

3/5 WAY SORTER



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1 INTRODUCTION AND PRODUCT MODELS

The technical information that is presented in this Technical Manual refers to the new **Sorter** and **Mini-sorter** range manufactured by Azkoyen Medios de Pago S.A.

This product is totally compatible with the previous model and provides numerous benefits in modularity and speed of classification.

1.1 MINI-SORTER UNIT

Mini-sorter or Mini-sorter assembly, are the names that refer to the device as a whole that validates and classifies the coins introduced by the user. They are always used with a coin validator. They are made up of the following elements:

- U bracket
- Sorter
- Refund module (optional)
- Standard coin guide (optional)

None of these components are accessible from the exterior of the machine.



Figure 1: Sorter unit.

1.2 SORTER UNIT + FRONT PLATE

The Front plate or U sorter + front plate are names that refer to the device as a whole that validates, classifies and even refunds, in the event of a jam, the coins introduced by the user. They are always used with a coin validator. They are made up of the following elements:

- U Bracket
- Sorter (optional)
- Front plate(with refund button and refund tray)
- Coin guide



Figure 2: Front plate

2 DESCRIPTION OF COMPONENTS

2.1 VALIDATOR BRACKET

This element is used to hold the rest of the components of the U sorter, such as the front plate, the validator, the refund system, the coin guide and the sorter.

There is only one model of validator bracket and it is used in the Sorter and Mini-sorter assemblies.



Figure 3: Validator bracket for Sorter Unit

2.2 SORTER MODULE

The sorter module directs the coins to the desired paths. It activates two or three, depending on the model of sorter, electromagnets (solenoids) to direct the coins.

The difference from the previous models of sorter is that this module is fixed, that is, the flaps move when they are activated and deactivated and the sorter module stays in a fixed position.



Figure 4: Sorter module

The following is a description of the way each one of the components that make up the sorter module works.

2.2.1 Components

Electronic circuit board

There are 2 models of electronic circuit board, one for the protocol cctalk and another for the parallel mode.

The following Figures show the two circuit boards and the pin out of their connectors.

CCTALK BOARD:

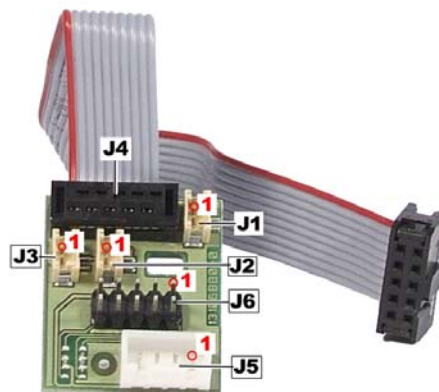


Figure 5: CCTALK sorter board

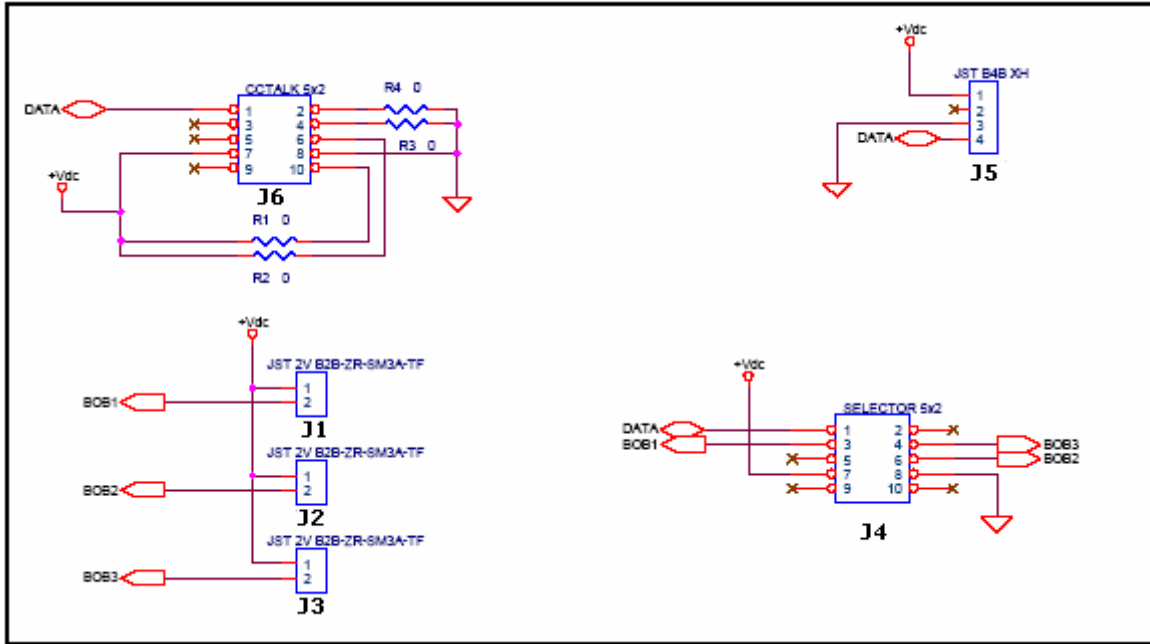


Figure 6: Diagram of cctalk board

Pin	Connectors J1, J2 and J3
1	Vdc
2	Solenoid

Table 1: cctalk board, J1, J2 and J3 Connectors for activating the solenoids

The connector J1 is connected to solenoid 1. (See Figure 10: Position of the solenoids in the sorter)

The connector J2 is connected al solenoid 2. (See Figure 10: Position of the solenoids in the sorter)

The connector J3 is connected al solenoid 3. (See Figure 10: Position of the solenoids in the sorter)

Pin	Connector J4
1	/ DATA
2	
3	solenoid 1
4	solenoid 3
5	
6	solenoid 2
7	Vdc
8	0 Vdc
9	
10	

Table 2: cctalk board, J4 Connector for the validator to the board

Pin	Connector J5Cctalk
1	Vdc
2	-----

3	0 Vdc
4	/ DATA

Table 3: cctalk board, J5 Standard cctalk 4-pin connector

Pin	Connector J6 CCTALK
1	/ DATA
2	0 Vdc (Optional)
3	-----
4	0 Vdc (Optional)
5	-----
6	Vdc (Optional)
7	Vdc
8	0 Vdc
9	/ SERIAL MODE
10	Vdc (Optional)

Table 4: cctalk board J6, 10-pin standard connector

PARALLEL BOARD:

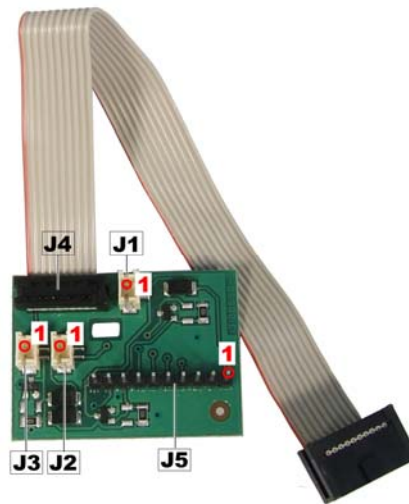


Figure 7: Parallel sorter board

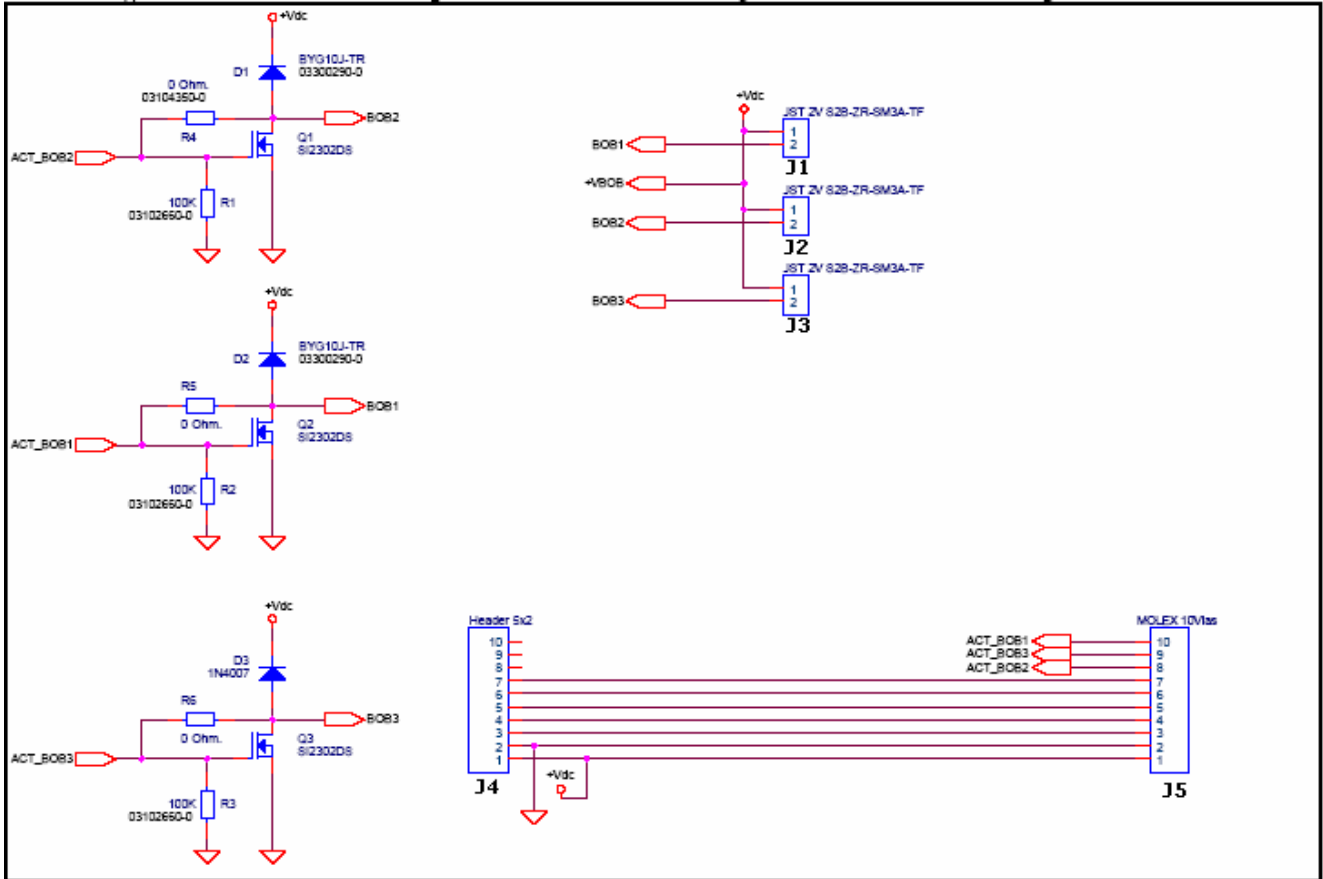


Figure 8: Parallel wiring diagram

Pin	Connectors J1, J2 and J3
1	Vdc
2	Solenoid

Table 5: Parallel board. Connectors for activating the solenoids

The connector J1 is connected al solenoid 1. (See Figure 10: Position of the solenoids in the sorter)

The connector J2 is connected al solenoid 2. (See Figure 10: Position of the solenoids in the sorter)

The connector J3 is connected al solenoid 3. (See Figure 10: Position of the solenoids in the sorter)

Pin	Connector J4
1	(+) 12 V DC
2	(-) 0 V DC
3	Coin output/Classification
4	Coin output
5	Coin output/Classification
6	General Inhibition
7	Coin output
8	Coin output
9	Coin output
10	Coin output

Table 6: Parallel board. J4, connector from validator to board

Pin	Connector J5 Parallel
1	(+) 12 V DC
2	(-) 0 V DC
3	Coin output
4	Coin output
5	Coin output
6	Inhibition general of the validator
7	Coin output
8	Transistor solenoid 1
9	Transistor solenoid 2
10	Transistor solenoid 3

Table 7: Parallel board. Connector 10 pins - parallel.

Solenoids

In the 3-way sorters there are two solenoids to route the coins to three different paths.

In the 5-way sorters there are three solenoids to route the coins to five different paths.



Figure 9: Solenoids

The positions of the solenoids se are shown in the following Figure.

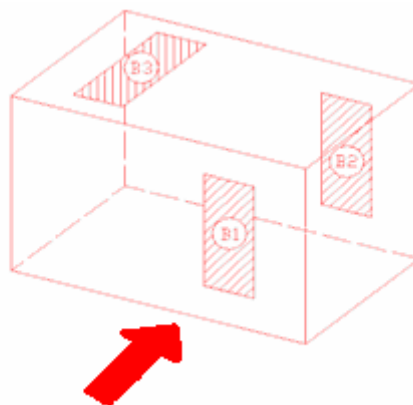


Figure 10: Position of the solenoids in the sorter

The following table shows the activation sequence of the solenoids.

B3	B2	B1	
OFF	OFF	OFF	PATH 1
OFF	OFF	ON	PATH 3

OFF	ON	OFF	PATH 2
ON	OFF	ON	PATH 5
ON	ON	OFF	PATH 4

Table 8: Activation of the solenoids and the outlet paths

Sorter Casing, Arms and Flaps

This is the mechanical part of the sorter. It physically directs the coins to their paths.

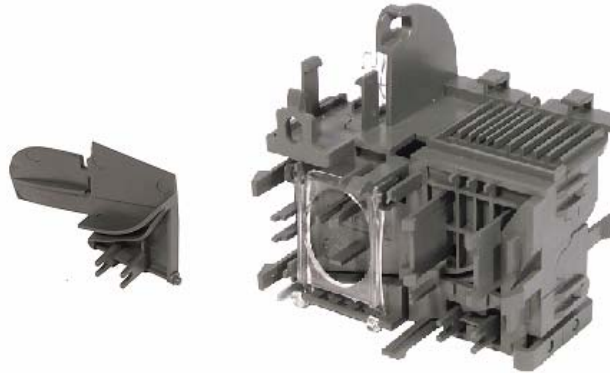


Figure 11: Casing, Arms and Flaps on the sorter

2.2.2 Types of sorter depending on number of paths

5-way sorter

The 5-way sorter has three solenoids. Table 10 and Figure 12 show the activation sequence of the solenoids.

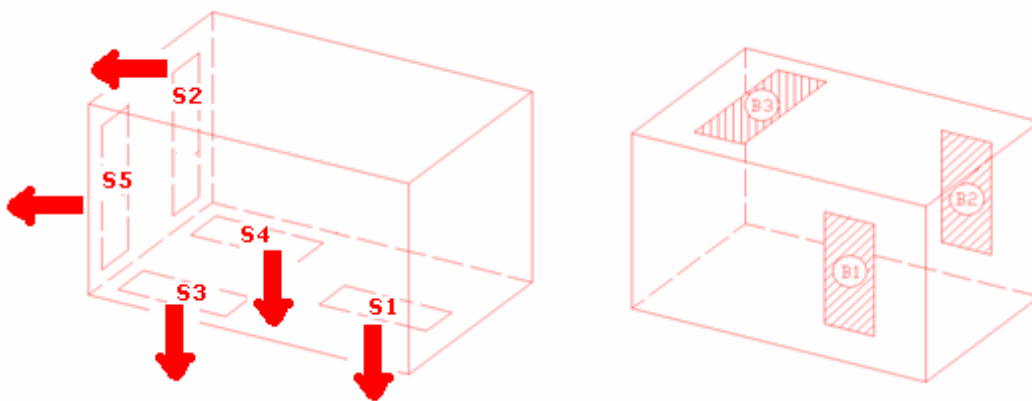


Figure 12: The outlet paths



Solenoids 1 and 2 must never be activated at the same time.

3-way sorter

The 3-way sorter has two solenoids.

It is possible to configure various combinations of coin output in the 3-way sorter, depending how the flaps, arms and supplements to cover the channels are configured.

The following shows all the possibilities for configuring the coin outputs.

B2	B1	
OFF	OFF	PATH 1
OFF	ON	PATH 3
ON	OFF	PATH 4

Table 9: Paths covering paths 2 and 5

B2	B1	
OFF	OFF	PATH 1
OFF	ON	PATH 5
ON	OFF	PATH 2

Table 10: Paths covering paths 3 and 4

B2	B1	
OFF	OFF	PATH 1
OFF	ON	PATH 5
ON	OFF	PATH 3

Table 11: Paths covering paths 2 and 4

B2	B1	
OFF	OFF	PATH 1
OFF	ON	PATH 4
ON	OFF	PATH 2

Table 12: Paths covering paths 3 and 5

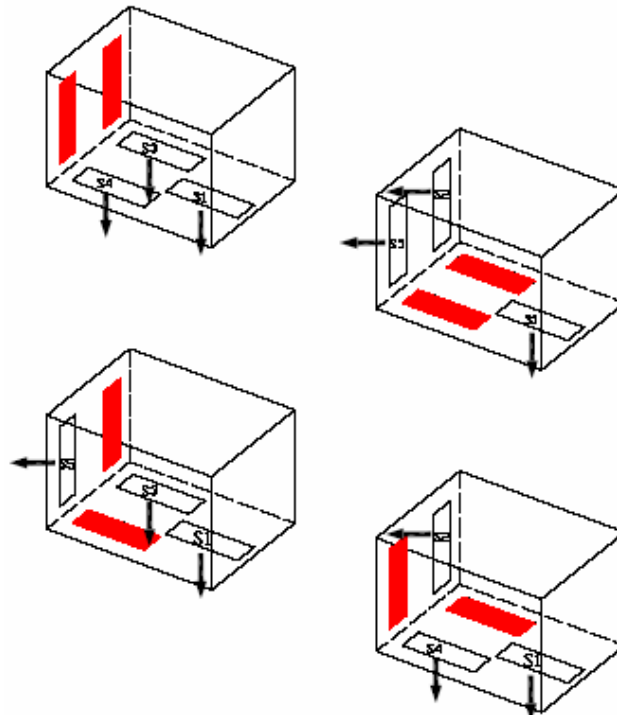


Figure 13: Paths activated in the 3-way sorter

2.2.3 Types of sorter depending on protocol:

The only component in the sorter that varies depending on the protocol is the circuit board.

Parallel Sorter

The parallel sorter must always work with a validator that uses this same protocol. Parallel sorters always use 12 Volts.

This kind of sorter can work with X6 parallel modular range and with L66S parallel model.

Cctalk Sorter

The cctalk sorter must always work with a validator that uses this same protocol. It can work on 12 to 24 Volts.

The model presented in this manual, should be used with a Modular X6 cctalk Validator and it is not valid for L66scctalk model.



All combinations are possible, that is, we can have parallel sorters of 3 or 5 paths, and cctalk sorters of 3 or 5 paths.



All the models of sorter can be used in the Mini-sorter assembly and in the Sorter + Front Plate assembly.

2.2.4 Classification times and current

For the sorter to work correctly it is necessary to keep the solenoids activated for 350 milliseconds once the acceptance gate on the validator has been deactivated. This means that the access time to the sorter is **350** milliseconds.

The following Figure shows the activation sequence of the acceptance gate on the validator and the solenoids on the sorter (Independently of the protocol).

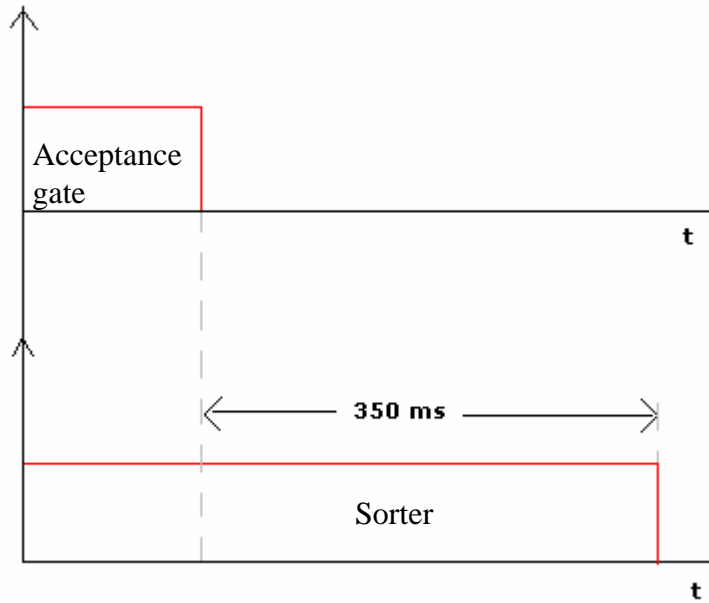


Figure 14: Activation of the sorter

The current draw of the sorter module is shown below.

	5-way Sorter	3-way Sorter
Current	500 mA	250 mA

Table 13: Current draw in sorter module

2.3 FRONT PLATE

This is the only part of the sorter assembly that is on the exterior of the machine. It is the only link between the sorter and the user.

The refund button and coin entry are mounted on the front plate and the large model, the refund tray is also mounted.

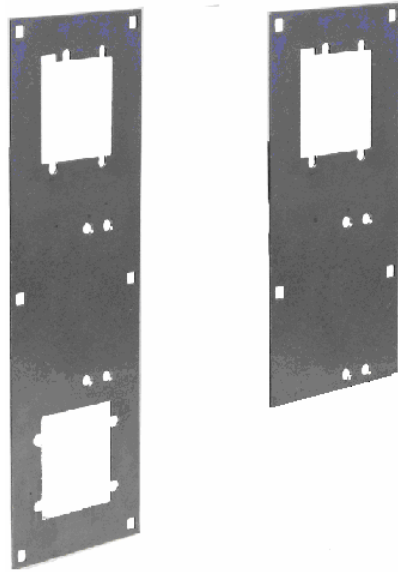


Figure 15: Front plate with and without the refund tray

REJECT BUTTON

This button is pressed to activate a refund of the coins in the case of a coin jam. It includes a lighting system with a LED.



Figure 16: Button

REFUND TRAY

This element collects the refunded coins from the validator. It has slots for the draining of liquid.



Figure 17: Refund tray

2.4 COIN GUIDE

The coin guide or chute directs the coins from the slot to the validator.

There are two models, one for the Mini-sorter and one for the sorter. Both models have various slots to allow the draining of liquid.

The coin guide is one complete piece that can be opened by unclipping the underside for assembly and cleaning. It is a necessary part of both sorter models of sorter.



Figure 18: Coin guide for front plate

The coin guide that is installed on Mini-sorter can be extended in length by adding as many centre modules as necessary. The coin outlet end is always the same and the modules are all the same length.



Figure 19: Modular coin guide for the Mini-sorter.

It is recommended to assemble the modules with the guide unclipped and open, as shown in Figure 21.



Figure 20: Coin guide modules, centre piece can be extended

2.5 REFUND MODULE

The refund module activates the refund lever on the validator using an electromechanical device to eliminate any possible coin jams in the validator.

There are various models of refund module depending on the voltage is used (12 or 24 Volts) or the control and stopping of the motor is carried out.



Figure 21: Refund modules

2.5.1 Autonomous Refund Module

The control of the refund in this module is carried out by the module itself.

There are 12 and a 24 volt models.

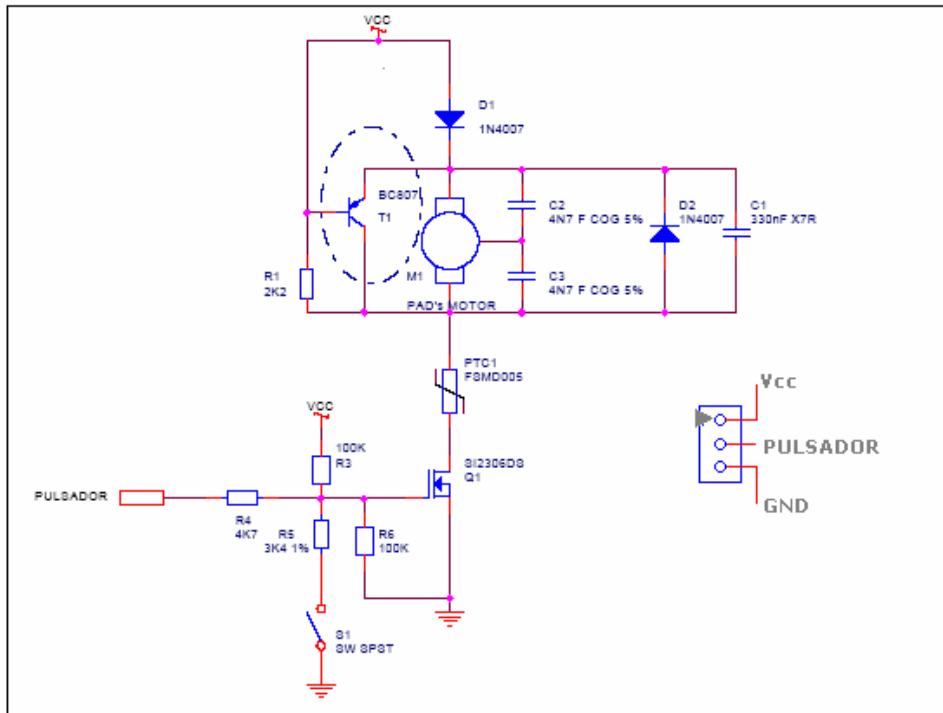


Figure 22: Wiring diagram of the autonomous refund module

2.5.2 Non-Autonomous Refund Module

The control of the refund in this module is carried out by the Machine.
There are 12 and 24 volt models.

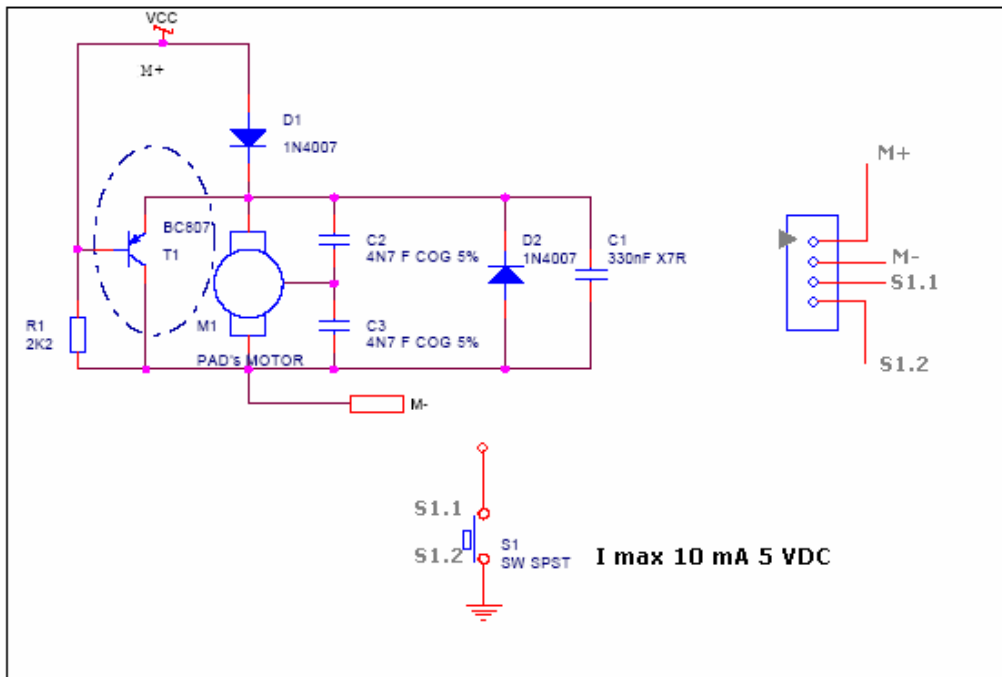


Figure 23: Wiring diagram for the non-autonomous model



3 WORKING MODES

3.1 IN PARALLEL

The control of the sorter in parallel mode is carried out directly by the machine (vending, extra-vending or amusement).

The information regarding the path of each coin is stored in the machine, and it is possible to modify this relation at any time during normal operation.

In section 6 (Annex 1), the connection between the validator, sorter and machine when working in parallel is shown.

3.2 CCTALK

The control of the sorter in cctalk mode is carried out directly by the validator. This device (Modular X6) has all the necessary electronics for the activation of the solenoids in the sorter.

The information regarding the path of each coin is stored in the validator, but the machine controls this information and can modify it at any time by sending the corresponding command.

In section 6 (Annex 1), the connection between the validator, sorter and machine when working cctalk protocol is shown.

4 WORKING CONDITIONS AND NORMS

To achieve optimum performance from the Sorter, it is necessary to fulfil a series of basic requirements regarding the installation and location. These conditions are due to the precision with which the coin validator works, the guidelines are:

➤ **Power supply:**

- Power to the Sorters must be through the connector on the sorter.

The power supply is:

- 12 V \pm 10% for parallel sorters.
- From 12 V \pm 10% to 24 V \pm 10% for sorters cctalk.
- For Mini-sorters, it is necessary to power the sorter and the refund module (in the case where this option is installed).

Sorter

- 12 V \pm 10% for parallel sorters.

- From 12 V \pm 10% to 24 V \pm 10% for sorters cctalk.
Refund module
- 12 V \pm 10% or 24 V \pm 10% depending on the model.

➤ **Inclination**

- Maximum of 3° on all axes.

➤ **Temperature range**

- Working: +5 a 55° C
- Storage: -25 a +70°C

➤ **Humidity**

- Maximum 95 % (Relative humidity without condensation)

➤ **Useful life**

- The useful life is determined by the useful life of the sorter, which is 300,000 coins per classification, it should function without loss of performance for the acceptance and classification coins.

➤ **Admissible coins**

The following shows the diameters and thicknesses of the coins accepted by each path of classification:

Path	Path 1	Path 3	Path 2	Path 4	Path 5
Coin diameter (mm)	32.5÷16.25	29÷16.25	29÷16.25	29÷16.25	29÷16.25
Coins width (mm)	3.2÷1.2	3.2÷1.2	3.2÷1.2	3.2÷1.2	3.2÷1.2

Table 14: Admissible coins

Norms met by the Sorters

- Electromagnetic compatibility:
 - UNE-EN 61000-4-2
 - UNE-EN 61000-4-3
 - UNE-EN 61000-4-4
 - UNE-EN 61000-4-6
 - UNE-EN 61000-4-8
- Emission:
 - UNE-EB 61000-6-3
 - Radiated emission EN 55011
- Immunity:
 - UNE-EN 61000-6-2
- Flammability:



- UL
- Security
 - EN60335-1
- CE.
- Directive RoHs

5 CLEANING AND MAINTENANCE

The maintenance the sorter assembly requires is determined by the amount of dirt coins leave and the foreign objects and dirt that may obstruct its elements. Use the following guidelines for cleaning:

- Disconnect the power.
- Clean the dirty areas with paint brush or brush with fine vegetable fibres (never metal) impregnated with alcohol.

WARNING:

Internal parts that are held with screws should never be dismantled. Their manipulation may result in alignment problems that provoke errors in measurement.

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

Never submerge the *Sorter* in any liquid.

6 ANNEX 1. CONNECTION TO THE MACHINE

6.1 CONNECTION CCTALK

There are 3 option for connecting the validator, sorter and machine when using cctalk protocol. The following figures show the diagrams of the 3 connection options.

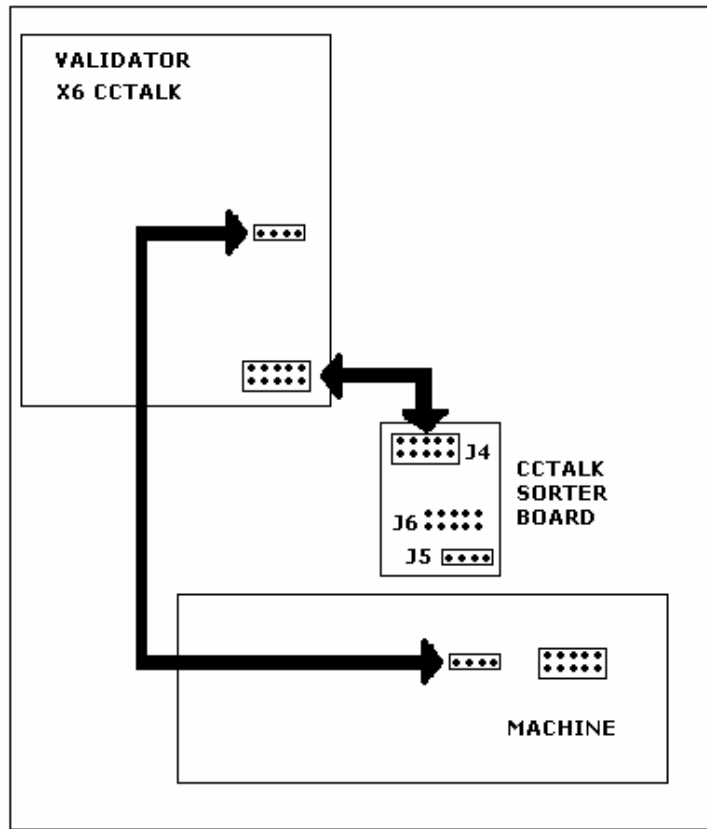


Figure 24: Connection Payment system - Machine. Option 1 cctalk

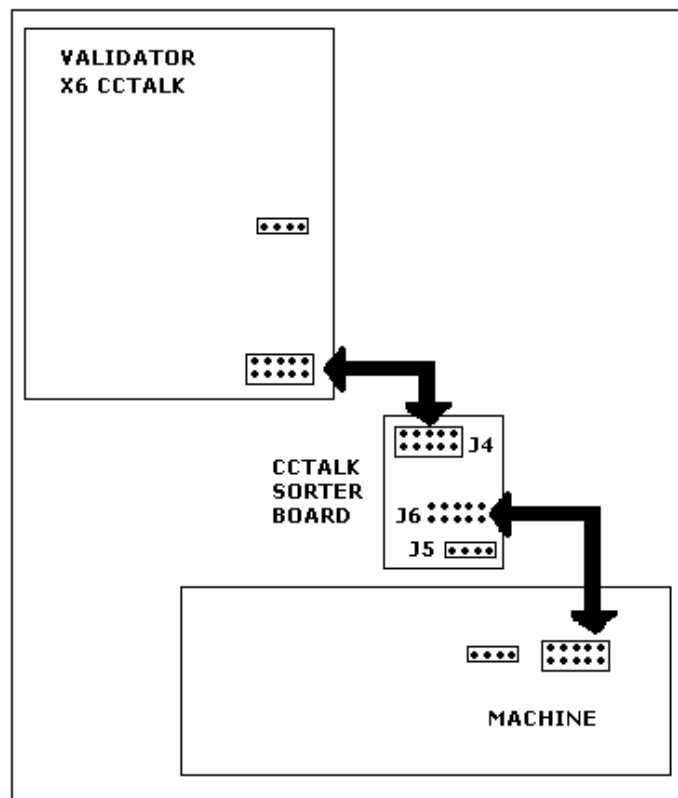


Figure 25: Connection Payment system - Machine. Option 2 cctalk

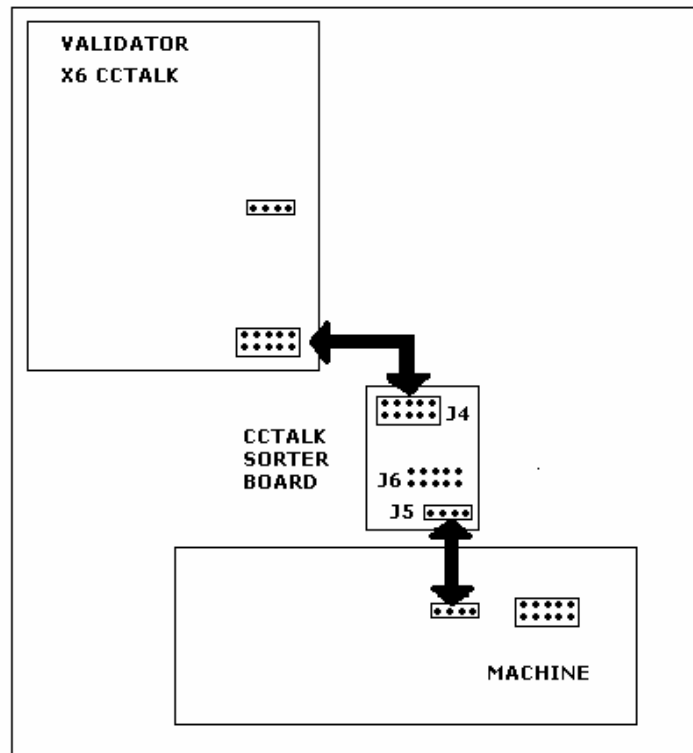


Figure 26: Connection Payment system - Machine. Option 3 cctalk

6.2 CONNECTION IN PARALLEL

When the sorter is controlled using parallel protocol, there is only one option for connecting the validator, sorter and machine.

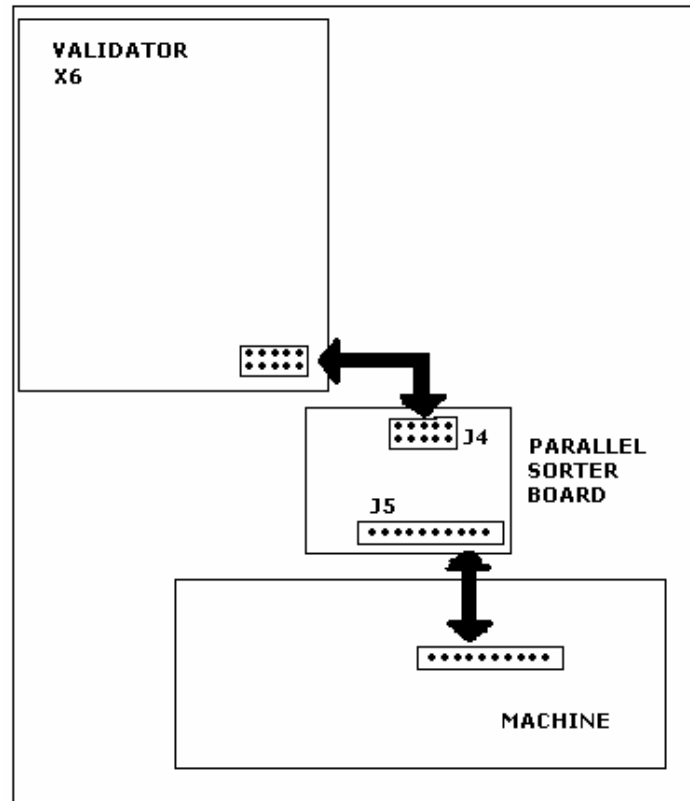


Figure 27: Connection Payment system - Machine. Parallel

7 ANNEX 2. DIMENSIONS

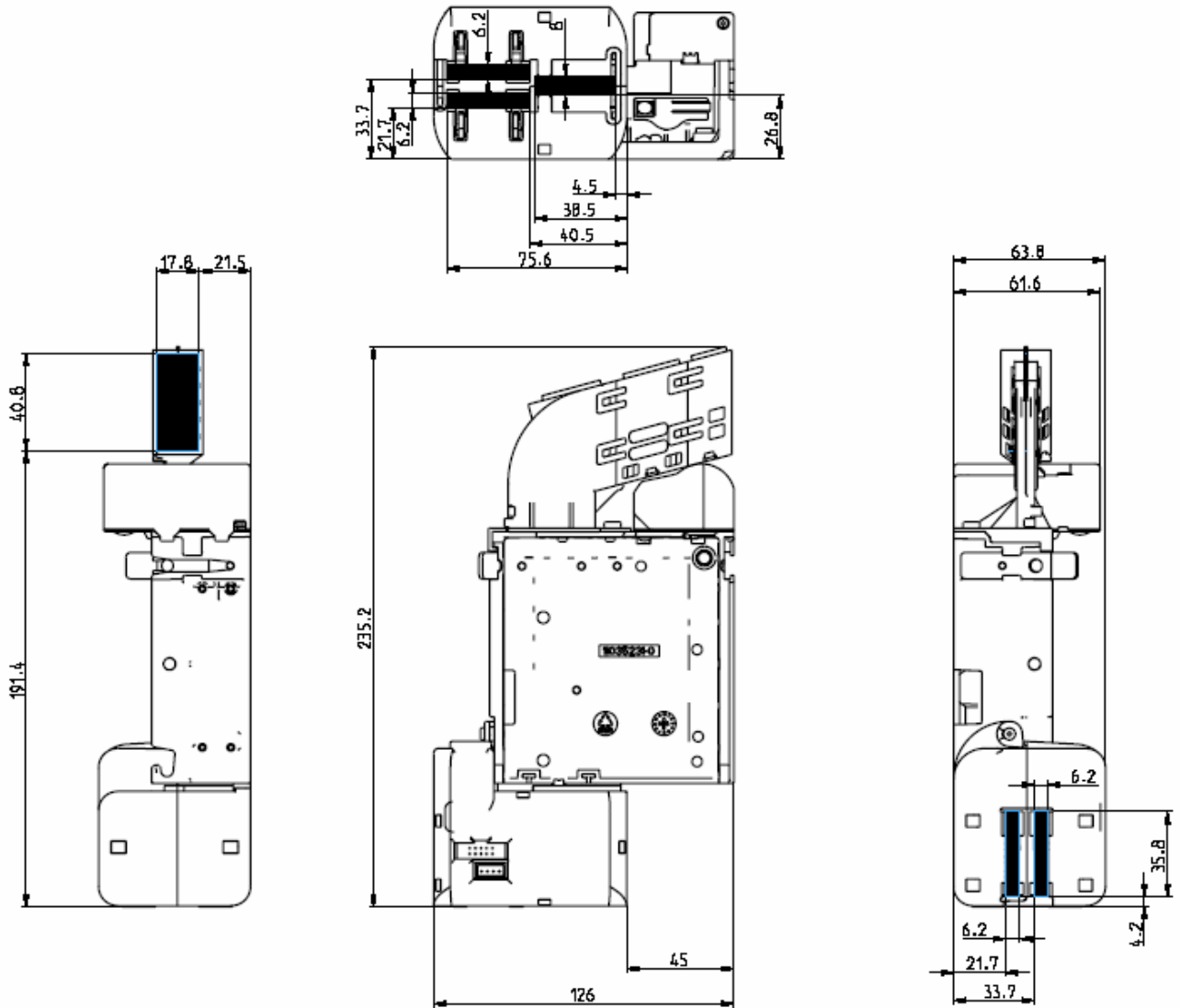


Figure 28. Dimensions for Mini-sorter with refund module and coins guide

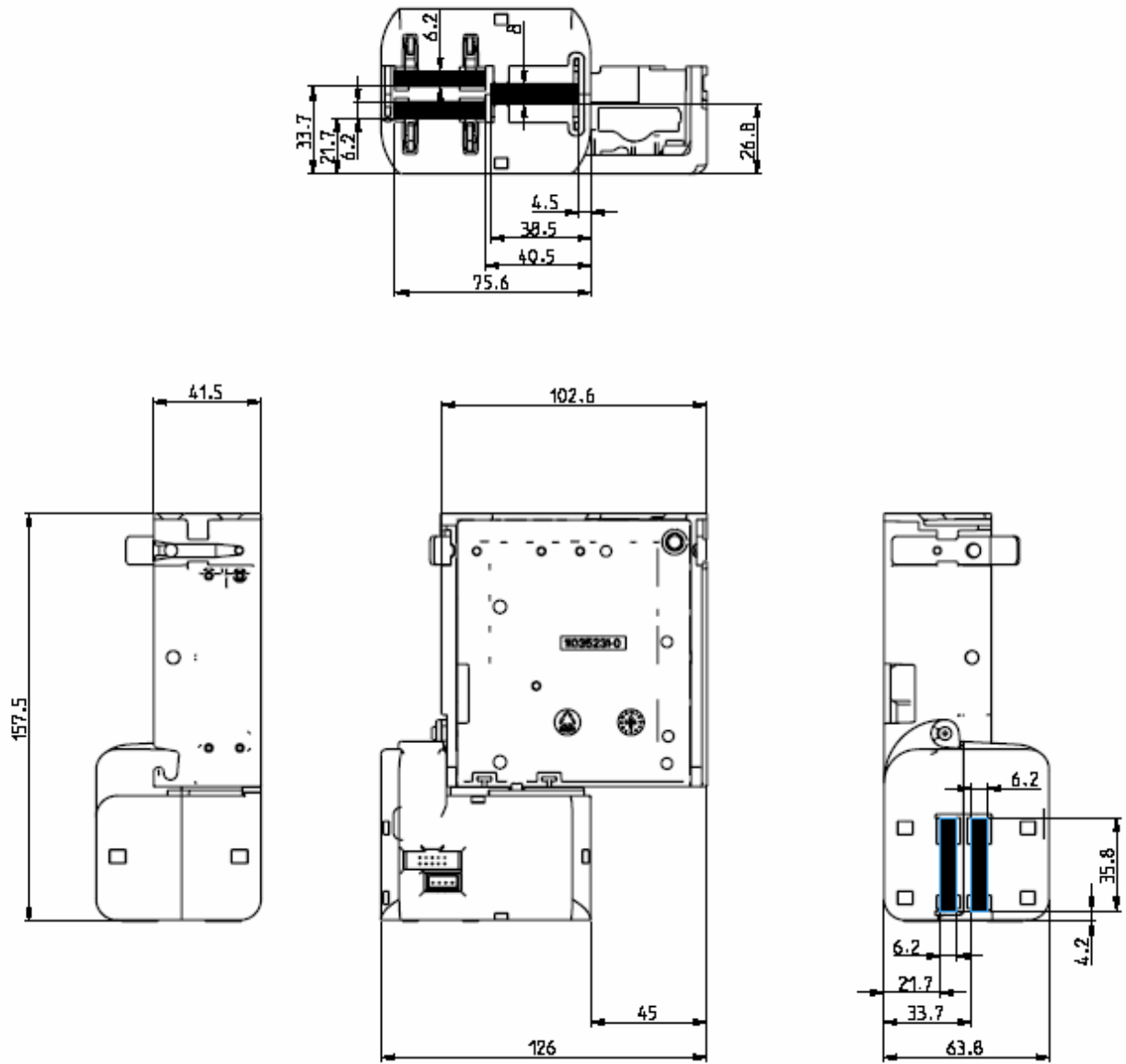


Figure 29. Dimensions for Mini-sorter without refund module or coins guide

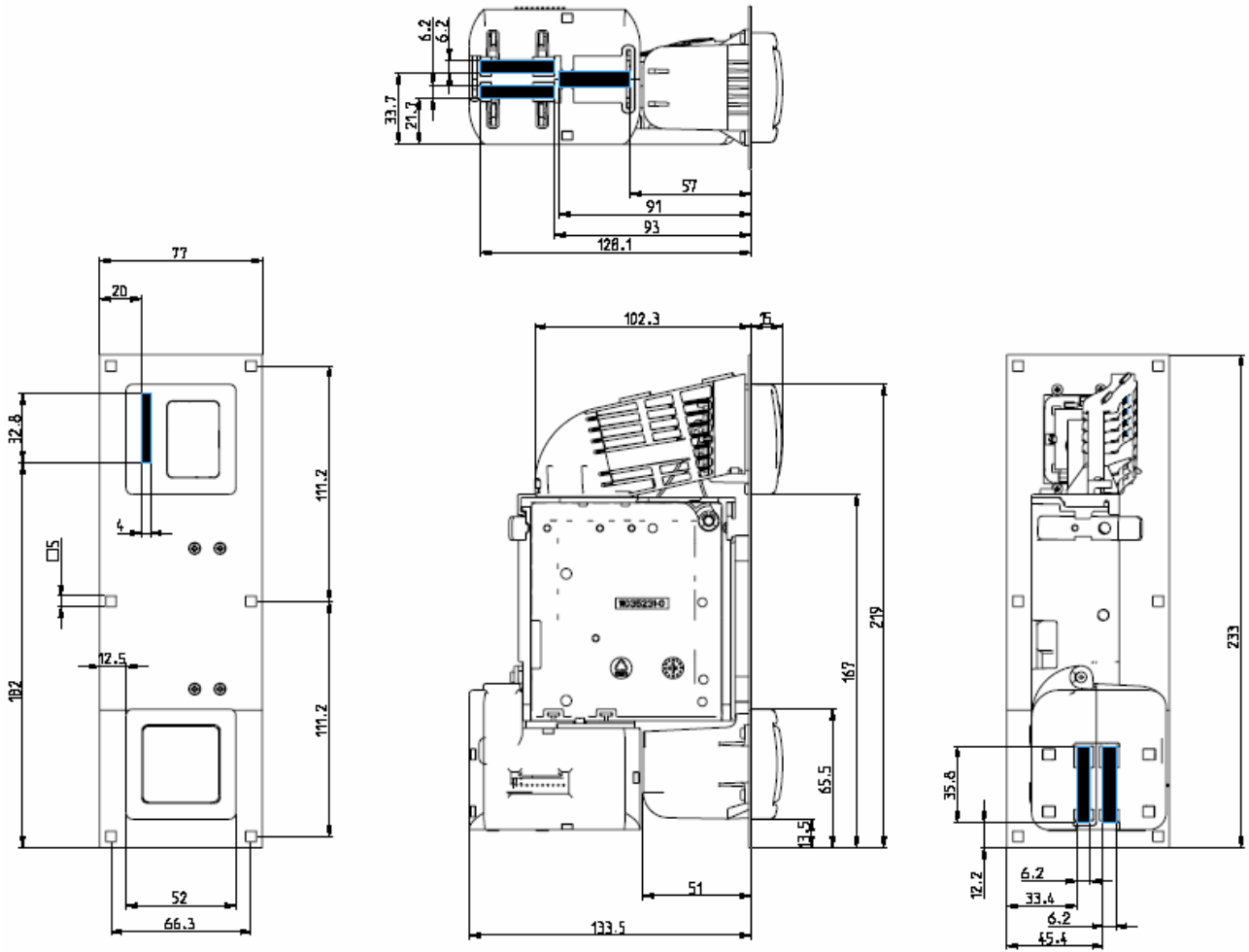


Figure 30. Dimensions for Sorter + Front plate