.

### 5.5.3 Inhibiting individual coins/coin channels via the switch blocks

As an alternative to inhibition via the control system you can inhibit individual coin channels on site via the switch blocks on the coin validator.

*Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 28* describes how to inhibit these coin channels.

## 5.6 Sorting accepted coins (option)

To direct accepted coins either to the cash-box or an external sorting device, e.g. change tubes or hoppers, the coin validator can be equipped with a 5-fold longitudinal sorting mechanism at the coin outlet. The chutes are controlled via a flap sorting system using three solenoids.



In this section you learn all about the principle of

- longitudinal sorting
  - without optional sorting adapter
  - with optional sorting adapter
- activation of a cash-box/spare sorting chute (option)

### 5.6.1 Sorting principle of 5-fold longitudinal sorting (Ex8xP4. ..)

The individual coin types can be distributed to the five chutes arranged behind one another independent of their dimensions. Each chute can be defined as cash-box chute.



Which coin is sorted into which of the up to five chutes is determined by customized factory programming.



*Use the single inhibit signal lines for external sorting control:*

*If the same coin is configured in two different coin channels with identical acceptance bands (in the factory or by heartbeat), you can assign different sorting chutes to the two coin channels. If, in addition, different single inhibit signal lines are assigned to the two channels, the machine can sort the coin via the single inhibit signal lines into either of the two sorting chutes or into both.*

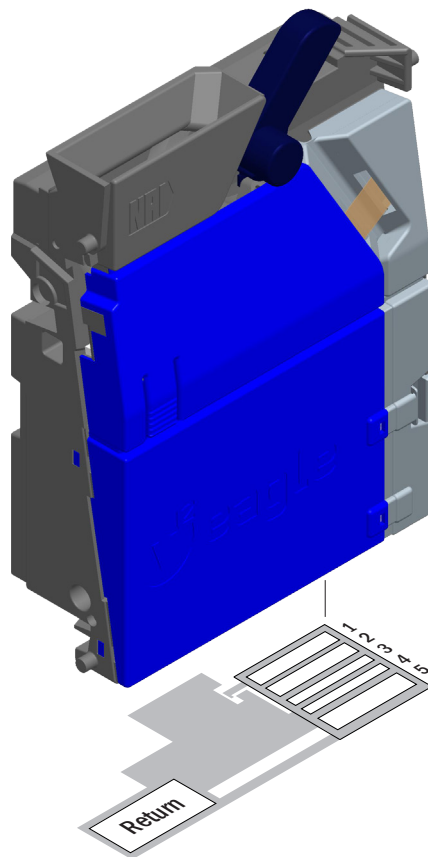


Fig. 4: Sorting chute 1–5 of longitudinal sorting system

**5.6.1.1 Sorting with NRI 4-fold sorting adapter (option)**

For the purpose of splitting-up and for better transport of the sorted coins you have the option of an NRI 4-fold sorting adapter (manifold) which can be screwed to the coin validator from the bottom. This adapter is primarily used in AWP and SWP slot machines.

If the sorting adapter is installed four sorting chutes are available to you (cf. Chap. 10.3 Accessories, p. 39).



Which coin is sorted into which of the up to four chutes is determined by customized factory programming.

The following table shows which adapter (manifold) chute corresponds to which coin validator chute:

Manifold chute	v <sup>2</sup> -eagle sorting chute
A	3
B	2
C	1
D	5

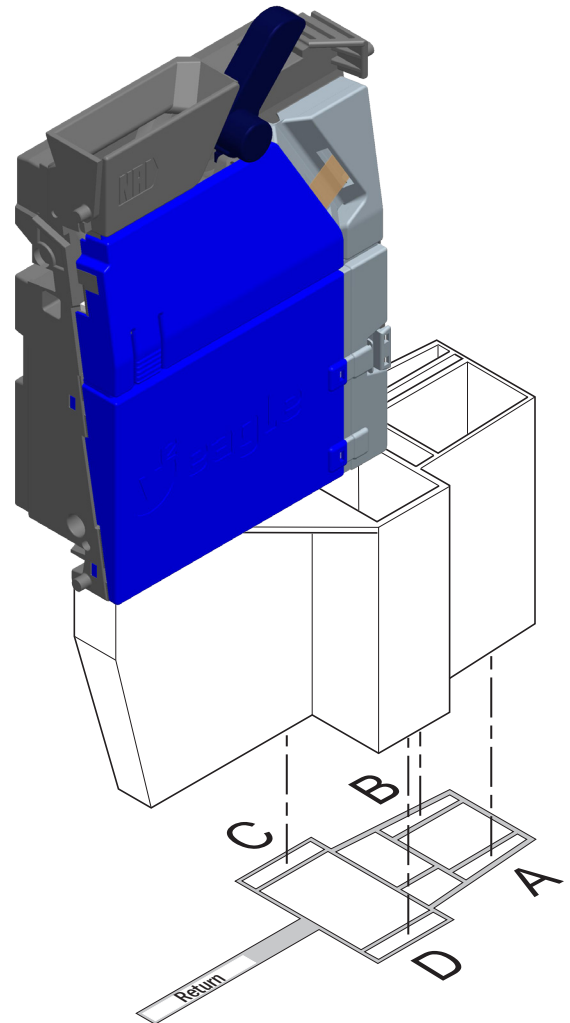


Fig. 5: Sorting chute A-D of sorting adapter

## 5.6.2 Activation of a cash-box/spare sorting chute (option)

If the machine control shall sort coins into the cash-box chute or into a spare sorting chute when the external sorting device sends a "full" signal, the coin validator can be programmed in the factory in such a way that, depending on the status of the single inhibit signal line 6 (pin 4) (high/low), the single inhibit signal lines 1-5 either

- inhibit coins by default (single inhibit signal line 6 = low, single inhibit lines 1-5 = high) or
- sort the coins assigned to the single inhibit signal lines into the cash-box (single inhibit signal line 6 = high, single inhibit signal lines 1-5 = high) (cf. Chap. 10.2 Machine interface, p. 36).



### Cash-box/spare sorting chute

The machine alternatively sends inhibit and sort signals to the coin validator via the single inhibit signal lines if no coin is accepted. The information is stored by the coin validator whenever the signal is present for at least 10 ms.



*If the cash-box chute is controlled via the single inhibit signal line 6, only five instead of six signal lines are available for coin acceptance and inhibiting.*



## 5.7 Teach mode (option)

If the v<sup>2</sup> eagle has been programmed accordingly in the factory, coin channels can be taught in the teach mode without configuration software via the switch block on the coin validator, i. e. a new token or coin is assigned to a coin channel. The new acceptance band is generated by inserting the tokens/coins. It is not necessary to remove the coin validator from the machine for this purpose. The last eight coin channels 9–16 (= teach channels) of the activated memory block are available for teaching (cf. Chap. 7.3 Teaching coin channels in teach mode (optional), p. 30).

## 5.8 String recognition (option)

To ensure that no coins suspended from a string can be inserted into the coin validator or that the acceptance gate cannot otherwise be tampered with, the coin validator can be equipped with an optical string sensor (cannot be retrofitted) in the acceptance area which recognizes both tight and loose strings.

The construction of the acceptance gate (dismounted in figure) makes the string go through the light beam between the two optical sensors. If the acceptance gate is completely closed, the string changes the light signal. If the acceptance gate is slightly open (tight string), the light beam is directly interrupted by flag on the acceptance gate.

If the sensor recognizes a string, coin signal line 1 or 6 sends a string signal to the machine and the coin is not accepted. At first, coin acceptance is inhibited for 30 seconds. If the string is not removed within this time period and the sensor continues to recognize it, coin acceptance remains inhibited and in addition all "jammed coins" are automatically released.

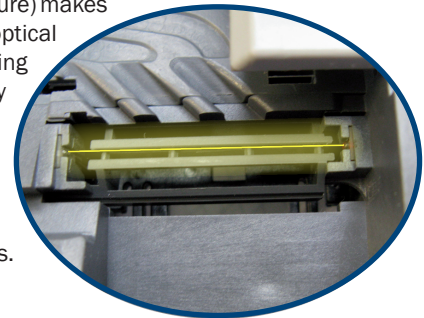


Fig. 6: Section – string recognition

Whether the string signal is sent via coin signal line 1 or 6 is determined by customized factory programming (cf. Chap. 10.2 Machine interface, p. 36).



Sensitivity of the string sensor



*To enable faster testing of the string sensor for functioning, coin acceptance is not inhibited when diagnosis is performed. When the string sensor is activated only a string signal is transmitted.*

*If your coin validator works in the G 18 mode - for controlling e.g. an external sorting device via a coin signal - manipulation protection is impaired, because this requires a coin signal at the end of the cash signal.*

## 6 Start-up

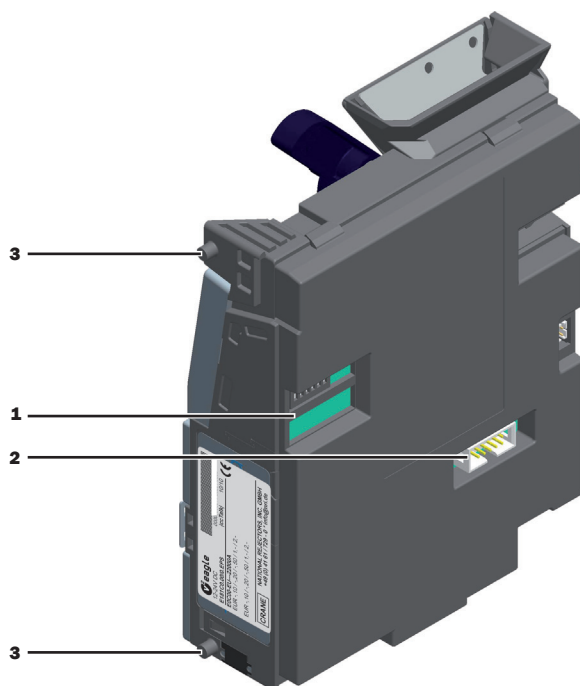


**For all assembly and installation work on the coin validator and the machine please observe the following safety instructions:**

- **The coin validator may only be connected by a qualified electrician.**
- **The coin validator is not suited for outdoor use.**
- **Do not use the coin validator if the device or connecting cable are damaged.**
- **Select the correct voltage for the coin validator (see label).**
- **Pay attention to correct equipotential bonding in the vending machine.**
- **Never pull the connecting cable of the coin validator from the machine when a voltage is applied.**
- **Pull the mains plug of the machine before installing or removing the coin validator.**

To install the v<sup>2</sup> eagle in a machine with parallel BDTA interface:

- 1** If necessary make individual settings via the switch blocks [Fig. 7/1] (cf. Chap. 7 Operation, p. 27).
- 2** Disconnect the machine from the mains supply.
- 3** Connect the coin validator to the machine using the 16-pin BDTA interface [Fig. 7/2] and the corresponding connecting cable.
- 4** Hang up the coin validator in the machine using the lateral mounting studs [Fig. 7/3].
- 5** Reconnect the mains supply to the machine.



- 1 Switch block
- 2 Interface – machine (BDTA)
- 3 Mounting stud

Fig. 7: Installation

## 7 Operation



This chapter describes how to operate the coin validator, i. e. set certain functions on the coin validator:

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

The settings which are made directly on the coin validator are described. A separate instruction manual describes how to make settings using the PC configuration software heartbeat (*cf. Chap. 9 What subsequent settings can be made?, p. 34*).

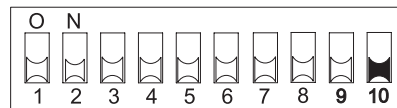
*Chap. 5 Function, p. 18* describes the functions of the adjustable device options.

### 7.1 Selecting the memory block ...

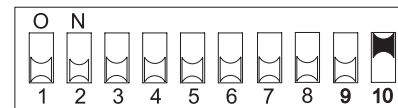
If the coin validator is to access the other memory block and e.g. accept Euro coins instead of the national currency coins, the desired memory block can be selected via the upper switch block on the coin validator or from the machine via a signal line:

#### 7.1.1 ... using the switch block on the coin validator

- 1 Unhook the coin validator from the machine.
- 2 For memory block 1 set DIL switch S1 to ON (up), for memory block 0 set DIL switch to OFF (down).



Memory block 0 selected



Memory block 1 selected

- 3 Remount coin validator in the machine.
- 4 Switch power off and on again.  
The required memory block is activated.
- 5 Check coin acceptance of the new memory block selected.

#### 7.1.2 ... via machine control (single inhibit signal line 6, option)

If the coin validator has been programmed accordingly in the factory, the other memory block in each case can also be loaded via the machine:

- 1 For memory block 1 set single inhibit signal line 6 (pin 4) to High, for memory block 0 to Low.  
The coin validator responds via coin signal line 1 (pin 13):
  - 10 ms pulse = memory block 0
  - 20 ms pulse = memory block 1
  - 30 ms pulse = error
- 2 Check coin acceptance of the new memory block selected.

## 7.2 Inhibiting coins/activating narrow coin channel

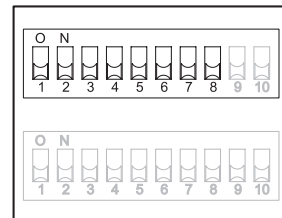
Using the two switch blocks on the coin validator you can inhibit on site each of the 16 coin channels of the activated memory block or each coin assigned to certain coin channels, which means that the inhibited channels are not used for payment on the machine:

- Accept coin unrestrictedly: all channels assigned are enabled
- Narrow the acceptance band of a coin: inhibit normal channel
- Inhibit coin: inhibit all channels assigned

The 16 DIL switches inhibit the following coin channels:

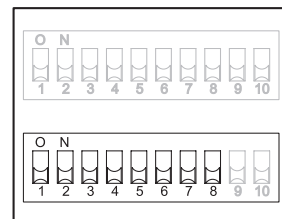
### 7.2.1 Inhibit functions – switch block S1

DIL switch	Function	OFF	ON
S1.1	Coin channel 1	enabled	inhibited
S1.2	Coin channel 2	enabled	inhibited
S1.3	Coin channel 3	enabled	inhibited
S1.4	Coin channel 4	enabled	inhibited
S1.5	Coin channel 5	enabled	inhibited
S1.6	Coin channel 6	enabled	inhibited
S1.7	Coin channel 7	enabled	inhibited
S1.8	Coin channel 8	enabled	inhibited



### 7.2.2 Inhibit functions – switch block S2

DIL switch	Function	OFF	ON
S2.1	Coin channel 9	enabled	inhibited
S2.2	Coin channel 10	enabled	inhibited
S2.3	Coin channel 11	enabled	inhibited
S2.4	Coin channel 12	enabled	inhibited
S2.5	Coin channel 13	enabled	inhibited
S2.6	Coin channel 14	enabled	inhibited
S2.7	Coin channel 15	enabled	inhibited
S2.8	Coin channel 16	enabled	inhibited



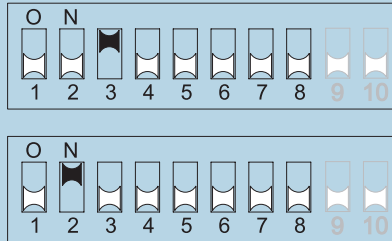
*On the rear of the device you will find a brief description of the individual switch functions with the factory assignment of coin denomination and coin channel.*

*This assignment can have been changed by means of the configuration software.*

If all coins are to be accepted for payment on the machine without restriction, the DIL switches S1.1–S1.8 and S2.1–S2.8 of the two switch blocks are set to OFF (down). If you want to inhibit any coin channel, you only must set the corresponding DIL switch to ON (up).

**Example**

The coin validator shall not use coin channels 3 and 10 for coin acceptance, so that coin channels 3 and 10 must be inhibited



With this setting the coin channels 3 and 10 are not used!



*If a normal and a narrow coin channel are programmed on the coin validator for one coin denomination, the normal coin channel must be inhibited as described above to enable activation of the narrow coin channel. If both channels are enabled, the broader acceptance band of the normal coin channel is used. If the coin denomination is to be inhibited, both coin channels must be inhibited.*

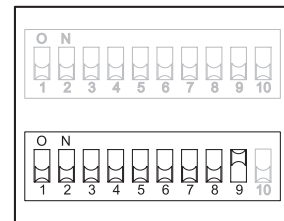
To inhibit coin channels on the coin validator:

- 1** Unhook the coin validator from the machine.
- 2** Inhibit the desired coin channels via DIL switches S1.1–8 and S2.1–8 (cf. example above).  
The desired coin channels have been inhibited.
- 3** Remount coin validator in the machine.

## 7.3 Teaching coin channels in teach mode (optional)

If the v<sup>2</sup> eagle has been programmed accordingly in the factory, up to eight coin channels (teach channels) can be taught on the coin validator via the bottom switch block in order to create new acceptance bands. You need at least ten coins/tokens of the new type. In the teach mode the following switches have the following functions:

DIL switch	Function	OFF	ON
S2.1	Teach mode	-	Teach channel 9
S2.2	Teach mode	-	Teach channel 10
S2.3	Teach mode	-	Teach channel 11
S2.4	Teach mode	-	Teach channel 12
S2.5	Teach mode	-	Teach channel 13
S2.6	Teach mode	-	Teach channel 14
S2.7	Teach mode	-	Teach channel 15
S2.8	Teach mode	-	Teach channel 16
S2.9	Teach mode	OFF	ON

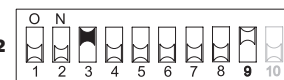


Proceed as follows to assign a new coin/token to coin channel 9-16 of the active memory block:



*Please note the current switch position to be able to reset the switch to this position for normal operation.*

- 1 Unhook the coin validator from the machine.
- 2 Set DIL switches S2.1–9 to OFF (down).
- 3 Set DIL switch S2.9 to ON (up).  
The device is in the teach mode for teaching the coin channels.
- 4 Select the coin channel to be taught (9–16, here: 11) by setting the corresponding DIL switch (S2.1–8, here: S2.3) to ON (up).
- 5 Insert at least 10 coins of the new coin type/token into the coin validator or machine.  
After the 10th coin has been inserted, the acceptance gate is operated once (brief clacking sound). Further coins can be inserted.



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

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

To save with the normal acceptance band:

**6a** Reset DIL switch S2.9 to OFF (down).

Successful saving is signalled by the acceptance gate attracting once. A saving error is signalled by the acceptance gate attracting twice (brief cracking sounds), if e.g. the acceptance band of the coins inserted and the acceptance band of a coin channel already programmed overlap, or the measured values generated are too different and the tolerances would become too large.



*To cancel the process first set the DIL switch of the respective coin channel (S2.1–8, here: S2.3) and then DIL switch S2.9 to OFF (down).*

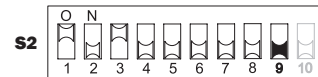
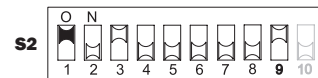
To save with the wide acceptance band:

**6b** Set an additional DIL switch S2.1–8 (here: S2.1) to ON (up).

The acceptance band has been widened.

Now you can reset DIL switch S2.9 to OFF (down).

Successful saving is signalled by the acceptance gate attracting once. A saving error is signalled by the acceptance gate attracting twice (brief cracking sounds), if e.g. the acceptance band of the coins inserted and the acceptance band of a coin channel already programmed overlap, or the measured values generated are too different and the tolerances would become too large.



*To cancel the process first set the DIL switch of the respective coin channel (S2.1–8, here: S2.3) and the additional DIL switches for the wide acceptance band (here: S2.1) and then DIL switch S2.9 to OFF (down).*

**7** Reset DIL switch S2.1–8 to the position for normal operation.

**8** Remount the coin validator in the machine.

**9** Switch power off and on again.

The coin validator will now accept the new coin/token for payment.

## 8 Maintenance and service



This chapter describes how to

- clean the v<sup>2</sup> eagle and
- remedy the cause of malfunctions.

### 8.1 Cleaning the coin runway

On their way through the coin validator the coins may leave residues on sensitive parts which must be removed from time to time to ensure reliable coin acceptance and rejection. Apart from this, no further maintenance work is required.

- Cleaning interval: as required, minimum once per year,
- Cleaning agent/tool: compressed air/small brush/moistened cloth, lukewarm water



**Moisten the cloth only slightly to prevent fluid from entering the device. This would damage the PCB.  
Do not use any solvents or scouring agents which attack the plastic material of the device.**

- 1 Pull the mains plug of the machine.
- 2 Pull the coin insert funnel [Fig. 8/1] at the front and open the flight deck widely - beyond the first stop.
- 3 Clean the coin runway in the coin validator using compressed air/brush or a cloth.
- 4 Remove dust and coin residues from the validation area using cloth/brush or compressed air.
- 5 Wipe the two sides of the coin runway clean using a slightly moistened cloth.
- 6 Allow all parts to dry.
- 7 Close flight deck and press closing device [Fig. 8/2] so that the flight deck audibly clicks into place.
- 8 Reconnect the machine to the mains supply.

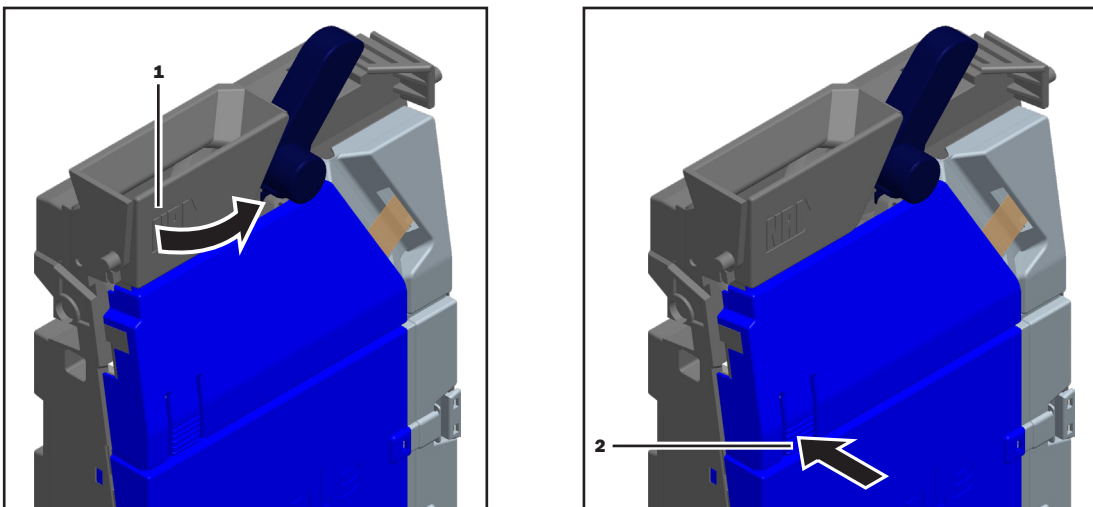


Fig. 8: Opening and closing the flight deck of the coin validator



## 8.2 Troubleshooting

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

Problem	Possible cause	Remedy, hints
Coin validator does not accept coin	No power supply	<ul style="list-style-type: none"> <li>• Connect cable to validator and machine correctly</li> <li>• Supply machine with voltage</li> </ul>
	Return lever pressed/got stuck	Ensure that return lever is not permanently pressed by error
	Coin runway dirty	Open flight deck and clean coin runway ( <i>cf. Chap. 8.1 Cleaning the coin runway, p. 32</i> )
	Flight deck not locked	Make sure that the flight deck is locked properly by pressing the closing device ( <i>cf. Chap. 8.1 Cleaning the coin runway, p. 32</i> )
	Coin inhibited	<ul style="list-style-type: none"> <li>• Make sure that the machine control does not inhibit coin acceptance via common or single inhibit signal lines or the wrong single inhibit signal line has been assigned (<i>cf. Chap. 10.2 Machine interface, p. 36</i>), if necessary, correct using heartbeat</li> <li>• Make sure that the coin is not inhibited via DIL switch on the rear of the device, or that not only the narrow coin channel is enabled and the normal one is inhibited (<i>cf. Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 28</i>)</li> </ul>
Coin validator accepts coin, but no credit is given	Coin does not exit the device	Make sure that the coin outlet is not blocked by foreign objects or devices connected to the bottom of the coin validator

If the malfunction cannot be remedied please contact our service technicians.

## 9 What subsequent settings can be made?



This chapter provides general information concerning the NRI service and configuration tools for the v<sup>2</sup> eagle and the device functions which can be configured subsequently.

### 9.1 Service and configuration tools

Depending on whether you want to configure the coin validator in the workshop or on site a PC software or a mobile service tool is recommended.

#### 9.1.1 PC configuration software heartbeat

The PC software heartbeat serves for diagnostics and individual configuration of the new NRI coin validator generation and for updating the complete coin and device configuration using data blocks currently provided by NRI (data block upload).

The heartbeat software identifies the coin validator connected to the PC and its device-specific data and displays the data on the screen of your PC for diagnostics and configuration.

The separate software manual describes how to connect the coin validator to your PC and how to install and use the software.

#### 9.1.2 On-site service tool HENRI<sup>+</sup>

For on-site configuration the HENRI<sup>+</sup> Service Tool is a suitable tool by which you can update the complete coin and device configuration quickly and reliably via data block upload.

The separate short reference guide describes how to connect and use the tool.



*HENRI<sup>+</sup> is also suitable for on-site firmware updates.*

### 9.2 Which device functions can be set?

- Acceptance of genuine coins and rejection of false coins  
(acceptance band adjustment after insertion of genuine coins and false coins)
- Coin via channel assignment of
  - coin signal line(s)
  - Coin pulse number
- Sorting via channel assignment of
  - sorting chute
  - cash-box tube/spare sorting tube (option)
- Coin blocking via channel assignment of single inhibit signal line
- Sensitivity of the string sensor
- New coins/tokens  
(generation of a new acceptance band and assignment of the coin/sorting data)
- Data block upload for current coin and device data

## 10 Technical data



This chapter contains

- all relevant v<sup>2</sup>-eagle data
- details concerning the machine interface
- information concerning v<sup>2</sup>-eagle accessories

### 10.1 Device data

Supply voltage	10 V to 28 V DC
Current consumption max. when accepting coins	Acceptance solenoid: approx. 3 W Sorting solenoid: approx. 2 W (max. 2 at the same time)
U <sub>nom</sub> = 12 V	Without sorting: approx. 400 mA (for approx. 150 ms) With sorting: approx. 400 mA (for approx. 150 ms)
U <sub>nom</sub> = 24 V	Without sorting: approx. 400 mA (for approx. 150 ms) With sorting: approx. 400 mA (for approx. 150 ms)
Dielectric strength, in/outputs	28 V max.
Current load, outputs	10 mA max. (open collector)
Temperature range	0 °C to 60 °C
Temperature change	0.2 °C/min. max.
Rel. humidity	up to 93 %
Condensation	not permitted
Machine interface	6 coin signal outputs (open collector) (active low ≤ 0.8 V) 6 single inhibit signal outputs (open collector) (active high ≥ 3.7 V (acceptance ≤ 0.9 V)) Common inhibit signal input (open collector) (active low ≤ 0.9 V (acceptance ≥ 3.7 V)) Return output (active low ≤ 0.8 V at I = 20 mA) For pin assignment refer to <i>Chap. 10.2 Machine interface, p. 36</i>
Coin acceptance	32 coin types max. in 2 x 16 channels Coin diameter: 15–31 mm (optionally up to 32 mm, at 2.4 mm thickness max.) Coin thickness: 1.5–2.4 mm (optionally up to 3.4 mm) Speed: 2 coins/sec
Device dimensions	Height: 181.3 mm Width: 127.0 mm (+ 2 x 4.5 mm for mounting studs) Depth: 64.0 mm
Mounting position	vertical, max. deviation: ± 2°
Directives applied	EMC: 2004/108/EC EN 55 014-2 (interference resistance) EN 55 022 (interference emission) Machinery: 2006/42/EC R&TTE: 1999/5/EC (Radio and telecommunications terminal equipment) (cf. Declaration of Conformity)

## 10.2 Machine interface

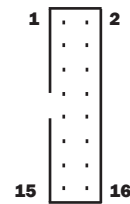


On the following pages you will find pin assignment, interface description and the connection diagram for the connection of the v<sup>2</sup> eagle to the machine.

### 10.2.1 Pin assignment

The **B**undesverband der **D**eutschen **T**abakwaren-Großhändler und **A**utomatenaufsteller (BDTA) (association of German tobacco wholesalers) determined the DTG standard 2 for the electrical interface to the vending machine. This standard includes the specification of the supply voltage, the coin signal lines, inhibit functions and the return signal. In addition to further standardization requirements for validators the measurement quality of validators is also specified.

Pin	Input/output	Function	Level
1	IN	Single inhibit line 4	active high
2	IN	Single inhibit line 5	active high
3	IN	Single inhibit line 2	active high
4	IN	<ul style="list-style-type: none"> <li>• Single inhibit line 6</li> <li>• Memory block 1 selection line (memory block 2 (active low))</li> <li>• Control line for cash-box/spare sorting chute</li> </ul>	active high
5	OUT	Return line	active low
6	IN	Common inhibit line	active low
7	OUT	Coin line 4	active low
8	-	Supply 0 V	GND
9	OUT	<ul style="list-style-type: none"> <li>• Coin line 6</li> <li>• String line</li> </ul>	active low
10	OUT	Coin line 2	active low
11	OUT	Coin line 5	active low
12	OUT	Coin line 3	active low
13	OUT	<ul style="list-style-type: none"> <li>• Coin line 1</li> <li>• String line</li> <li>• Message line for memory block</li> </ul>	active low
14	IN	Single inhibit line 3	active high
15	IN	Single inhibit line 1	active high
16	-	Operating voltage $U_b = +10-28$ V DC	-



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

## 10.2.2 Interface description

### Coin lines

Coin validator signals the coin accepted in the respective coin channel (usually by one pulse, if there are not sufficient lines by multiple pulses)

### Return line

After pressing of the return lever/return button the coin validator signal opening of the measuring and validation area

### Common inhibit line

Machine inhibits coin acceptance

### Single inhibit line

Machine inhibits coin acceptance in the coin channel assigned to the respective line

### String line (option)

Coin validator signals a coin suspended from a string (whether the signal is received via pin 9 or 13 is determined by customized factory programming)

### Memory block 1 selection line (option)

Machine loads memory block 1. (Memory block 0 = line at Low.)



*With this line function single inhibit line 6 is not available.*

### Memory block message line (option)

Coin validator signals which memory block has been activated via the memory block 1 selection line (10 ms = block 0, 20 ms = block 1) or whether an error occurred during memory block loading (30 ms).



*With this line function short pulse lengths should be defined for coin signals sent via coin line 1.*

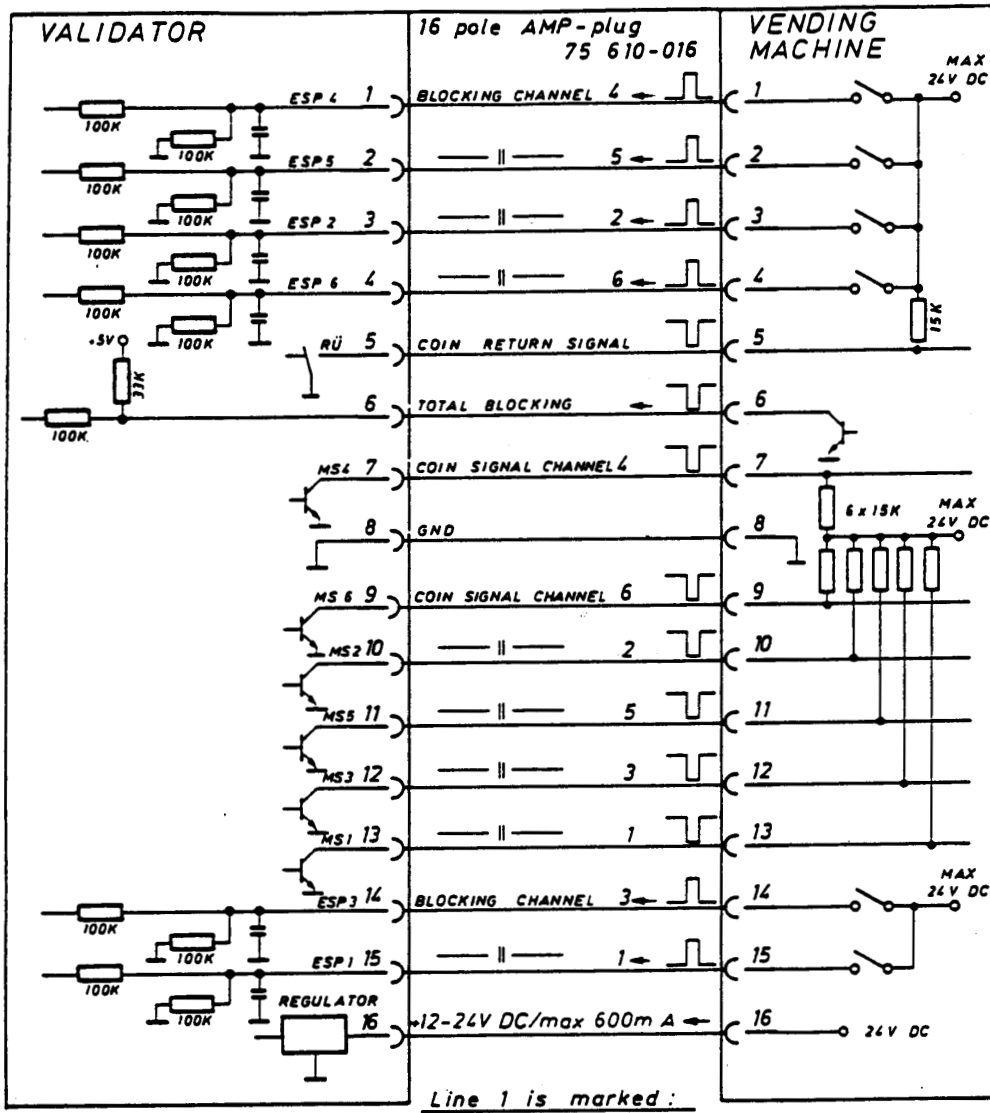
### Control line for cash-box/spare sorting chute (option)

Machine signals that single inhibit lines 1–5 are used for cash-box/spare chute sorting.



*With this line function single inhibit and coin line 6 is not available.*

### 10.2.3 Connection diagram



Line 1 is marked:  
by colour at the cable  
and by an arrow at the plug

## 10.3 Accessories

To adapt the v<sup>2</sup> eagle to your individual requirements you can acquire the following accessories from NRI:

### 10.3.1 Front plates

Accessories	Ordering code
Front plate for front entry and bottom return.....	12918
Front plate for front entry and front return.....	10897

### 10.3.2 Sorting adapter

Accessories	Ordering code
4-fold sorting adapter .....	10402

## 11 Index

4-fold sorting adapter 23  
5-fold sorting 10

### A

Accentuations in the text 8  
Acceptance band 18  
  narrow 18  
    activate 28  
  new 25  
    procedure 30  
  normal 18  
  very narrow 18  
Acceptance, coins 18, 35  
  inhibit 21  
Acceptance speed 35  
Accepted coin sensor 19  
Accessories 39  
Adapter, sorting 23  
  ordering code 39  
Advantages 9  
Angle, mounting position 35  
Application, proper 11

### B

Bar code 14  
BDTA interface 12, 35  
Block 14, 19  
  external selection line 37  
  select 27  
Blocking line 37

### C

Cash-box chute 24  
  external sorting line 37  
Change tubes 22  
Change units 22  
Channels 18  
  inhibit 28  
  narrow 18  
    activate 28  
  normal 18  
  very narrow 18  
Chapter summary 8

Cleaning 32

Coin

  inhibit 21  
    procedure 28  
  new 25  
    procedure 30  
Coin acceptance 18, 35  
  inhibit 21  
    procedure 28  
Coin channels 18  
  inhibit 28  
  narrow 18  
    activate 28  
  normal 18  
  very narrow 18  
Coin diameter 35  
Coin flight deck  
  closing device 12  
  open/clean 32  
Coin insert funnel 12  
Coin outlet 12  
Coin path 13  
Coin pulse 20  
Coin pulse length 20  
Coin runway 13  
Coin signal line 20, 37  
Coins, teaching 25  
  procedure 30  
Coin thickness 35  
Coin tubes 22  
Coin value 20  
Common inhibit/blocking 21  
Common inhibit line 37  
Condensation 35  
Configuration 8, 27, 34  
  on site (HENRI+) 34  
  PC programming station (heartbeat) 34  
Connections  
  description 36  
  pin assignment 36  
  service/configuration 12  
  vending machine 12  
Current consumption 35  
Current load, outputs 35



**D**

- Data block number 14
  - decoding 15
- Data block upload 34
- Date of manufacture 14
- Date of production 14
- Design 12
- Deviation, mounting position 35
- Device, connecting 26
- Device dimensions 35
- Device number 14
- Device type 14
- Diagnostics 34
- Dielectric strength, in/outputs 35
- DIL switch 12, 16
  - inhibiting coin channel/activating narrow coin channel 28
  - selecting memory block 27
  - teaching coins 30
- Dimensions 35
- Documentation, additional 9

**E**

- Electrostatic discharge 11
- Employment, proper 11
- External sorting 24

**F**

- Firmware update 34
- Flap sorting system 22
- Flight deck
  - closing device 12
  - open/clean 32
- Front entry and
  - bottom return 10
  - front return 10
- Front plate, ordering codes 39
- Function 18

**G**

- General information
  - chapter 8
  - coin validator 9
  - instructions 8
- Guide, chapter contents 8

**H**

- Heartbeat 34
  - adjustable functions 8, 34
  - manual 9
- HENRI+ 34
- Homepage, NRI 9
- Hopper 22
- Humidity 35

**I**

- Individual inhibit/blocking
  - via switch blocks 28
  - via vending machine 21
- Inhibit, coins 21
  - procedure 28
- Insert funnel 12
- Insertion 10
- Instructions 8
- Instructions, additional 9
- Interface
  - label 14
  - service/configuration 12
  - vending machine 12, 35, 36
- Internet address, NRI 9
- Introduction
  - chapter 8
  - coin validator 9
  - instructions 8

**L**

- Label 14
- Lines 20, 37
- Longitudinal sorting 22
  - 4-fold sorting adapter 23

**M**

- Malfunction, what to do? 33
- Manifold 23
  - ordering code 39
- Manuals, additional 9
- Marks in the text 8
- Measured values 18
- Measures 35
- Memory block 14, 19
  - external selection line 37
  - select 27

- Model number 14
- Models 10
  - decoding of model no. 15
- Mounting position 35
- Mounting stud 12
- Multiple pulse 20
  - pulse-to-pause ratio 20
- N**
- New coin 25
  - teach 30
- Nominal voltage 14
- O**
- Open, coin validator 32
- Operating instructions, additional 9
- Operating voltage 35
- Operation 27
- Options 10, 39
- Ordering code
  - accessories 39
  - coin validator 14
- Order number 14
- P**
- Payout units 22
- PC programming station (heartbeat) 34
  - service interface 12
- Pictographs in the text 8
- Pin assignment 36
- Plug
  - service/configuration 12
  - vending machine 12, 35
- Power consumption 35
- Power supply 35
- Programming 8, 34
  - on site (HENRI+) 34
  - PC programming station (heartbeat) 34
- Proper use 11
- Pulse 20
- Pulse length 20
- Pulse-to-pause ratio (multiple pulses) 20
- R**
- Relative humidity 35
- Requests to perform an action 8
- Return 10, 12
  - at the bottom and front entry 10
  - at the bottom and top entry 10
- Return lever 12
  - description 17
- Return line 37
- S**
- Safety instructions 8, 11
- Serial number 14
- Settings 8, 27, 34
  - on site (HENRI+) 34
  - PC programming station (heartbeat) 34
- Signal lines 20, 37
- Single inhibit line 37
- Software
  - for configuration 34
  - update 34
- Sorting 10, 22
  - 4-fold sorting adapter 23
  - external 24
  - figure 22
  - longitudinal sorting 22
- Sorting adapter 23
  - ordering code 39
- Sorting chute 12
- Sorting control 19
- Sorting line 37
- Spare sorting chute 24
- Start-up 26
- String recognition 25
- String signal line 37
- Summary, chapter 8
- Supply voltage 35
- Switch blocks 12
  - description 16
  - inhibiting coin channel/activating narrow coin channel 28
  - selecting memory block 27
  - teaching coins 30
- Symbols in the text 8

**T**

Teach mode 25  
    procedure 30  
Technical data 35  
Temperature change 35  
Temperature range 35  
Tilt, mounting position 35  
Top entry and bottom return 10  
Troubleshooting 33  
Tubes 22

**U**

Update, firmware 34  
Use, proper 11

**V**

Variants 10  
    decoding of model no. 15

**W**

Web site, NRI 9  
[www.nri.de](http://www.nri.de) 9