Eurocoin Technical Support Document

Product Description
Azkoyen Modular X Series Validator

Original Manufacturer	Eurocoin Part Number	Current Revision	Date of Release
Azkoyen	0x7xxxxx	Rev 1	Jan 2005

Document Content Summary
Introduction, technical features, functionality, working conditions, pinouts.

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Modular X6

1. INTRODUCTION AND DESCRIPTION OF COMPONENTS

This Technical Manual provides technical information corresponding to the coin in the **Modular X6-6S** and **X6-2i** range.

The coin *validators* are apparatus that, within the machine, and forming part of it, have the task of selecting and validating coins introduced into the machine. They are used in gambling machines, vending machines, betting machines, cigarette machines, etc.

In the rest of this Technical Manual the coin *validators* in the **Modular X6-6S** and **X6-2i** range will be called *validator* or *validators*

When reference is made to the *machine* it corresponds to the machine the *validator* is installed in.

When the word **configurable** is used in the Technical Manual it means that the parameter or characteristic it refers to can be programmed in the factory to suit the needs of the customer. These parameters or characteristics can later be reprogrammed using the adequate technical means.

1.1. PRINCIPLE TECHNICAL CHARACTERISTICS

The most relevant technical characteristics of this range of *validators* are:

- Voltage and power consumption:

	Average	Maximum	Minimum
Voltage	12 Vdc	15 Vdc	10 Vdc
Power consumption of the outlet solenoid	280 mA	400 mA	
Power consumption of the electronic circuit	50 mA		
Activation time of the outlet solenoid	110 milliseconds		

- The *validator* admits 32 types of different coins.

  Of the 32 coins, 2 can be reprogrammed by the operator on site. The following of the two coins is not programmed:

- The output *code*s
- The assigning of inhibition *dipswitches*
- The coin classification
- The coin inhibition

These parameters are associated to the reference the *validator* has as a final product.

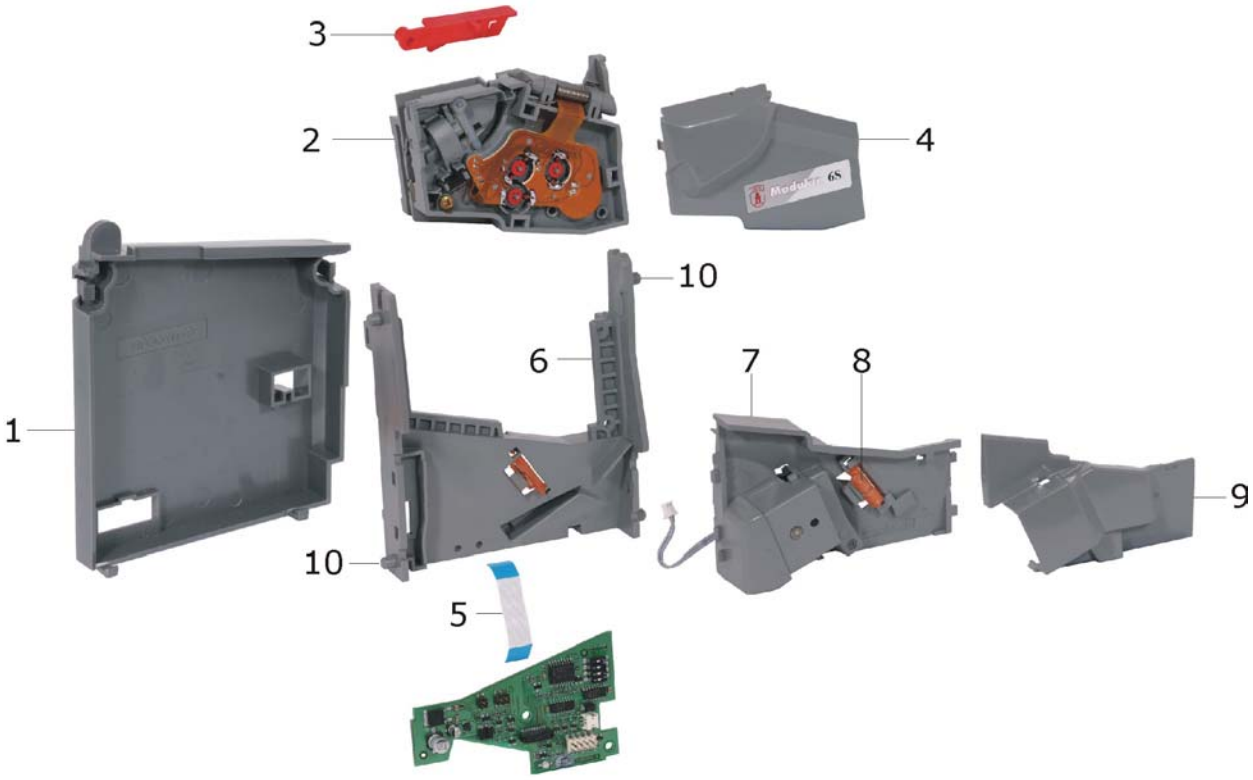
The maximum number of coins admitted by the *validator* depends on the type of "*Sensor module*" it has.

- All the models come standard with an effective string detection system, which will foil any attempt at fraud using a string tied to a coin.
- Using **Pin 6,** a general inhibition of the *validator* can be made. This option is configurable at **Low** or **High** level.
- These *validators* have 4 inhibition *dipswitches* located on the outlet module PCB.
- After admitting 1,000,000 coins the *validator* will still correctly validate legal currency.
- It has a system that generates a "refund *code*" when the *validator* door opens. When this *code* is activated the *machine* interprets that the user wants their money refunded and does so.
- Options that the *validator* can be configured for with the *HeUs* user tool:
  - *Validator* door open signal.
    Its function is programmed: yes or no, its output *code* and how much it has to open for the *validator* to determine if it is open or not.
  - String detector signal: its function is programmed: yes or no and its output *code*.
  - Configuration of the inhibition level: **High** o **Low**.
  - "Output code" impulse time; maximum 255 milliseconds.
  - Coin rejected *code*. Its function is programmable (if it exists or not), and its output *code*. When it is activated the *validator* informs of all the coins that it rejects, not identified, the cause, string detector, parameters, outlet gate solenoid times, etc.
  - Assignation of the output *code* of each coin.
  - Assignation of the working mode of the *dipswitch*es: inhibition or admission.
  - Assignation of the inhibition *dipswitch* for each coin. It is possible that only one inhibition *dipswitch* acts on various coins.

It is also possible to configure the coin classification pins and the Classification: Yes / No in the X6S *validator* range

- **Mean time between failures (MTBF):** Under normal working conditions, these validators have a MTBF of 1.3 validator of every 100 per year.
- **Mean cycles between failures (MCBF)**: Under normal working conditions, these validators have a MCBF of 840,000 coins.
- **Construction material:** The latest generation plastics, resistant to wear, static electricity dissipating, of high rigidity and dimensionally stable at high temperatures and humidity (low absorption levels) and resistant to saline deposits.

1.2. COMPONENT DESCRIPTION



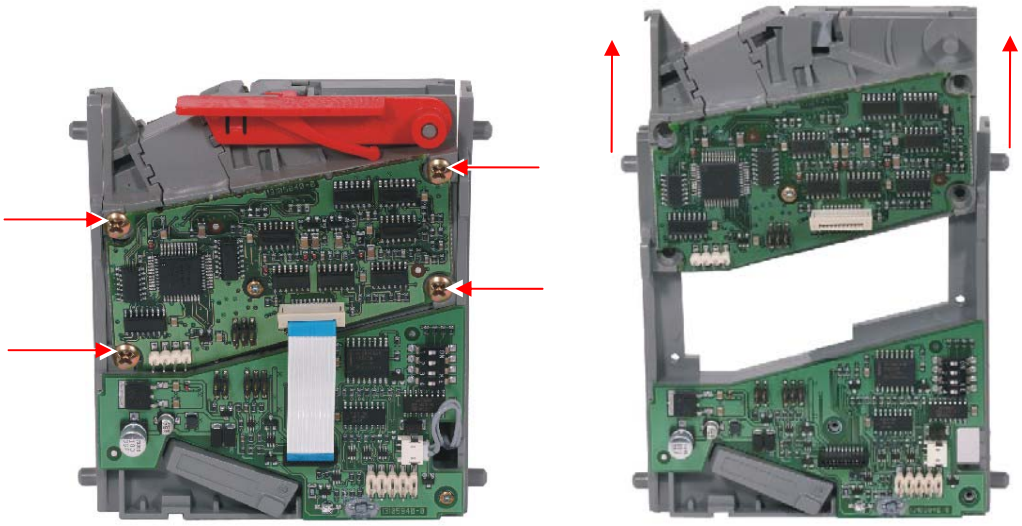
1. Cover

This cover protects the electronic elements in the *validator*.

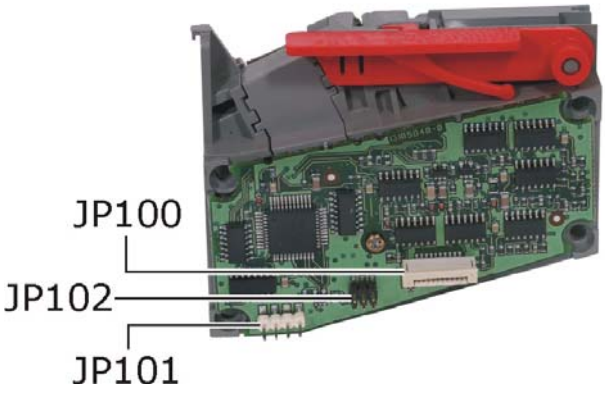
2. Sensor module

This element has the majority of the parts responsible for measuring and control in the *validator*. It is a common element of the *validators* that have the same sensors, it is where the different measurements and controls are carried out to determine if the coin is accepted or rejected.

To remove it from the *outlet module módulo* it is necessary to unscrew the 4 screws shown with arrows in the picture below:



The principle elements that the *sensor module* has are:

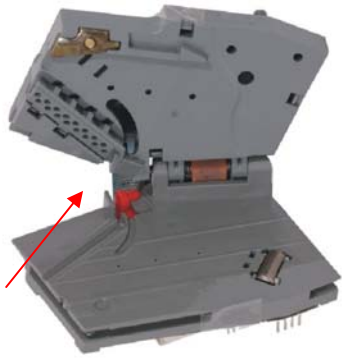


JP100: Communication bus for the outlet module

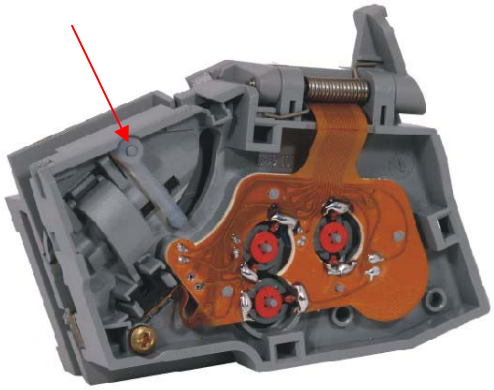
JP101: Serial port

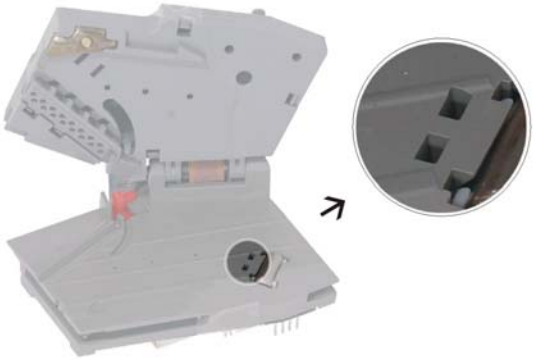
JP102: Programming connector

Inside the *sensor module* is the "string detector system". An electro-mechanical system to foil any attempt at fraud using a string tied to the coin. The system is based on an infrared beam passing through a hole in the *shutter*. The beam is interrupted when the string attached to the coin tenses and moves the *shutter*. The *validator* interprets this signal as a fraud attempt and inhibits the coin.



The coin entry rocker is designed to stabilize the speed at which the coins move through the interior of the *validator.*





In the lower part of the entry model is the acoustic sensor. This device receives the sound made by the coin when it hits the *metallic cylinder* on falling into the validator. The parameters received by this sensor are very important in the coin acceptance or rejection process.

Depending on the model, the validator has between 2 and 6 inductive sensors that obtain coin parameters related to its thickness and alloy. Its design favours the reading of coins manufactured using bimetallic technologies and/or multilayer. An example of these technologies is the €1 and €2 coins.	
	3 pairs of infrared sensors that obtain parameters related to the diameter of the coin.

3. Recuperation lever

Activating this lever will open the *validator* to free possible coin jams within the *validator*.

4. *Sensor module* cover

This cover protects the PCB.

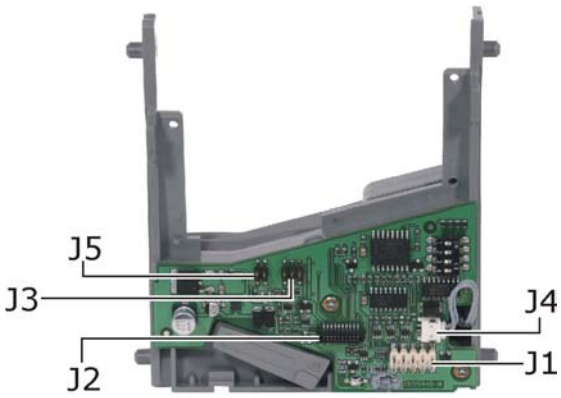
5. Communication bus for the entry and sensor modules

This communicates the *entry* and *sensor modules*. Disconnect from the sensor module with the connector shown in the picture.

6. Outlet module

This element manages the communication between the *validator* and the machine it is installed in. Its PCB has a "flash memory" that can be reprogrammed with the tools and procedures that are described in the Technical Manual of the "User Tool" (***HeUs***).

Its principle elements are:



J1: 10-way bus. It communicates with the *machine*.

J2: Communication bus with the sensor module.

J3: Programming the microprocessor

J4: Acceptance gate

J5: Links

7. Acceptance gate

When the *validator* validates a coin, the electromagnet opens the gate to let the coin through the accepted coin channel.

The solenoid is powered by 12 Vdc.

8. Anti return

This mechanical element impedes the return of the coins.

9. Acceptance gate cover

It protects the acceptance gate assembly; it is held by anchoring "clips".

10. Anchorage pivots

These anchorage elements on the *validator* hold it inside the machine and have a ø of 4.5 mm and are 5 mm long.

2. FUNCTIONING PRINCIPLES

2.1. Function

The *validators* in the **Modular X6** range are characterised for communicating with the machine and allowing it to make the decisions on admitting or rejecting the coin and its destination. The communication method is described below:

The diagram represents the input and output signal times of the *validator* in the process of admitting a coin (inhibition level **Low**).

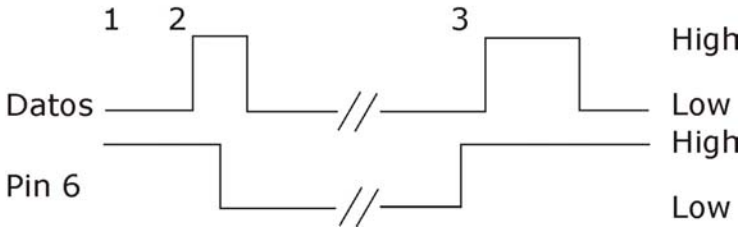
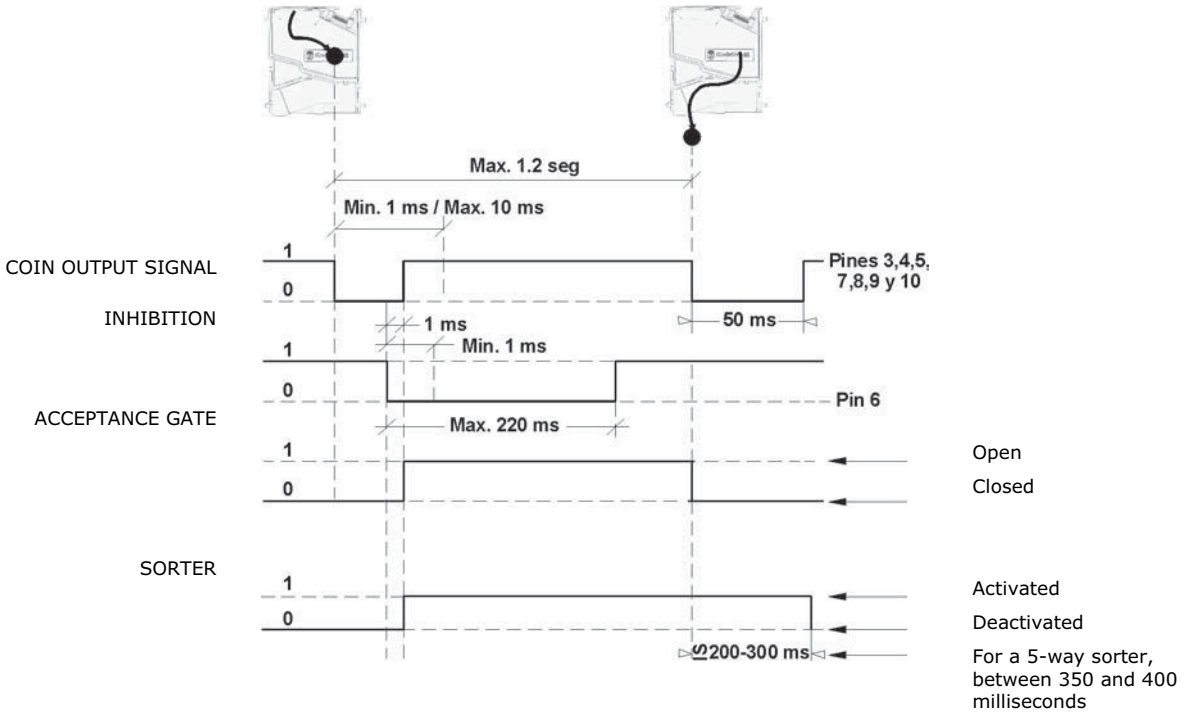


FIGURE 1: A valid coin has been detected

FIGURE 2: A coin has been accepted



The second picture shows the instant when the coin has passed all the sensors that are used for its analysis and the validator starts its communication with the machine

Function:

- With the *validator* at rest, point **1** in the first picture, the state of the signals is:

  a- High impedance data lines.

  b- *Confirmation line*, Pin 6: the *machine* has to control this line and maintain it **High** or disconnected.

- Once a coin has been introduced, the *validator* measures its characteristics and compares the results with the previously programmed coin tables. The comparison can have two values: valid coin (coin programmed), or coin not valid (coin not programmed). If the coin is not valid, it is rejected; if it is valid, the acceptance process starts.

- When the *validator* admits the coin as valid, point **2** on the first picture, it emits a *code* on the data lines informing the machine of the coin value. The pulse of the *code* oscillates between a minimum of 1 millisecond and a maximum of 10 milliseconds.

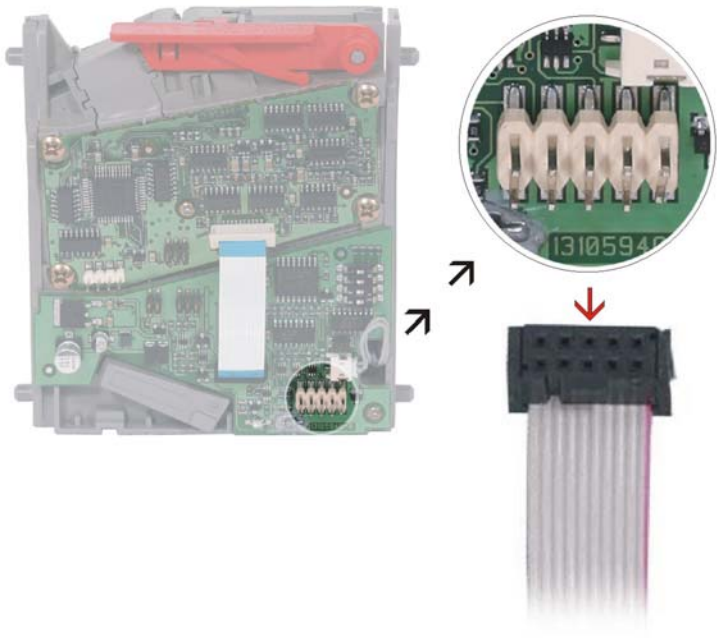
- Within the 10 milliseconds that the *code* pulse lasts, the *machine* has to confirm to the *validator* that the coin is to be accepted as good. For this it puts the *confirmation line* **Low** for a minimum of 3 milliseconds. If the *machine* does not change the *inhibition line* or it sends this code outside the time limit the *validator* will reject the coin.
- When the *validator* detects that the *inhibition line* is **Low** for a minimum of 1 millisecond, it will deactivate the data lines and activate the acceptance gate solenoid so the coin enters the accepted coin channel. The *validator* can also emit a *code* that can be used to activate the *sorter*.
- When the coin leaves the *validator* through the accepted coin channel, point **3** of the first picture, it emits a *code* on the data lines confirming that the coin has been accepted and has left through the correct channel. This *code* is the same as the first *code* that was sent in point **2** on the first picture.
- When the *inhibition line* goes **High** the *validator* goes to rest mode waiting for another coin.

The maximum time that is accepted between the first communication signal and the second confirmation signal, point 3, of the first picture is of **1 second**

2.2. Programming of 2 coins or metallic tokens

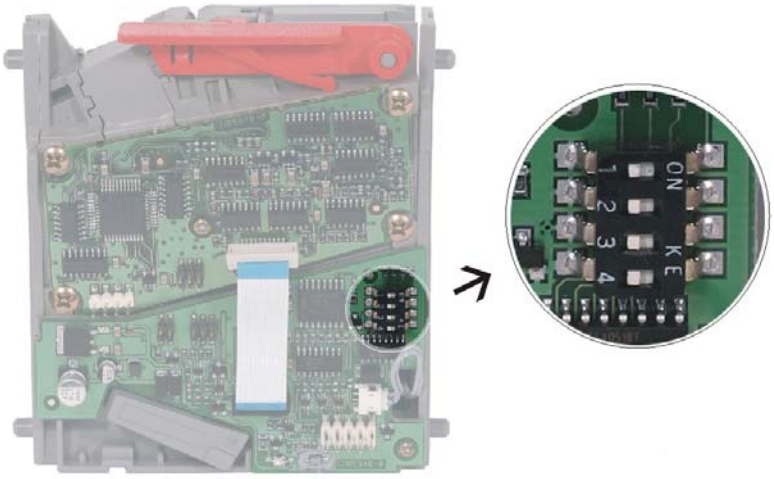
The process to follow to auto-programme these coins or tokens is described below:

1st. Disconnect the loom from connector J1 on the *validator*.

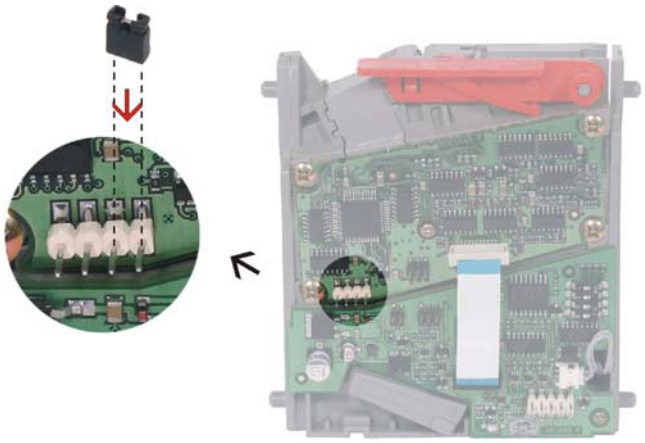


2nd. Remove the cover of the *validator and* activate *Dipswitch* 1 to determine the número of the coin or token you wish to programme.

- *Dipswitch* 1 ON: Token 1
- *Dipswitch* 1 OFF: Token 2



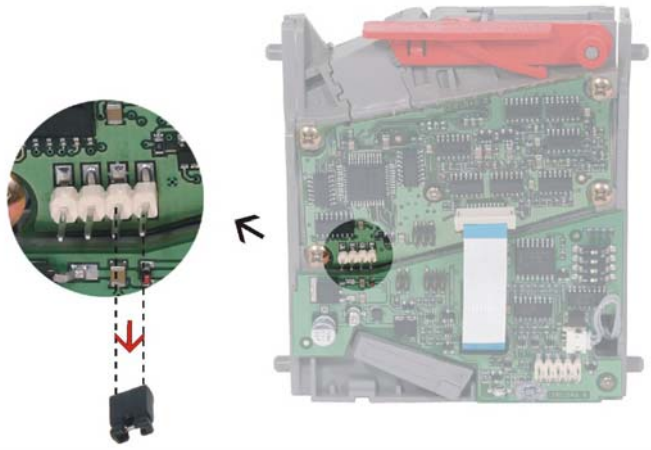
3º. Short pins 1 and 2 on the 4-way connector J5. The *validator* indicates that it is in "auto programming" mode by briefly activating the acceptance gate solenoid (approximately 100 milliseconds).



4º. Introduce at least 25 tokens of the type you wish to programme into the *validator.* If they are within the acceptance parameters of the *validator*, it will accept them and they will come out of the accepted coin channel.

5º Now, remove the short from J5. On doing this the acceptance gate solenoid will again briefly active (approximately 1 second); this signal indicates that the programming has

been carried out. If there has been any incident in the programming, the acceptance gate solenoid will not activate.



To eliminate the coin or token programmed: place and then remove the short on pins 1 and 2 of the 4-way connector J5

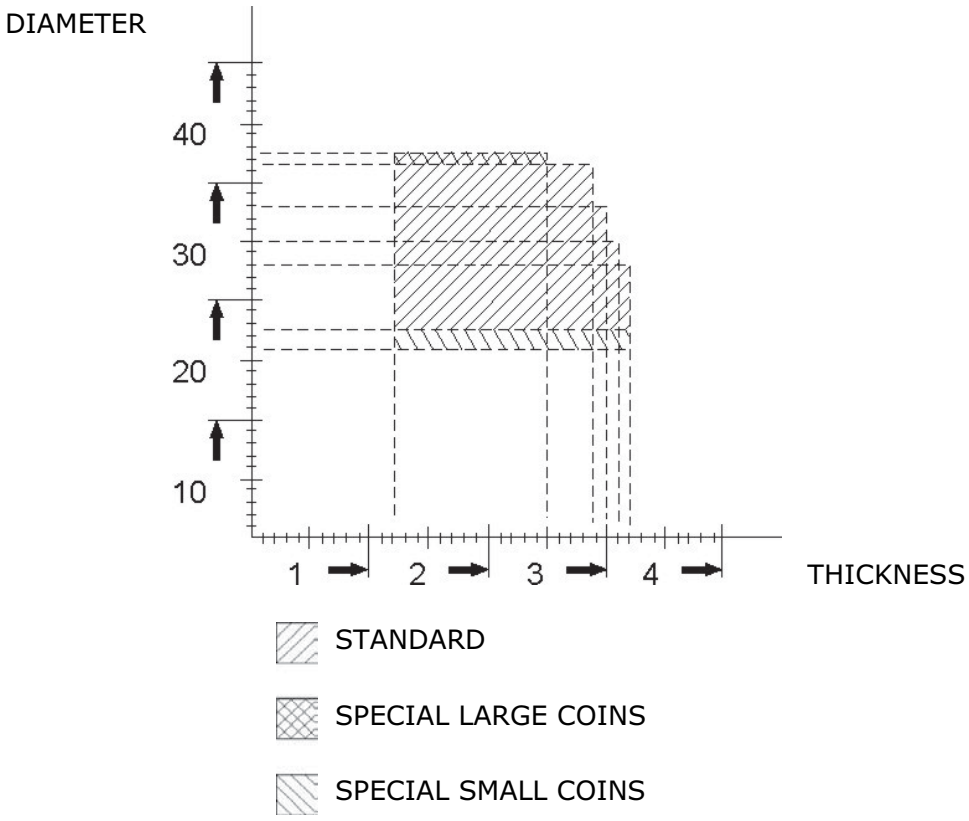
It is important to use tokens made of non magnetic metals

3. WORKING CONDITIONS AND NORMS

Optimum results from using this equipment can be obtained by meeting the following requirements:

- ❒ Install the Coin validator with a maximum inclination of +/- 3º on all axes.
- ❒ Temperatures:
  - ➘ Storage: from -25 to +70ºC.
  - ➘ Working from +5 to +55ºC.
- ❒ Humidity: maximum 95% (relative humidity without condensation).
- ❒ Physical characteristics of the coins that are admitted:

	Minimum	Maximum
Diameter	16.5 mm	32.5 mm
Thickness	1.2 mm	3.5 mm



❒ Norms that are met.

➘ EN50081-1. General emission norm.

- EN50022: Radiated emission (measurement of the radiated perturbation field).
- EN50022: Conductive emission (measurement of the conductive perturbations in power supply).

➘ EN50082-1: General immunity norm.

- IEC801-2: Electrostatic discharges (measurement of the immunity to electrostatic discharges).
- IEC801-3: Radiation immunity (measurement of the immunity to electric fields).
- IEC801-4: Transitory peaks and spikes (Measurement of the immunity of transitory peaks and spikes).

➘ EN60335-1 (94-95). Electrical appliance safety norm

➘ **CE**

3. CLEANING AND MAINTENANCE

The amount of dirt coins leave and the foreign objects and dirt that may obstruct its elements determine the maintenance the coin validator requires. Use the following guidelines for cleaning:

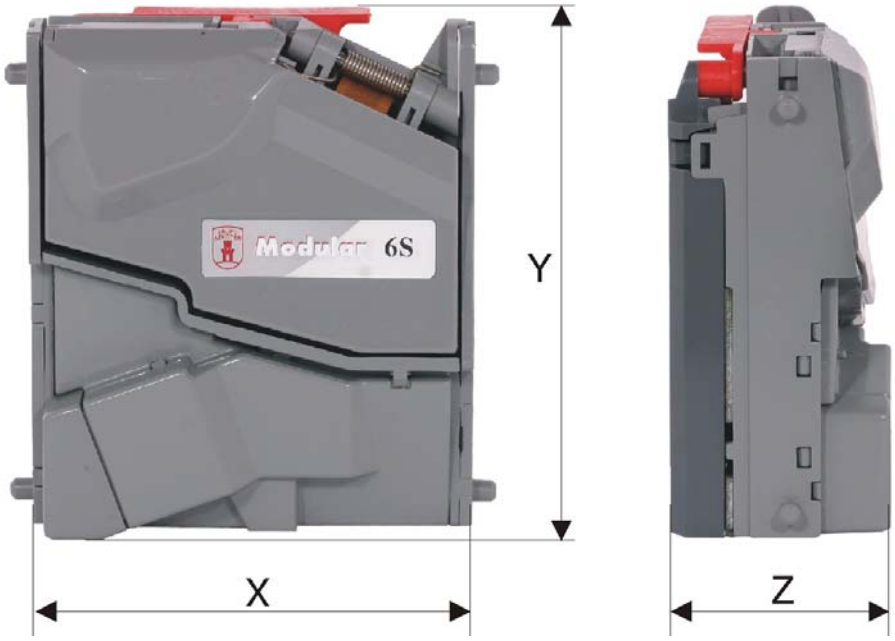
- Disconnect the power – connector J5 -.
- Clean the dirty areas with paint brush or brush with fine vegetable fibres (never metal) impregnated with alcohol. Limpiar con más detalle:
  - The coin guide
  - The metal ramp
  - The optic sensor holes
  - The string detector photocells
  - The string detector system

WARNING:
Never use products that contain benzene hydrocarbons. These products severely degenerate the plastic parts producing irreparable damage.

Never submerge the *Coin validator* in any liquid.

4. DIMENSIONS

The *validator* has the same general external dimensions as the "L": 3.5 type *validator*. The *validator* will fit in the same housing as the "L" *validator*.



X = 89

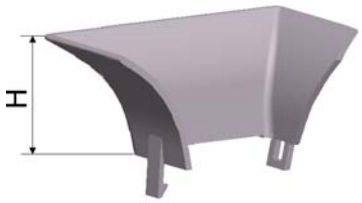
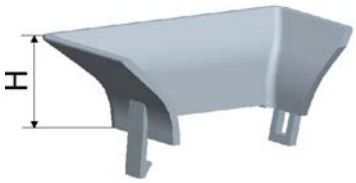
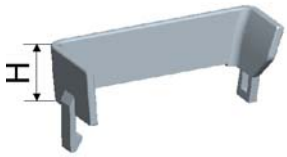
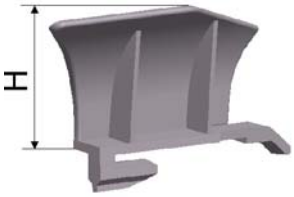
Y = 102

Z = 48

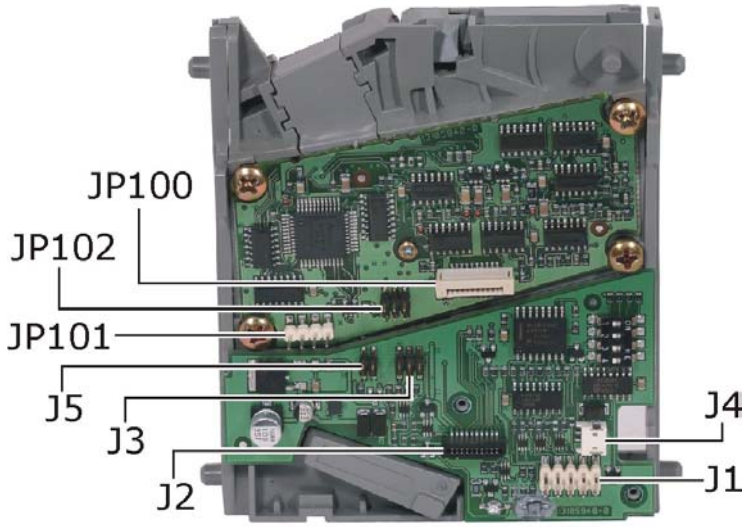
- Dimensions (mm)-

Weight: 202 grams

Funnels

Large funnel	Medium funnel	Small funnel
H: 23.5 mm Ref. 11032221-0 	H: 15.5 mm Ref. 11032231-0 	H: 10 mm Ref. 11032241-0 
Ref. 11032191-0 	Ref. 11032201-0 	Ref. 11032211-0 

5. DIAGRAMS AND PIN OUT



Connector J1 on the Outlet module		
Pins	Function	Notes
Pin 1	+ 12 Vdc	Minimum: + 10 Vdc; Maximum: +15 Vdc
Pin 2	GND	
Pin 3	Data line D6	Open collector, transistor NPN. On X5 validators this Pin is used to classify coins.
Pin 4	Data line D0	Open collector, transistor NPN
Pin 5	Data line D5	Open collector, transistor NPN. On X5 validators this Pin is used to classify coins.
Pin 6	General inhibition	
Pin 7	Data line D2	Open collector, transistor NPN
Pin 8	Data line D1	
Pin 9	Data line D3	
Pin 10	Data line D4	

0 Vdc at 0.7 Vdc - logic level zero

>4 Vdc, maximum voltage or **Pin** open: Logic level one

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