Índex

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Important information

Symbols used in this manual.

⚠️ Warning! The contents of this section requires special attention.

👩‍💻 Indicates that this section affects the programming of the validator.

🌳 Indicates that this section affects the working of the validator.

💻 Warns that the following section requires an auxiliary programming system.

Standards

AZKOVEN guarantees that the ES525 Validator complies with the directive, CD89/336/EEC, according to the following norms:

EN-50008-1. General emissions standard.
  - EN-55022: Conducted emissions. Measurement of the conducted disturbances in loading.

EN-50082-1: General immunity standard.
  - IEC 801-2: Electrostatic discharges. ESD measurement of immunity against electrostatic discharges.
  - IEC 801-3: Radiated immunity. Measurement of the immunity against the electrical field.
  - IEC 801-4: Rapid/intermittent transients: Measurement of immunity against rapid/intermittent transients.

The ES 525 also complies with:


All materials comply to the standard referring to fire resistance.

Compiles with the standard BACTA, «Binary interface VI. GEp»

Definitions:

Table: Group of parameters measured during the programming of a coin.

Bank: Set of programmed tables which make up the total admission of the validator.

Credit Line: Output signal (OUTPUT) of each validator table.
1.1- Introduction.

The ES525 Validator is a mechanism designed by AZKOVEN for use in amusement machines.

There are two models of coin entry.

**Upper entry.** The insertion of coins is made via the upper part of the validator.

This system has an entrance funnel which helps the coin to enter and a coin reject lever.

**Front entry.** The insertion of coins is made via the lateral part of the validator.

The validator has an entry funnel and no coin reject lever.

In both models, the coin exit, whether accepted or rejected, is effected via the lower part, although it is possible to change the reject coin exit to the front by changing a cover.

It is possible to install a 4 ways separator that routes the coins to each one of these.

**Front Exit.**

This diagram shows the validator with FRONT EXIT COIN REJECT. Normally used with single entry front plate.
General characteristics

Front plate.
Single entry front plate with integral coin entry bezel and push button reject. Front or bottom rejects are available.

"Y" Chute.
This unit incorporates coin and/or token acceptance paths, liquid divert duct and reject lever.

Entry Bezel.
This incorporates the two back illuminated window identification entries for coins and/or tokens. A double coin entry bezel is available. The centre push button operates the reject lever.
General characteristics

1.2.- Insertion of coins. The ES525 validator is designed to accept 25 different types of coins by means of the following programming methods:

- 23 tables programmable with the aid of a programming system.
- 2 self-programmable tables in the field.

In all the tables, the following parameters can be assigned:

- Credit line.
- Line of corresponding electrical inhibition and level of inhibition.
- Coin family to which it belongs (1 to 7) and channel through which it should enter.
- Separation route by default and separation line which will be used in active mode (routing plug).
- Bank to which it belongs (1 or 2)

The ES525 is able to accept coins or tokens with a maximum diameter of 31 mm and a maximum thickness of 3.3 mm.

1.3.- Measuring and security system.

The ES525 has various modules for the identification and validation of the coins inserted:

- Infra-red barriers to measure the diameter of the coin.
- Inductive sensors to obtain the parameters related to composition of the metal alloy and thickness.
- Acoustic sensor sensitive to the bounce return characteristics of the coin alloy and its possible substitutes.

The ES525 also incorporates various security systems:

- **Anti-thread.** Detects the existence of thread on a coin inserted and rejects it.
- **Anti-return.** In the event of a coin with a thread having been validated despite the anti-thread system, this system prevents it from travelling in the reverse direction through the insertion channel.
- **Software control of the coins passage time,** refuses to accept coins with a very high or low travelling speed.
- **Coin entry channel detection control** by means of infra-red barriers.
1.4.- Electrical specifications.

**Input voltage:** from 12 Vdc to 24 Vdc, minimum 10. maximum 27 Vdc.

**Consumption:**
- Standby: Typically 45mA (12Vdc), 50mA (27Vdc)
- In measurement: Typically 61mA (12Vdc), 65mA (27Vdc), maximum 2 sec.
- In admission: Maximum 259mA (12Vdc), 500mA (27Vdc) at peak. Mean energy.

**Inverse polarity protection:** pins 11 and 12

**Vcomma (pin 3 JP5):**
- Positive: Between 0Vdc and +27Vdc.
- Negative: Between 0Vdc and -27Vdc.

**Exit lines (pins Vcomma l, 2, 4, 6, 7 and 9 of JP5):**
- Standby: Open collector
- Active: In common positive. Vcomma -1.2V.
- In common negative. Vcomma +1.2V.
- I_max: 50mA

**Entry lines (pins 8, 10, 13, 14, 15, 16 and 17 of JP5):**
- High level: Open circuit or over 3.6Vdc, maximum 5.5Vdc.
- Low level: Maximum 1.2Vdc.
- **I_max driver for the separator:** 1.3 A
1.5.- Electrical specifications of the separator

Supply voltage: From 12Vdc to 24Vdc, minimum 10, maximum 27Vdc.

Consumption per coil: typically 300 mA (12Vdc), 670 mA (27Vdc)

Protected against continuous activation with a thermofuse.

1.6.- Dimensions (mm)

1.7.- Working temperature

In use: from 0°C to 60°C
In storage: from –25°C to 70°C
Humidity margin: Maximum 95% H.A. without condensation.

1.8.- Working Inclination

The «ES525 validator» is equipped to function at a maximum inclination of 3° on all axes.
Chapter 2. Description of the validator

2.1.- Main connector, JP5

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coin exit 6 (parallel)/ident pin (binary)</td>
</tr>
<tr>
<td>2</td>
<td>Coin exit 5</td>
</tr>
<tr>
<td>3</td>
<td>Common output</td>
</tr>
<tr>
<td>4</td>
<td>Coin exit 1</td>
</tr>
<tr>
<td>5</td>
<td>Polariser</td>
</tr>
<tr>
<td>6</td>
<td>Coin exit 2</td>
</tr>
<tr>
<td>7</td>
<td>Coin exit 3</td>
</tr>
<tr>
<td>8</td>
<td>Binary / parallel mode</td>
</tr>
<tr>
<td>9</td>
<td>Coin exit 4</td>
</tr>
<tr>
<td>10</td>
<td>Inhibition line 4</td>
</tr>
<tr>
<td>11</td>
<td>Vcc.</td>
</tr>
<tr>
<td>12</td>
<td>Gnd</td>
</tr>
<tr>
<td>13</td>
<td>Inhibition line 3</td>
</tr>
<tr>
<td>14</td>
<td>Inhibition line 2</td>
</tr>
<tr>
<td>15</td>
<td>Inhibition line 1</td>
</tr>
<tr>
<td>16</td>
<td>Inhibition line 5</td>
</tr>
<tr>
<td>17</td>
<td>Inhibition line 6</td>
</tr>
</tbody>
</table>
### 2.2.- Separator connector. JP2

<table>
<thead>
<tr>
<th>Pin N°</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Vcc.</td>
</tr>
<tr>
<td>6</td>
<td>Vcc.</td>
</tr>
<tr>
<td>19</td>
<td>Connection to the upper gate coil</td>
</tr>
<tr>
<td>20</td>
<td>Connection to the lower gate coil</td>
</tr>
</tbody>
</table>

![JP2 Diagram]

### 2.3.- Routing plug connector. JP4

<table>
<thead>
<tr>
<th>Pin N°</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Line 7</td>
</tr>
<tr>
<td>5</td>
<td>Gnd</td>
</tr>
<tr>
<td>7</td>
<td>Channel D</td>
</tr>
<tr>
<td>8</td>
<td>Line 1</td>
</tr>
<tr>
<td>10</td>
<td>Line 2</td>
</tr>
<tr>
<td>11</td>
<td>Gnd</td>
</tr>
<tr>
<td>12</td>
<td>Line 3</td>
</tr>
<tr>
<td>13</td>
<td>Channel C</td>
</tr>
<tr>
<td>14</td>
<td>Gnd</td>
</tr>
<tr>
<td>15</td>
<td>Channel B</td>
</tr>
<tr>
<td>16</td>
<td>Line 4</td>
</tr>
<tr>
<td>17</td>
<td>Line 6</td>
</tr>
<tr>
<td>18</td>
<td>Line 5</td>
</tr>
</tbody>
</table>

*See section 2.8*

### 2.4.- Double coin entry connector. JP6

<table>
<thead>
<tr>
<th>Pin N°</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vcc</td>
</tr>
<tr>
<td>2</td>
<td>Photo-diodes serializing cathode</td>
</tr>
<tr>
<td>3</td>
<td>Right hand entrance photo transistor collector</td>
</tr>
<tr>
<td>4</td>
<td>Left hand entrance photo transistor collector</td>
</tr>
<tr>
<td>5</td>
<td>Gnd</td>
</tr>
</tbody>
</table>

![JP6 Diagram]
2.5.- SORTER OVERRIDE connector. JP8

<table>
<thead>
<tr>
<th>Pin No</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>Polarizer</td>
</tr>
<tr>
<td>7</td>
<td>OVERRIDE B</td>
</tr>
<tr>
<td>8</td>
<td>OVERRIDE C</td>
</tr>
<tr>
<td>9</td>
<td>OVERRIDE D</td>
</tr>
<tr>
<td>10</td>
<td>Vcc</td>
</tr>
</tbody>
</table>

2.6- Anti-thread signal

The ES525 is able to allocate a code for the exit pins warning of the opening of the anti-thread system. The system check is made every 100mSec. The ES525 will keep the signal active while the system is open.

In the process of the parameters acquisition of a coin and its subsequent admission, neither is the system checked nor the signal given.

2.7.- Rejection lever actuated signal.

The ES525 is able to allocate a code for the exit pins announcing the opening of the hinge. The margin needed to give the signal is programmable. The ES525 will keep this signal active while the system is open.

As is the case with the anti-thread signal, during the ES525’s measurement and admission process this signal is not given.
The ES525 is equipped to control a 4 ways separator.
The ES525 routes the coins by default to one of the designated channels, according to the factory settings, but you can change this routing using the JP4 connector.

Each coin to be routed has to be assigned to a line of this connector (Line 1 to 7, pins 8, 10, 12, 16, 17, 18 and 1). If these lines are connected to the desired channel (Channel B, C or D, pins 7, 13, 15) the coins will be routed to the corresponding channels. If it is not connected to any channel, the coin will be routed the common route A.

Once the ES525 has validated a coin it checks to see if there is any connection made in the JP4 connector, and if there is none, the validator will use the default routing programmed in the factory. In the event that there is one or more connections made, all the default routing is not considered and only the routes programmed in the routing plug will be considered.

If you wish to route two or more coins to just one channel, diodes need to be positioned to join these lines. The anodes should be joined to the lines and all the cathodes joined to the desired channel.

Sorter override: when a coin is programmed in the routing plug to be routed to two or more channels, it will be routed to the highest priority channel. The priority order from highest to lowest is: D-C-B-A. In order to inhibit one channel in the hierarchy mentioned, you must activate the corresponding pin of this channel in the SORTER OVERRIDE (JP3) connector.
Description of the validator

2.9.- Switch layout

The ES525 has 8 micro-switches with the following working characteristics:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1</td>
<td>Coin inhibition or Token family/Select Table 1 or 2 in selflearning mode</td>
</tr>
<tr>
<td>SW2</td>
<td>Coin inhibition or Token family</td>
</tr>
<tr>
<td>SW3</td>
<td>Coin inhibition or Token family / Swap output codes</td>
</tr>
<tr>
<td>SW4</td>
<td>£2 = 4 x 50 p.</td>
</tr>
<tr>
<td>SW5</td>
<td>Alarms (if these are programmed. ON to disable)</td>
</tr>
<tr>
<td>SW6</td>
<td>Double entry control (if it is programmed. ON to disable)</td>
</tr>
<tr>
<td>SW7</td>
<td>Bank 1</td>
</tr>
<tr>
<td>SW8</td>
<td>Bank 2</td>
</tr>
</tbody>
</table>

Working of the switches SW1, SW2 and SW3:

**Coin inhibition.** If the validator has coin inhibitions programmed, simply activate each switch to inhibit the coin or coins assigned to each switch.

**Token family.** The ES525 validator is designed to combine the tables of each bank in such a way that by acting on the switches it can select the acceptance of different tokens from each bank.

For this, during the programming of the validator, one or more codes has been assigned to each table. By activating the combination of switches which has been assigned to this code, the ES525 will then accept all the tokens which have received this code on programming the tables.

The switches are combined in binary mode, i.e.:

- **SW1 SW2 SW3**
  - OFF OFF OFF All coded Tokens are inhibited
  - ON OFF OFF Will admit tables with code 1
  - OFF ON OFF Will admit tables with code 2
  - ON ON OFF Will admit tables with code 3

And so on up to tables with code 7 whose combination will be

- **ON ON ON** Will admit tables with code 7
Description of the validator

NOTE: In the validator programming there is a series of tables to which the code «0» has been assigned. These coins are basic coins for the validator, and therefore their acceptance is not programmable with this system.

Example: Your validator has the table programmed for "TOKEN 1" with the codes 1 and 3, and the table for the "TOKEN 2" with the codes 2 and 3.

If you wish to accept "TOKEN 1" only, you should position the switches:

\[ \text{SW1/ SW2/ SW3 = ON/OFF/OFF} \]

If you wish to accept "TOKEN 2" only, you should position the switches:

\[ \text{SW1/ SW2/ SW3 = OFF/ON/OFF} \]

If you program \text{ON/ON/OFF} code 3 will be programmed, and the validator will accept both TOKENS.

Note that SW1 is extreme right of the DIL Switch bank.

SW3 can also be used to swap output codes between two different coins. This function has to be programmed in the factory.

2.9.- Alarms

The ES525 will send an alarm signal in case of:

- Validator coin exit detectors continuously activated.
- Coin measuring sensors continuously activated.
- Coin rejected because of the anti fishing system.
- Valid coin that remains for too long in the coin exit detector.
- Valid coin that does not arrive to the coin exit detector.
- Valid coin that arrives too early to the coin exit detector.

The alarm code is programmable.

The alarm signal will last 600 ms., but if in the event that the alarm situation continues, then the alarm signal will remain active until this situation disappears.

If you want to inhibit the alarm signal, then set the switch SW5 (section 2.9) to ON.
3.1.- AZKOYEN protocol

It is possible to use the AZKOYEN communication protocol. This option should be activated when programming the validator in the factory. The operation mode is as follows:

☐ While the validator is not carrying out any measurement, the state of the signals is:

  - Exit lines in standby.

- Inhibition line. The machine should control this line and keep the validator in a state of inhibition. High level or low level, depending on how it has been programmed as an active level. Which one of the 8 inhibition lines of the JP5 connector will be used for this protocol is defined in the initial programming.

☐ Once the coin has been inserted, the validator analyses its characteristics and compares its results with the values given in the tables. The result of this operation can be given as the validation or rejection of the coin inserted. If the coin is accepted, the coin admission process begins.

☐ Once the validator has recognised and validated the coin it sends a code via the exit lines informing the machine that the coin is now inside. The duration of this impulse falls between a minimum of 1 msec. and a maximum of 10 msec.

☐ At this moment and within 10 msec. of the previous impulse the machine should confirm to the validator that it wishes to accept the coin, taking the inhibition line to the selected level for at least 3 msec. If the machine does not modify the inhibition line or if it does so but outside the time limit, the validator will reject the coin.

☐ Once the validator has checked that the inhibition line has been taken to the corresponding level for at least 1 msec., it de-activates the exit lines and activates the acceptance gate so that the coin can pass through the valid coins channel. At this moment the validator also drives the separator.

☐ When the coin leaves the validator via the valid coins route, this sends a code through the exit lines confirming that the coin has been accepted. The duration of this code can be programmed for between 1 and 255 msec. The code which the validator sends at this time is the same as the first code which is sent. The inhibition line should have returned to its active state in order to be prepared for the insertion of another coin. The maximum time lapse between the first signal and the confirmation signal is 1.2 second.

☐ Even though the acceptance process has been valid and correctly carried out, but due to an interruption in the acceptance mechanism the coin has not come out into the correct channel, the validator will not send the second code.
3.2.- Binary protocol.

In order to select this protocol simply set pin 8 of the JP5 connector at low level, 0Vdc.

When this mode is selected, pin 1 (Ident. pin) reflects the level of voltage applied in pin 3, indicating to the machine that the ES525 is equipped to use this protocol.

In this working mode there is a special layout of exit lines and inhibition lines for each coin which, as a general rule, uses the coded system for the exit lines.

3.3.- Parallel protocol.

In order to select this protocol leave pin 8 of the main connector JP5 open or at high level.

In this working mode, pin 1 (Ident. pin) is converted into a coin exit line (coin exit 6).

There is a special configuration of exit lines and inhibition lines for each coin which is different to the previous one, and which, as a general rule, uses one exit and one inhibition line for each coin denomination.

3.4.- Banks

There are two coin banks. Each of the 25 tables that the ES525 admits can be configured in such a way that it belongs to one bank only, to both banks, or to neither. When working the ES525 will only accept coins which belong to the bank, which has not been inhibited or assigned to a specific bank.

To inhibit the banks you should set the corresponding switches(section 2.9).
3.5.- Self-programming

The ES525 Validator is able to programme the acceptance of 1 or 2 coins/tokens without the need to connect it to any auxiliary programming system.

To program these coins/Tokens, carry out the following steps:

0 Power up the validator.

1 Select the table to be programmed by means of SW1.
   SW1 OFF Table 1
   SW1 ON Table 2

2 Connect a jumper between pins 2 & 3 of JP1. The validator will tell you by means of a short «click» that it has been set into «self-programming» mode.

3 Insert the coins/tokens to be accepted, at least 25 coins. If the ES525 carries out the measurement correctly, the coins/Tokens will be accepted, or if not, they will be rejected.

4 When finished, remove the jumper JP1.2-3. The ES525 will tell you that the programming has been completed by emitting another «click». If there has been any error in the process, the ES525 will not emit any sound and you will have to carry out this process again.

If you wish to delete the programmed coins/Tokens, simply connect and remove the jumper and the the selected table by means of SW1 will be deleted.

Warnings:

⚠️ Only the acceptance parameters of inserted coins/Tokens can be validated by means of the self-programming. The values of the credit lines, inhibition lines etc. cannot be altered.

This function has been designed in order to program any type of metallic discs, whether they are coins or tokens. The result obtained will be better when the quality and uniformity of these discs is optimum.

The use of discs made of non-magnetic materials, of uniform dimensions, metallic composition and embossment and which do not contain relieves which are proud of the edge of the coin are recommended.
4.1.- Changing the entry funnel

The entry funnel of the ES525 can be changed in order to modify coin entrance from the front to the upper part or vice versa. To do this, simply take out the funnel from its mounting by unscrewing it from the upper part of the validator (1 and 2).

Both funnels are mounted in the same way.

4.2.- Cleaning

In order for the machine to accept coins correctly, it is essential that both the channels of passage and the mechanical mounting, together with the openings of the sensors be clean and free of any foreign objects.

In order to carry out the cleaning, disconnect the validator's supply and open the hinge. Clean the coin passage channel by means of a cloth moistened with alcohol.

⚠️ DO NOT USE WATER, DETERGENTS, ABRASIVE MATERIALS OR DISSOLVENTS IN ANY CIRCUMSTANCES.
The ES525 is designed to be incorporated in host machines that provide the necessary environment for the validator providing both, protection from humidity, and access in normal operating conditions.

The ES525 power must be supplied by a safety transformer that complies with EN-60742 and when off load gives a voltage output less than 42.4V.

The ES525 should be protected by a fuse rated 2A Blow blow, that complies with CEI 127. Any other mechanism used to protect the ES525 against failures, must ensure a minimum safety level equivalent to the one mentioned above.

Note: In order to ensure an effective protection, the «host» power supply should be able to supply at least 2.75 times the nominal current of the fuse.

If the power supply cable becomes damaged, it must be replaced immediately, by the technical service department, in order to avoid risk.

Always dispose of defective units according to local regulations.
1 11018541-0 PCB Control board cover
2 43308280-0 PCB Control board
3 43519190-1 Microprocessor
4 11018431-0 Deflector anvil
5 11018421-0 Cradle location peg.
6 11018311-0 Cover for bottom exit
11019141-0 Cover for front exit
7 11018391-0 Anti fish balance gate
8 11018331-0 Gate cover
9 11025061-0 Coin upper entry fixed to gate
10 11018411-0 Reject bearing roller
11 11018381-0 Reject lever
12 12001650-0 Reject lever spring
13 41101911-1 Coin upper entry fixed to gate
14 41080971-0 “Y” chute electronics
15 43308610-0 “Y” chute token detector PCB
16 43210880-0 “Y” chute PCB loom
17 41083761-0 Front plate without front exit
41083771-0 Front plate with front exit
18 41081531-0 Single entry bezel
19 41084541-0 Coin token bezel
20 11018361-0 Coin front exit fixed to body
21 11018371-0 Coin front entry fixed to gate
22 41076011-0 Separator
23 01010241-0 Separator fixing screws
24 43105820-0 Separator coll