

NV200 CONCISE MANUAL

INTELLIGENCE IN VALIDATION



Innovative Technology
INTELLIGENCE IN VALIDATION



Automated Transactions
INTELLIGENCE IN VALIDATION



Bellis Technology
INTELLIGENCE IN VALIDATION

CONTENTS

1	Introduction	3
2	Environment and power requirements	5
3	General description	6
4	Machine interfaces	9
4.1	Bezel LED's	9
4.1.1	Operational colour	9
4.1.2	Diagnostic codes	9
4.2	Hardware	10
4.2.1	Ports and buttons	10
4.2.2	Interface connector pin details	10
4.2.3	USB connection	11
4.2.4	Dip switches	11
5	Using barcodes	12
8	Appendix	13
8.1	Appendix A – How to order a NV200 validator	13
8.2	Appendix B – NV200 mechanical installation	16
9	Index	21

The chapter numbers in this document are synchronized with the operations manual in order to help when searching for information. Therefore those chapter numbers that are not included in this manual will be skipped.

1 INTRODUCTION

This manual describes the operation of the NV200 Bank Note Validator, programmed with Firmware Version 4.04 or greater.

This document is intended for those who will maintain the NV200 equipment.

To have full information about the configuration of this equipment please refer, via our website, to the NV200 Operations Manual GA620.

Although information is included which will allow a degree of fault diagnosis and repair, it is recommended that for all but simple mechanical repairs, the unit must be returned to an approved service centre for repair.

CAUTIONS

- Never exceed the recommended environmental and electrical limits.
- Do not attempt to lubricate the mechanisms as this may affect the note transport.
- Do not polish the lens as this may alter the optical characteristics.
- If the NV200 validator is disassembled the unit must be re-initialised, following assembly using LB149 initialisation paper from ITL.

WARNING

- Only suitably trained personnel should carry out any work on this equipment in accordance with all current local, national and international health and safety regulations.

We recommend that you study this manual as there are many new features permitting new uses and more secure applications. If you do not understand any part of this manual please contact your local office for assistance, contact details are available from www.innovative-technology.co.uk. In this way we may continue to improve our product.

The NV200 Validator has been designed to minimise any performance variation over time. Much of this is achieved by careful Hardware and Software design. Innovative Technology Ltd has a policy of continual product improvement. As a result the products supplied may vary from the specification described here. This manual can be printed in A4 or letter sizes.

MAIN HEADQUARTERS

Innovative Technology Ltd
Derker Street – Oldham – England - OL1 4EQ
Tel: +44 161 626 9999 Fax: +44 161 620 2090
E-mail: support@innovative-technology.co.uk
Web site: www.innovative-technology.co.uk

GROUP



EMAIL CONTACT

BRAZIL

suporte@bellis-technology.com.br

CHINA

support@innovative-technology.co.uk

COLUMBIA

support@automated-transactions.net

GERMANY

support@automated-transactions.de

ENGLAND

support@innovative-technology.co.uk

SPAIN

soporte@automated-transactions.es

UNITED STATES OF AMERICA

supportusa@bellis-technology.com

REST OF THE WORLD

sales@innovative-technology.co.uk

2 ENVIRONMENT AND POWER REQUIREMENTS

ENVIRONMENT

Environment	Minimum	Maximum
Temperature	+3°C	+50°C
Humidity	5%	95% Non condensing

Table 1 – Environmental Requirements

CAUTION

Depending upon the environment in which the NV200 is used, it may at some time require re-calibration.

For such purpose, it has an in-built self-calibration system that maintains the optical sensors at their best operating point. However if the NV200 is disassembled for any reason it will need to be re-calibrated. Re-calibration may only be performed under license from ITL, contact support@innovative-technology.co.uk for further details.

Re-calibration can only be performed in conjunction with the diagnostics software option in the ITL BNV Currency Manager Program.

POWER REQUIREMENTS

Electrical Supply	Minimum	Maximum
Supply Voltage (V DC) Absolute Limits	+11 V	+13.5 V
Supply Ripple Voltage	0 V	0.25 V @ 100 Hz
Supply Currents:		
Standby		0.4 A
Validating		1.5 A
Peak (Motor Stall)		3.0 A

Table 2 – Power Requirements

Interface Logic Levels	Logic Low	Logic High
Inputs	0 V to + 0.5 V	+3.7 V + 12 V
Outputs with 2K2Ω pull up	0.6 V	Pull up voltage of host interface
Maximum Current Sink	50mA per output	

Table 3 – Interface Logic Levels

It is recommended that a ferrite cable clamp be used on the cable to the NV200, with the cable having a single turn around the ferrite.

The suggested ferrite is as follows

Manufacturer: Fair-Rite

Manufacturer P/N: 0443166651

Impedance at 100MHz @ 1 turn: 225 Ohms

3 GENERAL DESCRIPTION

The NV200 is the next generation of note reader from Innovative Technology Ltd.

- Simple, quick re-programming (approximately 30 seconds) with 128 bit encrypted memory card, PIN number protected
- Up to 16 channels (Depending on mode of operation)
- Secure dual lock cash box with 500 used note capacity
- Seamless note path
- Can accept notes up to 85mm wide and 170mm long
- Seconds note to note
- Reads industry standard barcodes in any direction
- Note centring and straightening mechanism
- Single note escrow function
- User definable colour for bezel illumination

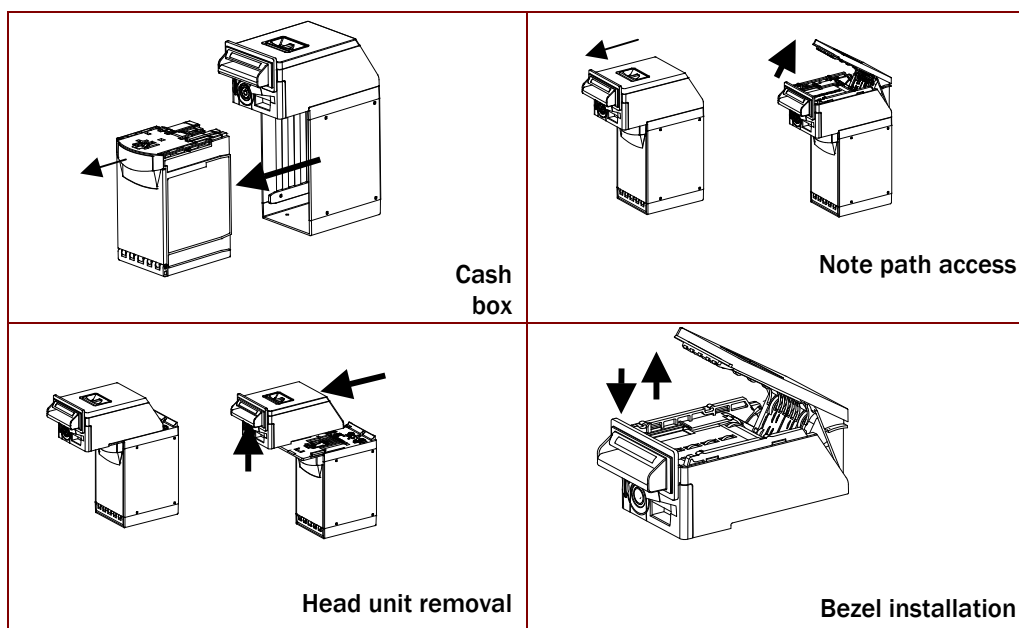


Figure 1 - The NV200 validator

Note sizes accepted	Width: 60 – 85mm, Length: 115 – 170mm
Weight	2.8kg
Note to note time	3 seconds
Escrow	Single note
Cash box capacity	500 street grade notes
Interface	SSP, Parallel, Pulse, Binary, ccTalk, MDB. (Contact ITL for other interface availability)

Table 4 – General Specification

ACCESSING



In the Appendix B – NV200 Mechanical Installation you can find a detailed explanation for cash box removal, note path access, bezel installation and validator head unit removal.

MOUNTING

The NV200 can be mounted via the mounting holes on either side of the chassis using 4 x M4 fixing screws and a suitable mounting bracket. See drawing number GA604 in Appendix B – NV200 Mechanical Installation for the location of the mounting holes.

NOTE:

- The length of the screw must be no more than 6mm plus the thickness of the mounting bracket.

It is also possible to mount the NV200 via fixing holes in the rear of the chassis. Care must be taken not to obstruct the cash box when using the rear fixing holes.

LOCK INSTALLATION

The NV200 has the provision of fitting three locks for extra security. One lock can be added to the front of the NV200 that locks the validator head and cash box into position without the need of external brackets. Another two locks can be added to the cash box itself.

The cams required for the lock are supplied with the NV200 attached to the back of the lock blanking plugs. For lock fitting instructions, see drawings numbers GA605 and GA606 in Appendix B – NV200 Mechanical Installation for the location of the mounting holes.

Suggested lock: - ITL part number PA650; Camlock part number 28D181CPA

ORDERING INFORMATION

When ordering NV200 the following information must be specified:

	NV200	EUR01	404	CCT	255	255	255	N	12345	0	123456
Product											
Dataset											
Firmware Version											
Firmware Interface											
Red LED brightness											
Green LED brightness											
Blue LED brightness											
Bezel flash											
Memory Card PIN											
Number of re-tries											
CcTalk key											

Figure2 - Order Code Example

For detailed information on how to order a NV200 validator and use of the ordering template, refer to Appendix A - How to order an NV200 validator.

REPROGRAMMING THE NV200

The NV200 can be updated in a number of ways as follows:

- Atmel Dataflash Memory Cards
- ITL Bank Note Validator Currency Manager Software

Please refer to the Operations Manual for detail information about reprogramming.

INTERFACE

Interfacing the validator is very simple, with the choice of the following protocols:

- Smiley® Secure Protocol – SSP
- ccTalk® Protocol – CCT
- Multi-Drop Bus/Internal Communications Protocol (MDB/ICP)
- Parallel Input and Output
- Pulse Stream Output
- Binary Output – BIN

Any queries regarding interfaces not mentioned in this manual should be made to support@innovative-technology.co.uk

4 MACHINE INTERFACES

4.1 BEZEL LED'S

4.1.1 OPERATIONAL COLOUR

The operational colour of the bezel illumination can be set to a user definable colour by using the BNV Currency Manager Software. Each of the three colours of LED in the bezel can be set to a different brightness level (0-255) to achieve the desired colour. The colour is selected using the sliders in the Tools menu of the Bank Note Validator Currency Manager Software. The default colour for the bezel is Magenta

Examples:



Red – 200, Green – 125, Blue – 255



Red – 255, Green – 255, Blue – 0

The Bezel LED's can also be set to either permanently on or flashing at a rate of once per second when the note validator is enabled.

Re-programming the NV200 with a memory card that has been programmed using the NV Card Utilities software will also set the colour and operation of the LED's.

4.1.2 DIAGNOSTIC CODES

If the NV200 detects an error that is preventing normal operation, the Bezel LED's will indicate the cause of the problem by flashing in a certain sequence as shown in Table 5 - Bezel LED Diagnostic Codes. The LED's will first flash red a number of times (at 300ms intervals) to indicate the general area of the problem, then flash blue a number of times (at 120ms intervals) to give a more exact cause. The full sequence repeats after a pause of 700ms.

Number of RED flashes	Number of BLUE flashes			
	1	2	3	4
1	Note Path Open	Note Path Jam	Unit Not Initialised	
2	Cash Box removed	Cash Box Jam		
3	Firmware Checksum	Interface checksum	EEPROM Checksum	Dataset Checksum
4	PSU too Low	PSU too High	Card Not Formatted	

Table 5 - Bezel LED Diagnostic Codes

4.2 HARDWARE

4.2.1 PORTS AND BUTTONS

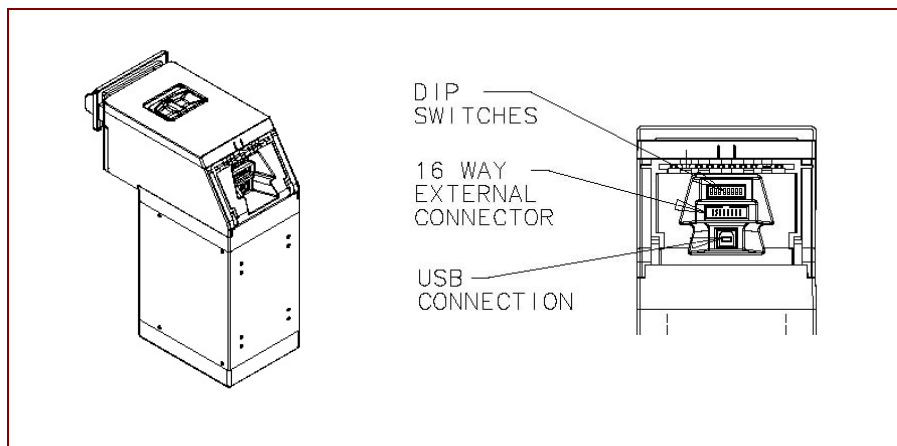


Figure 3 - Connector And Switch Location

4.2.2 INTERFACE CONNECTOR PIN DETAILS

The function of pins 1-8 changes according to which machine interface is being used. See the individual interface descriptions for details.

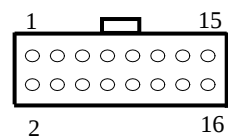


Figure 4 - Pin detail

Pin	Name	Type	Description
1	Vend 1	Output	Open collector outputs. Function changes depending on machine interface protocol (see individual interface descriptions for details)
2	Vend 2	Output	
3	Vend 3	Output	
4	Vend 4	Output	
5	Inhibit 1	Input	Inputs are held high to internal +5V via 10KΩ. Function changes depending on machine interface protocol (see individual interface descriptions for details)
6	Inhibit 2	Input	
7	Inhibit 3	Input	
8	Inhibit 4	Input	
9	Busy	Output	Active LOW when the NV200 is transporting, reading or stacking a note
10	Escrow	Input	Enable the escrow function by holding LOW in Parallel, Pulse or Binary modes
11	-	-	Not connected
12	-	-	Not connected
13	Factory Use Only		Do not connect
14	Factory Use Only		Do not connect
15	+Vin	Power	Nominal 12V DC supply
16	0V	Ground	0V supply

Table 6 – 16 way External Connector Pin Out

4.2.3 USB CONNECTION

The USB port function is currently under development. Details will be added here when available

4.2.4 DIP SWITCHES

The bank of 8 dip switches have the following function:

Switch No	Function	Switch OFF (↓)	Switch ON (↑)
1	Disable Barcode	Barcode read enabled	Barcode read disabled
2	Channel 1 Inhibit	Channel 1 enabled	Channel 1 disabled
3	Channel 2 Inhibit	Channel 2 enabled	Channel 2 disabled
4	Channel 3 Inhibit	Channel 3 enabled	Channel 3 disabled
5	Channel 4 Inhibit	Channel 4 enabled	Channel 4 disabled
6	Channel 5 Inhibit	Channel 5 enabled	Channel 5 disabled
7	Channel 6 Inhibit	Channel 6 enabled	Channel 6 disabled
8	Programming Mode	Switch from OFF to ON and back to OFF to activate	

Table 7 - Dip Switch Functions

5 USING BARCODES

The NV200 has the ability to read barcode tickets in all four directions in SSP and ccTalk modes. Barcode tickets must be compatible with Gaming Device Standards (GDS), document number GSA-P0038.001.01 (available from www.gamingstandards.com).

Switching Dip Switch 1 to the ON position disables the Barcode Function. See chapter 4.2.4 for details.

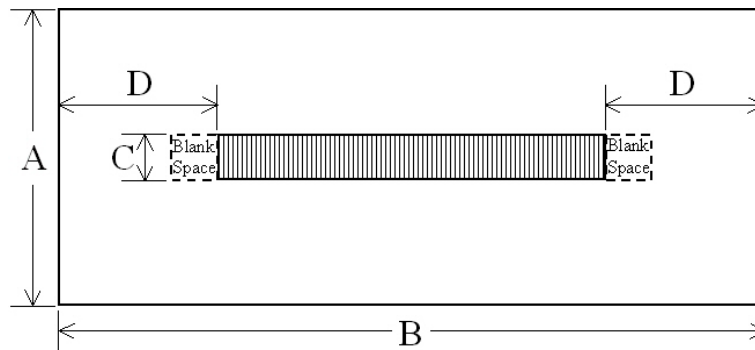
Notes:

- In SSP mode there is a set of commands to set the required barcode configuration.
- In ccTalk mode, the default number of characters expected by the NV200 is 18. To change this value, the Bank Note Validator Currency Manager software must be used.

For more details on implementing barcodes into SSP or ccTalk applications, please see the relevant specification documentation.

Barcode Characteristics	Details
Encoding	Interleaved 2 of 5
Narrow bar width	Minimum: 0.5mm Maximum: 0.6mm
W:N Ratio	2:1
Number of characters	Minimum: 6 Maximum: 24

Dimensions



Dimension	Details
A	65mm
B	120mm to 156mm
C	Minimum 10mm
D	Minimum 35mm

Note: A blank space of at least 10mm must be left on either side of the barcode

8 APPENDIX

8.1 APPENDIX A – HOW TO ORDER A NV200 VALIDATOR

When ordering NV200 the following information must be specified:

Product	NV200	EUR01	404	CCT	255	255	255	N	12345	0	123456
Dataset											
Firmware Version											
Firmware Interface											
Red LED brightness											
Green LED brightness											
Blue LED brightness											
Bezel flash											
Memory Card PIN											
Number of re-tries											
CcTalk key											

Figure 6 - Order Code Example

Dataset – This code signifies the currency and notes included, for example. For available datasets and dataset codes, please refer to the currency download section of our website www.innovative-technology.co.uk.

Firmware – This code is the version of firmware required. If left blank, the latest current version will be programmed

Interface – This is the 3 letter code of the required communications interface. For more details of available interfaces, see chapter 4.3 Protocols.

- SSP – Smiley Secure Protocol
- MDB – Multi-Drop-Bus
- PL1 – Pulse Mode
- CCT – ccTalk
- PAR – Parallel
- BIN – Binary

LED Brightness – The values of brightness for each colour of the bezel LED's in the order Red, Green, Blue between 0 and 255. If no colour is specified, the NV200 will be shipped with the bezel colour set to magenta by default.

Bezel Flash – Y/N. If the bezel flash is set to Y, when enabled, the validator bezel will flash at a rate of 1Hz. If set to N, the bezel will be illuminated constantly when the validator is enabled.

Memory Card PIN – The required PIN number for the memory card. Programming with a memory card has the added security of setting a PIN number. The PIN programmed into the memory card must match the PIN programmed into the NV200 for re-programming to take place.

Number of Re-tries – The number of times the NV200 will read the note should it not be recognised on the first attempt. This value must be between 0 and 2

ccTalk Encryption Key – The required ccTalk encryption key if the selected interface is CCT. If left blank, a key of 123456 will be used.

ORDER FORM

To order a validator, please print and fill the order form and send it to our nearest office. You may send it by fax or email. To find our contact information, please go to our website or refer to the introduction chapter in this document. If you do not know which office to send the order form, send it to our main head quarters:

MAIN HEADQUARTERS	Innovative Technology Ltd Derker Street – Oldham – England - OL1 4EQ Tel: +44 161 626 9999 Fax: +44 161 620 2090 E-mail: support@innovative-technology.co.uk Web site: www.innovative-technology.co.uk
--------------------------	---

If you have any questions about the information required for the order form, or you want to know more about other products and possibilities, do not hesitate to contact your nearest dealer. We offer a wide range of products and accessories such as alternative validators, programming kits, interfaces, connecting cables, bezels and other elements. Please contact your nearest office for more information.

NV200

Date:

Customer Details

Company	Phone Number:
Contact Person	Country:
Issue No.	Customer Part No:

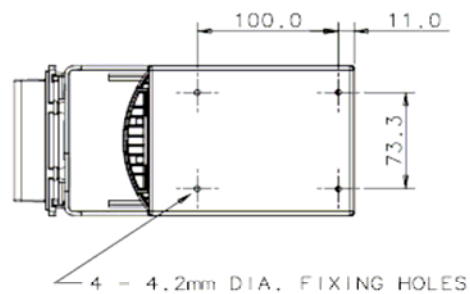
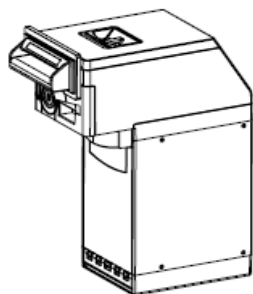
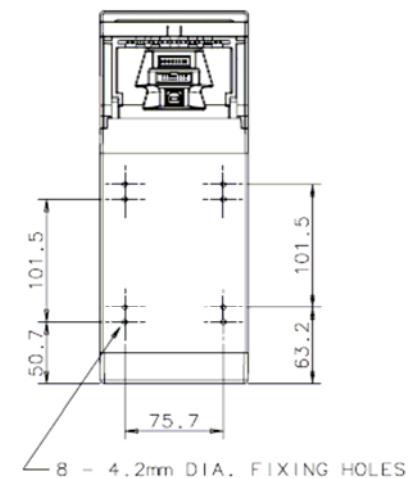
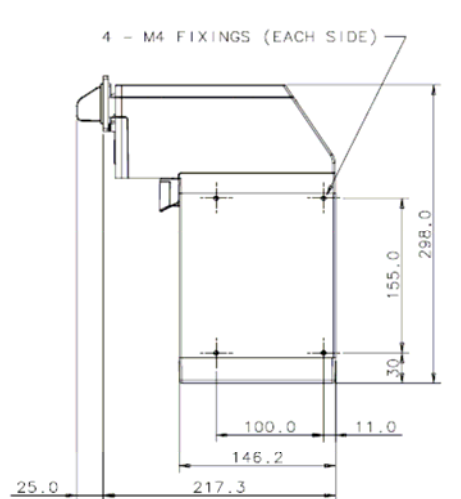
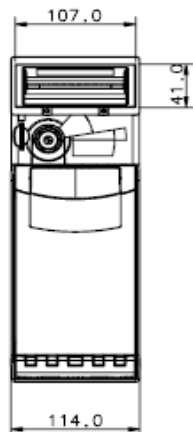
	NV200									
Product										
Dataset										
Firmware Version										
Firmware Interface										
Red LED brightness										
Green LED brightness										
Blue LED brightness										
Bezel flash										
Memory Card PIN										
Number of re-tries										
CcTalk key										

APPROVED

Customer:	Innovative Technology:
-----------	------------------------



In line with continued product development Innovative Technology Ltd reserves the right to change specifications without prior notice.

**ACCEPTS NOTES:**

1. 60 mm x 85 mm WIDE
2. 115 mm x 170 mm LONG

SUPPLY AND POWER CONSUMPTION:

VOLTAGE: 11.00 - 13.5 V

RIPPLE: 0.25 V at 100 Hz

IDLE: 0.4 A

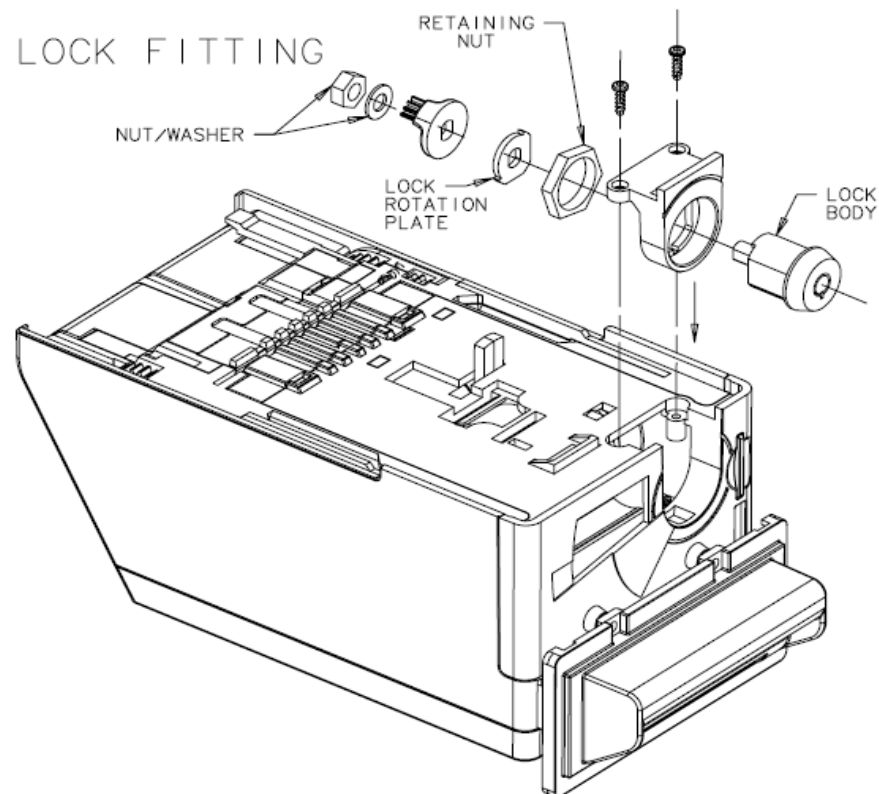
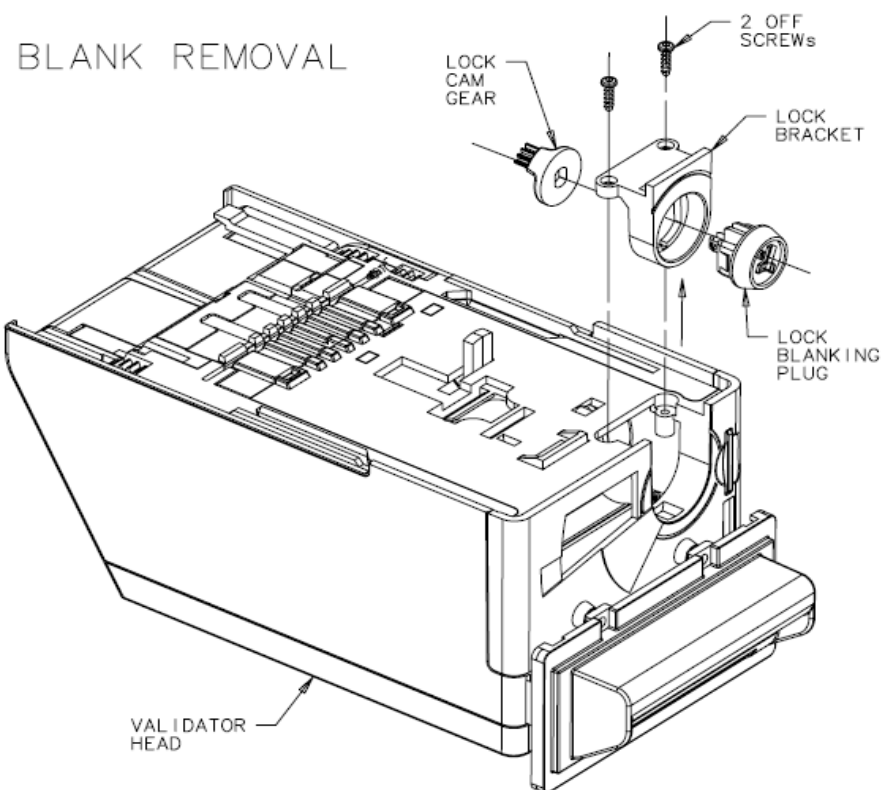
VALIDATING: 1.5

PEAK: 3.0 A

ENVIRONMENTAL OPERATING RANGE:

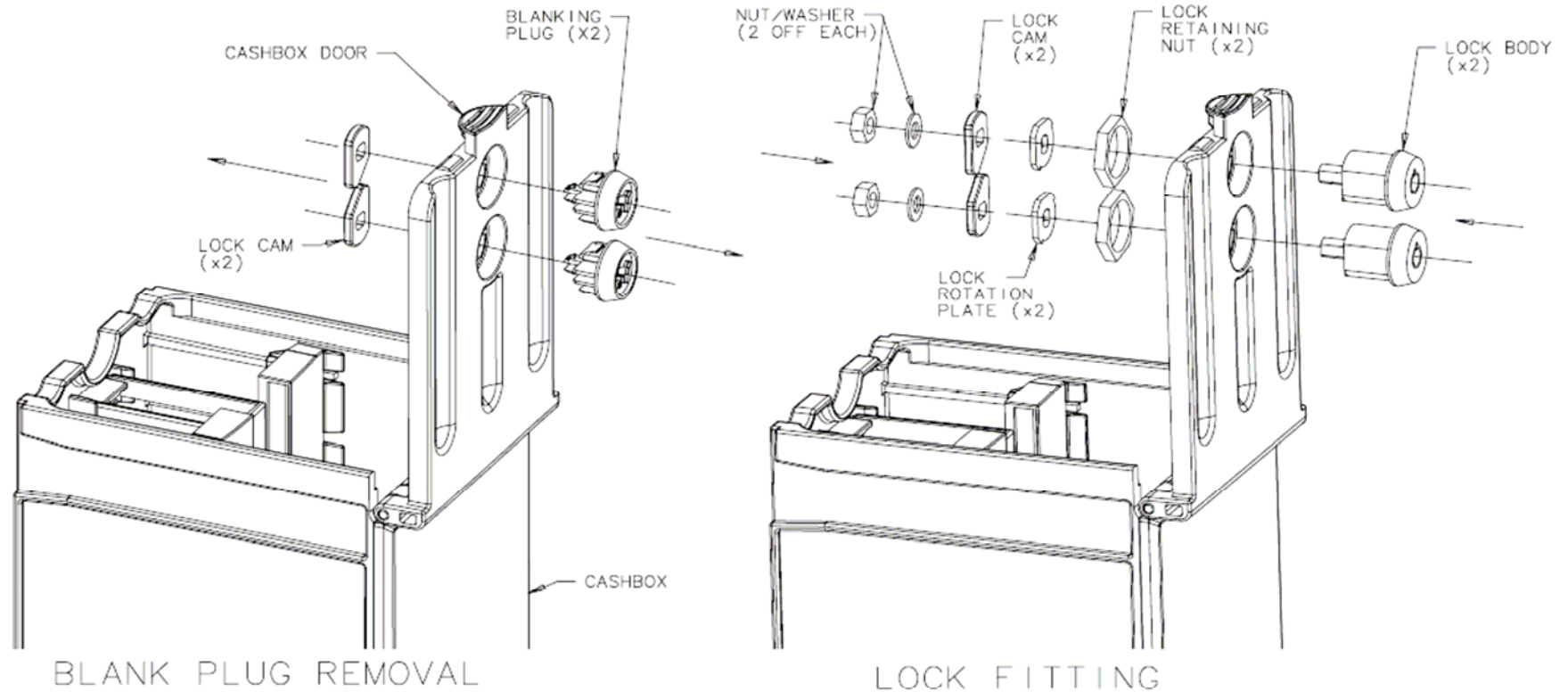
+3 OC to +50 OC at 5% to 95% RH
(NON - CONDENSING)

UNLADEN WEIGHT: 2.8 KG



1. UNSCREW 2 OFF SCREWS (INDICATED) WITH A T8 TORX SCREWDRIVER
2. WITHDRAW LOCK BRACKET FROM THE VALIDATOR HEAD
3. UNCLIP LOCK BLANKING PLUG AND LOCK CAM GEAR (RETAIN)
4. INSERT LOCK INTO BRACKET (AS SHOWN), AND FIX IN PLACE WITH LOCK RETAINING NUT
5. PLACE LOCK ROTATION PLATE OVER STUB OF LOCK, IN ORIENTATION SHOWN

6. PLACE LOCK GEAR CAM ONTO STUB OF LOCK IN THE ORIENTATION SHOWN. RETAIN WITH WASHER AND NUT
7. INSERT KEY AND ROTATE CLOCKWISE, PLACE ASSEMBLY BACK INTO VALIDATOR HEAD AND FIX SCREWS. (FINGERTIP TIGHT)
8. WHEN VALIDATOR FITTED TO CHASSIS:- TURN KEY ANTICLOCKWISE AND REMOVE



1. OPEN CASHBOX DOOR
2. UNCLIP LOCK CAMS FROM BLANKING PLUGS. (RETAIN)
3. UNCLIP THE TWO BLANKING PLUGS FROM CASHBOX DOOR.
4. FIT THE TWO LOCK BODEIS INTO RECESSES IN THE DOOR IN THE ALIGNMENT SHOWN

5. RETAIN LOCKS WITH RETAINING NUTS (2 OFF)
6. FIT LOCK ROTATION PLATES IN ORIENTATION SHOWN
7. FIT LOCK CAMS TO STUBS OF LOCKS IN ORIENTATIONS SHOWN
8. SECURE CAMS WITH RETAINING WASHERS AND NUTS

CASH BOX REMOVAL

To remove the cash box from the NV200, first unlock the 'Cashbox & Head Release Lock' (if fitted). Pull the silver 'Cashbox Release Handle'. The cashbox will slide forward for removal.

To replace the cashbox, simply slide it into the chassis and push until it clips into place.

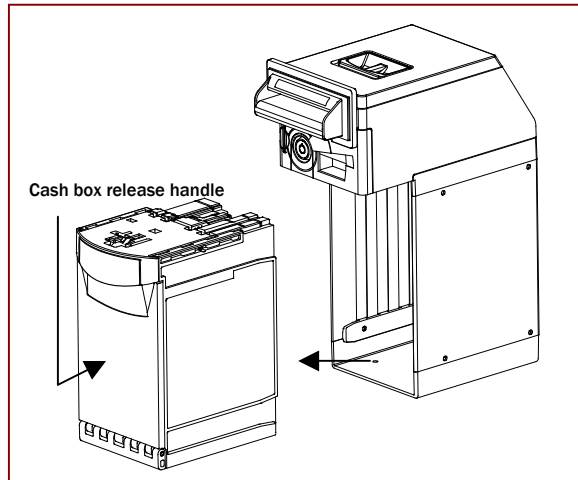


Figure 7 – Cashbox removal

NOTE PATH ACCESS

To access the note path of the NV200, pull the top cover release latch forward and lift the upper cover.

To close the note path, simply push the cover down until it clicks into place.

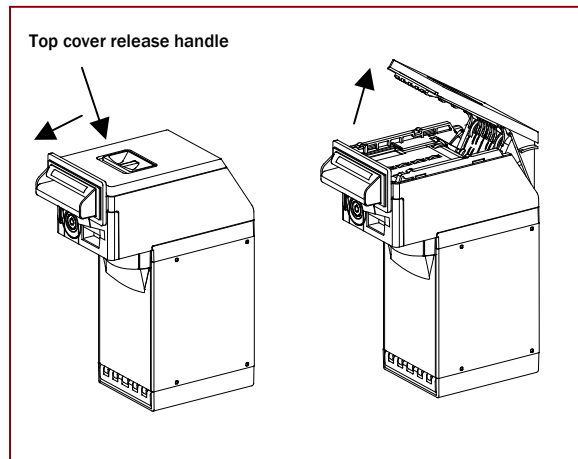
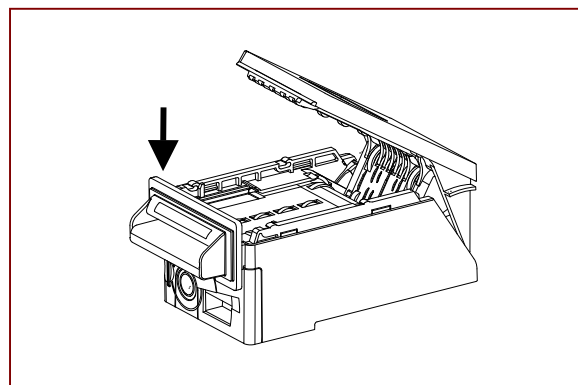


Figure 8 – Note path access

BEZEL INSTALLATION

To fit the bezel to the NV200 access to the note path is required. Lift the upper cover by pulling the latch forward. Connect the cable from the bezel assembly to the socket located on the front of the validator head unit and click the assembly down into place. Close the note path upper cover. M3 screws can be fitted to hold the bezel assembly securely in place if required.



VALIDATOR HEAD UNIT REMOVAL

To remove the head unit from the validator, first unlock the 'Cashbox & Head Release Lock' (if fitted). Lift the silver 'Head Release Latch' located on the front of the validator, slide the head unit forward and lift up away from the chassis.

To replace the head unit, align the lugs on the chassis with the groove on the underside of the head assembly and slide the head assembly backwards until it clicks securely into place

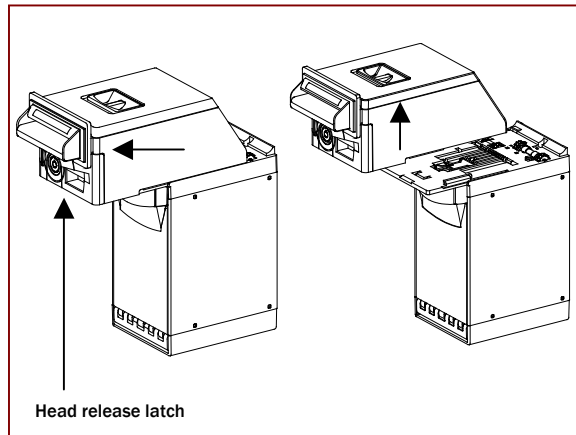


Figure 9 – Validator head removal

9. INDEX

INDEX OF TABLES

Table 1 – Environmental Specification	5
Table 2 – Electrical Supply Specification	5
Table 3 – Interface Logic Levels	5
Table 4 – General Specification	6
Table 5 – Bezel LED Diagnostic Codes	9
Table 6 – 16 way External Connector Pin Out	10
Table 7 – Dip Switch Functions	11

INDEX OF FIGURES

Figure 1 – The NV200	6
Figure 2 – Order Code Example	7
Figure 3 – Connector and Switch Location	10
Figure 4 – Pin detail	10
Figure 6 – Order Code Example	13
Figure 7 – Cashbox Removal	19
Figure 8 – Note Path Access	19
Figure 9 – Validator Head Removal	20

GENERAL INDEX

Bezel	6, 9, 13, 19
Cash box	6,7,19,20
CcTalk	6,8,12,13,14
Communication	8,13
Connector	10
Escrow	6,10
Humidity	5
Interface	5,6,8,9,10,13,14,15
Multi-drop bus	8,13
Pin	10,13,14
Smiley Secure Protocol	8,13
Supply	5
Temperature	5
Voltage	5

Smiley® and the ITL Logo are international registered trademarks and they are the property of Innovative Technology Limited.

Innovative Technology has a number of European and International Patents and Patents Pending protecting this product. If you require further details please contact the factory.

Innovative Technology is not responsible for any loss, harm, or damage caused by the installation and use of this product. This does not affect your local statutory rights. If in doubt please contact Innovative Technology for details of any changes.

In line with continued product development Innovative Technology Ltd. reserves the right to change specifications without prior notice. The data used in this document may be used as a guideline only.