

Operating Instructions



3.5" Free Fall Coin Validator **v² falcon**

02.14 WP/Hns/Roe
BA_v2_falcon_EN_1-3



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1 Revision protocol

Version	Revision	Chapters/sections concerned
_1-0	General revision of draft version 0.2	All
_1-1	Decoding of data block number	4.3.1 "Data block number decoding"
_1-2	New section title	6.2 "Installation dimensions for customer-supplied coin feeder"
_1-3	• Additional drawing for coin feeder	6.2 "Installation dimensions for customer-supplied coin feeder"
	• Additional ccTalk error code 15	10.2.1.3 "ccTalk error code table"

2 About ...



This chapter is intended to give you an initial overview of the advantages and options of the v² falcon free fall coin validator. 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 3.5" v² falcon free fall coin validator with serial ccTalk interface or parallel standard or SGI interface. Afterwards, chapters 6 and 7 explain the necessary steps for starting up and operating the coin validator. Chapter 8 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 instructions and to operate the device, the symbols below are printed 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 that are set or prepared on a customer-specific basis at the factory and which you can set or change using our service and configuration tool (cp. Chap. 9 What can be set later?, p. 36).

1 2 3 ...

Requests to perform an action are numbered in a different typeface.

[Fig. 1/2]

Cross-reference to an illustration. 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 these operating instructions, there is further documentation for the v² falcon and its accessories. You can download all the documentation PDF files by visiting www.craneps.com "Support".

2.2 About the v² falcon

The v² falcon coin validator with parallel or serial ccTalk interface in standardized 3.5" format uses the patented multi-frequency measuring technology (MFT) for reliable coin validation. Its free fall construction allows the coin validator to measure coins in free fall. This shortest way possible through the measurement area of the validator guarantees an extremely high acceptance speed of up to ten coins per second. So the v² falcon is ideally suited for amusement and service machines.

Communication with the machine control is either via a ccTalk specified four-pin male connector or a ten-pole parallel male connector providing the machine with eight signal lines for the transmission of coin acceptance, inhibition and errors.

For coin acceptance, the coin validator has available 32 coin channels that can be managed either in a single memory block or divided into two memory blocks – 2 x 16 coin channels – with different coin configurations, the blocks can be switched on an individual basis.

Depending on the application, the coin validator can control a 3-fold sorter.

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 in the workshop via a PC programming station.

You can also configure coins or tokens that are ignored ex-works without needing configuration software, you just insert the coins in teach mode on the coin validator.

2.2.1 v² falcon properties

- 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
- Operational safety and security against manipulation by means of an optical accepted coin sensor in the coin validation and coin outlet area
- String recognition
- Acceptance speed of up to ten coins per second
- 32 coin channels managed in one or two memory blocks that are configured independently of one another and are switched individually (2 x 16 coin channels)
- Service interface for PC programming station
- Flash technology for easy and time-saving firmware updates (CXflash)
- Options
 - HSD-3000 3-fold high-speed sorter
 - ACMI write protection with ccTalk units
 - Eight different parallel SGI interfaces depending on machine environment

2.2.2 Models and operating modes

There are different versions of the v² falcon available. They mainly differ in

- construction and
- machine interface.

2.2.2.1 Construction

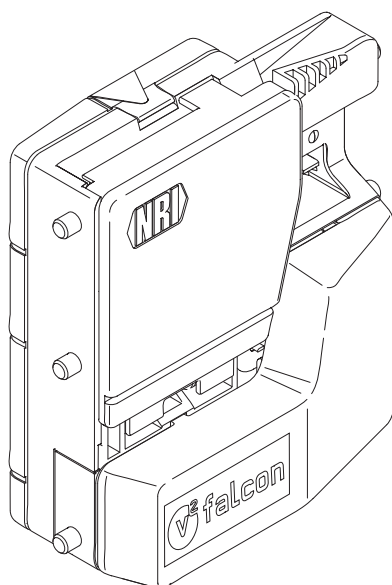


Fig. 1: v² falcon standard construction

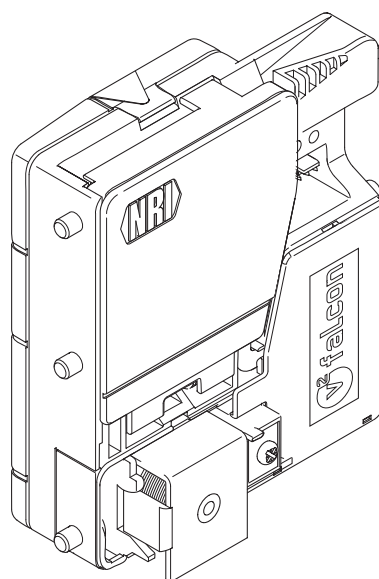


Fig. 2: v² falcon extra flat

2.2.2.2 Machine interface

It is possible to operate the v² falcon using the serial or parallel interface.

In serial operation the coin validator communicates with the machine controller via the ccTalk protocol (cp. Chap. 10.2.1 v2 falcon ccTalk – Machine, p. 38). The coin validator works as slave and the machine as master. The ccTalk protocol is open for everybody and can be used without restrictions. Two versions are possible:

- Standard
Protocol according to ccTalk specification.
- ACMI
The factory programming of the coin validator in this model meets all requirements of the Italian gaming machine act "legge 289 – comma 6" passed in July 2003. The ACMI version of the v² falcon is write-protected so that it is not possible to change the factory programming using configuration tools.



In order to meet the requirements of the Italian gaming machine act subsequent configuration of the ccTalk ACMI model is impossible. If you want to change the factory settings please contact our sales representative.

In parallel operation the coin validator is fitted with either a 10-pole standard interface (cp. Chap. 10.2.2 v2 falcon parallel, standard – Machine, p. 42) or one in eight optional SGI interfaces (cp. Chap. 10.2.3 v2 falcon parallel, SGI – Machine, p. 44).

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 v² falcon electronic 3.5" coin validator with serial ccTalk interface or parallel standard or SGI interface is for use in entertainment, vending and service machines with an interface equivalent and is intended to check the coins that are inserted in the machine for specific properties and to either accept 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 must only be connected by a trained 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 nameplate).

Ensure the correct potential equalization in the machine.

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

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

Please consult Crane Payment Solutions in Buxtehude, Germany if you intend to make additions or modifications to the device that go above and beyond the modifications 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 component parts of the v² falcon,
- which path a coin takes from coin insert funnel to coin outlet and
- all parts required for the operation of the coin validator.

4.1 Overview

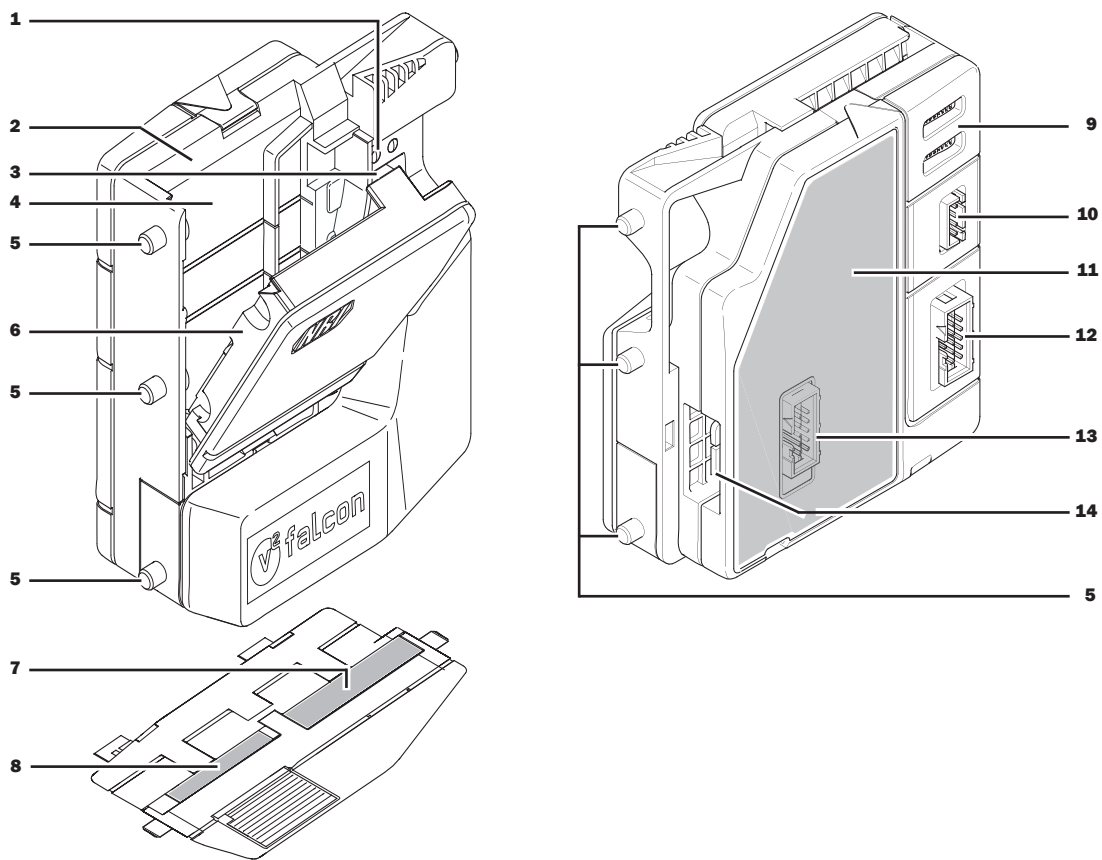


Fig. 3: Design – v² falcon, standard construction

- | | |
|--|---|
| 1 Status LEDs | 9 Switch blocks |
| 2 Coin insert funnel | 10 Interface – machine (ccTalk) |
| 3 Interface – machine (SGL, 3–7-pole) | 11 Nameplate (<i>cp. Chap. 4.3 Nameplate, p. 14</i>) |
| 4 Coin runway, measurement & validation area | 12 Interface – 3-fold sorter, option (e.g. s ² HSD-3000) |
| 5 Mounting studs | 13 Interface – machine (parallel standard or SGL, 3–10-pole) |
| 6 Flight deck | 14 Interface – service/configuration |
| 7 Coin outlet – return | |
| 8 Coin outlet – cash box | |

4.2 Coin path

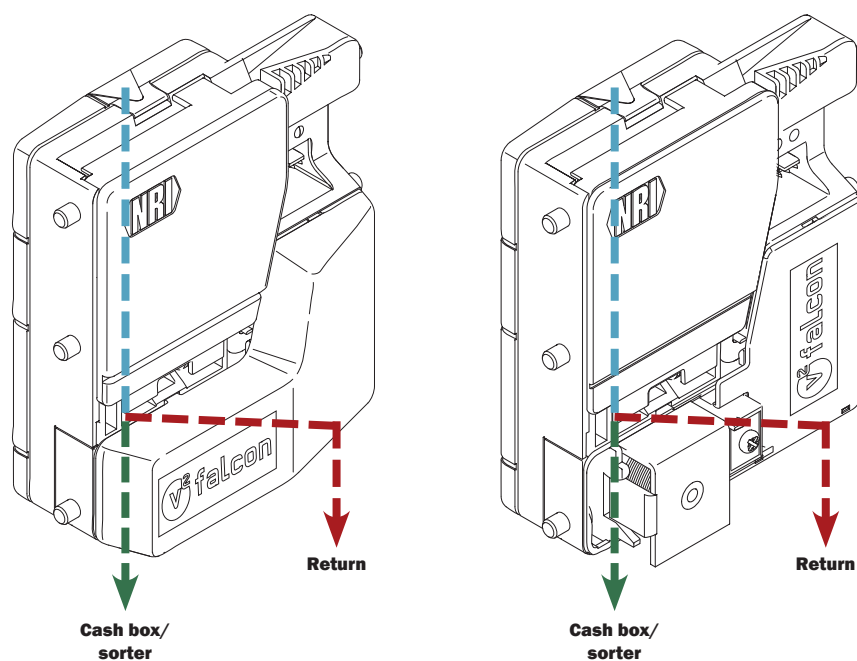


Fig. 4: Coin path of v² falcon, standard construction (on the left) and extra flat construction (on the right)

4.3 Nameplate

The nameplate [Fig. 3/11] shows the characteristic data of the device like the device series, type, and operation as well as customer-specific currency and coin programming:

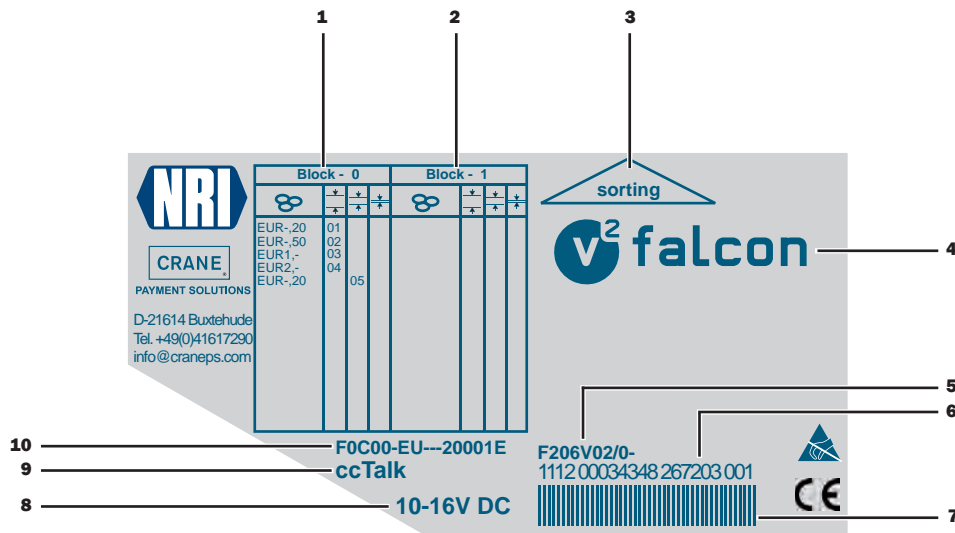


Fig. 5: Nameplate

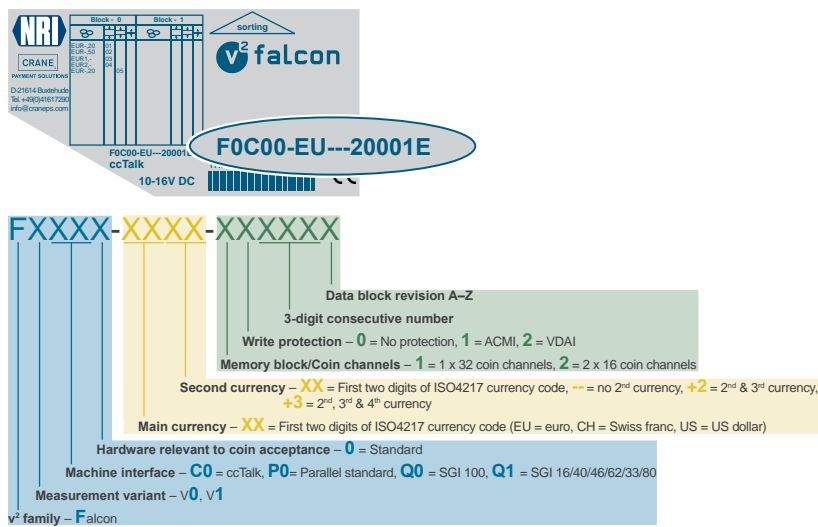
- | | |
|---|---|
| <p>1 Coin programming – memory block 0
(if DIL switch S1.10 to OFF)</p> <ul style="list-style-type: none"> ⌘ currency & coin denomination programmed in ⌘ normal coin channel (2-digit no.) ⌘ narrow coin channel (2-digit no.) ⌘ super narrow coin channel (2-digit no.) N new coinage <p>2 Coin programming – memory block 1
(if DIL switch S1.10 to ON)</p> <p>3 Interface – external sorter</p> <p>4 Device type/name</p> <p>5 Model number Fxyxzz/O</p> | <p>6 Date of manufacture (4-digit)
Ordering code (8-digit),
Order number (6-digit),
Device serial number (3-digit)</p> <p>7 Bar code</p> <p>8 Nominal voltage</p> <p>9 Machine interface</p> <p>10 Data block number (cp. Chap. 4.4 Switch blocks,
p. 16)</p> |
|---|---|
-
- | | |
|--|--|
| <p>F0yV with parallel standard interface</p> <p>F1yC with parallel SGI interface: 16A/B</p> <p>F2yC with parallel SGI interface: 40A</p> <p>F3yC with parallel SGI interface: 46A</p> <p>F4yC with parallel SGI interface: 62A/AS</p> <p>F5yC with parallel SGI interface: 33A</p> <p>F6yC with parallel SGI interface: 16A/B</p> <p>F9yC with parallel SGI interface: 80A</p> <p>F3yB with parallel SGI interface: 100A/B</p> <p>Fx6x as standard construction</p> <p>Fx5x as extra flat construction</p> <p>Fxyx0z with connection cable for 3-fold sorter</p> <p>Fxyx2z without connection cable for für 3-fold sorter</p> <p>Fxyx1 without sorter interface</p> <p>Fxyx2 with sorter interface</p> | <p>Sorting</p> <p>Machine interface_1</p> <p>Construction</p> <p>Machine interface_2</p> |
|--|--|

4.3.1 Data block number decoding



The data block number identifies the coin and device data programmed in the coin validator. You may update the data block when loading a new revision, e.g., in order to adapt the coin acceptance bands. If the coin validator is not write protected, you may even load a completely different data block with a different coin and device configuration into the coin validator.

v² falcon DATA BLOCK NUMBER DECODING



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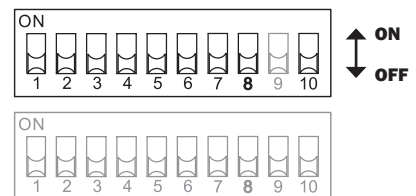
4.4 Switch blocks

On the back of the coin validator, there are two switch blocks S1 and S2 [Fig. 3/9] that each have ten DIL switches S1.1-10 and S2.1-10. Using the DIL switches, you can set specific device functions:

To find out how to set the individual functions with the help of the switch blocks, refer to *Chap. 7 Operation*, p. 28.

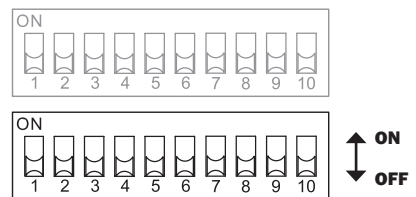
4.4.1 Switching functions S1.1-10

DIL switch	Function	OFF	ON
S1.1	Coin channel 1	accepts	inhibited
S1.2	Coin channel 2	accepts	inhibited
S1.3	Coin channel 3	accepts	inhibited
S1.4	Coin channel 4	accepts	inhibited
S1.5	Coin channel 5	accepts	inhibited
S1.6	Coin channel 6	accepts	inhibited
S1.7	Coin channel 7	accepts	inhibited
S1.8	Coin channel 8	accepts	inhibited
S1.9	No function	–	–
S1.10	Memory block	0	1



4.4.2 Switching functions S2.1-10

DIL switch	Function	OFF	ON
S2.1	Coin channel 9	accepts	inhibited
S2.2	Coin channel 10	accepts	inhibited
S2.3	Coin channel 11	accepts	inhibited
S2.4	Coin channel 12	accepts	inhibited
S2.5	Coin channel 13	accepts	inhibited
S2.6	Coin channel 14	accepts	inhibited
S2.7	Coin channel 15	accepts	inhibited
S2.8	Coin channel 16	accepts	inhibited
S2.9	Mode	operating mode	teach mode
S2.10	Teach mode	normal band	wide band



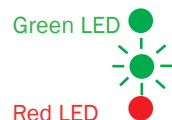
4.5 Flight deck/Measurement & validation area

Coins inserted in the machine initially pass the measurement and validation area [Fig. 3/4] of the coin validator (via a coin feeder (provided by the customer)). Here the coins run past inductive and optical sensors and generate individual measurement values. Each coin is checked for its coin properties and dimensions.

The flight deck [Fig. 3/6] can be opened in order to remove a jam caused by coins which have become stuck.

4.6 Status LEDs

Three status LEDs [Fig. 3/1] in the top right-hand corner of the coin validator indicate the operating state or a malfunction:



Coin validator ready to operate
Service mode (heartbeat PC application connected)

Red LED

Coin validator ready to operate, but coin acceptance inhibited (cp. Chap. 5.7 Coin enable/inhibit/activation of narrow coin channels, p. 23)



Malfunction, can be remedied by cleaning or eliminating a coin pile-up (cp. Chap. 8 Maintenance and service, p. 34)



Error (service case)

4.7 Interfaces

For more information on the machine interfaces [Fig. 3/3, 10, 13] and the sorter interface [Fig. 3/12] refer to Chap. 5 Function, p. 18 and Chap. 10 Technical data, p. 37.

5 Function



This chapter describes how the coin validator works:

- Coin acceptance and coin channels
- Single or double block data-management
- Accepted coin sensor
- String recognition (option)
- Coin validator control
- Control for external sorter (option)
- Coin inhibition/activation of narrow coin channels
- Teach mode

5.1 Coin acceptance and coin channels

For coin acceptance the coin validator has 32 "memory blocks" 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.



After a reset, coin acceptance of ccTalk validators is inhibited and must be enabled by the machine. By default, the v² falcon refuses to accept any further coins if the machine had not addressed it within the last 500ms or if the machine has not yet polled the last accepted coin.

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 together so that fraud coins with similar measured values can be rejected if the normal channel is disabled (cp. Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 29). However, narrow and super-narrow coin channels also have 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 value/signal line/pulse number or sorting information for an external sorter.



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.

The last eight coin channels 25 to 32 (or 9-16 with double block data-management (cp. Chap. 5.2 Single or double block data-management, p. 19)) are intended for teach mode. In these teach channels, you can also teach new types of tokens/coins directly via the switch blocks on the coin validator without needing configuration and service tools; i.e. a new coin or token is assigned to a channel (cp. Chap. 5.8 Teach-Mode, p. 24).

5.2 Single or double block data-management

At the factory, the device is programmed on a customer-specific basis whether the 32 coin channels of the coin validator are managed in one memory block or, divided up into 16 channels each, in two memory blocks (double block data-management).

If double block data-management is configured, the v² falcon can manage two (memory) blocks 0 and 1 that are programmed independently of one another (*cp. Chap. 4.3 Nameplate, 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 choose the desired block using the top switch block on the device (*cp. Chap. 7.1 Selecting memory block (for double block data-management only), p. 28*).

5.3 Accepted coin sensor

To ensure that accepted coins get to the cash-box or an external sorting device and that acceptance is not tampered with, an accepted coin sensor checks before the cash-box coin exit [Fig. 3/8] whether the inserted coin drops without hindrance through the coin outlet towards the cash-box or the sorter. Only when the coin has passed these checking device, does the validator either transmit the acceptance of a coin or, in the case of tampering, transmit an error code to the machine (*cp. Chap. 10.2.1.3 ccTalk error codes, p. 40*).

If the accepted coin sensors are covered permanently, e.g. by a coin jam, coin acceptance is inhibited.

5.4 String recognition (option)

To protect the device from string tampering, the accepted coin sensor in the v² falcon is designed such that coin acceptance is only transferred to the machine if the coin passes the accepted coin sensor from the direction of the insert funnel. If a coin was pulled back on a string, the system transfers an error code (*cp. Chap. 10.2.1.3 ccTalk error codes, p. 40*), (*cp. Chap. 8.3 Error diagnosis using tilt line (only parallel operation), p. 35*) and coin acceptance is inhibited for 30 seconds.

5.5 Coin validator control

Depending on the machine interface the coin validator is controlled either using signals transmitted via the lines of the parallel interface or using a serial data transfer protocol.

5.5.1 Transmission of coin values via coin pulses and coin signal lines (parallel interface only)

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. The standard and SGI interface differ in their coin signal lines:

5.5.1.1 v² falcon with parallel standard interface

The parallel standard interface has six signal lines transmitting coin impulses. Depending on the signal line activated the machine knows the coin denomination (coin value) concerned (cp. Chap. 10.2.2 v2 falcon parallel, standard – Machine, p. 42).



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.

5.5.1.2 v² falcon with parallel SGI interface

The parallel SGI interface always uses the same signal line to transmit coin pulses (cp. Chap. 10.2.3 v2 falcon parallel, SGI – Machine, p. 44). If the coin validator accepts more than one coin denomination, coins with higher values will be transmitted as multiple pulses (cp. Chap. 5.5.1.3 Multiple pulses, p. 20).

5.5.1.3 Multiple pulses

If the number of coin denominations programmed exceeds the number of signal lines available, several coin pulses (multiple pulses) per coin can be assigned to the coin denominations, so that the machine distinguishes the coin denominations not by the signal line (not with SGI interface) 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-coin is inserted two coin pulses would be sent to the vending machine control via the coin signal line assigned to the €1-coin.



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

5.5.1.4 Coin pulse length

The length of coin pulses transmitted to the machine can be adapted to the machine individually.

Possible settings: 5 to 500ms, default setting: 100ms.



It is also possible to assign different pulse lengths. In this case only one pulse is transmitted to the machine and no multiple pulses to distinguish the coins (cp. Chap. 5.5.1.3 Multiple pulses, p. 20).

5.5.2 ccTalk data transfer protocol

In serial operation the v² falcon ccTalk communicates with the machine controller via the ccTalk protocol. The coin validator works as slave and the machine as master. The ccTalk protocol is open for everybody and can be used without restrictions. For all information about the ccTalk protocol please refer to *Chap. 10.2.1 v2 falcon ccTalk – Machine*, p. 38 and the ccTalk specification at www.ccTalk.org. Two version are possible:

- Standard
Protocol according to ccTalk specification.

- ACMI

The factory programming of the coin validator in this model meets all requirements of the Italian gaming machine act "legge 289 – comma 6" passed in July 2003. The ACMI version of the v² colibri is write-protected so that it is not possible to change the factory programming using configuration tools.



In order to meet the requirements of the Italian gaming machine act subsequent configuration of the ccTalk ACMI model is impossible. If you want to change the factory settings please contact our sales representative.

5.6 Control for external sorter (option)

If your coin validator is equipped with a sorter interface [Fig. 3/12], you can connect the validator with an NRI 3-fold high-speed sorter s² HSD-3000 or another 3-fold sorter to route the accepted coins either to the cash box or to change tubes or hoppers, for example.

5.6.1 Sorting principle

The sorting gates are controlled by two sorting lines on pins 3 and 4 of the 10-pole connector [Fig. 3/12] on the back of the device (cp. Chap. 10.2.4 v² falcon – external 3-fold sorter (option), p. 46).

In serial mode you set which coin is to be sorted on which sorting line by means of the machine's ccTalk controller.



Assignment of coin type to sorting line as well as sorting time (for how long shall the sorting gates be controlled? 10–1000ms).



While the coin validator is sorting an accepted coin (the sorting time), it cannot accept any further coins unless the same ccTalk sorting path is addressed. If external sorting is no longer needed and the sorting time is not set to zero, the system continues to reduce the coin acceptance speed by the set sorting time. This means that you should set the sorting time to zero for faster coin acceptance.

5.6.2 Sorting using NRI 3-fold sorter s² HSD-3000

The s² HSD-3000 is a high-speed sorter with three sorting chutes and monitored coin inlet and outlet.

For the pin assignment of the sorting interface please refer to Chap. 10.2.4 v² falcon – external 3-fold sorter (option), p. 46. The mounting dimensions and further details are stated in the separate s² data sheet.

The following table lists the sorting interface pin and ccTalk sorter path that must be addressed for sorting to be carried out into a specific sorting chute:

Sorting chute	Pin, sorting interface	ccTalk sorter path
1	4	3
2	3	2
3	–	1, 4–8

The sorter is also available with a mounting frame allowing easy mounting to the coin validator (cp. Chap. 10.3.1 Sorter, p. 47).



Fig. 6: v² falcon with s² HSD-3000 in mounting frame

5.7 Coin enable/inhibit/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 in order that this coin is no longer accepted at all
- inhibit the normal coin channel of a certain coin so that this coin is accepted only in the narrow channel.

Inhibiting and enabling coins is different in serial and parallel operation.

Alternative: deactivating individual coins in the long term



5.7.1 Coin enable/inhibit in serial ccTalk operation

In ccTalk operation you may inhibit coins either via the controller protocol or using the switch blocks on the coin validator.

5.7.1.1 Inhibiting all coins/individual coin channels via machine control system

The control system can

- inhibit coin acceptance completely. In this case the coin validator does not accept any coins.
- 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.

How to program the inhibit or enable functions is described in the specification "ccTalk Serial Communication Protocol, Generic Specification" (Headers 231/228), made available on the Internet at "www.ccTalk.org".

5.7.1.2 Inhibiting a coin channel/a group of coin channels by means of a switch block

As an alternative to blocking with the controller, you can use the two switch blocks on the coin validator to inhibit individual coin channels or groups of coin channels on site (*cp. Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 29*).



If a coin channel is inhibited on the switch block, the controller cannot enable this channel using the ccTalk protocol.

5.7.1.3 Enabling coins after reset

After a reset, coin acceptance of the v² falcon is inhibited and must be enabled by the machine.



By default the coin validator refuses any further coin acceptance when it has not been addressed by the machine within last 500ms or if the last coin accepted has not yet been scanned by the machine.

5.7.2 Coin enable/inhibit in parallel operation

In parallel standard or SGI operation you may inhibit coins either via the machine controller sending pulses over the signal lines or using the switch blocks on the coin validator.

5.7.2.1 Inhibiting all coins/individual coin channels via machine control system

The control system can

- inhibit coin acceptance completely via (common) inhibit line. In this case the coin validator does not accept any coins.
- inhibit all coin channels of a certain coin via single inhibit lines, e.g. if there is no more change in an external payout unit or in case of high fraud hazard (not for SGI interface).
- inhibit the normal coin channel of a certain coin via single inhibit line so that this coin is accepted only in the narrow channel (not for SGI interface).



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

5.7.2.2 Inhibiting a coin channel/a group of coin channels by means of a switch block

As an alternative to blocking with the controller, you can use the two switch blocks on the coin validator to inhibit individual coin channels or groups of coin channels on site (cp. Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 29).



If a coin channel is inhibited on the switch block, the controller cannot enable this channel using the signal lines.

5.8 Teach-Mode

You can teach coin channels in teach mode without configuration software either by means of the bottom switch block on the coin validator or the ccTalk machine controller, i.e. a token or coin is assigned to a new 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. With double block data-management, the last eight coin channels 9–16 (the teach channels) of the activated memory block are available for teaching, with coin channels 25 to 32 being available for this in the case of single block data-management (cp. Chap. 7.3 Teaching coin channels in teach mode ... (not for ACMI version), p. 31).



Activating/deactivating teach mode/channels

6 Start-up



When carrying out any assembly and installation work on the coin validator and machine, always observe the following safety instructions:

- **The coin validator must only be connected by a trained electrician.**
- **The coin validator is not suited for outdoor use.**
- **Never use the coin validator if there is damage to the device or the connecting cables.**
- **Select the correct voltage for the coin validator (see nameplate).**
- **Never pull the connecting cable of the coin validator from the machine when a voltage is applied.**
- **Pull out the mains plug of the machine before installing or dismantling the coin validator.**



In order that the coins inserted into the machine fall into the coin validator so that they can be measured properly and not become stuck in the validation area, the customer must provide a coin feeder suited for the coin validator [Fig. 8/] [Fig. 9/].

6.1 Installing the coin validator in the machine

To install the v² falcon in a machine with parallel or serial ccTalk interface:

- 1** If necessary, make individual settings on the switch blocks [Fig. 7/1] (cp. Chap. 7 Operation, p. 28).
- 2** If necessary, mount the 3-fold sorter on the coin validator and connect the sorter with the validator using the sorter interface [Fig. 7/3].
- 3** Disconnect the machine from the mains supply.
- 4** Connect the coin validator via the relevant machine interface [Fig. 7/2, 5, 6] and the associated connecting cable to the machine.
- 5** Suspend the coin validator on its lateral mounting studs [Fig. 7/4] in the machine mount.
- 6** Install coin feeder (provided by the customer) above the coin validator [Fig. 8/] [Fig. 9/].



If the coin feeder is not positioned exactly, the coins inserted into the coin validator cannot be processed properly. This may result in downtimes and incorrect measurements.

Please also pay attention to the measures recommended for the insertion of euro coins in the figure.

- 7** Reconnect the mains supply to the machine.

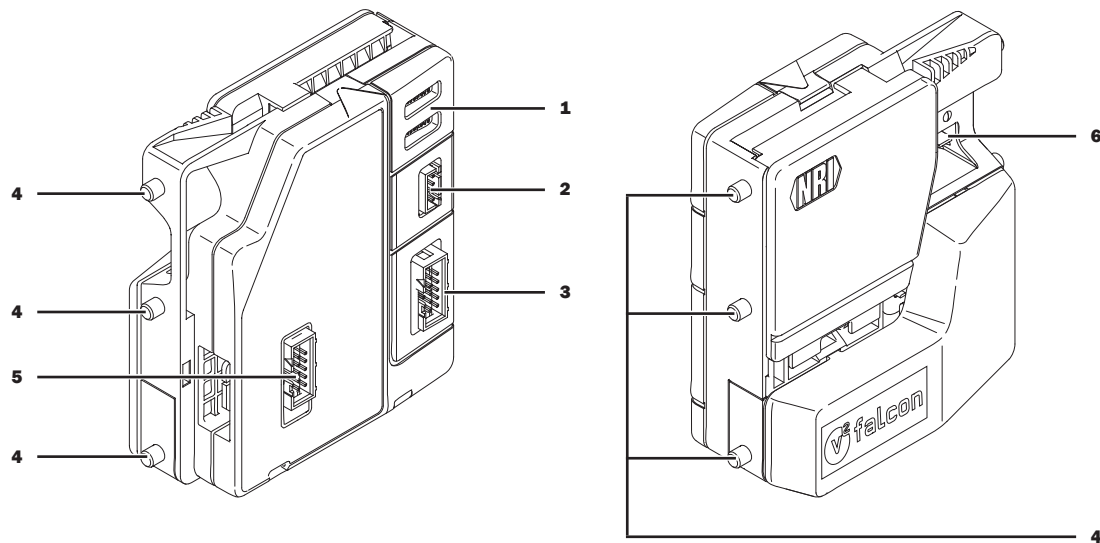


Fig. 7: Installation

- | | |
|--------------------------------------|---|
| 1 Switch blocks | 5 Interface – machine (parallel, standard and SGI, 10-pole) |
| 2 Interface – machine (ccTalk) | 6 Interface – machine (parallel, SGI, 3-7-pole) |
| 3 Interface – external 3-fold sorter | |
| 4 Mounting studs | |

6.2 Installation dimensions for customer-supplied coin feeder

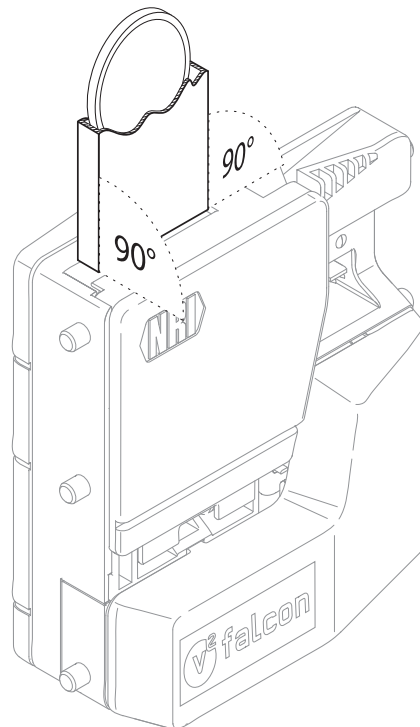


Fig. 8: Vertical coin feeder (to be provided by the customer)

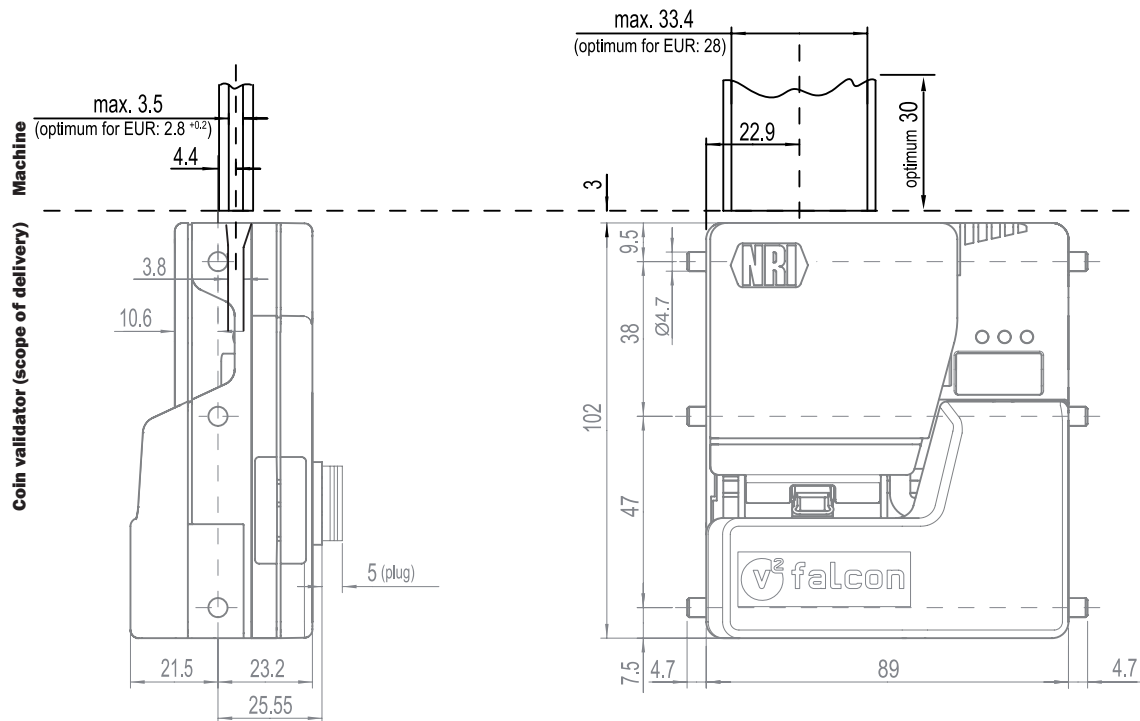


Fig. 9: Installation dimensions for installation of coin feeder (to be provided by the customer)

7 Operation



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

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

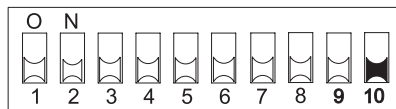
The settings which are made directly on the coin validator are described. To find out how to make the settings using the heartbeat PC configuration software, refer to the separate guide (cp. Chap. 9 What can be set later?, p. 36).

The exact function of the settable device options is described in Chap. 5 Function, p. 18.

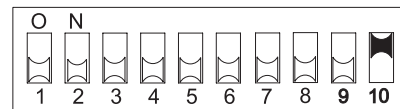
7.1 Selecting memory block (for double block data-management only)

If the coin validator is to access the other memory block and accept euro coins instead of national currency coins, for example, you can choose the correct block using the top switch block:

- 1** Unhook the coin validator from the machine.
- 2** For memory block 0, set DIL switch S1.10 downwards (to OFF); for memory block 1, set it upwards to ON.



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.

7.2 Inhibiting coins/activating narrow coin channel

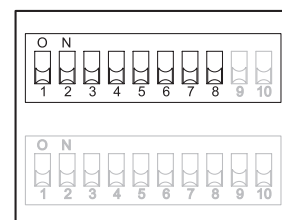
Using the two switch blocks on the coin validator, you can individually inhibit on site each of the 16 coin channels of the activated memory block or each of the coin types assigned to specific coin channels, i. e. these inhibited coin channels are no longer used for payment on the machine.

- Accept coin without limitation: All the assigned coin channels are enabled
- Limit acceptance band: Normal coin channel is inhibited
- Inhibit coin: All the assigned coin channels are inhibited

The 16 DIL switches inhibit the following coin channels:

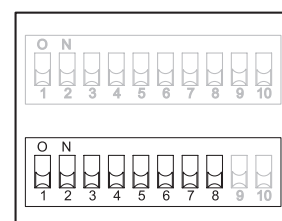
7.2.1 Inhibit switch functions – switch block S1

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



7.2.2 Inhibit switch functions – switch block S2

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



For information on which coins are assigned to which coin channels ex-works, refer to the nameplate on the back of the device (cp. Chap. 4.3 Nameplate, p. 14).

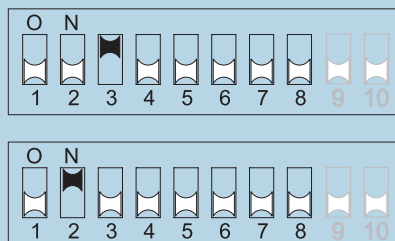


This assignment may have been changed using the configuration tool.

If all coins are to be accepted for payment on the machine, DIL switches S1.1-8 and S2.1-8 on both switch blocks are in the bottom position (set to OFF). If you want to inhibit a coin channel, you only need to set the associated DIL switch upwards to ON.

Example

The coin validator is not to use coin channels 3 and 10 for acceptance any more so that coin channels 3 and 10 must be inhibited.



With this setting, coin channels 3 and 10 are no longer used!



If one normal and one narrow coin channel are programmed for a coin type on the coin validator, you must inhibit the normal coin channel as described above to activate the narrow coin channel. If both channels are activated, the wider acceptance band of the normal coin channel is used. If you intend to inhibit the coin type, you must also inhibit both coin channels.

To inhibit coin channels on the coin validator:

- 1** Unhook the coin validator from the machine.
- 2** Use DIL switches S1.1-8 and S2.1-8 to inhibit the desired coin channels (see the example above). The desired coin channels are inhibited.
- 3** Remount coin validator in the machine.

7.3 Teaching coin channels in teach mode ... (not for ACMI version)

You can assign a token or a new coin to a coin channel either using the switch blocks on the coin validator or by means of ccTalk commands and a service menu of the machine for serial operation.

7.3.1 ... using the switch block on the coin validator

To generate new acceptance bands, you can teach up to eight coin channels (teach channels) by means of the bottom switch block on the coin validator. You need at least ten coins of the new type. The switch block assignment is different with double and single block data-management:

7.3.1.1 Teach mode switching functions with double-block data-management

DIL switch	Function	OFF	ON
S2.1	Teach mode	–	Teach coin channel 9
S2.2	Teach mode	–	Teach coin channel 10
S2.3	Teach mode	–	Teach coin channel 11
S2.4	Teach mode	–	Teach coin channel 12
S2.5	Teach mode	–	Teach coin channel 13
S2.6	Teach mode	–	Teach coin channel 14
S2.7	Teach mode	–	Teach coin channel 15
S2.8	Teach mode	–	Teach coin channel 16
S2.9	Teach mode	OFF	ON
S2.10	Teach mode	Normal acceptance band	Wide acceptance band



7.3.1.2 Teach mode switching functions with single-block data-management

DIL switch	Function	OFF	ON
S2.1	Teach mode	–	Teach coin channel 25
S2.2	Teach mode	–	Teach coin channel 26
S2.3	Teach mode	–	Teach coin channel 27
S2.4	Teach mode	–	Teach coin channel 28
S2.5	Teach mode	–	Teach coin channel 29
S2.6	Teach mode	–	Teach coin channel 30
S2.7	Teach mode	–	Teach coin channel 31
S2.8	Teach mode	–	Teach coin channel 32
S2.9	Teach mode	OFF	ON
S2.10	Teach mode	Normal acceptance band	Wide acceptance band





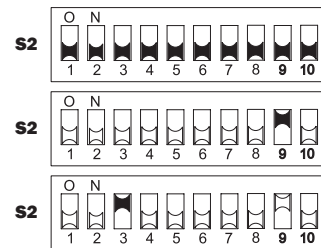
By default, the eight teach channels of the v² falcon with parallel standard interface have been programmed, so that one coin impulse is transmitted to the machine via coin signal line 6, when a new coin is accepted (cp. Chap. 10.2.2 v2 falcon parallel, standard – Machine, p. 42).

To assign a coin type/token to coin channel 9-16 or 25-32, proceed as follows:



If you use the bottom switch block to inhibit individual coins, make a note of the current switch settings so that you can restore them afterwards for normal operating mode.

- 1** Unhook the coin validator from the machine.
- 2** Set DIL switches S2.1-10 downwards to OFF.
- 3** Set DIL switch S2.9 upwards to ON.
The device is in the teach mode for teaching the coin channels.
- 4** Enable the coin channel to be taught (9-16/25-32, here: 11/27) by setting the corresponding DIL switch (S2.1-8, here: S2.3) upwards to ON.
- 5** If necessary, remount the coin validator in the machine.
- 6** Insert at least 10 coins of the new coin type/token into the coin validator or machine. Insertion of the tenth coin is confirmed by one-off activation of the acceptance gate (a brief clicking noise). Further coins can be inserted.



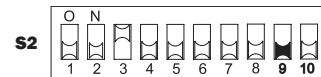
If there is no signal after the 10th coin has been inserted, the coins inserted cannot be used.

- 7** If necessary, unhook the coin validator from the machine again.

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 presents itself if you only have available a limited selection of tokens for teaching.

To save with the normal acceptance band:

- 8a** Set DIL switch S2.9 downwards back to OFF.
The system indicates successful saving with a single actuation of the acceptance gate and an error at saving with a double actuation (a brief clicking noise in each case) if the acceptance band of the inserted coins and that of an already programmed coin channel overlap or the generated measured values are too different and the tolerances would be too high, for example.



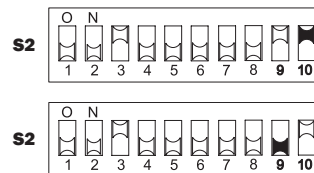
To cancel the operation, first set the DIL switch of the corresponding coin channel (S2.1-8, here: S2.3) and then DIL switch S2.9 downwards to OFF.

To save with the wide acceptance band:

- 8b** Set an additional DIL switch, S2.10, upwards to ON.
The acceptance band has been widened.

Only now set DIL switch S2.9 back downwards (to OFF).

The system indicates successful saving with a single actuation of the acceptance gate and an error at saving with a double actuation (a brief clicking noise in each case) if the acceptance band of the inserted coins and that of an already programmed coin channel overlap or the generated measured values are too different and the tolerances would be too high, for example.



To cancel the operation, first set the DIL switch of the corresponding coin channel (S2.1-8, here: S2.3) as well as DIL switch S2.10 for the wide acceptance band and then DIL switch S2.9 downwards (to OFF).

- 9** If necessary, set DIL switch S2.1-8 again for normal operation (cp. Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 29).
- 10** If necessary, remount the coin validator in the machine.
- 11** Switch power off and on again.
- 12** For serial operation, enable the taught coin channel (here: 11/27) via the control system and adapt sorting, if necessary.

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

7.3.2 ... using ccTalk commands/machine service menu

If the coin validator is not write-protected, you can teach coin channels via a ccTalk command set to generate new acceptance bands (cp. Chap. 10.2.1.5 ccTalk teach mode (not for ACMI version), p. 41). This command set can be used to start and monitor the teach mode e.g. via a service menu.

The new acceptance bands are generated and saved by inserting ten coins/tokens of the new type. After saving of the acceptance bands the coin validator will accept the new coin type/token for payment.

For further information about teaching of coins/tokens via the service menu please refer to the instruction manual for the machine.



If you have overwritten an already configured coin channel in teach mode, you must adapt all the properties that are assigned to this channel (e.g. coin ID, sorting, etc.) to the new coin/token (see the separate heartbeat manual).

8 Maintenance and service



This chapter describes how to

- clean the v² falcon 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, at least annually
- Cleaning agent/tool: Compressed air/soft brush/slightly moistened cloth, lukewarm water



**Moisten the cloth only slightly to prevent fluid from entering the device. This would damage the PCB.
Do not use solvents or scouring agents that could affect the plastic and appearance of the device.**

- 1 Pull the mains plug of the machine.
- 2 Carefully unfold the flight deck [Fig. 10/1] on the coin insert funnel and hold it open.
- 3 Clean the coin runway [Fig. 10/2] in the coin validator using compressed air, a soft brush or 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 the flight deck again.
- 8 Reconnect the machine to the mains supply.

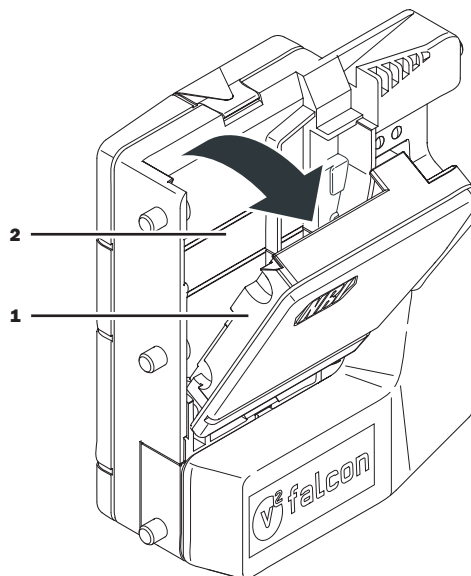


Fig. 10: Unfolding the flight deck of the coin validator

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"> Connect the cable correctly to the coin validator and the machine Connect power to the machine
	Coin runway dirty	Open the flight deck and clean the coin runway (<i>cp. Chap. 8.1 Cleaning the coin runway, p. 34</i>)
	Coin inhibited	<ul style="list-style-type: none"> Ensure that the machine controller is not inhibiting coin acceptance using ccTalk commands Ensure that the machine controller is not inhibiting coin using common inhibit/inhibit line (<i>cp. Chap. 10.2 Interfaces, p. 38</i>) Ensure that the machine controller is not inhibiting coin using corresponding single inhibit line (<i>cp. Chap. 10.2.2 v2 falcon parallel, standard – Machine, p. 42</i>) Ensure that the coin is not inhibited via the DIL switch on the back of the device or that just the narrow coin channel is enabled and the normal one is inhibited (<i>cp. Chap. 7.2 Inhibiting coins/activating narrow coin channel, p. 29</i>)
Coin validator accepts coin, but no credit is given	Coin does not exit the device or covers the accepted coin sensor for too long	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.

8.3 Error diagnosis using tilt line (only parallel operation)

The tilt line of the parallel standard and SGI interface is used to transmit an error signal with different pulse lengths in case of failure or error:

Error cause	Pulse length
Supply voltage high (~18V)/low (~8V)	As long as error present
Checksum error (validator defective)	As long as error present
Coin pile-up	As long as error present
Accepted coin sensor covered/dirty/defective	As long as error present
Sensor on return chute covered/dirty/defective	As long as error present
Inhibited coin accepted, as acceptance gate permanently open	Coin pulse length (is transmitted together with accepted coin signal)
Non-programmed coin accepted, as acceptance gate permanently open	Coin pulse length (is transmitted together with accepted coin signal)
Programmed coin rejected, as acceptance gate closed	Coin pulse length (is transmitted together with accepted coin signal)
Coin too slow, could not be measured	Coin pulse length
Flight deck open	As long as error present

9 What can be set later?



In this chapter you will find out general information about the NRI configuration software for the v² falcon and what device functions you can retrospectively configure (cp. Chap. 10.3.2 Service tools, p. 47).



In order to meet the requirements of the Italian gaming machine act subsequent configuration of the ccTalk ACMI model is impossible. If you want to change the factory settings please contact our sales representative.

9.1 heartbeat PC configuration application

The heartbeat PC application is for diagnostics and individual configuration of NRI coin validators.

The heartbeat application identifies the coin validator that is connected to the PC and its specific data and displays this data on your PC's screen for diagnosis and configuration.

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

9.2 Which device functions can be set?

- Acceptance of genuine coins and rejection of fraud coins (acceptance band adjustment after insertion of genuine coins and fraud coins)
- Pulling time of acceptance gate
- Coin via channel assignment of
 - coin value,
 - ccTalk coin ID and
 - ccTalk coin type/position 1–16 or
 - coin signal line, pulse number and pulse length
- Output signal definition for coin rejection (parallel interface only)
- Sorting via
 - assigning the sorting control line/sorter path and coin type
 - definition of a sorting time
- Coin inhibit via channel assignment of
 - single inhibit line (parallel interface only)
 - DIL switches S1.1–8 (single block data-management)
- Long-term coin deactivation
- Teach mode via
 - activating/deactivating teach mode
 - activating/deactivating teach channels
- New coins/tokens (generation of a new acceptance band and assignment of the coin/sorting data)

10 Technical data



This chapter contains

- All relevant v² falcon data
- details of machine and sorter interfaces
- Information about v² falcon accessories

10.1 Device data

Supply voltage	10V to 16V DC
Current consumption in	Standby mode: approx. 200mA Measuring mode: approx. 200mA Acceptance mode: approx. 500mA
Transmitter/Receiver (active low)	Inactive (H): 3.5..5V, $I_{max} = 5\mu A$ Active (L): 0..1V, $I_{max} = 30mA$
Dielectric strength, in/outputs	35V max.
Current load, outputs	150mA max. (open collector)
Temperature range	0 °C to 60 °C
Temperature change	Max. 0.2 °C/min.
Rel. humidity	Up to 93%
Condensation	Not permitted
Machine interface	<u>ccTalk:</u> 9600 Baud, 8-bit, N, 1, 5V TTL, common send and receive line, active low Protocol according to Generic Specification "cctalk Serial Communication", Money Controls <u>Parallel, standard:</u> 6 coin signal parallel outputs (open collector)/6 single inhibit inputs (active low) Common inhibit line (active high) <u>Parallel, SGI:</u> S. Chap. 10.2.3 v2 falcon parallel, SGI – Machine, p. 44 For pin assignment, see Chap. 10.2 Interfaces, p. 38
Sorting interface	2 parallel outputs (open collector) (cp. Chap. 10.2.4 v2 falcon – external 3-fold sorter (option), p. 46)
Coin acceptance	32 coin denominations max. in 2 x 16 or 1 x 32 channels Coin diameter: 15–32.5mm Coin thickness: 1.5–3.3mm Speed: 10 coins/s max.

Device dimensions	Height: 102mm
	Width: 89mm (+ 2 x 4.7mm for mounting studs)
Mounting position	Depth: 52mm standard construction
	50mm extra flat construction
Refer to the separate documentation for all the installation dimensions	
Directives applied	Vertical, max. deviation: $\pm 2^\circ$
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 Interfaces



On the next few pages, you will find the interface descriptions, pin assignments and v² falcon-specific ccTalk commands/settings and error messages for connecting the coin validator to

- the machine
- an external 3-fold sorter

10.2.1 v² falcon ccTalk – Machine

10.2.1.1 Pin assignment

Pin	Function	Level
1	12V DC supply	–
2	–	–
3	GND	–
4	Data	active low



You will find a detailed description of the serial ccTalk interface with different connection diagrams in the Generic Specification "ccTalk Serial Communication Protocol" available on the Internet at www.cctalk.org.

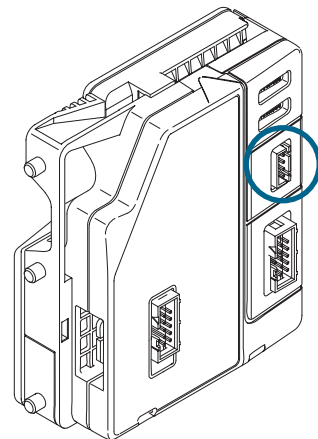


Fig. 11: ccTalk interface

10.2.1.2 Implemented ccTalk commands

Header	Command	Function, No. of data bytes [expected/returned]	Optional ACMI deviations for Italian gambling machine market
254	Simple poll	[0/0]	
253	Address poll	[0/1]	
252	Address clash	[0/1]	
251	Address change	[1/0]	
250	Address random	[0/0]	
249	Request polling priority	2, 20 (= "200ms") [0/2]	
248	Request status	0 = OK, 1 = Flight deck open, 2 = Coin on string detected [0/1]	
246	Request manufacturer ID	"NRI" [0/3]	
245	Equipment category ID	"Coin acceptor" [0/13]	
244	Request product code	"F2" [0/3]	
243	Request database version	0 = remote coin database not available [0/1]	
242	Request serial number	3 bytes [0/3]	
241	Request software revision	"xx-xx" [0/5]:	
240	Test solenoids (external sorting device)	[1/0] Bit 0: gate 0 (acceptance gate) Bit 1: gate 1 (upper sorter gate) Bit 2: gate 2 (lower sorter gate)	
238	Test output lines	[0/1] Bit 0: 1 = open escrow to cash box Bit 1: 1 = open escrow to return Bit 2: 1 = activate return lever motor	
236	Read opto states	[0/1] Bit 0: SO1 (Sizing Optics) Bit 1: SO2 (Sizing Optics) Bit 4: CP3 (Coin Position) Bit 5: CP4 (Coin Position)	
232	Perform self test	[0/1] 0 = no error 1 = EEPROM checksum fault (settings corrupt)	
231	Modify inhibit status	[2/0]	
230	Request inhibit status	[0/2]	
229	Read buffered credit or error codes	[0/11] (cp. Chap. 10.2.1.3 ccTalk error codes, p. 40)	
228	Modify master inhibit status	[1/0]	
227	Request master inhibit status	[0/1]	
222	Modify sorter override status	[1/0]	
221	Request sorter override status	[0/1]	
219	Enter new PIN	[4/0] (no function)	
218	Enter PIN	[4/0] (no function)	
216	Request data storage availability	0,0,0,0,0 [0/5]	no reply

Header	Command	Function, No. of data bytes [expected/returned]	Optional ACMI deviations for Italian gambling machine market
213	Request option flags	[0/1] Bit 7: MSB, 1 = remote teach support Bit 6: 1 = escrow control supported Bit 5: 1 = return lever motor control supported Bit 4..0: 0 (not used)	
210	Modify sorter paths	5 bytes [5/0]	2 bytes [2/0]
209	Request sorter paths	4 bytes [1/4]	1 byte [1/1]
202	Teach mode control	[1/0] (cp. Chap. 10.2.1.5 ccTalk teach mode (not for ACMI version), p. 41)	no reply
201	Request teach status	[0/2] (cp. Chap. 10.2.1.5 ccTalk teach mode (not for ACMI version), p. 41)	no reply
192	Request build code (incl. Write protection info)	"DE0" (no protection) "DE1" (ACMII) "DE2" (VDAI) "DE2" (extra)	"IT0" (no protection) "IT1" (ACMII) "IT2" (VDAI) "IT3" (extra)
189	Modify default sorter path	[1/0]	
188	Request default sorter path	[0/1]	
185	Modify coin ID (Duration: 0.5..1.5s!!!)	[7/0]	no reply
184	Request coin ID	[1/6] e.g. "EU200A" = €2	
4	Request comms status revision	2, 4, 2 [0/3]	
1	Reset device	[0/0]	

10.2.1.3 ccTalk error codes

Error no.	Error	Description (cp. spec)
0	No error	
1	Rejected coin	
2	Inhibited coin	
5	Validation timeout	
6	Credit/accepted coin sensor timeout	
8	2 nd close coin error	
10	Credit/accepted coin sensor not ready	Light attack on credit sensor
11	Sorter not ready	External escrow was open
14	Credit/accepted coin sensor blocked	
15	Sorter sensor error	Sensor of external sorter blocked or sorter not connected correctly
29	Acceptance gate open/not closed	
30	Acceptance gate closed/not open	
*120	External light	Interfering light on coin position or measurement sensors detected
*121	Validation sensor blocked	Coin jam in validation area or soiled validation sensor
*122	Diverter failed	Sorter failed. Coin has been routed to wrong path. The following coin event will report coin and (wrong) path
254	Coin return mechanism activated	
255	Unspecified alarm code	

* NRI-specific (not part of official ccTalk specification)

10.2.1.4 ccTalk standard settings (after reset)

All the settings that the machine controller makes are volatile (exception: Modify Coin ID). After a reset, the following default settings apply until the controller changes settings:

Header	Command	Value
251	Address change	2
231	Modify inhibit status	0000h (all coins inhibited)
228	Modify master inhibit status	01h (not inhibited)
222	Modify sorter override status	FFh (no override)
218	Enter PIN	0 0 0 0 (not used)
210	Modify sorter paths	predefined setting according to data block coin configuration
189	Modify default sorter path	predefined setting according to data block coin configuration

10.2.1.5 ccTalk teach mode (not for ACMI version)

Header 202 – Teach mode control

Transmitted data: Position (1 byte)

Received data: ACK

Position: Bit 0..6: Coin type (1..16)

Bit 7: 0 = normal acceptance band

1 = wide acceptance band

Position = 0 = abort teaching process

Header 201 – Request teach status

Transmitted data: None

Received data: Byte 1 = No. of coins inserted

Byte 2 = Status code:

252 = teaching process aborted (see header 202)

253 = teaching error (overlapping with existing acceptance band, coin type not found)

254 = teaching in process

255 = teaching process completed



The status code remains active until reset or the next teaching process.

10.2.2 v² falcon parallel, standard – Machine

10.2.2.1 Pin assignment

Pin	Input/ Output	Function	Level
1	–	0V supply	GND
2	–	Operating voltage $U_B = +12V$ (10–26V DC)	–
3	OUT/IN	Coin line 5/ Single inhibit line 5	active low
4	OUT/IN	Coin line 6/ Single inhibit line 6	active low
5	OUT	Tilt line	active low
6	IN	Common inhibit line	active high
7	OUT/IN	Coin line 1/ Single inhibit line 1	active low
8	OUT/IN	Coin line 2/ Single inhibit line 2	active low
9	OUT/IN	Coin line 3/ Single inhibit line 3	active low
10	OUT/IN	Coin line 4/ Single inhibit line 4	active low

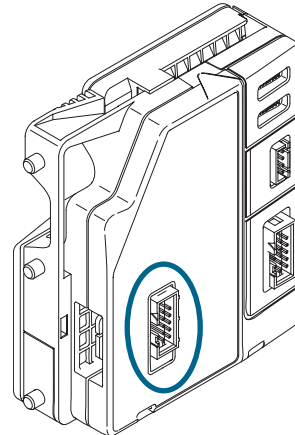
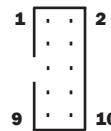


Fig. 12: Parallel standard interface



All signals must be debounced from the input side.

10.2.2.2 Interface description

Coin/Single inhibit line

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

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

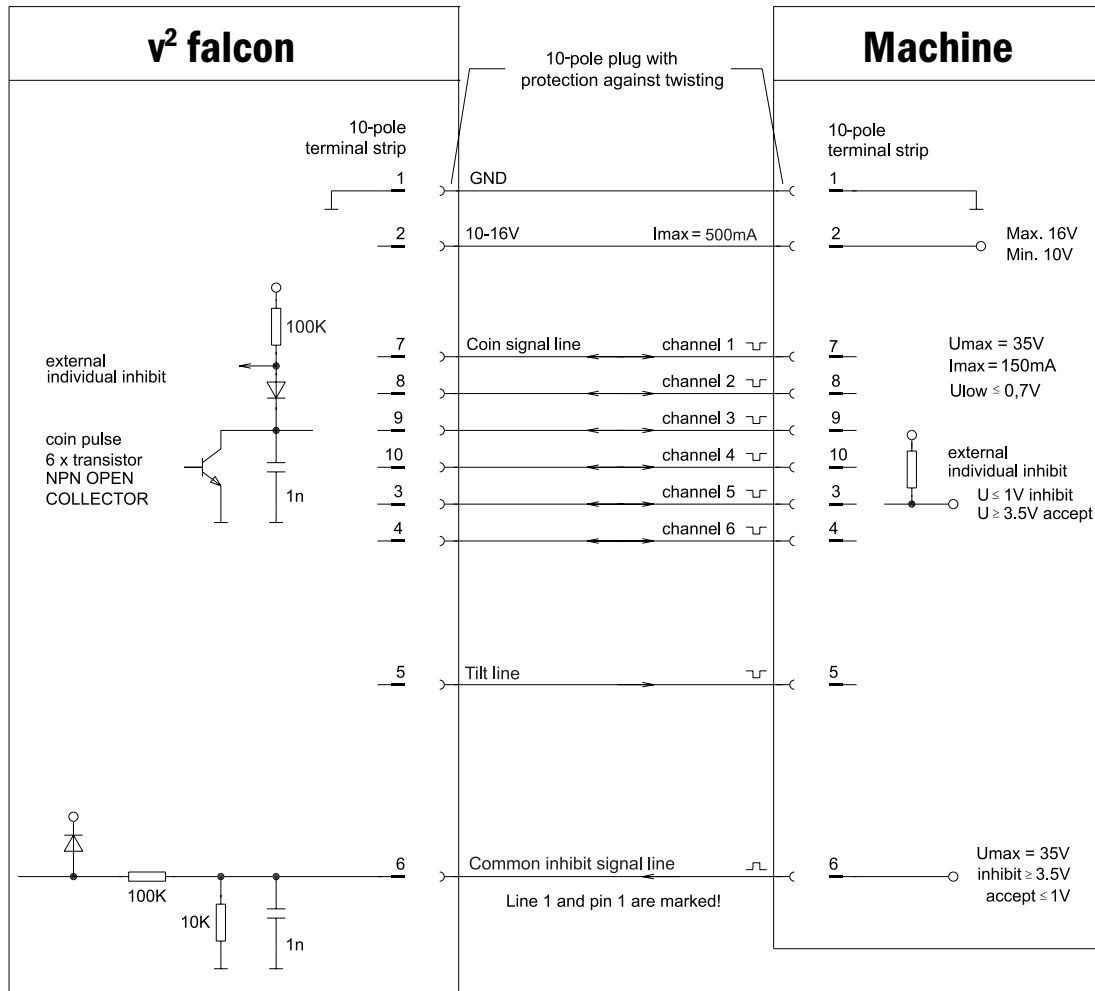
Tilt line

Coin validator signals error (cp. Chap. 8.3 Error diagnosis using tilt line (only parallel operation), p. 35)

Common inhibit line

Machine inhibits coin acceptance

10.2.2.3 Connection diagram



Subject to technical changes!

Fig. 13: Connection diagram for v² falcon with parallel standard interface

10.2.3 v² falcon parallel, SGI – Machine

The SGI interface (Simple Gaming Interface) has especially been designed for the gaming industry.

10.2.3.1 Pin assignment

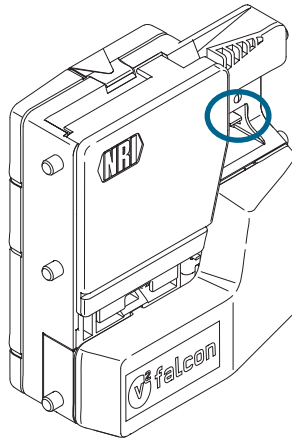


Fig. 15: Parallel SGI interface
(3 – 7-pole)

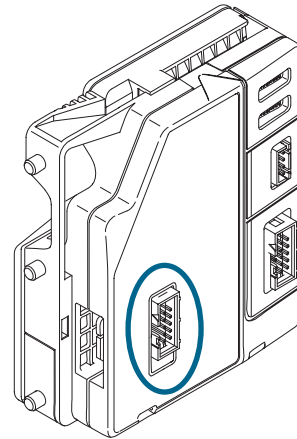


Fig. 14: Parallel SGI interface
(10-pole)

	SGI 16 A	SGI 16 B	SGI 40 A	SGI 46 A	SGI 62 A/AS	SGI 33 A	SGI 80 A*	SGI 100 A*	
Connector type	JST	JST	JST	Molex	Molex	JST	JST	10-pole terminal strip	
Pinout	1	Inhibit (active hi) 1K to GND	Inhibit (active hi) 10K to 5V	Tilt (active lo)	Inhibit (active hi) 10K to 5V	GND	12V DC	GND	GND
	2	Sense (active lo)	Sense (active lo)	Inhibit (active hi) 10K to 5V	Tilt (active lo)	Sense (active lo)	Sense (active lo)	Inhibit (active hi) 10K to 5V	12V DC
	3	nc	nc	Credit (active lo)	Credit (active lo)	Tilt (active lo)	GND	Ready (active lo)	Credit 5 (active lo)
	4	nc	nc	nc	Sense (active lo)	Credit (active lo)		Tilt (active lo)	Sense (active lo)
	5	12V DC	12V DC	12V DC	12V DC	nc		Credit (active lo)	Tilt (active lo)
	6	GND	GND	GND	GND	12V DC		Sense (active lo)	Inhibit (active hi) 10K to GND
	7					Inhibit (active hi) 10K to 5V		12V DC	Credit 1 (active lo)
	8							nc	Credit 2 (active lo)
	9								Credit 3 (active lo)
	10								Credit 4 (active lo)
Compatible with	CC16	CC16	CC40	CC46	CC62	CC33	Defender 3	–	

* Machine interface on the back of the validator



All signals must be debounced from the input side.

10.2.3.2 Interface description

Credit line

Coin validator signals coin accepted (if more than one coin has been programmed, by multiple pulses)

Inhibit line

Machine inhibits coin acceptance

Sense line

Coin validator signals programmed coin passed measurement and validation area, even if inhibited

Tilt line

Coin validator signals error (*cp. Chap. 8.3 Error diagnosis using tilt line (only parallel operation), p. 35*)

10.2.4 v² falcon – external 3-fold sorter (option)

10.2.4.1 Pin assignment

Pin	Function
1	GND
2	Sensor supply 12V DC
3	Sorting line 5
4	Sorting line 6
5	-
6	Power supply, sorting gate
7	Sensor, coin inlet
8	Sensor, coin outlet
9	Photoelectric sensor, bottom gate
10	Photoelectric sensor, top gate

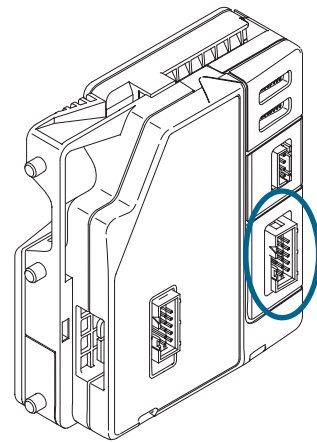
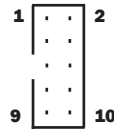


Fig. 16: Sorter interface (option)

10.2.4.2 Connection diagram

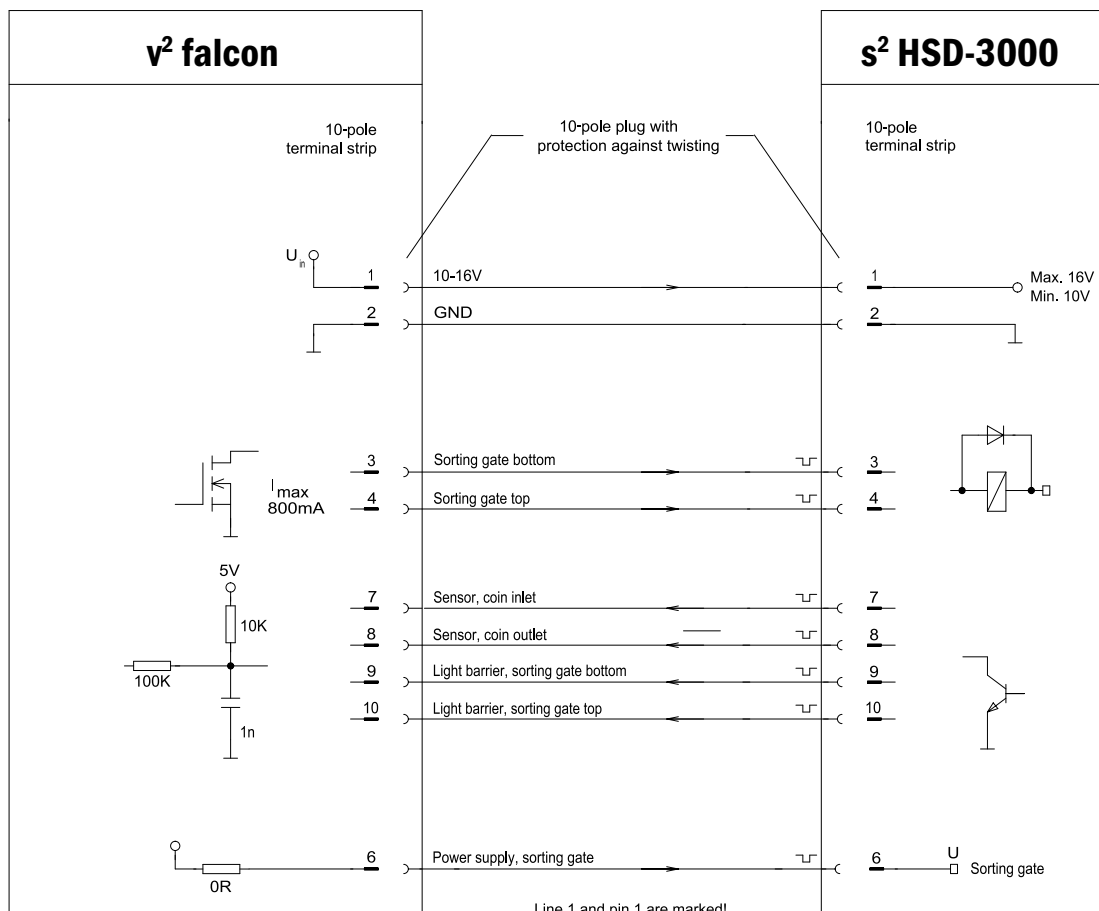




Fig. 17: Connection diagram for high-speed 3-fold sorter s² HSD-3000

10.3 Accessories

To customize the v² falcon to your own individual requirements, you can purchase the following NRI accessories from Crane Payment Solutions, Germany:

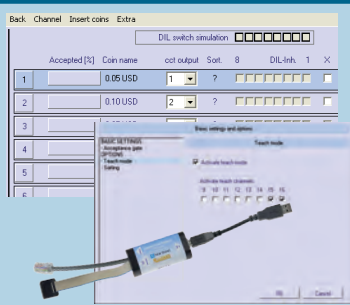
10.3.1 Sorter

Designation	Order no.	
s² HSD-3000	30500	
s² HSD-3000 with mounting frame	33686	



For more information on the NRI 3-fold sorter, refer to the separate data sheet. All the documentation is available for download as PDF files on the NRI website (www.craneps.com, Support).

10.3.2 Service tools

Designation	Order no.	
heartbeat PC application For diagnosing and updating individual settings (including license, USB PC cable, 12V power supply)	28535	

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