



Comestero
group

*Progettazione, produzione e distribuzione
di sistemi di pagamento e controllo denaro.
Accessori per macchine a moneta.*

Coin validator

RM5

OPERATING MANUAL



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1. GENERAL INFORMATION

The RM5 validator is the result of the investment made by Comestero to provide the market with a reliable and extremely versatile product. The project started two years before the introduction of the new European currency, the EURO. Many were the investments as well as the visits to the different European mints in order to introduce a decidedly advanced product on the market. Despite our engagement we found out remarkable differences between the different coins produced in the various mints and even among the coins of the same mint. These differences are mainly caused by the alloy, i.e. the metal used. To face this problem, i.e. making the equipment accept the highest number of Euro coins possible, although structurally different, the RM5 coin validator has been equipped with 60 channels, thus increasing the possibility of adjusting up to 59 different coins.

The brand new electronics of the RM5 validator combines the extraordinary selectivity due to seven measuring sensors to the extreme versatility thanks to the CLONING system which allows to duplicate the equipment directly on site within a few seconds.

The series of RM5 electronic coin validators has been designed to fully meet the different requirements of the sectors using this product. In particular:

- automatic distribution
- gaming and amusement
- gas stations
- parking areas
- photocopiers
- etc.

The RM5 Evolution series includes 10 versions with different performances to better meet the different requirements.

They all have the following basic features:

	EVOLUTION /E0 /AT	CC TALK VERSION
Acceptance:	59 coins and/or different tokens	16 coins
maximum acceptance speed:	3 coins/second	3 coins/second
power supply	+ 12Vdc \pm 10%	+ 12 Vdc / + 24 Vdc \pm 10%
output signals	NPN OPEN COLLECTOR BC817 OUTPUT LEVEL "O" LOGIC \leq 1.0 V	Cc Talk serial protocol
Cloning and reprogramming	via portable programmer or Personal Computer	NO
Total disabling	High potential on pin 6	high potential on pin 6 or via software
Partial disabling	via DIP-SWITCH -only first 6 channels)	Via software
Size 3.5 inches – See “Size of Coin validator”		

Each version has its specific features that can be enabled or disabled by the customer either via RM5 PROGRAMMER (portable programmer) or PC program.

2. WARRANTY

Our products are guaranteed for a 12-month period. The serial number on the label marks the beginning of the warranty period.

The warranty will not apply in the following cases:

- Tampering of the label containing the serial number of the equipment.
- Breakage or malfunctioning caused by transportation.
- Breakage or malfunctioning due to vandalism, natural disasters or fraudulent acts.
- Incorrect or bad installation of the product.
- Inadequate or anomalous electric systems.
- Carelessness, negligence or incompetence in the use of the product.
- Non-compliance with the operating instructions.
- Interventions for alleged defects or convenient checks.

Repair interventions are carried out in our Gessate premises, where the parts arrive free-of-charge. COMESTERO group will carry out no intervention whatsoever at the customer's premises without prior agreement.

Reference is anyway made to the general warranty conditions and terms that are available on request.

Any returned unit for repair shall include a detailed description of the defect.

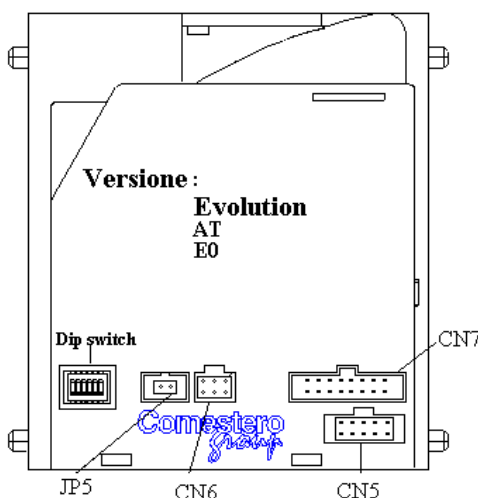
The parts will be returned carriage forward or carriage charged.

At the expiry of the guarantee the assistance center will remain at your disposal. Furthermore the Call Center Manager is at your complete disposal for any question you may have.

3. COIN VALIDATOR CONNECTION

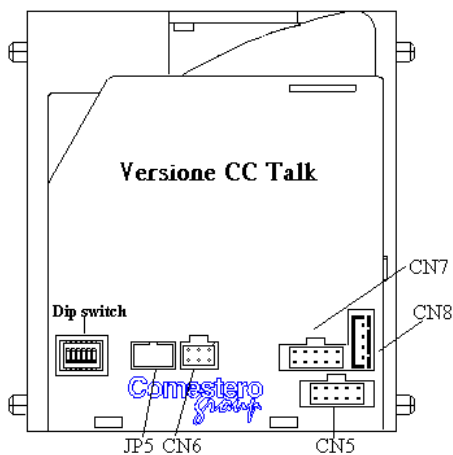
In order to assure the highest level of compatibility with the currently available systems, the RM5 coin validator in the 12-24Vdc power supply version shown on the label is equipped with a standard 10 Pin connector, usually powered with 12Vdc and one standard 16 Pin connector, usually powered with 24Vdc and also has the opportunity to exploit the same connectors with 12Vdc and 24Vdc power supply. Moreover the programming connector also acts as serial output which responds by sending the value of the introduced coin to the computer. Fig.1

There are two different Hardware versions: RM5 Evolution (standard) / EO / AT and RM5 CC TALK, please refer to the images below.



CONNECTOR MEANING FOR VERSIONS: **EVOLUTION / EO / AT**

- JP5 : Wake-Up connector
- CN5 : Standard 10 Pin connector
- CN6 : Programming connector or serial output
- CN7 : Standard 16 Pin connector

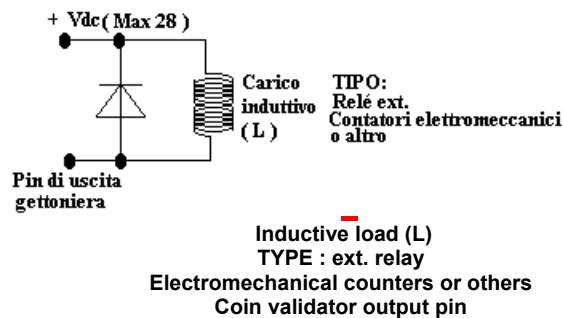


MEANING OF CONNECTORS FOR CC TALK COIN VALIDATOR

JP5 : Empty
 CN5 : Standard 10 Pin connector
 CN6 : Programming connector
 or serial output
 CN7 : 10 Pin CC Talk Connector
 CN8 : 4 Pin CC Talk Connector

In case of inductive load, it is necessary to externally protect outputs by means of clamp diodes (1N4001 or equivalent). Please refer to the diagram.

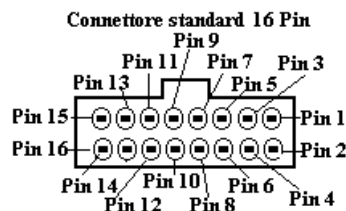
Fig. 2



3.1 PIN-OUT OF 16 Pin STANDARD CONNECTOR EVOLUTION VERSION ONLY (CN4)

The 16 Pin standard connector is used in all those applications where it is necessary to interface with a machine using or needing a 16 Pin parallel payment system. Available only for EVOLUTION coin validators.

Fig. 3



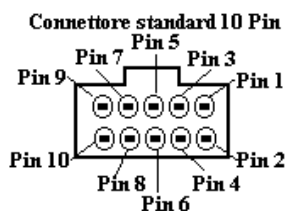
Pin No.	Meaning	Pin No.	Meaning
1	N.U.	9	CH 4
2	N.U.	10	CH 5
3	N.U.	11	CH 6
4	N.U.	12	CH 2
5	N.U.	13	CH 1
6	Inhibit	14	N.U.
7	CH 3	15	N.U.
8	Gnd	16	+ 12 / 24 Vdc

16 Pin standard connector

3.2 PIN-OUT OF 10 Pin STANDARD CONNECTOR (CN5)

As the pin meaning varies according to the configuration of the coin validator, please refer to the relevant paragraph.

Fig. 4



Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibit
2	+12-24 Vdc	7	CH 1
3	CH 5	8	CH 2
4	CH 6	9	CH 3
5	N.U.	10	CH 4

10 Pin standard connector

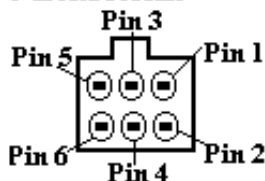
3.3 PIN-OUT OF SERIAL CONNECTOR, FOR ALL VERSIONS (CN6)

Starting from series number 90000, every RM5 electronic coin validator, with any configuration, is equipped with a serial output: therefore if it is necessary to connect it or operate it via PC, it is sufficient to connect the appropriate interface cable and build the desired software. The transmission protocol is provided on request.

The validator responds to PC by sending the value of the coin introduced.

Fig. 5

Connettore di Programmazione
e uscita seriale



Pin No.	Meaning	Pin No.	Meaning
1	Gnd	4	RX
2	+5 Vdc	5	N.U.
3	TX	6	N.U.

Programming Connector and Serial Output

3.4 WAKE-UP CONNECTOR, FOR WAKE-UP VERSION ONLY (JP5)

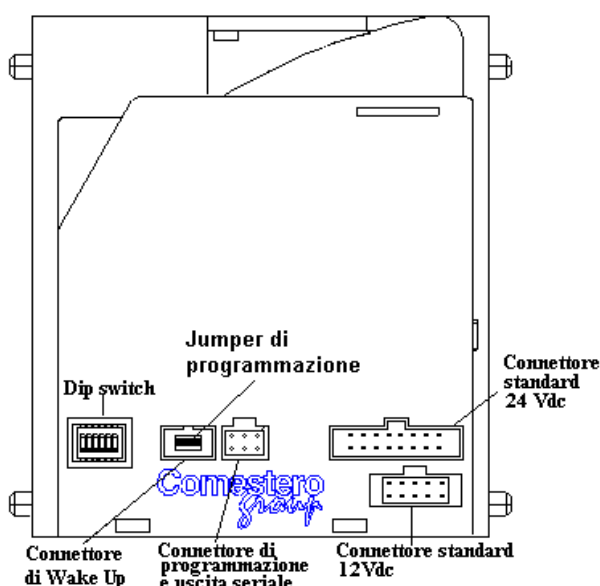
In those applications where an extra low consumption coin validator is required, on request, it is possible to use a special version with wake-up device.

This special coin validator is usually in a “Stop” status with reduced consumptions, lower than 90 micro Ampere. Further to the introduction of the first coin, the equipment restores its normal functions for a given time, then it returns to “Stop” status.


The coin validator is supplied with a jumper which **MUST** be used only during the programming phase.


This jumper prevents the equipment from going into low consumption status and therefore it can be adjusted or programming can be modified. Insert jumper between the two pins of WAKE-UP connector as shown in the figure.

Remember not to leave it on, otherwise the equipment will never go to low consumption status and as a consequence the battery will quickly run down.



Programming jumper

 Programming condition (Jumper on)

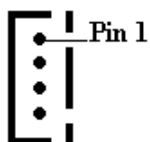
 Work condition (Jumper off)

Programming jumper – Dip switch . 24 Vdc standard connector- Wake Up connector – Programming Connector and Serial output – 24 Vdc standard connector

3.5 CC TALK CONNECTIONS

THE CC TALK VERSION IS PROVIDED WITH THE FOLLOWING CONNECTORS:

- **CC TALK 4 Pin CONNECTOR(CN8) Model B 4B-XH-A (JST)**



Pin No.	Meaning
1	+ V
2	N.U.
3	0 V
4	Data

- **CCTALK VERSION SEPARATOR CONNECTOR (CN5)**

The RM5 coin validator can pilot a coin separator through pins 3 and 4 of the 10 pin standard connector. The control consists of a low signal (Open Collector which closes to mass) for a given time of 500 msec that cannot be modified.

For the coin validator to control the separator it is necessary , through CLONE5 PC program, to enable the separator function and to set the desired falling position.

(Please refer to Clone 5 manual).

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibit
2	+12-24 Vdc	7	CH 1
3	CH 5	8	CH 2
4	CH 6	9	CH 3
5	N.U.	10	CH 4

- **CC TALK 10 Pin CONNECTOR (CN7)**

Pin No.	Meaning	Pin No.	Meaning
1	Data	6	N.U.
2	N.U.	7	+ V
3	N.U.	8	0 V
4	N.U.	9	N.U.
5	N.U.	10	N.U.

4. DIP-SWITCHES

The dip-switches can carry out three different functions: STANDARD FUNCTION, 3,3 FUNCTION, 4,2 FUNCTION.

- STANDARD FUNCTION

THIS IS THE DEFAULT FUNCTION.

Using the dip-switch group it is possible to program the equipment in Self-prog mode (**EXCEPT RM5 X CC, RM5 X E0, RM5 X AT**). Please refer to paragraph "PROGRAMMING SYSTEMS" or use the same to manually inhibit five of the first six channels they are associated to.

When the dip-switch is on "ON" the channel is inhibited, when it is on "OFF" (NUMBER SIDE) it is enabled. If for example you do not want the equipment to accept a coin, it is sufficient to look at the adjustment channel on the label and to put the relevant dip-switch on "ON". When you want to re-enable it, just put the dip-switch on "OFF" again.



Channels 3 and 4 inhibited.
Channels 1,2,5,6, enabled

- 3,3 FUNCTION

It is possible to request this function in the purchase order or to set it through "Clone5" (please refer to paragraph "PROGRAMMING SYSTEMS").

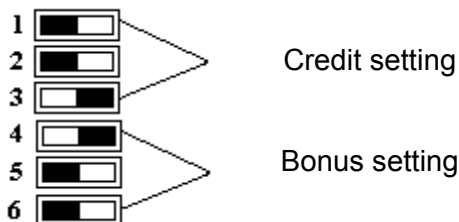
Using the dip-switch group, it is possible to program the equipment in Self-Prog mode (please refer to paragraph "PROGRAMMING SYSTEMS").

In the "Totalizer" versions it is possible to set the credit price using the first 3 dip-switches while the other three are used to set a bonus threshold (Version 20, 40, 60) or the service time (Version 30).

PRICE AND BONUS SETTING VIA DIP-SWITCHES

When the dip-switches are disabled (all on "OFF") the internal programming of the equipment will apply.

When the dip-switches are set the credit cost is equivalent to the binary value of the first three multiplied by the basic value of the equipment, while the last three dip-switches show **the number of credits** after which 1 bonus is given.



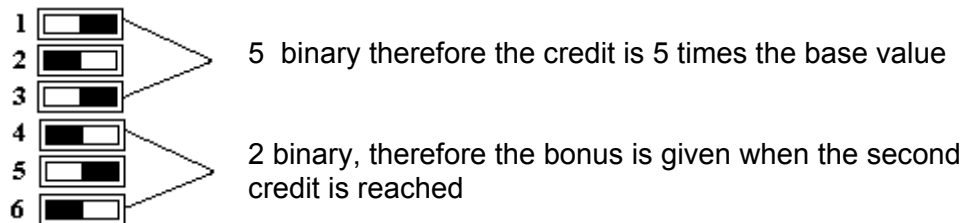
The difference with respect to the setting with RM5 PROGRAMMER or with CLONE 5 (please refer to paragraph "PROGRAMMING SYSTEMS") is that it is possible to set **only one bonus which must however be a multiple of the basic cost of the credit.**

Example: with X21 validator adjusted on 0,50 ; 1,00 ; 2,00 €.

As shown in the figure the credit is 5 times (expressed in Binary on the first 3 dip-switches) the basic value of the equipment, $5 \times 0,50 = 1,50$

The bonus is given further to an introduction which is twice the credit value. i.e $2 \times 1,50 = 3,00\text{€}$.

Therefore when a set of coins is introduced and the credit value is reached, i.e. 1,50€ the coin validator will send a pulse to the machine; if more coins are introduced and the bonus value is reached, i.e. 3,00€ the equipment will send the second pulse plus the bonus pulse. $3,00\text{€} = 2 \text{ pulses} \times 1,50\text{€} + 1 \text{ bonus pulse}$.



- 4,2 FUNCTION

Similar to the previous function, it is possible to request this function in the purchase order or to set it through "Clone5" (please refer to paragraph "PROGRAMMING SYSTEMS")

Using the dip-switch group, it is possible to program the equipment in Self-Prog mode, (please refer to paragraph "PROGRAMMING SYSTEMS")

In the "Totalizer" versions, it is possible to set the credit price using the first 4 dip-switches, while with the remaining 2 it is possible to set a bonus threshold (Version 20, 40, 60) or the service time (Version 30).

BINARY CONVERSION TABLE

(FUNCTION DISABLED FOR : RM5 X CC, RM5 X E0, RM5 X AT)

Example of price setting with DIP-SWITCH on a Euro-adjusted coin validator with base coin 0,05 €

0 = Dip on OFF

1 = Dip on ON

CREDIT SETTING

1	2	3	4	5	6	
0	0	0	0	0	0	= DIP OFF-internal programming will apply
1	0	0	0	0	0	= 1 x 0,05 = Sale price 0,05 €
0	1	0	0	0	0	= 2 x 0,05 = Sale price 0,10 €
1	1	0	0	0	0	= 3 x 0,05 = Sale price 0,15 €
0	0	1	0	0	0	= 4 x 0,05 = Sale price 0,20 €
1	0	1	0	0	0	= 5 x 0,05 = Sale price 0,25 €
0	1	1	0	0	0	= 6 x 0,05 = Sale price 0,30 €
1	1	1	0	0	0	= 7 x 0,05 = Sale price 0,35 €

BONUS SETTING

1	2	3	4	5	6	
x	x	x	1	0	0	= 1 = bonus = credit (2 pulses x credit)
x	x	x	0	1	0	= 2 = Bonus twice the credit
x	x	x	1	1	0	= 3 = Bonus 3 times the credit
x	x	x	0	0	1	= 4 = Bonus 4 times the credit
x	x	x	1	0	1	= 5 = Bonus 5 times the credit
x	x	x	0	1	1	= 6 = Bonus 6 times the credit
x	x	x	1	1	1	= 7 = Bonus 7 times the credit

5. LABEL

In order to facilitate the validation of the equipment, i.e. of the configuration (operating mode) and of the adjustment (type of coins accepted), below is the graphic representation of the labels on the front or the back of the coin validator subdivided into models:

RM5 EVOLUTION

The label identifies:

- The serial number of the equipment
- The type (V,G,F)
- The configuration
- The adjustment
- The value of the coins and the channels adjusted
- The exit of the coin
- The power supply

Take as example the label here below:


As you can see the label consists of 10 squares per line (VALUE) preceded by ten rectangles (OUT).

Inside the squares the “value of the coin adjusted” is entered; to identify the channel it is sufficient to read the “Value identifying the first channel of the line” and count the number of squares. For example, the second value on the third line identifies the 22nd channel.

The rectangle “OUT” represents the output channel.

Fig. 6

Valore che identifica il primo canale della linea		Valore della moneta tarata sul canale 2		N° che identifica l'uscita della moneta													
Out	Value	Out	Value	Out	Value	Out	Value	Out	Value	Out	Value	Out	Value	Out	Value	Out	Value
1	1	0.05	2	0.10	3	0.20	4	0.50	5	1	6	2	4	TK	6	STK	
11																	
21	Canale 21		Canale 22														Canale 30
31																	
41																	
51																	

RM5 : V 00 Euro	12 / 24 VDC	12345	
Tipologia e configurazione della gettoniera	Tensione di alimentazione		Codice a barre che identifica il N° di serie della gettoniera

value identifying the first channel of the line – Value of the coin adjusted on channel 2 – No. identifying the coin output- Type and configuration of the equipment – Power supply – Bar code identifying the serial number of the equipment

RM5 CC TALK

The label identifies:

- The serial number of the equipment
- The type (V,G,F)
- The configuration
- The value of the coins and the channels adjusted
- The power supply
- The "NON MODIFIABLE" indication under law 326



RM5 AT

The label identifies:

- The serial number of the equipment
- The type (V,G,F)
- The configuration
- The value of the coins and the channels adjusted
- The separator output
- The power supply
- The indication of the first pulse
- The "NON MODIFIABLE" indication under law 326

RM5 E0

The label identifies:

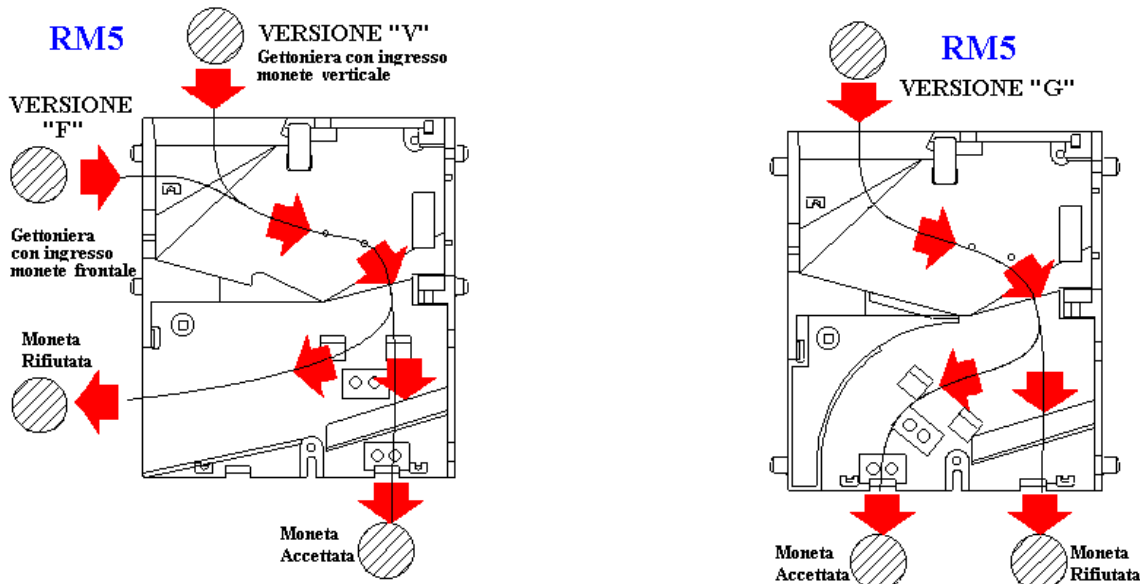
- The serial number of the equipment
- The type (V,G,F)
- The configuration
- The value of the coins and the channels adjusted
- The coin output
- The separator output
- The power supply
- The "NON MODIFIABLE" indication under law 326

6. MODELS

In order to meet the requirements of various markets, Vending, Games, Car wash, etc. the mechanical features of the coin validator come in three different models:

MODEL V (Vending)
MODEL F (Reduced front panel)
MODEL G (Gaming)

Fig. 7



Version F: coin validator with front coin insertion – Coin rejected – Coin accepted

Version V: coin validator with vertical coin insertion

Version G: coin accepted – coin rejected

Models “V” and “F”, are identical, as regards coin introduction and rejection. They differ as regards their applications.

Model “V” can be used both for front application featuring the F6 front panel (Code RM F6), see paragraph 10.1 “Front panel size”, and for application of traditional 5” Vending coin validators (Code RM ADAPTER / 5).

Model “F” can be used only for front application both with F6 front panel and with F1 reduced panel (Code RM F1). See paragraph 10.2 “Front panel size”.

Model “G” can be applied on appropriate vertical supports, such as standard video doors or RM37/IL front panels or doors with luminous push button, with coin separator, if any.

7. PROGRAMMING SYSTEMS

Thanks to the state-of-the art electronics used, the coin validator can be programmed in three different modes:

- SELF-PROG FUNCTION (**FUNCTION DISABLED FOR : RM5 X CC, RM5 X AT, RM5 X E0**);
- PORTABLE PROGRAMMER (**2 MODELS AVAILABLE, ONE FOR EVOLUTION VERSION AND ONE FOR CC TALK**)
- PC KIT (**2 PROGRAMS AVAILABLE, ONE FOR EVOLUTION, E0, AT VERSION, ONE FOR CC TALK VERSION**)

7.1 SELF-PROG FUNCTION

(FUNCTION DISABLED FOR : RM5 X CC, RM5 X AT, RM5 X E0)

The SELF-PROG function is extremely useful in case of programming of a coin or a token directly on the machine where they are installed as the first six channels of the RM5 validator can be reprogrammed without requiring any external equipment. To be noted that, in addition to the programming of the coin/token on the specific channel, other parameters of the validator may be modified, such as for example the value attribution; in this case it is absolutely necessary to use either the Portable Programmer or the PC Kit.

Programming a token or a coin on channel No. 6

- With machine off, put the 6 DIP-SWITCHES to "ON"
- Energize and insert 15 coins/tokens
- Wait for the double "clack" of programming end
- Put DIP switches to OFF
- Switch off the validator and switch it on again

Programming tokens and/or coins on channels 1 to 5

- With machine off, put the 6 DIP-SWITCHES to "ON"
- Energize and insert 1 or 2 coins
- Leave on ON only the SWITCH corresponding to the channel to be programmed
- Insert coins until the double "clack" of programming end
- Put DIP switches to OFF
- Switch off the validator and switch it on again

NOTE: At the end of the procedure the first two coins introduced may be rejected. With the operation the new adjustment (coin/token) will keep the previously programmed value. In X 21 configuration the credit will be equal to the previously set game price.

7.2 PORTABLE PROGRAMMER

The major innovation determining the strong point of the equipment, in particular in this period of major changes, is given by the Portable Programmer: the RM5 PROGRAMMER, which modifies all functions of the equipment on site and also includes the "CLONING" function.

This function allows to take the data from one coin validator or from a PC and to transfer them to another coin validator which will therefore be identical to the first one: adjustment, configuration and options included.

For the versions RM5 X CC, RM5 X AT, RM5 X E0 it is ONLY POSSIBLE TO READ THE DATA CONTAINED IN THE EQUIPMENT.

There is also a cheaper "EASY" version, not including some of the functions, such as the configuration change and duplication.

For these functions and for the performances provided by the two models, please refer to the manual of the portable programmer.

7.3 PC KIT

The computer kit is certainly the most complete system to adjust and check every single option of the equipment.

It consists of a CD-ROM containing the software, an interface cable containing an SMD board for RS232 connection, a feeder, a validator support, and a test box useful for the power supply and to check the correct operation of the validator.

To this purpose please refer to "CLONE 5" PC kit manual.

For versions RM5 X CC a dedicated program is available.

8. CONFIGURATION

Every validator is identified by a code consisting of six characters which determines the configuration, i.e. the operation mode. Reference is now made to the code below which appears on the validator label.

RM5 X nn		
RM5	X	nn
It identifies the type of Coin validator	It identifies the type of mechanical set-up V, F, G	It identifies the type of configuration

The currently available versions are:

RM5 X 00: Electronic validator

RM5 X CC: Validator with CC Talk protocol

RM5 X E0: SPAGNA mode validator

RM5 X AT: SPAGNA mode validator with differentiated time pulses

RM5 X B0: Binary validator

RM5 X BC: Confida binary validator

RM5 X 0M: Multipulse validator

RM5 X 10: Dual price totalizer

RM5 X 14: Single price totalizer with internal time reset

RM5 X FD: Totalizer for fountains

RM5 X 20 – RM5 X 21: Credit pulse emission totalizer (RM5 X 20); with possibility of controlling a separator of cashed coins (RM5 X 21).

RM5 X 30: Progressive timer

RM5 X 3R: Progressive timer with on request timed credit emission

RM5 X 3C: Progressive timer with counter output

RM5 X 40: Totalizer with on request credit pulses

RM5 X 60: Totalizer with on request timed credit emission

RM5 X 70: Single price multiple sale totalizer for photocopiers

NOTE: Versions X 01 and X 21 are identical to X 00 and X 20. except that they have the external separator control function enabled. See relevant paragraph.

8.1 VALIDATOR CONFIGURATION (RM5 X 00)

In standard validator configuration, RM5 can manage up to six different coin values, i.e. up to six different outputs. Standard validator means a validator which further to the introduction of a coin gives as validation signal a pulse to the corresponding output. The standard pulse length is 100 msec (+0 -2%); nevertheless it can be varied between 10mSec. and 2 sec. **NOTE:** When a value ranging between 10 and 630 msec is set, the ratio 1 to 4 is guaranteed, i.e.the pulse will be active (low) for the fixed timed, while the pause time between one pulse and the other will be four times as much. When a value higher than 630 msec is set, the pause time will not follow this rule. To inhibit one or more coins adjusted on the first 6 channels it is sufficient to put the DIP-SWITCH relevant to the channel to be inhibited to "ON". To inhibit the coins programmed in the channels after 6 the PC kit or RM5 PROGRAMMER shall be used.

The coin validator has a general inhibiting pin, PIN 6, (see connector), which when set on HIGH (+5Vdc, +12Vdc.) completely inhibits the coin validator, therefore each coin introduced would always be rejected. This pin is usually controlled by the machine if this is out of order.

There is also the possibility to inhibit the validator after a fixed number of coins introduced by setting, by means of the relevant programming kits (PC Kit or RM5 PROGRAMMER) the "cash limit" function.

When the validator reaches the programmed threshold it will be disabled; to be enabled again the machine shall send a reset signal to the validator inhibition pin.

This application is particularly used on "BINGO" machines and small-sized coffee machines and on all machines with a limited number of accepted coins.

To separate coins from tokens a coin separator can be installed. To this purpose the validator shall be programmed, by means of Clone5, to manage the separator (RM5 x 01). When the separator function is enabled, the validator can manage the first 4 channels, as the outputs relevant to channels 5 and 6 (Pin 3 and 4) are used to control the separation coils.

NOTE: the RM5 X 00 validator is totally interchangeable with NRI G13 validator and with COIN CONTROLS C 120 validator, with AZKOYEN AZ66 validator, Jofemar T11 MS 130 MARS, G18 NRI and FAGE validator. Thanks to the mechanical adapter it can be turned from 3.5" to 5" standard thus becoming also mechanically interchangeable with the abovementioned 24VDC validators when these are installed on an RM1000 support or Juke Boxes with 5" validator. An interface has also been produced to make electronically interchangeable the validator with MARS 111 validators PNP outputs (MRS 111 interface) as well as from a mechanical point of view thanks to the front panel code RM F3 as shown in the paragraph "Front panel size".

PIN-OUT OF RM5 X 00 COIN VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibit
2	+12-24 Vdc	7	CH 1
3	CH 5	8	CH 2
4	CH 6	9	CH 3
5	N.U.	10	CH 4

8.2 CC TALK VALIDATOR CONFIGURATION (RM5 X CC)

In validator configuration with CC TALK protocol, RM5 can manage up to sixteen different coin values. The equipment will respond to serial controls described below.

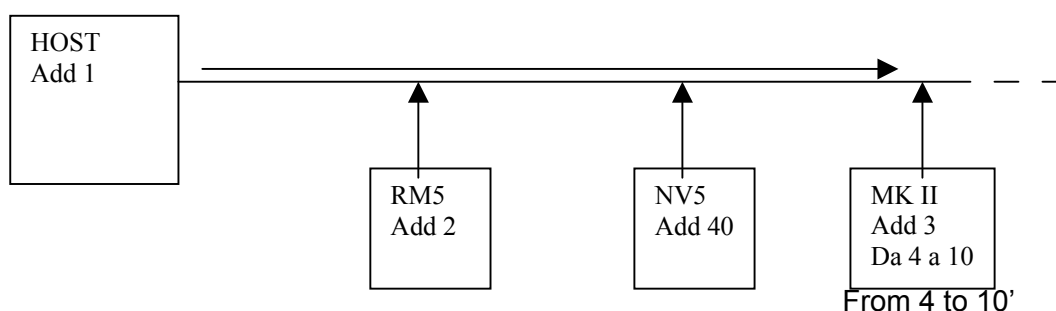
CC TALK is a serial communication protocol providing an excellent balance between easiness and safe information. This protocol was designed for the GAMING industry.

It includes a high number of specific controls, aimed at meeting a high control flexibility by a control unit called Host (Machine Data Sheet)

It was designed to allow the interconnection between different types of money treatment devices simply with a serial cable, shown below.

The use of controls is free and according to the type of application and requirements; anyway all strategies and supervision are carried out by the Host.

The type of connection is called Multidrop, where only the Host can "Ask", all devices "Listen" and only the addressed device "Responds". Communication is of "half duplex" type, i.e. on the line there is only the request or the answer, never both at the same time (full – duplex).



The protocol provides no procedure to manage peripherals. This is left to the common sense of the Host programmer. For example, if you want to avoid replacing the validator or any other device, it may be sufficient that, when the machine is started up, this requests its peripheral about serial numbers, product code, manufacturer code, etc. If all information received from the peripherals matches the information stored in the host all activities can go on, otherwise these may be inhibited and the necessary measures will be taken.

RM5 X CC implements 35 controls described below.

CONTROLS IMPLEMENTED ON RM5

Control	Function
254	Simple poll
253	Address poll
252	Address clash
251	Address change
250	Address random
249	Request polling priority
248	Request status
246	Request manufacturer id
245	Request equipment category id
244	Request product code
243	Request database version
242	Request serial number
241	Request software version
240	Test solenoids
238	Test output lines
237	Read input lines
236	Read opto states
233	Latches output lines
232	Perform self check
231	Modify inhibit status
230	Request inhibit status
229	Request Buffered credit or error codes
227	Request master inhibit status
210	Modify sorter path
209	Request sorter path
197	Calculate rom checksum
196	Request creation date
195	Request last modification date
192	Request build code
184	Request coin id
170	Request base year
169	Request address mode
4	Request comms revision
3	Clear comms status variables
2	Request comms status variables
1	Reset Device

For the detailed description of each control listed above please refer to the CCTALK manual available on this site: www.cctalk.org

All RM5 coin validators produced by implementing CCTalk protocol are configured as VALIDATORS 00 (please refer to chapter 8.1. VALIDATOR CONFIGURATION). Each of them, in order to meet the requirement of non modifiable condition, is programmed so that nobody can intervene on the settings carried out by Comestero either through the usual management/programming systems (Clone 5 and RM5 Programmer) or by acting on the output connector. The protocol also identifies the type of physical interface to be used and defines the voltage levels and suggests the appropriate circuits.

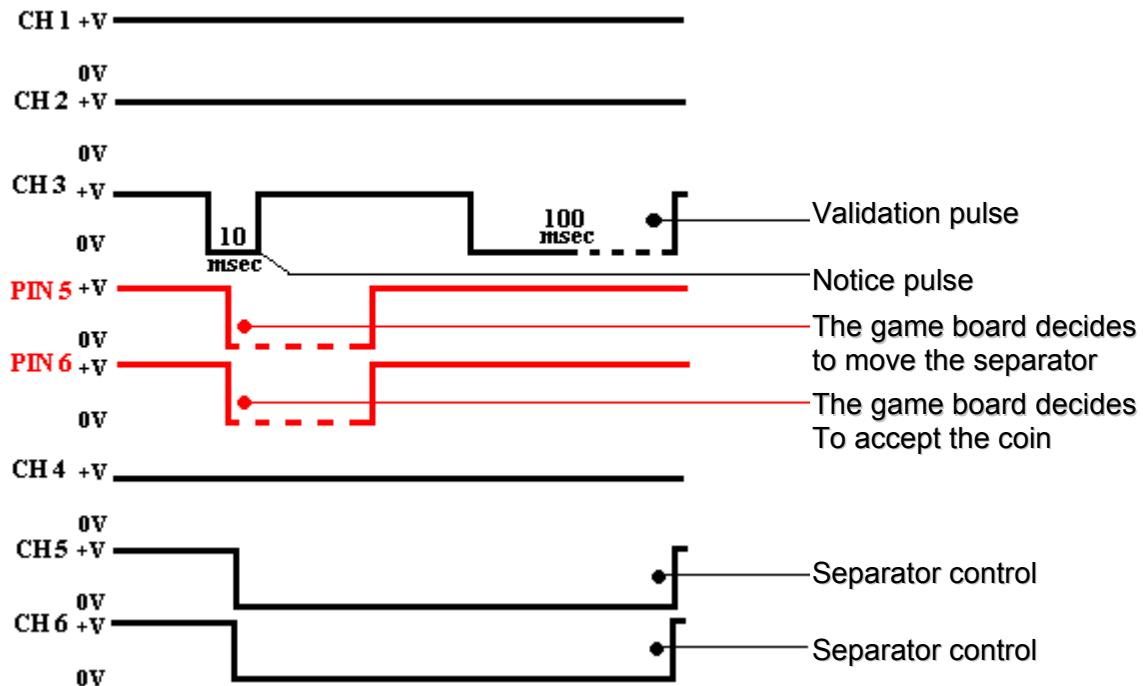
It suggests the type of connection (connectors). In particular for the coin validator, a 4 Pin and a 10 Pin connectors are suggested (and therefore used by our company) represented in para. 3.5.

8.3 SPAGNA VALIDATOR CONFIGURATION (RM5 X E0)

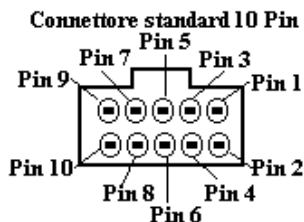
In validator configuration with SPAGNA protocol, RM5 can manage up to six different coin values, i.e. up to six different outputs. If the equipment has to pilot a coin separator the outputs will be only 4, as two outputs are destined to pilot the separator.

Spagna Validator means a coin validator which, after introducing a coin, before giving the standard 100 msec validation pulse (+0 -2%), generates a 10msec notice pulse on the output corresponding to the programmed channel.

For this operation two inhibition pins are available on the validator, PIN 6 concerning the validator inhibition, PIN 5 concerning the separator inhibition. The board shall keep these 2 pins high (+ 5 Vdc, inhibition status). Further to the insertion of a coin, the validator sends the notice signal to the machine, now the machine can decide whether to accept the coin, placing PIN 6 to mass (validator inhibition) and whether to separate it or convey it to the cash by acting on PIN 5 (separator inhibition).



PIN OUT OF RM5 X E0 COIN VALIDATOR 10 PIN CONNECTOR



Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Rm5 Inhibition
2	+12-24 Vdc	7	CH 1
3	CH 5	8	CH 2
4	CH 6	9	CH 3
5	Separator Inhibition	10	CH 4

10 Pin standard connector

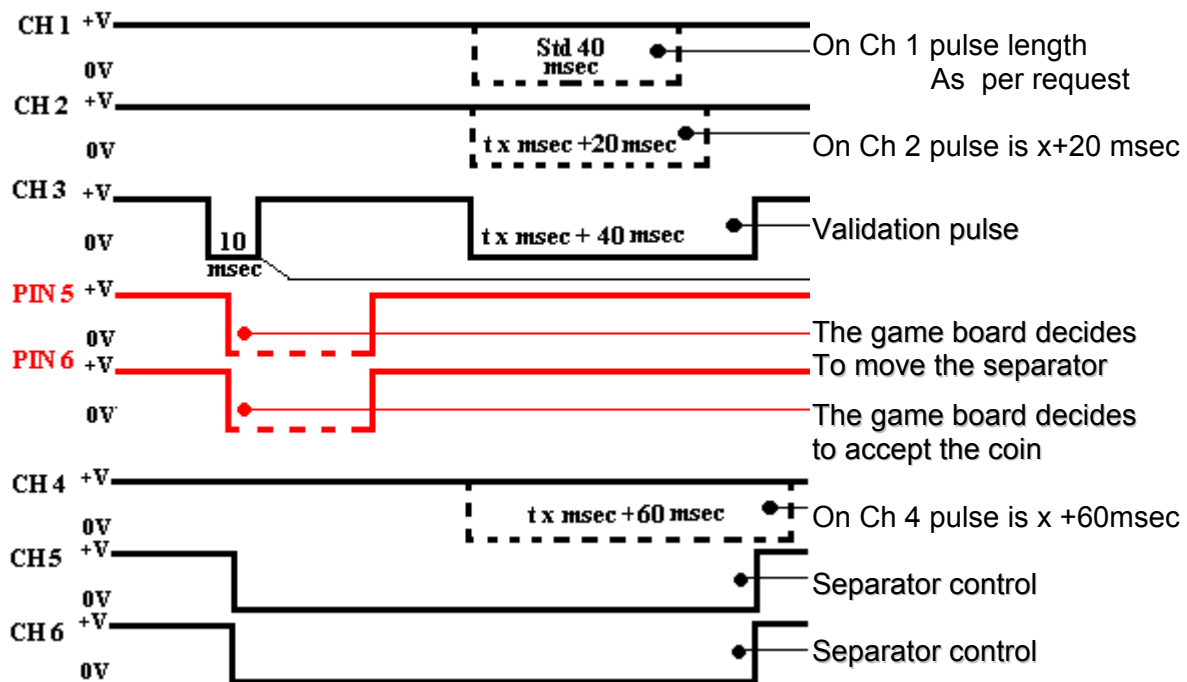
8.4 TIMED PULSE VALIDATOR CONFIGURATION (RM5 X AT)

In validator configuration - SPAGNA mode WITH TIMED OUTPUTS, RM5 can manage up to six different coin values, i.e. up to six different outputs. If the equipment has to pilot a coin separator the outputs will be only 4, as two outputs are destined to pilot the separator.

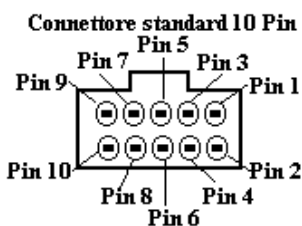
TIMED Spagna Validator means a coin validator which, after introducing a coin, before giving the validation pulse, generates a 10msec notice pulse on the output corresponding to the programmed channel. During this time the game board must decide whether to accept the coin and to activate the separator to convey it to the hoppers.

For this operation two inhibition pins are available on the validator, PIN 6 concerning the validator inhibition, PIN 5 concerning the separator inhibition. The board shall keep these 2 pins high (+ 5 Vdc, inhibition status). Further to the insertion of a coin, the validator sends the notice signal to the machine, now the machine can decide whether to accept the coin, placing PIN 6 to mass (validator inhibition) and whether to separate it or convey it to the cash by acting on PIN 5 (separator inhibition).

The peculiarity of this version is that the validation pulse of each channel has a different duration. The pulse time related to channel 1 can be factory programmed according to the customer request (10 to 630 msec +0 -2%), **standard 40 msec**. The following ones have a 20 msec step. This complies with the new regulations requiring the non modifiable condition for the machine, as in the event that the wires corresponding to the outputs on the parallel connector were inverted, the machine board would detect it.



PIN OUT OF RM5 X AT VALIDATOR 10 PIN CONNECTOR



Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibit Rm5
2	+12-24 Vdc	7	CH 1
3	CH 5	8	CH 2
4	CH 6	9	CH 3
5	Inhibit Separator	10	CH 4

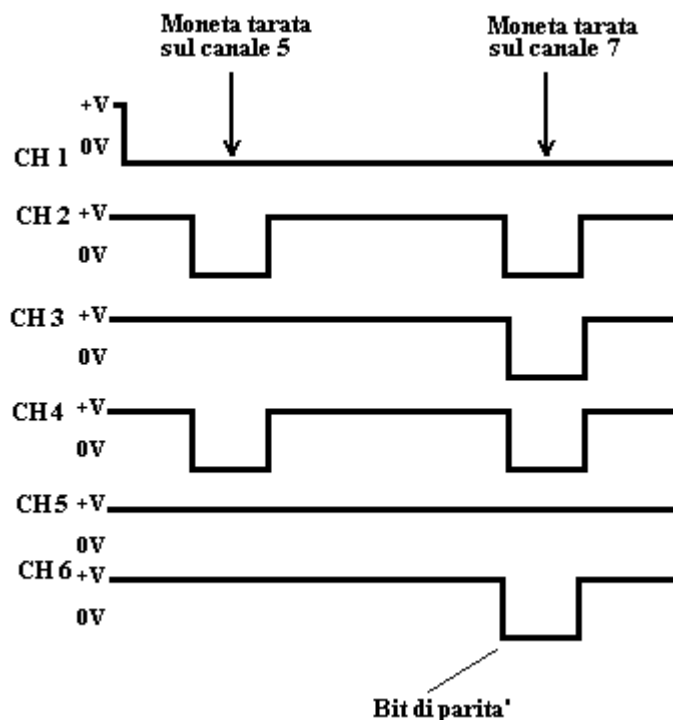
10 Pin standard connector

COMESTERO GROUP

8.5 BINARY VALIDATOR CONFIGURATION (RM5 X B0)

In standard validator configuration, RM5 can manage up to fifteen coin values, i.e. up to 59 different coins provided that these are re-addressed to the first 15 channels. When the coin is introduced, the validator will signal in binary code on the first 4 channels the channel on which the coin has been adjusted; at the same time the “data valid” signal will activate on channel 6; this one will activate at every coin introduction.

Output meaning:



Coin adjusted on channel 5 – Coin adjusted on channel 7- Parity bit

NOTE : In case of a binary validator capable of piloting a separator, the “data valid” signal corresponding to channel 6 will be omitted.

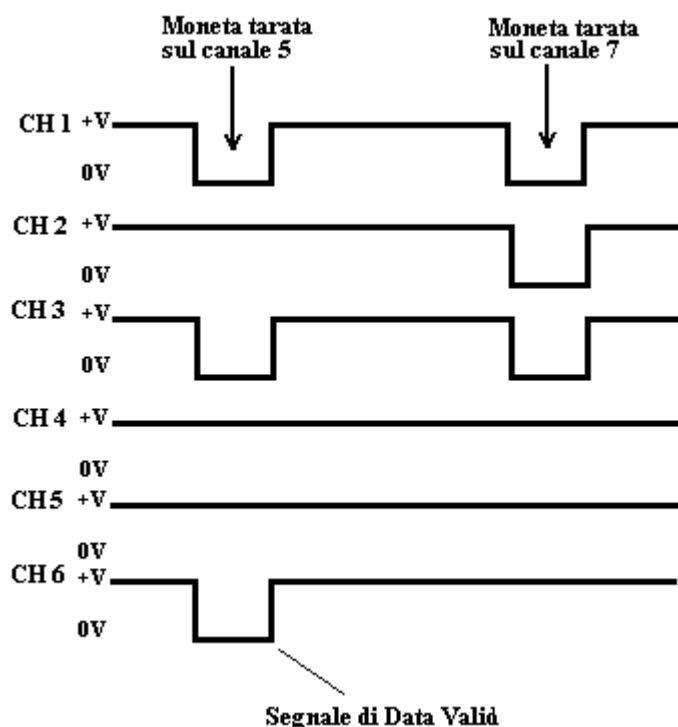
PIN OUT OF RM5 X B0 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibition
2	+12-24 Vdc	7	CH 1
3	N.U.	8	CH 2
4	Data Valid	9	CH 3
5	N.U.	10	CH 4

8.6 CONFIDA BINARY VALIDATOR CONFIGURATION (RM5 X BC)

In Confida binary validator configuration, RM5 validator can manage up to fifteen different coin values, i.e. up to 59 different coins provided that these are re-addressed to the first 15 channels. Channel 1 is used to indicate the type of communication adopted to the machine: if disabled (open collector) the validator uses a standard mode, if enabled (Gnd) the validator uses the confida combinatory mode.

Channel 6 is used as even parity display to increase safety on the value of the combination transmitted to the validator; thanks to this, always more than one line is activated for every communication thus making easier the identification of any illegal combination due to causes of different nature.



Coin adjusted on channel 5 – Coin adjusted on channel 7- Data Valid Signal

PIN OUT OF RM5 X BC VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibition
2	+12-24 Vdc	7	CH 1
3	N.U.	8	CH 2
4	Parity bit	9	CH 3
5	N.U.	10	CH 4

The validator is usually supplied with passive reset, i.e. if the power supply is stopped for at least 100msec on pin 6. For special applications, i.e. machines which do not manage a reset signal, an internal reset (automatic) can be programmed and its duration defined; when the validator reaches it, it is automatically reset. **(RM5 X 14)** .. Version Warning: in this configuration only one sale price can be managed.

- The display can show the introduced coins, increasing from zero up to the sale price or decreasing from the sale price down to zero.
- Modify sale prices

PIN OUT OF RM5 X 10 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Reset Inhibit.
2	+12-24 Vdc	7	Display Clock
3	Display Data	8	Price 1
4	Display Enable	9	Price 2
5	N.U.	10	N.U.

NOTE: To use the validator on machines provided with "ESTRO" connector, it is necessary to use the RM929 connection interface which make it fully interchangeable with RM4 V1E validator and with NRI DUAL-PRICE G13.

FOUNTAIN TOTALIZER CONFIGURATION (RM5 X FD)

The only difference with RM5 x 14 version lies in the fact that with two identical prices, the line of the second price will be enabled with a 2 sec delay, time necessary to glass dispensing.

8.9 CREDIT PULSE EMISSION TOTALIZER CONFIGURATION (RM5 X 20) (RM5 X 21)

The validator can recognize 59 coins which can have even 59 different values, it sums them up and directly manages a display to visualize the introduced amounts. It has been designed to directly drive the videogames boards. It allows to define a game cost (credit cost) and up to two bonus levels. For example with a credit cost of 0.25, by introducing 1.00 € you can have 5 credits (4 + 1 bonus); by introducing 2.00 € you can set 11 credits (2nd bonus).

When the validator has acquired a value equal to the credit cost, it gives a pulse and when the bonus thresholds are reached, it shows the number of the related credits. The standard pulse length is 100 msec (+0 -2%); nevertheless it can be varied between 10mSec. and 2 sec. **NOTE:** When a value ranging between 10 and 630 msec is set, the ratio 1 to 4 is guaranteed, i.e. the pulse will be active (low) for the fixed time, while the pause time between one pulse and the other will be four times as much. When a value higher than 630 msec is set, the pause time will not follow this rule.

The bonuses are assigned if the coins are introduced in sequence within a maximum time of 10 sec. between one coin and the other.

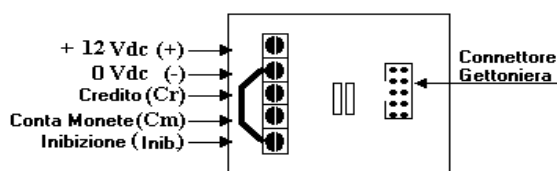
There is also an output to directly control an external counter for the accepted coins.

Thanks to the RM5-PROGRAMMER portable programmer the following options can be enabled and/or modified:

- enabling the reading of the internal counter for introduced coins and reset
- adjusting pulse length between 10msec and 2 sec (standard signal 100 msec +0 – 2%)
- disabling every single coin acceptance channel
- setting credit cost and bonus levels

To facilitate the installation of this model, an RM927 interface board is provided equipped on one side with a standard container connector for the validator and on the other side with a 5-pole terminal board. See attached diagram.

Fig. 8



Credit – Coin Counter –Inhibition – Coin validator connector

To inhibit the electronic S.E.C.I. validator using RM 927/N interface board it is sufficient to connect the inhibition wire of the game board to the connector shown below.

The game board is provided with an internal pull-up; therefore if you do not want to connect the inhibition pin it is necessary to carry out the abovementioned modification.

IMPORTANT NOTE: IF THE INHIBITION PIN IS NOT USED, IT MUST BE BRIDGED TO THE GND PIN.

If you wish to separate the coins or tokens a coin separator can be installed. To this purpose the validator must be programmed via Clone5, to manage the separator (**RM5 X 21**). When the separator function is enabled, the outputs related to channels 5 and 6 (Pin 3 and 4) are used to control the separation coils.

PIN OUT OF RM5 X 20 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibition
2	+12-24Vdc	7	Display Clock
3	Display Data	8	Coin Counter
4	Display Enable	9	Credit
5	N.U.	10	N.U.

PIN OUT OF RM5 X 21 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibition
2	+12-24 Vdc	7	Display Clock
3	Coil separator B	8	Coin counter
4	Coil separator A	9	Credit
5	N.U.	10	N.U.

8.10 PROGRESSIVE TIMER CONFIGURATION (RM5X30 3R 3C)

RM5X30: PROGRESSIVE TIMER

It recognizes 59 coins which can have even 59 different values, it sums them up and when a previously set value is reached (basic service cost), it enables a signal for a defined time (basic

service time). When other coins are added, the signal duration is increased proportionally to the value of the coins added.

The validator manages a display that visualizes the introduced coins until the basic cost is reached and then it visualized the time expressed in seconds or minutes.

An output signal is provided to give a notice of the expiry of the available time: the notice time is adjustable.

There is also an input signal (PIN 6) called economizer that stops the time and suspends the relevant output control. When this signal is disabled, the validator will enable the service and the time count again.

By means of the portable programmer the following operations can be carried out:

- Enabling the counting of the introduced coins
- Setting the basic service cost (P1)
- Setting the minimum amount to be added to have additional time (P2). If P2 is not defined, to have extra time, another amount corresponding to the service cost shall be entered
- Defining the counting and visualization time unit (seconds or minutes)
- Defining the service duration ranging from 1 to 255 seconds or 1 to 255 minutes (+0 – 2%) according to the time unit selected
- Setting the notice signal time (always expressed in seconds)
- Enabling the economizer actions

PIN OUT OF RM5 X 30 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Time inhibition/stop
2	+12-24 Vdc	7	Display Clock
3	Display Data	8	Timed output
4	Display Enable	9	Notice
5	N.U.	10	N.U.

RM5X3R: ON REQUEST PROGRESSIVE TIMER

The only difference with RM5x30 version is that the timed signal will be given only on customer request by pressing a button.

PIN OUT OF RM5 X 3R VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Time inhibition/stop
2	+12-24 Vdc	7	Display Clock
3	Display Data	8	Timed output
4	Display Enable	9	Notice
5	Credit request	10	N.U.

RM5X3C: PROGRESSIVE TIMER WITH COUNTER OUTPUT

The only difference with RM5 x 30 version is that, in addition to the timed signal, the validator can be directly connected to an electromechanical counter which will store the validator accounting expressed as multiple of the basic value set on the validator.

PIN OUT OF RM5 X 3C VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Time inhibition/stop
2	+12-24 Vdc	7	Display Clock
3	Display Data	8	Timed output
4	Display Enable	9	Counter output
5	N.U.	10	N.U.

8.11 ON REQUEST CREDIT EMISSION TOTALIZER CONFIGURATION(RM5X40)

It recognizes 59 coins that can have even 59 different values, it sums them up;when the validator has acquired a value equal to the credit cost, it accumulates it and the signal is given only on request of the player who sends a credit to the machine by pressing a button.

This validator has been designed to meet the requirements of the manufacturers of Kiddy rides, billiards, table games In general.

The signal can be of two types:

- Adjustable pulse between 10msec and 2 sec (standard 100 msec (+0-2%))
- Fixed awaiting a reset on PIN 6

NOTE: When a value ranging between 10 and 630 msec is set, the ratio 1 to 4 is guaranteed, i.e.the pulse will be active (low) for the fixed timed, while the pause time between one pulse and the other will be four times as much. When a value higher than 630 msec is set, the pause time will not follow this rule.

The fixed signal is useful when an automatism not equipped with self-supply must be supplied and at the end of the cycle a reset signal will return.

The validator directly controls a display that visualizes the introduced amounts until the value of one credit is reached and then the accumulated credits will be displayed.

Alternatively, i.e. when the use of a display is not provided, the presence of credits can be shown using the signal given by the validator on output on pin 10 which is kept enabled when the validator has at least 1 credit stored.

Also this version has an output for the direct control of an external counter of accepted coins.

By means of the portable programmer the following operations can be carried out:

- Setting the cost of the single credit and the two bonus thresholds
- Enabling and reading the internal counter of accepted coins
- Selecting the type of signal: pulse or fixed (standard pulse)
- Adjusting the length between 10msec and 2 sec in the case of a pulse
- Individual disabling of coin acceptance channels

PIN OUT OF RM5 X 40 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	inhibition / reset
2	+12-24 Vdc	7	Display Clock
3	Display Data	8	Coin counter
4	Display Enable	9	Credit
5	Credit request	10	Residual credit signalling

8.12 ON REQUEST TIMED CREDIT EMISSION TOTALIZER CONFIGURATION (RM5X60)

Basically it is equivalent to RM5X40 validator with a built-in timer function. The credit emission is not a simple pulse as in 40 version but a fixed signal with adjustable length.

The display visualizes the coins introduced until at least one credit is reached, then the number of accumulated credits and then, when on request a credit is consumed, it visualizes the passing of time.

This validator has been designed for time table games (billiards, volley, etc.) for Kiddie-Riders, etc. Also this version is provided with an output for the direct control of an external counter of accepted coins and a signal (PIN 10) which is enabled when the validator has accumulated at least one credit for a credit available signal, if any, in case of lack of display.

By means of the portable programmer the following operations can be carried out:

- Setting the cost of the single credit and the two bonus thresholds
- Defining the counting/visualization time unit (seconds or minutes)
- Defining the length of the credit signal which can range from 1 to 255 sec (+0 – 2%) or 1 to 255 minutes (+0 – 2%) according to the time unit selected
- Enabling and reading the internal counter of accepted coins
- Disabling the single acceptance channels.
-

PIN OUT OF RM5 X 60 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibition
2	+12-24 Vdc	7	Display Clock
3	Display Data	8	Coin counter
4	Display Enable	9	Timed credit emission
5	Credit Request	10	Residual credit signalling

8.13 CONFIGURATION OF PHOTOCOPIER SINGLE PRICE MULTIPLE SALE TOTALIZER (RM5X70)

It is a validator designed for photocopying and basically it accomplishes the "KEY-COUNTER" function.

It accepts 59 coins that can have even 59 different values. When it has accumulated at least one value equal to the cost of one photocopy it gives an enabling signal to the machine. It accumulates credits for more photocopies. At every cycle (copy made) of the photocopier it receives a signal (reset) that decrements the accumulated credits. When it arrives to the last copy, it disables the machines. It directly manages a display showing the money introduced until it has credited at least the value of the cost of one copy and therefore the number of photocopies (credits) acquired.

The cost of a single copy scales down on the basis of the introduced coins.

In addition to an internal counter, the validator directly controls an external counter of accepted coins.

There is also an output signal (PIN 10) which is kept enabled when the validator has availability of credit of at least the cost of one copy. This allows to signal, if you do not want to use the display, the presence of residual credits.

By means of the portable programmer the following operations can be carried out:

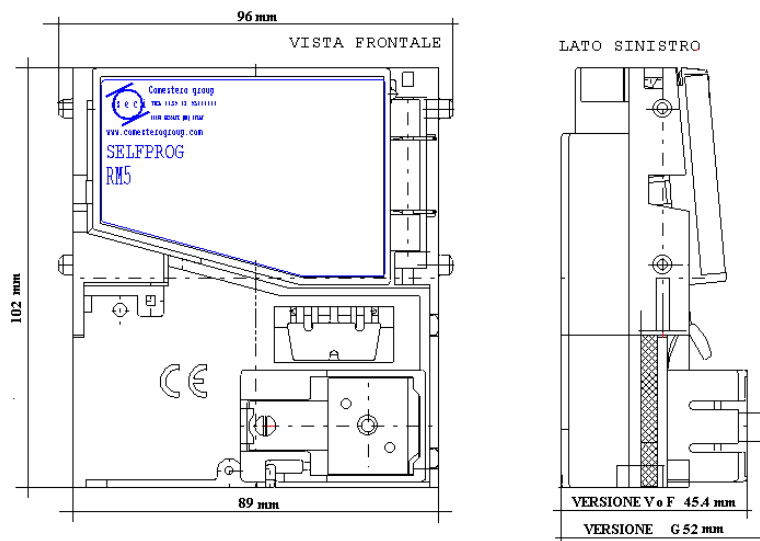
- setting the cost of the single copy and the two bonus levels
- enabling and reading the internal counter of accepted coins
- disabling the acceptance of the single channels
- adjusting the delay of photocopier disabling to allow, when the reset signal of the last copy is received, the machine to regularly complete the cycle.

PIN OUT OF RM5 X 70 VALIDATOR 10 PIN CONNECTOR

Pin No.	Meaning	Pin No.	Meaning
1	Gnd	6	Inhibition / Reset
2	+12-24 Vdc	7	Display Clock
3	Display Data	8	Coin Counter
4	Display Enable	9	Sale Enabling
5	Credit request	10	Residual credit signalling

9. COIN VALIDATOR SIZE

Fig.11

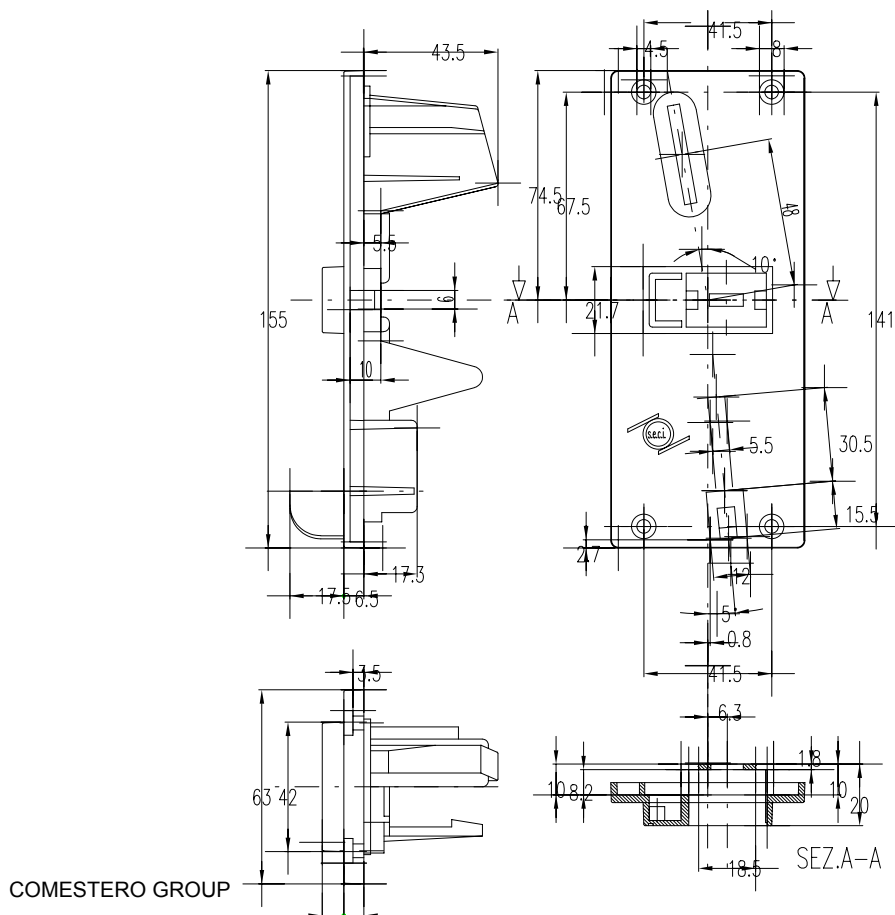


Front view – left side – version

10. FRONT PANEL SIZE

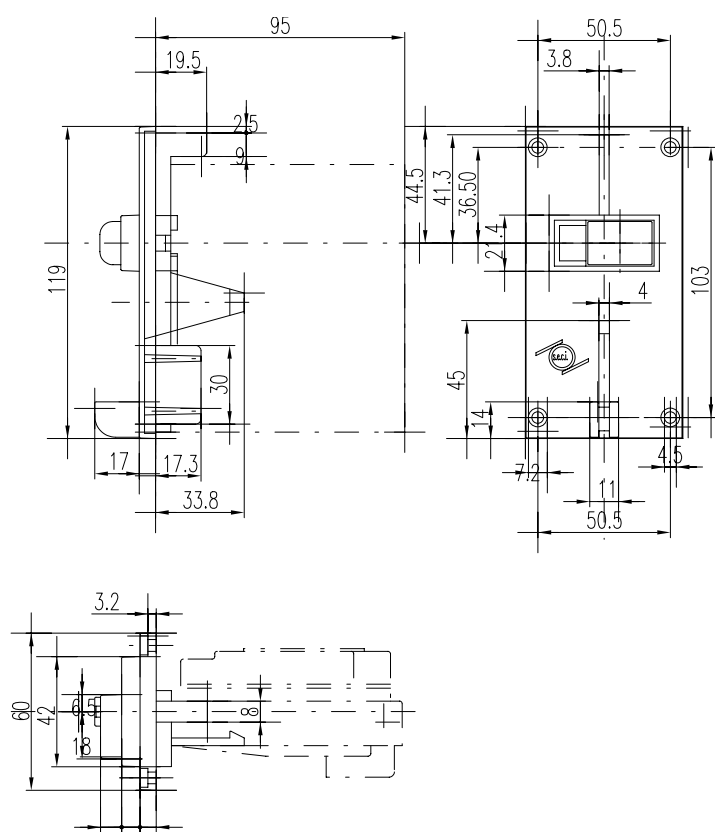
10.1 FRONT PANEL F6

Fig. 12



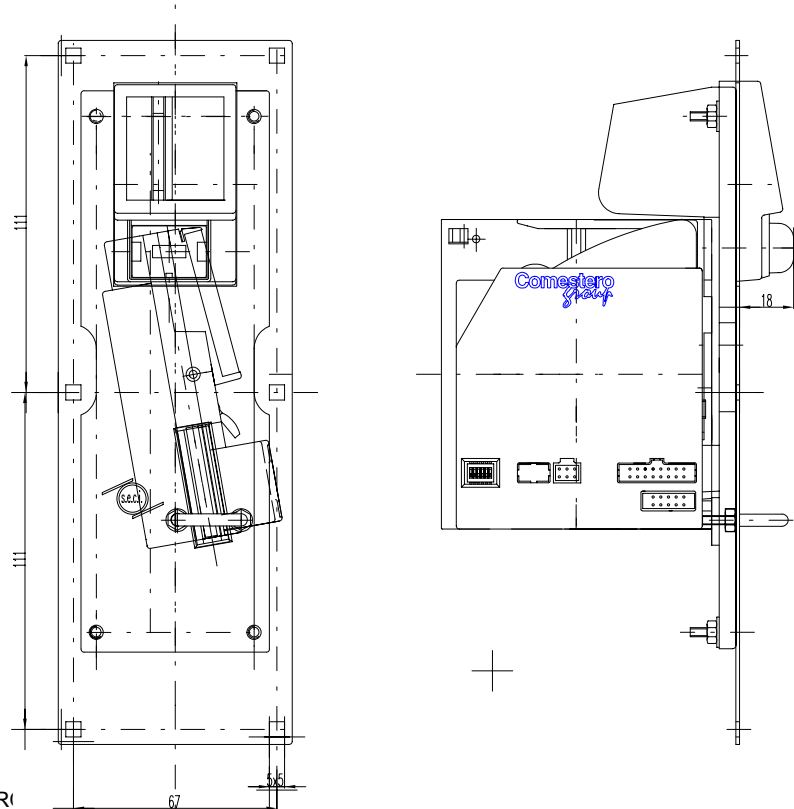
10.2 FRONT PANEL F1

Fig. 13



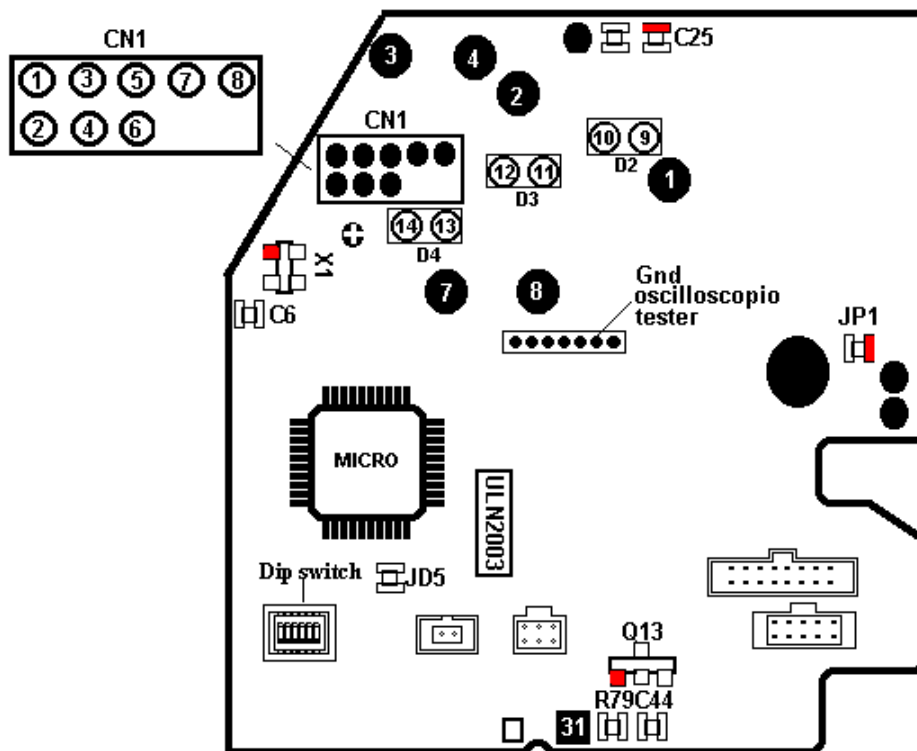
10.3 FRONT PANEL F3

Fig. 14



COMESTERO GR

11. RM5 REPAIR GUIDE – FOR EVOLUTION VERSION ONLY



GND oscilloscopy tester

TEST PROCEDURE

Connect equipment to PC and open Clone5 program.

- Make sure that channels are adjusted and enabled.
- Make sure that the configuration of the equipment is the one requested by the machine.
- Make sure that for each channel the coin/token value is present.
- In totalizer versions, check price setting.
- Check for the presence of a "Limit", if any.

Access HARDWARE menu

- out the output test by making sure that the coil correctly trips and the six leds corresponding to the six outputs are lit.
- Make sure that "Cash" sensor (TLP) is "Disabled". To check operation, insert a coin into the cash slot (see figure in RM5 manual) and press Hardware Test push button: its status will change and "Enabled" will be displayed.
- Make sure that reference and stand by values of acceptance coils are approximately equal.

Acceptance solenoid does not trip:

Carry out a short circuit between CHECK POINT 31 and X1 red pin. If the solenoid does not trip, replace it otherwise check with Q13 oscilloscopy (red terminal). With the above-mentioned short

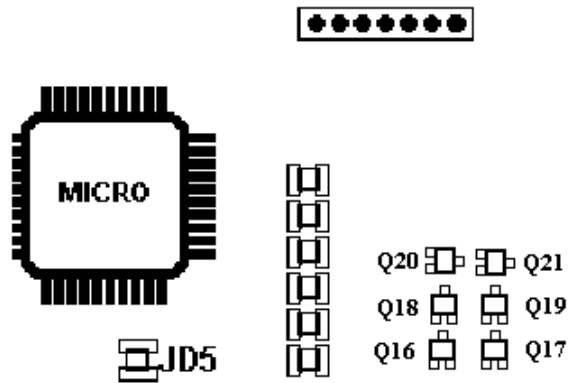
circuit, it should change its status, if not, try and make weldings again on Q13,R79,C44 or replace these components.

Faulty outputs: VERSION WITH ULN2003

Replace ULN2003, Check continuity between it and pin-out.

Faulty outputs: VERSION WITH TRANSISTOR

Replace output transistors



Ch1= Q16; Ch2= Q17; Ch3= Q18; Ch4= Q19; Ch5= Q20; Ch6= Q21;

Q16-Q21= BC817

Faulty coils:

Check and make again weldings related to the check points described below.
Check with tester as Ohmmeter (Coils on board)

Check point	Check point	Ohm	Component
1	2	50 Ohm	LF
3	4	20 Ohm	HFU
7	8	10 Ohm	HFL

CN1 CONNECTOR (Coils on door)

2	8	20 Ohm	LF
4	8	10 Ohm	HFL
6	8	20 Ohm	HFU

If a problem concerning the coils installed on RM5 board is found out, it is advisable to send the coin validator to Comestero for repairs, if a problem is found out on the door coils, it is sufficient to change the door and the relevant flex.

Amplitude:

Check voltage on C25 (Red terminal) it must be 3.5 Vdc.
Check HFL coils (See Faulty coils)

Cash sensor (TLP):

13. TECHNICAL SPECIFICATIONS

SIZE:	Standard 3 Inches and ½ (Ref. page 17)
WEIGHT:	185 Grams
OPERATING TEMPERATURE:	Between 0 and 55 °C from 10% yo 75% of non condensed humidity
STORAGE TEMPERATURE:	Between 0 and 55 °C
POWER SUPPLY:	12 Vdc / 24 Vdc ± 10%
CONSUMPTION:	Test carried out at 12 Vdc Stand-by 35 mA Max Coin measurement 50 mA Max In acceptance 340 mA Max
OUTPUTS:	Low active signal: ≤ 1.0 Vdc. (Open collector NPN) V max 24±10% Vdc I max 200 m A (CH1 to CH4) 800 m A (CH5 and CH6) for separator control
CHANNEL NO.:	60,59 can be used (depending on version)
COIN SIZE :	Diameter from 16 to 31,5 mm Thickness 3,3mm Max
CONFORMITY DECLARATIONS:	EN 61000-6-3 - Emissions EN 61000-6-1 -EMC EN 55022 Immunity from Radio Noises and Interferences EN 60950 Safety

NOTE: In case of inductive load, it is necessary to externally protect outputs with clamp diodes. See paragraph "Coin validator connections"