SMV
BackLoad Bill Validator

Operation and Service Manual

Part 1. Operation Manual

CONTENTS

INTRODUCTION

The scope of this document is to provide all technical information related to:

- Development of new equipment with the SMV bill validator.
- Selection of the right configuration and part number.
- Installation of SMV.
- Maintenance and service of SMV.
- Repair of SMV.

The Manual consists of two parts: part 1 – Operation Manual and part 2 – Service and Repair Manual.

PRODUCT OVERVIEW

SMV is the simplified version SM series. SMV has easy plastic removable cassette, the reduced set of sensor for scanning a bill, one type of the interface. Distinctive features SMV in comparison with devices of the previous versions SM are addition in the interface socket of circuits for reading statistics, programming and diagnostics, socket convenient arrangement of switches of a mode and and to for flash card that allows to change mode of operations carry out updating the program not removing cassettes.

The Crane Payment Solutions SMV bill validator is typically installed on the front door (or the front panel) of a machine. Access to the cassette is from the rear side of the validator.

A complete **SMV** unit consists of three parts – the **bill validator** itself the **holder** and the light plastic **removable cassette.**

Cassette

Holder

Bill Validator
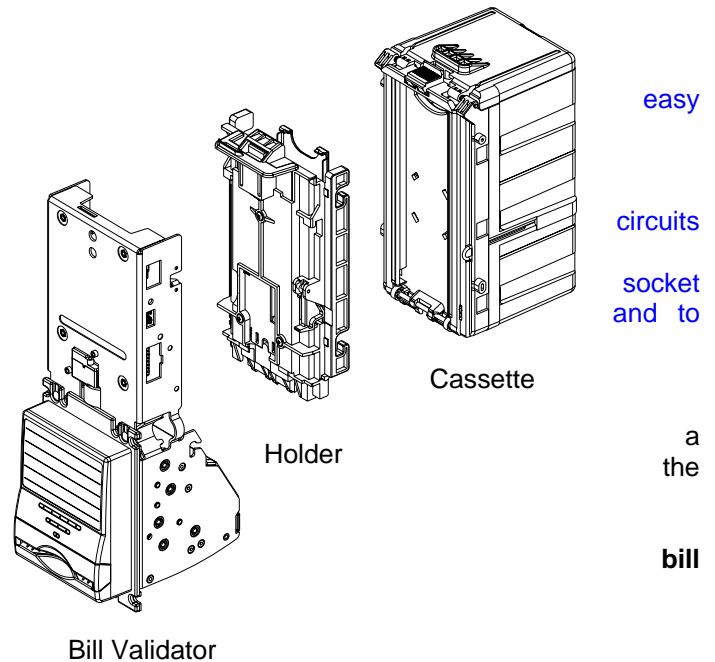
SMV has a fixed width bill path and is available for currencies 66 or 70 mm wide. This implementation encompasses most of the countries using fixed width for their denominations.

SMV has a very high acceptance rate, due to a set of advanced **sensors** and smart software that can precisely identify authentic bills from all known counterfeits.

Six multi-colour **optical sensors** collect images from both sides of the bill.

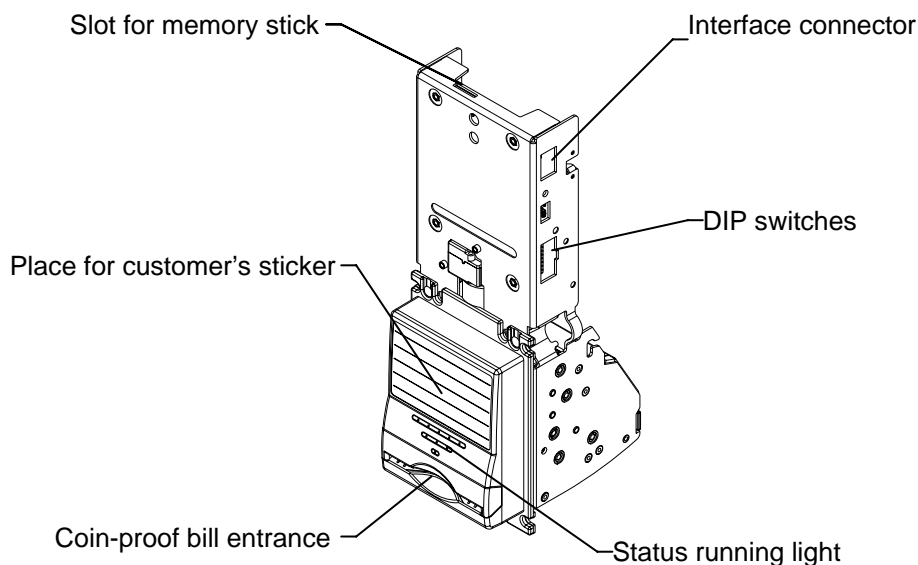Patented **inductive sensor** evaluates magnetic properties of specialized ink.

All sensors do not require any manual adjustment. As a result, the validator keeps the same high acceptance level during its lifetime.

SMV is capable of accepting bills inserted in **any** of four **directions** (any side forward, face up or face down).

The highest security level is provided by an **anti-stringing sensor** that can detect any sort of string, thread or film attached to a bill.

Following features make the **SMV** highly efficient:
- **Beltless** roller design minimizes maintenance of bill transport mechanism.
- "**Clamshell**" design provides fast and easy access to the bill path.
- Special rollers **prevent a bill jam** situation even with wet or worn bills.
- Fast and easy **software updates** due to **Crane Payment Solution Memory Stick**. An update is easily performed in seconds. The procedure does not require technical personnel, validator disconnection, or any tools. In distinction from the previous version SMV the socket for Memory Stick is accessible without removal of drop cassette.

Slot for memory stick — ———— Interface connector

————— DIP switches

Place for customer's sticker —

Coin-proof bill entrance — ———— Status running light

The features of **SMV** allow it to be customised to any application quickly and easily.
SMV is installed **STACKER UP** (common for vending equipment).
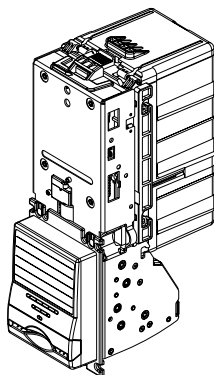
SMV supports MDB **protocol**.

A choice of coin-proof plastic bezel with running lights or single-LED metal bezel with vandal-proof features is available.

The **Removable cassettes** used by SMV are capable of accepting only **66 or 70 mm** wide bills. The cassettes are capable of stacking bills up to 160 mm in length.

Cassette capacity refers to the number of average quality bills that can be stored.
A line of plastic **Cassettes.**

300   400   600
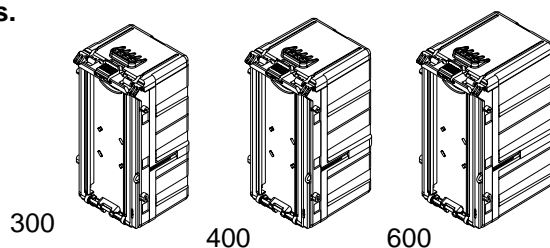
GENERAL SPECIFICATIONS

Validation Sensors:
3-color optical sensors …………………………………………………...……………………………6
Inductive sensors………………………………………………………………………………1 central
Anti-stringing sensor

Interface connector:
10-pin connector (compatible with MB but not compatible with regular SM harnesses) used with custom ribbon cable harness

Supported Protocols and Interfaces:
  24V Platform……………………………………………………………………………………….MDB
  Custom interface channel for NRI changer connection, reading of statistical data and programming

Supported drop cassette types (easily replaceable)
Drop-resistant plastic drop cassette (survives free falling from 1 m on hard floor)

Maximum stacking capacity (new bills)
With plastic drop cassette…………………………………………………………………..……..300, 400, 600

Bezels
Coin-proof plastic bezel with running lights
Vandal and coin-proof single-LED metal bezel

Service indication
Blinks of the bezel lights

Memory programming Crane Payment Solution Memory Stick
In the service mode (via interface connector)
Using handheld device via custom NRI interface channel
Supported memory stick types:
Manufacturer, Multi-update

Mode selection…………………………………………………………………………………8-position DIP switch

Acceptance:
Bills…………………………………………………………………lengthwise 4 ways or 1 way selectable by switch
SMV Single width backload bill validator specification. Doc# 205 Revision 1.0
Custom coupons……………….…………………………….lengthwise 4 ways or 1 way selectable by switch
Barcoded coupons…………………………………………………………………………………..not supported
Validating rate……………………………………..………………..……96% or higher on first insertion
Bill Width, in mm…………………………………………………………………………….......66, 70
Maximum length of bill, in mm…………………………………………………………………………160
Minimum length of bill, in mm………………………………………………………………….…..120
Bill escrow………………………………………………………………………………………one bill
Complete Validation cycle, in seconds………………………………………………………………….1.7

Power supply voltage……………………………………………………..………….24 V AC or 18…40 V DC

Current consumption:
  24 V AC or 34 V DC, operating mode (max)……………………………………………………2.0 A
  24 V AC or 34 V DC, standby……………………………………………………………………...0.1 A

Power consumption:

Idle mode……………………………………………………………………………………………2W
Validation mode……………………………………………………………………………………12W

Environmental:

Operating temperature ……………………………………………………….…………-18°C to +60°C
Storage temperature…………………………………………………….…………-30°C to +60°C
Humidity (non-condensing)…………………………………………………….…………30%-90%RH
Validation M.T.B.F…………………………………………………………………….750,000 cycles

Approvals

ROHS compliant

Installation ……………………………………………….………On a vertical front wall of machine from inside.

Cabinet front panel's thickness………………….……………….. 1.5 to 12.7 mm (depends on bezel type)
Access to cassette……………………………………….…………. from back side of the validator

Dimensions (WxHxD)
With cassette 300 bills ……………………………………………………………..…..104x279x115
With cassette 400 bills ……………………………………………………………...…..104x279x131
With cassette 600 bills ……………………………………………………………..…..104x279x163

Weight

Weight (validator without cassette, with plastic bezel)……………………………………………1.3 kg
Weight (blank cassette) 300…………………………………………………………………0.25 kg
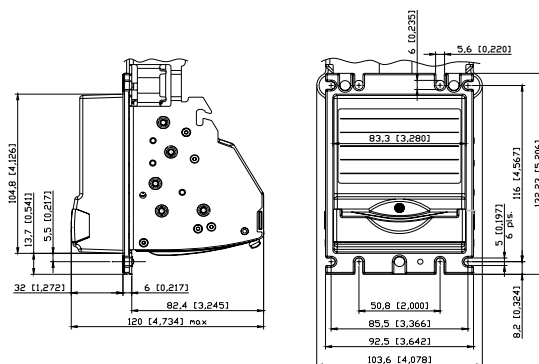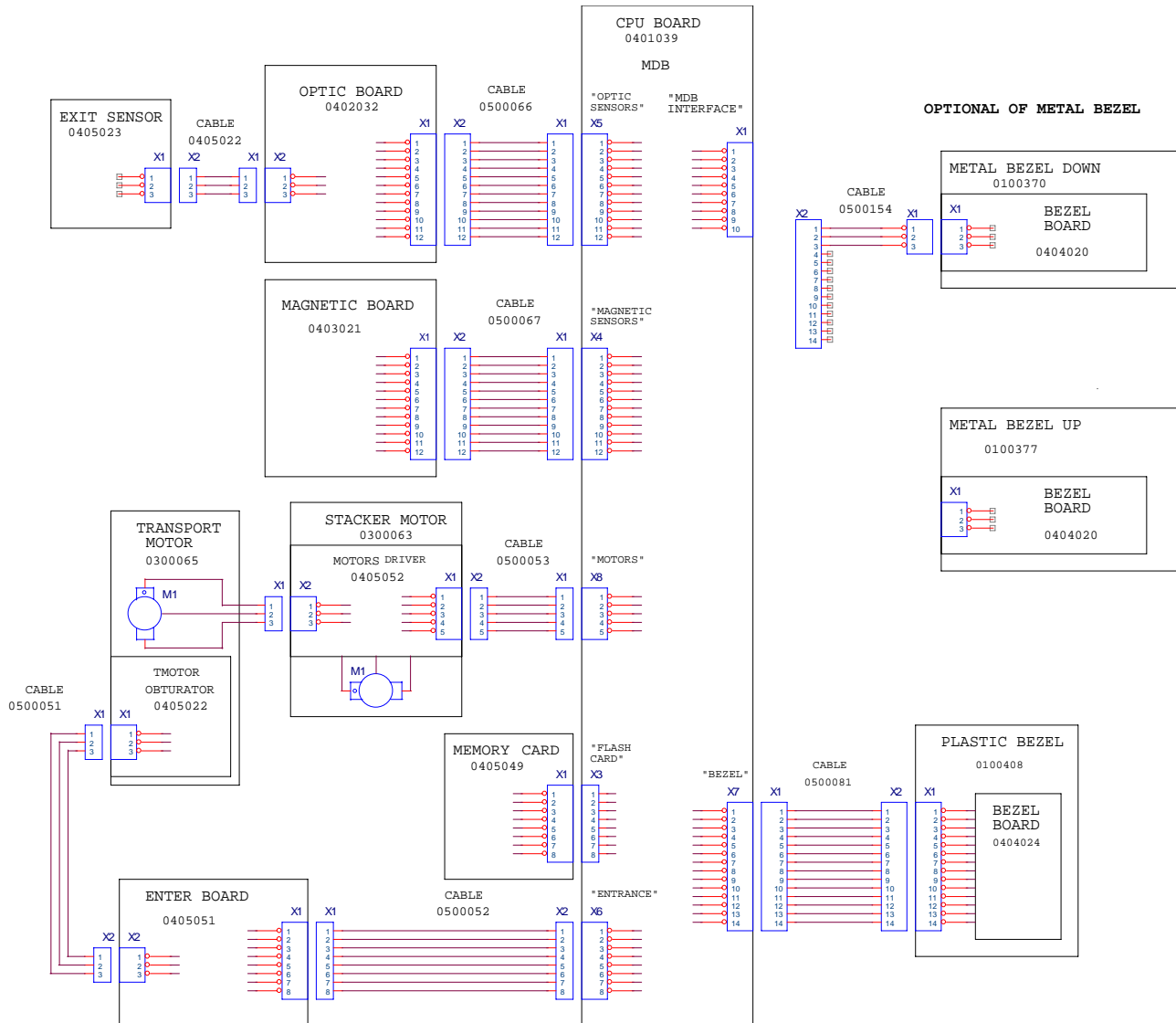
Dimensions
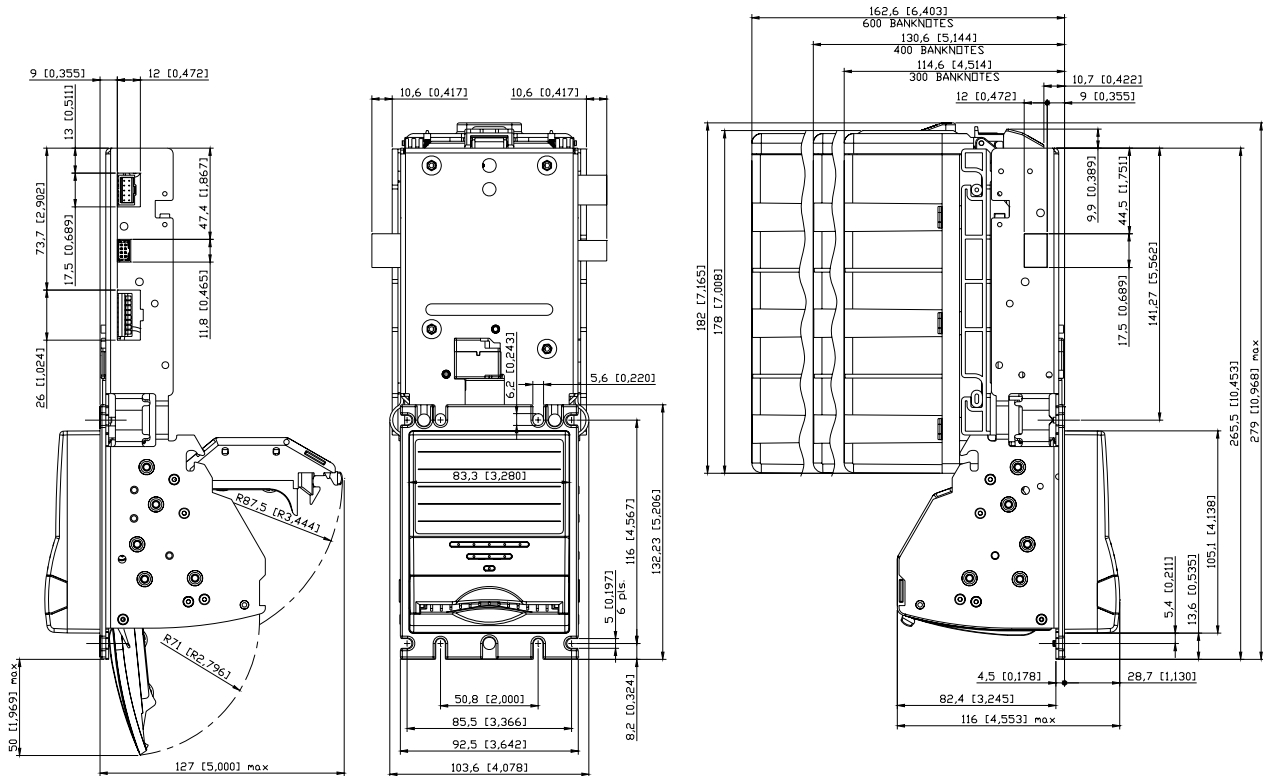
Metal Down
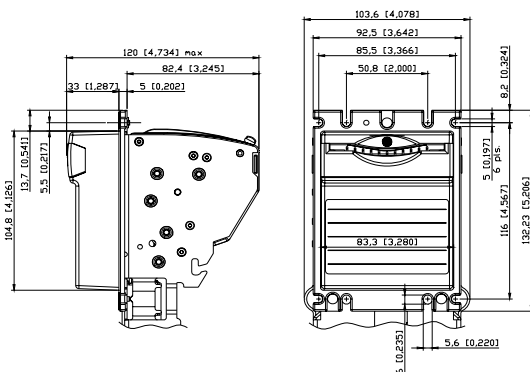
Metal Up Bezel

GENERAL WIRING DIAGRAM

CHOOSING SMV FEATURES AND PART NUMBERS

Bill Validator

Following information helps in the choice of a proper SMV bill validator:
- Bezel style;
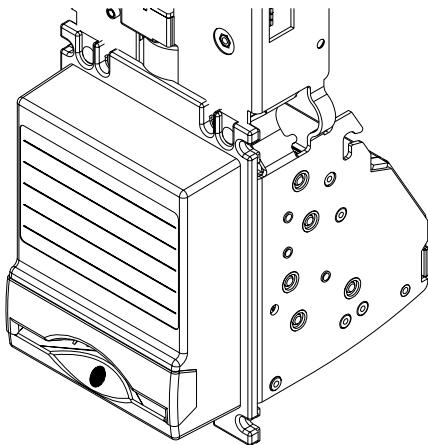- Indoor or outdoor application (coated boards are used for outdoor application);

Bezel style

Three different styles of bezel are currently available:

Standard plastic bezel. This bezel can be used for –   running
STACKER UP configuration. The bezel has a status indicator with   helps as
light that glows blue when ready RED when busy. The indicator also   from
a diagnostic tool for service personnel. The bezel has protection   to
inadvertent insertion of coins. The bezel has one designated place   with the
accommodate sticker of 76x48 mm size. A set of stickers is supplied
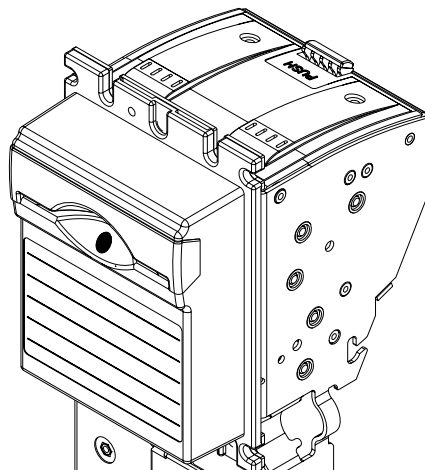SMV for most of the countries.
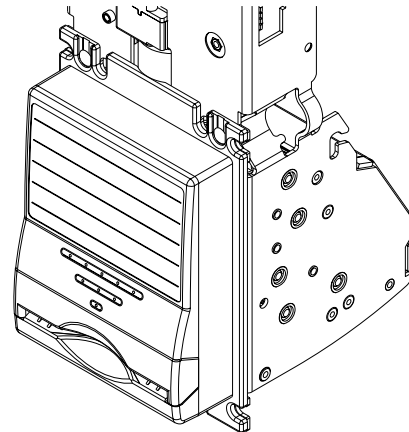
The **Metal bezel** is developed to protect the SMV from
intentional damage or in environments subject to impacts from other   objects.
It also has a curved path to protect from inadvertent insertion of coins. A red/green light indicates the status of the
validator. Customized stickers of size 76x48 mm can be applied on the bezel. The bezel is available in two
configurations – STACKER UP or STACKER DOWN.

Metal Bezel (STACKER UP)   Metal Bezel (STACKER DOWN)

Indoor or outdoor application

The SMV bill validator can be ordered with boards coated for outdoor applications.

Cassette

Cassettes for SMV bill validator have 3 sizes: 300, 400, 600 bills.

Memory Stick and software update options

Crane Payment Solutions SMV Bill Validators are supplied with pre-installed software, according to user's order. Software updates are released to accommodate new currency releases or to improve security against counterfeits. Software updates are offered in three options:

1)   Single-download Memory stick.

The software from the new Memory stick is downloaded when it is first installed on the validator.

2)   Multi-download Memory stick.

The multi-download Memory stick allows for updates of multiple SMV validators depending on the number of licenses ordered.

3)   Download via interface connector.
The updating is fulfilled with a handheld device via custom NRI interface channel.

Downloads may be performed by connecting the validator to a personal computer through an appropriate adapter. Instructions for Memory stick replacement and software updates can be found in the chapter named "SOFTWARE UPDATES".

There are two separate part numbers for the SMV bill validator - software part number and hardware part number.

Example hardware part number:

SMV – 4017

Hardware part number
SMV series
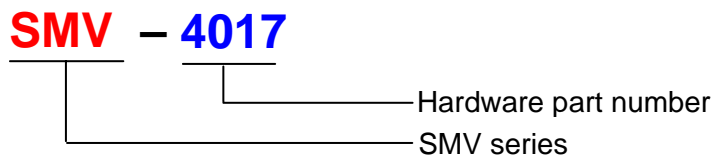
Example software part number:

SMV – US80 – 1.00

Version number
Software part number
SMV series
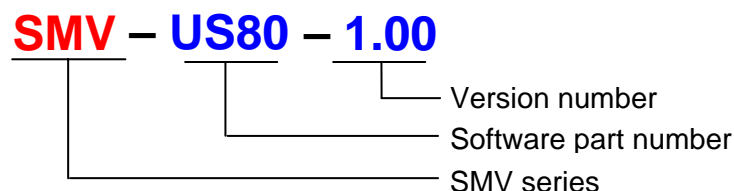
INSTALLATION

Bill validator installation

The SMV bill validator is usually installed on a door or a panel. The panel or door must have a rectangular cut-out and four threaded studs as per picture below.

Location of threaded studs
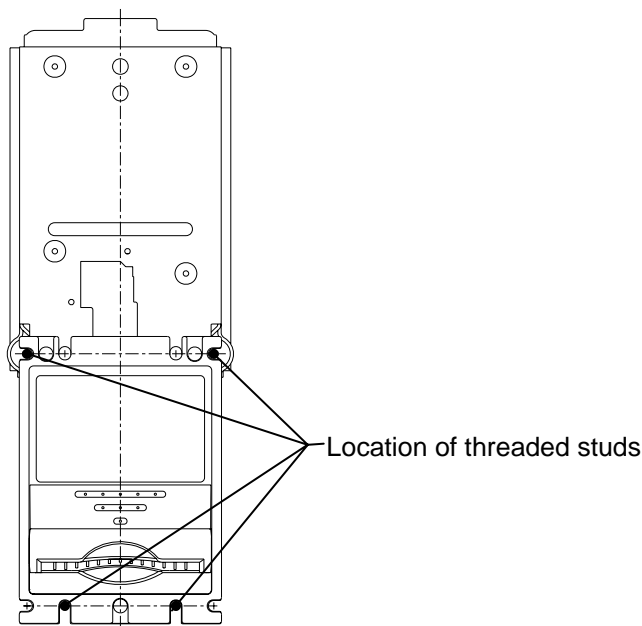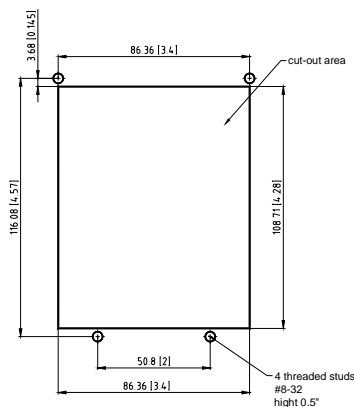
Protective-earth ground terminal must be connected to the automat local electric earth. Electric earth connection must be made by cable OPT-MKSM-GND or another cooper wire cable with wire gage 14…. 12 AWG. Use the shortest, practical wire length.
Refer to local wiring codes and regulations for grounding requirements.

Chassis grounding.

See View A
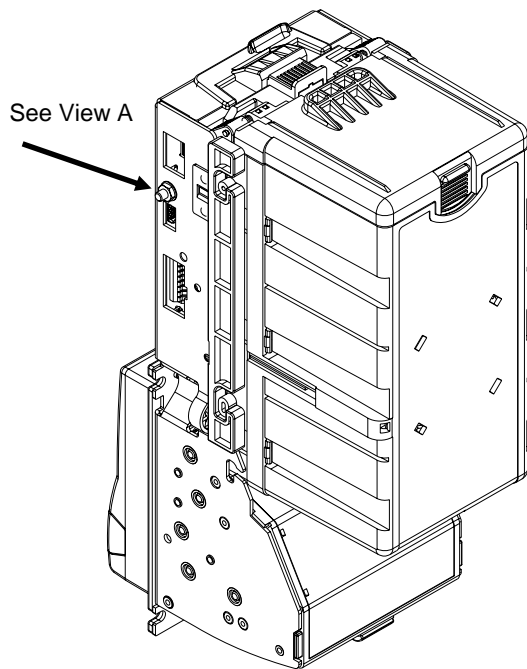
VIEW A
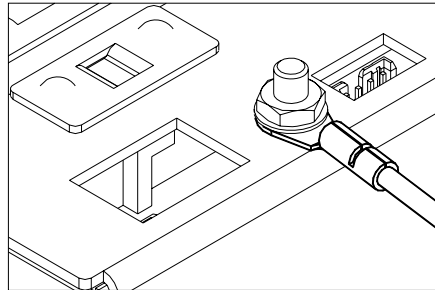
Metal bezel grounding

A

A
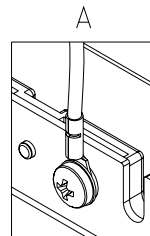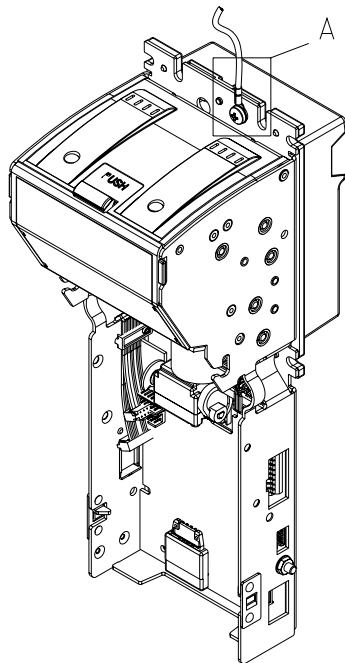
INTERFACE CONNECTION

The validator is powered by 24 V AC /18 ..40V DC and is suited for MDB Interface (vending applications).
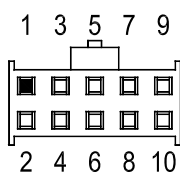
For detailed interface descriptions, please refer to Protocol Description Manuals available from the Crane Payment Solutions website at www.cashcode.com

Pin Assignment
(cable connector):

1 3 5 7 9

2 4 6 8 10

**Molex, Part #: 90142;
                90119, 9 pcs**

The supplied harness OPT-HS-MDB connects the validator to a regular Multi Drop Bus.

Signal descriptions:

TERMINAL	SIGNAL	FUNCTION
1	AC / DC+	POWER
2	AC / DC-	POWER
3	N/C	
4	MRX	MASTER RECEIVE
5	MTX	MASTER TRANSMIT
6	COMMON	COMMUNICATION COMMON
7	CMTX	SECONDARY CHANNEL MASTER TRANSMIT
8	CMRX	SECONDARY CHANNEL MASTER RECEIVE
9	GND	COMMUNICATION GROUND
10	+5V	POWER (for test purposes only)

INPUT/OUTPUT CIRCUITS

CPU board (SM04.51.300)
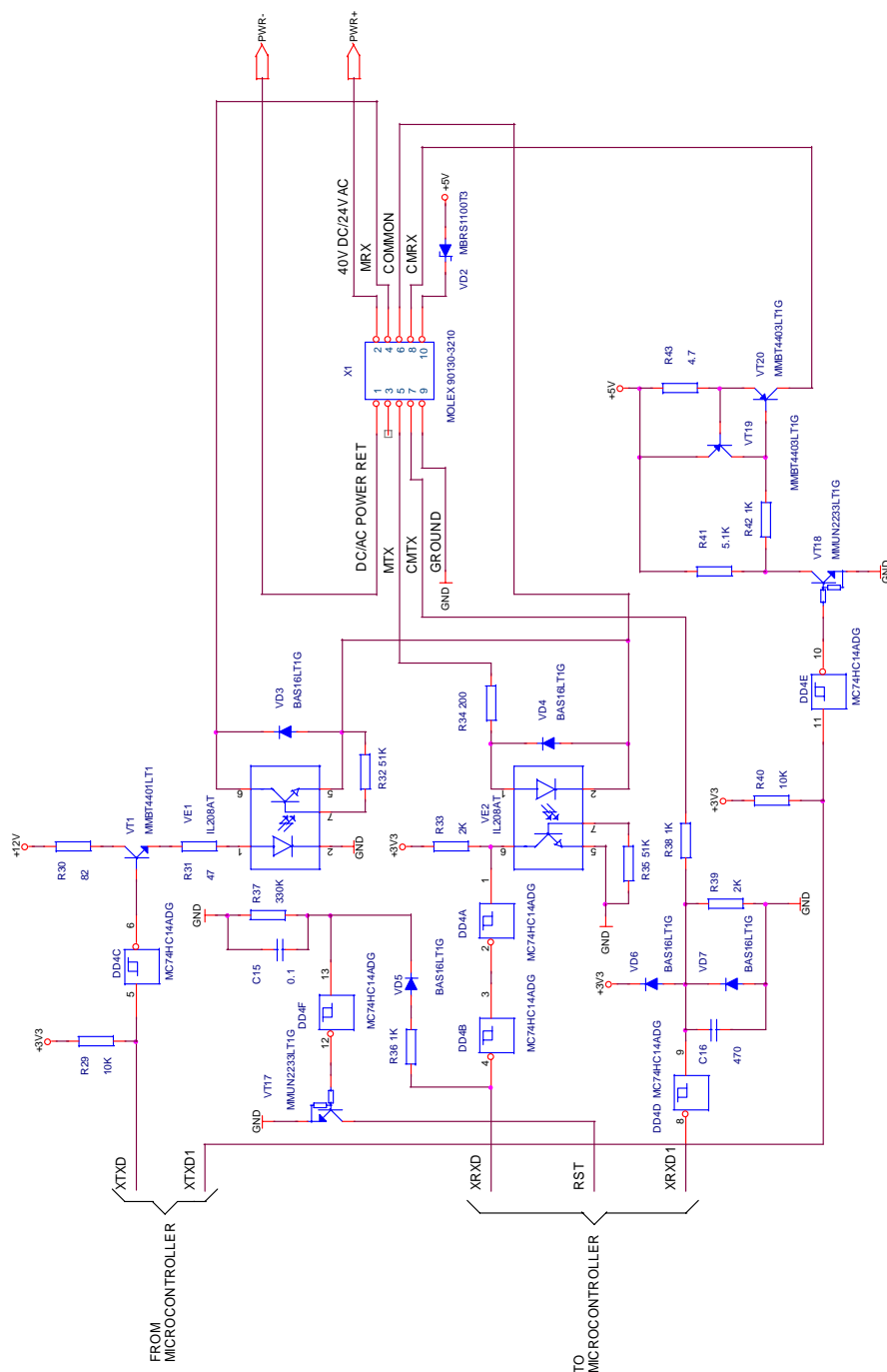
SWITCH SETTINGS

The DIP switches are located at the CPU board and are accessible without removal drop cassette.

The SMV bill validator operates in two basic modes: Validation Mode and Service Mode.

Validation Mode: This is the mode for normal operation.

**Service Mode:** This is the mode for programming and testing.

A set of 8 DIP switches defines the settings and programs the Bill Validator to recognize and validate different denominations or define other parameters.

For a complete explanation of switch description, please see the software User's Guide (enclosed to each bill validator and available at www.cashcode.com).

MAINTENANCE AND SERVICE

Plastic Cassette Removal And Installation

To install the cassette into the bill validator direct four bosses of the cassette to corresponding slots in the holder up to the stop and push on the cassette top-down .
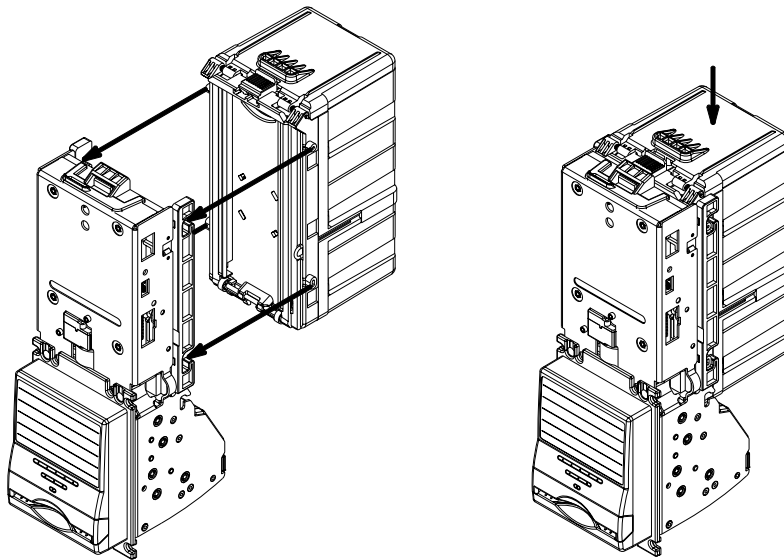
To remove the cassette, press on latch, raise the cassette and remove it.
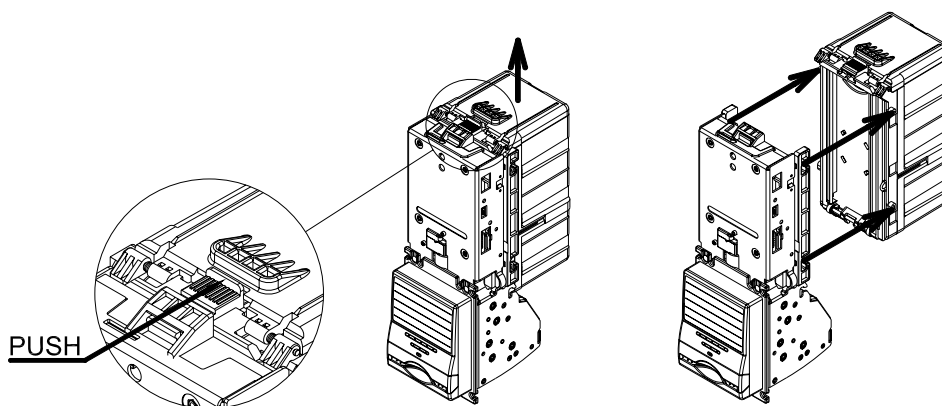
PUSH

To collect bills from the cassette unlock latch having pressed on it and open the cover. Remove bills. Close the cover.
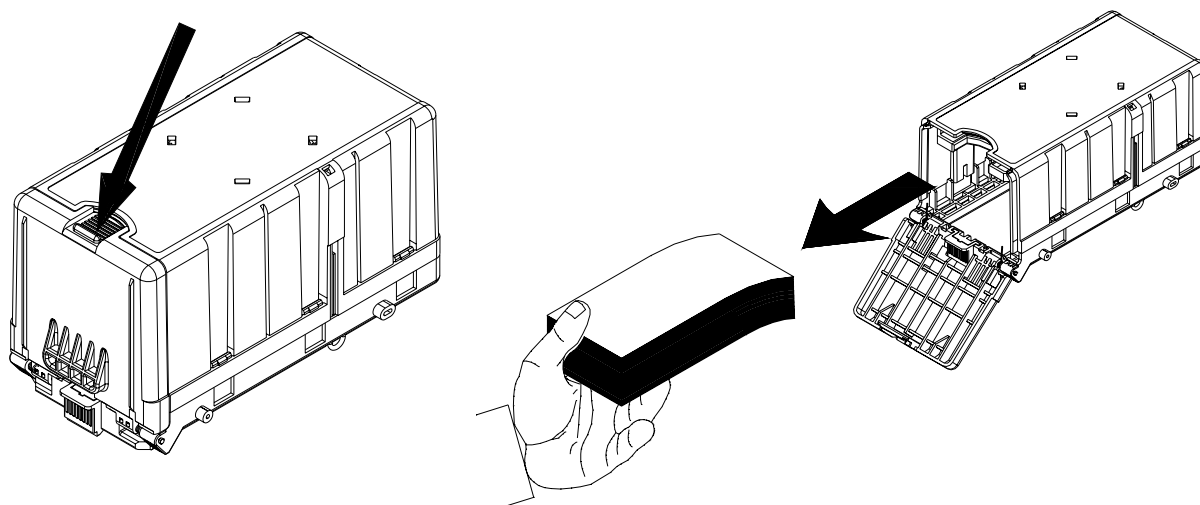
Holder Removal and Installation

To remove the holder remove the cassette previously and then, push on latch, raise the holder and remove it.
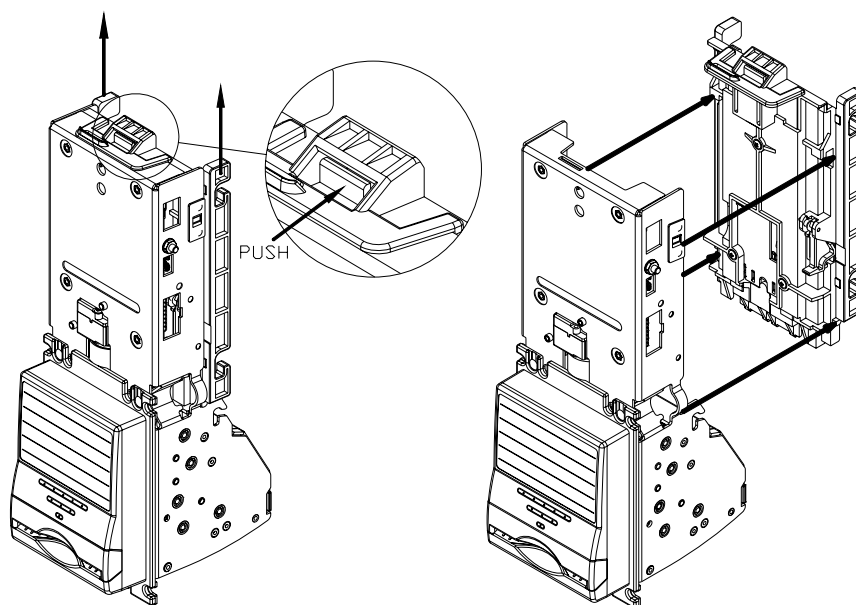
PUSH

To install the holder into the bill validator direct two bosses of the holder to corresponding slots in the bill validator and two bosses of the bill validator to corresponding slots in the holder then down to the stop and push on the holder top-down

PERIODIC MAINTENANCE

During normal operation dust and dirt accumulate on the optical sensors and the rollers. This could result in reduced acceptance rate. It is recommended to clean the bill path as explained below every 6 months or 60,000 bills whichever comes first.

Remove the cassette.
Open the clamshell by pushing the button as shown below.
Ensure:
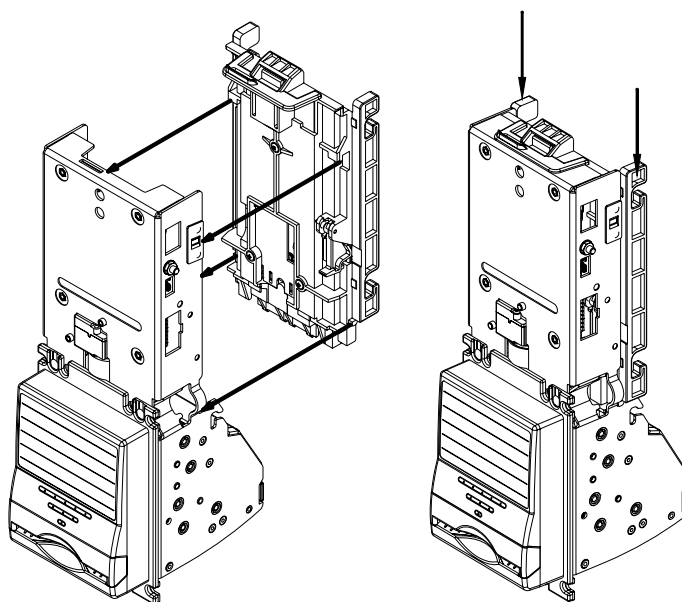No scratches present on the guides and optical sensors.
No dirt or cracks present on the surface of the transport rollers
No dirt on the surface of the optical sensors.
The entire bill path is clean of paper debris or residue.

All dirt must be cleaned with soft moistened cloth. Isopropyl Alcohol is recommended for cleaning excessively dirty rollers.

DO NOT USE ACETONE OR PETROLEUM BASED PRODUCTS AS THEY COULD CAUSE DAMAGE TO PLASTIC PARTS.

Inspect the cassette chamber to see no bill fragments or paper residue is left behind.
This may be blown away with the use of compressed air.

Push the button

Open the guides

Optical sensors

Inductive sensors
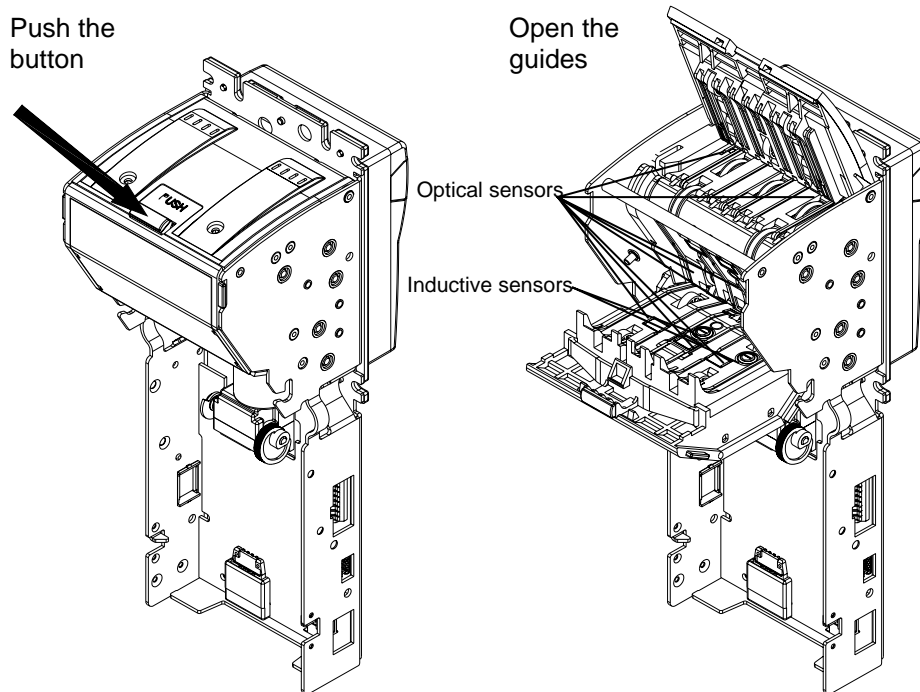
Access to the DIP switches and Memory stick

The access to switches and Memory stick is provided without disassembly Bill Validator.

Memory Stick

Switches

SOFTWARE UPDATES

To ensure the proper operation of the SMV Bill Validator, software updates can be ordered according to the original SMV part number.

The SMV Bill Validator is shipped with pre-installed software, according to a user's ordered specifications.

Download procedure for a single-download Memory Stick:
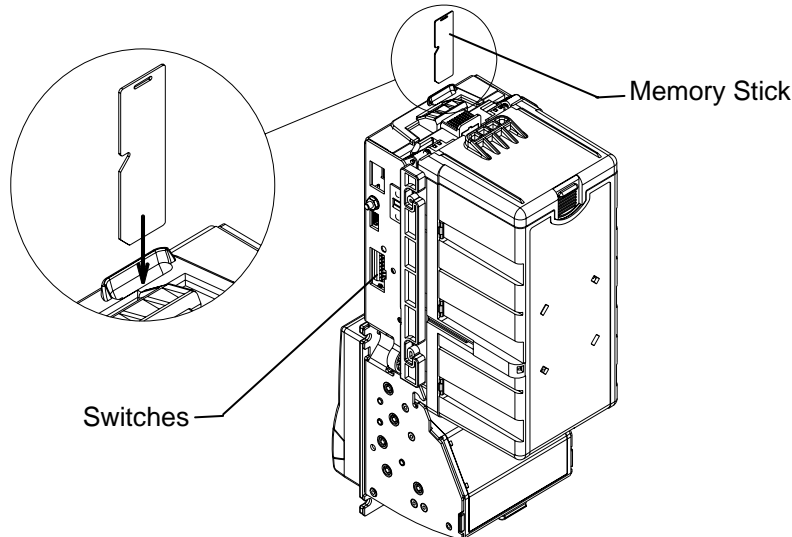
Step 1. Turn Power OFF.
Step 2. Remove the Memory stick from the Memory stick slot of the CPU Board.
Step 3. Insert the new Crane Payment Solutions Memory stick into the Memory stick slot of the CPU Board.
Step 4. Turn Power ON and wait until the download process is completed. During the download, a red-blue status light will blink. Once the download is completed, the diagnostic light will turn blue. Should the light stay red; this means there is no communication between the SMV Bill Validator and the host controller.

Download procedure for the multi-download Memory Stick:

Please refer to the instructions concerning the single-download Memory stick. Follow steps 1, 3, and 4. After the successful completion of step 4, follow steps 1and 2.

The Memory Card can be used to update more units, until the number of licenses is reached.

Download procedure via interface connector:

Software Update Diagnostics

Normally, the download process will be accompanied by a blinking red-blue status light for about 1 minute. If the download has competed successfully, the status light will turn blue. Should the download be unsuccessful, the status light will emit short blue flashes followed with a longer red flash ("blue flashes on red").

The following table lists description of errors, based on status of indicator flashes.

STATUS OF DIAGNOSTIC LIGHT	ERROR DESCRIPTION	FAULT – HANDLING
1 Blue Flash on Red	External interface error in CCNET Download mode	1. Verify that software is suitable for CCNET download. Repeat procedure.
2 Blue flashes on red	Memory stick CRC ERROR	1. Turn power off, remove and insert the Memory stick again, turn power on. Replace Memory stick with the new one.
3 Blue flashes on red	Incorrect data in Memory stick	1. Verify that the software is suitable to the Bill Validator type. Insert correct type of Crane Payment Solutions Memory stick.
4 Blue flashes on red	Memory stick is not inserted	Properly insert the Memory stick.
5 blue flashes on red	Wrong type of Memory stick	Insert correct type of Crane Payment Solutions Memory stick.
6 blue flashes on red	Failure during download	1. Turn power off, remove and insert the Memory stick again, turn power on. Repeat procedure.
7 blue flashes on red	Operation ERROR of Memory stick Interface	1. Turn power off, remove and insert the Memory stick again, turn power on. Replace Memory stick with new one.

TROUBLESHOOTING

Crane Payment Solutions SMV Bill Validator is equipped with a self-diagnostic feature to aid in repair and maintenance. When the power to the Bill Validator is turned ON, the Bill Validator begins its self-diagnostic operation. If the self-diagnostic test is passed, then the status light will turn blue. If an error is detected, then the status light on the front of the Bill Validator will blink red. The number of times the red light flashes on the Bill Validator is an indication of a specific problem or malfunction. A detailed list of these errors and corrective action is provided below.

Operation Mode Diagnostics

Number of status light flashes (red on black)	Error description	Fault - handling
1	Cassette is removed from the bill validator	Check if cassette is installed correctly
2	Wrong type of sensors or no communication with sensors	Check reliability of electrical connection to processor board
3	Cassette is full	Replace the cassette with empty one
4	Mechanical jam in cassette or stacker motor failure	1. Remove the cassette from the bill validator and remove jammed bill 2. Turn power on and check stacking motor operation
5	Failure of dielectric sensors	
6	Failure of optical sensors	Open the guides and clean optical sensors.
7	Failure of inductive sensors	Open the guides and clean inductive sensors.
8	Failure of transport motor	1. Open the guides and clean the bill path. 2. Remove the cassette from the bill validator and open the cover. Check mechanical and electrical connections
11	Bill pathway is not empty	Open the guides and check the condition of the bill path
12	Bill jam in entry slot of the cassette. No credit issued.	Remove the cassette from the bill validator and clean the bill path.

Transport motor

Stacking motor

Check connecting
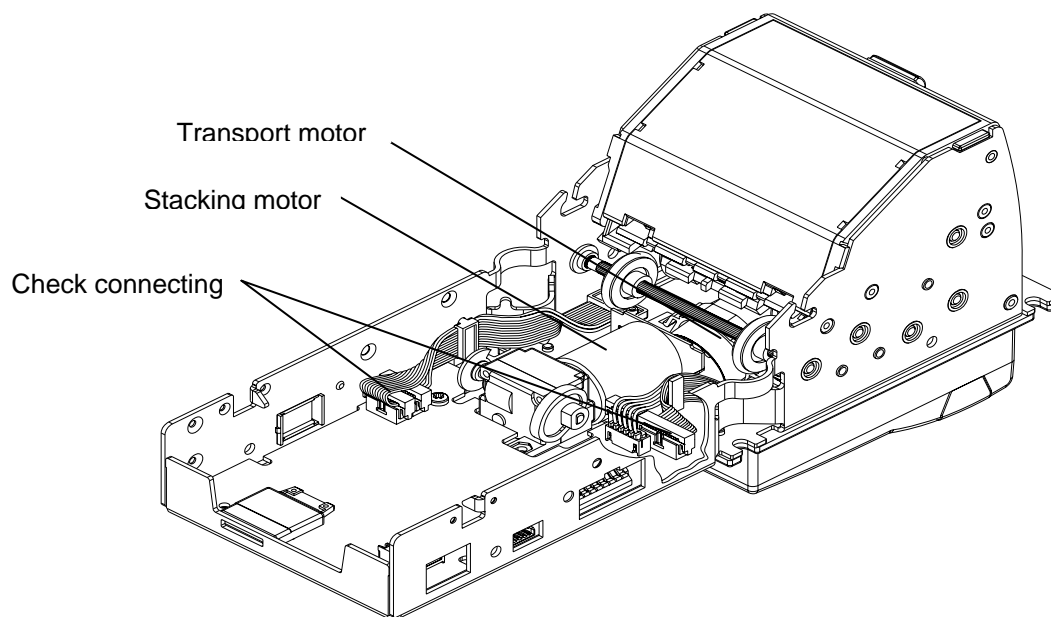
Interface communication errors

Number of status light flashes (blue on red)	Error description	Fault - handling
1	COM port CRC Error	
2	Internal CRC Error	
3	Improper CCMS format	
4	CCMS is absent	
5	Improper type of CCMS	
6	Download Error	

TECHNICAL SUPPORT

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E-mail: support@cashcode.com
Website: www.cashcode.com