Innovative Technology

POWERING TRANSACTIONS AND INTERACTIONS

NV200S Range User Manual

Document Revision - v.1

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Change History

Version	Date	Comment
1	12 Dec 2024	Initial Release

Uncontrolled Document Once Exported.
Please visit the Support Hub for the latest Information.

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NV200 Spectral Range Product Information

Contents

General Description

The NV200 Spectral is a highly secure and technologically advanced banknote validator. State of the art spectral sensors offer complete note image capture by scanning over 4.8 million data points to authenticate the validity of notes. The unit boasts 99%+ first time acceptance of new and street grade notes with a note to note processing time of 2 seconds.

The unit contains a number of security features including optical and mechanical anti-strimming technology that delivers outstanding fraud protection. The NV200 Spectral's cutting-edge note centering mechanism, together with 4-way barcode acceptance bring the user exceptional note handling and increased ticket acceptance rates.

Key Features

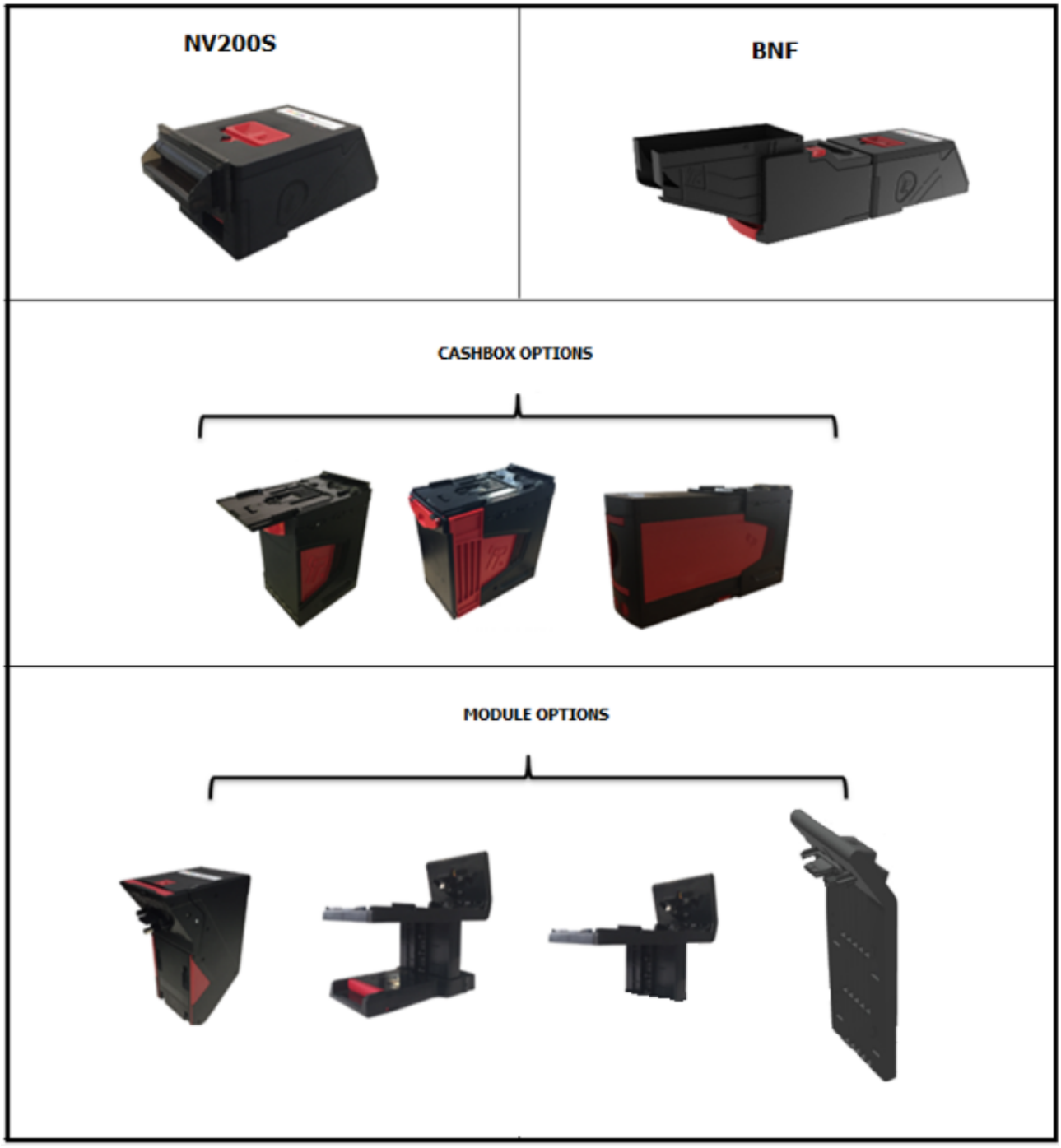
- 100% note image capture - 4.8 million data points
- 99%+ first time acceptance of new & street grade notes
- Stained note detection
- 2 second note to note processing
- Modular design - recycler, safe interface and different cashboxes available
- Multi-Currency support (SCU)
- Payout module capacity up to 80 mixed banknotes

Typical Applications

The NV200 Spectral validator can be used in a variety of situations where high security and high-volume bank note acceptance and validation are needed. Some typical applications are:

- AWP and SWP applications
- Self-Serve and Retail
- Kiosks
- Casinos
- Parking and Ticketing
- Vending
- Retail environment.
- POS Systems

Component Overview

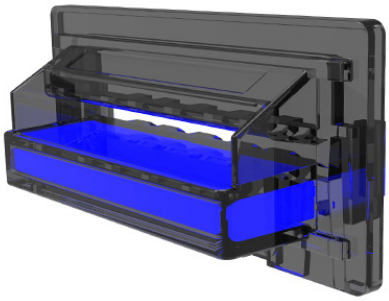
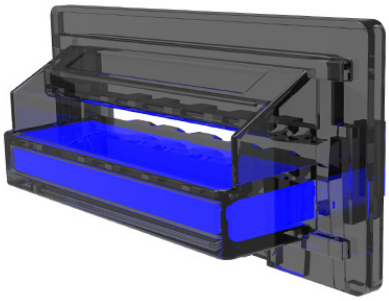


BNF Build Revision 2.0 and FW 4.30+ are required to operate with Payout option!

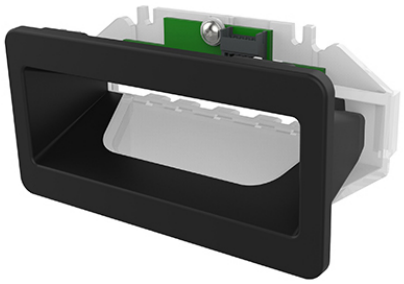
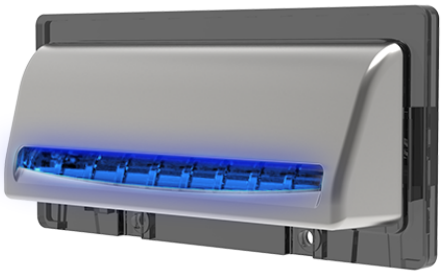
NV200 Spectral Options

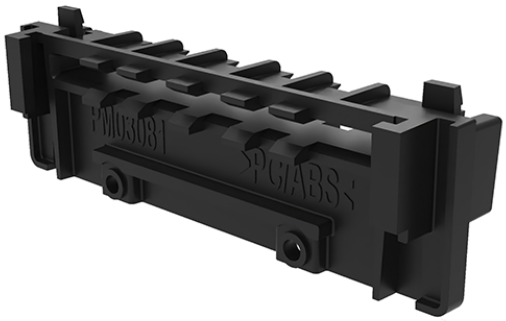
ITL Part Number	Description	Image
PA02158	NV200 Spectral Head	
PA03269	NV200 Spectral with UAP	

Bezel Options

ITL Part Number	Description	Image
PA00610	Standard Bezel (85mm)	
PA00634	82mm Narrow Bezel	

ITL Part Number	Description	Image
PA00639	Metal Bezel	
PA01038	Self-Aligning Bezel (White) *	

ITL Part Number	Description	Image
PA02053	Self-Aligning Bezel (Black) *	
PA04224	Coin Resistant Metal Bezel	

ITL Part Number	Description	Image
PM03081	17mm Bezel Extension For short notes, check that notes can still be removed when paid out / rejected.	
PM03012	30mm Bezel Extension For short notes, check that notes can still be removed when paid out / rejected.	

* - If NV200 Spectral equipped with this bezel, it might blink different way during Update procedure.

Cashbox Options

Some national currencies differ in thickness and circulation practices. Depending on usage, this can impact cash box capacities by 10-15%. Consult with your ITL representative for more details.

ITL Part Number	Description	Image
PA02739	500/1000 Note Cashbox Chassis	
PA03845	500 Note Cashbox Inner	

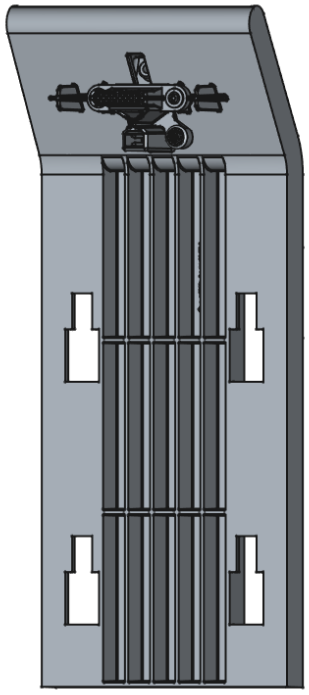
ITL Part Number	Description	Image
PA03849	1000 Note Cashbox Inner	
PA03296	2200 Note Cashbox Chassis	

ITL Part Number	Description	Image
PA03109	2200 Note Cashbox Inner 2200 Note Cashbox has a different chassis size to the 500 and 1000 Note Cashboxes	

Payout Module Option

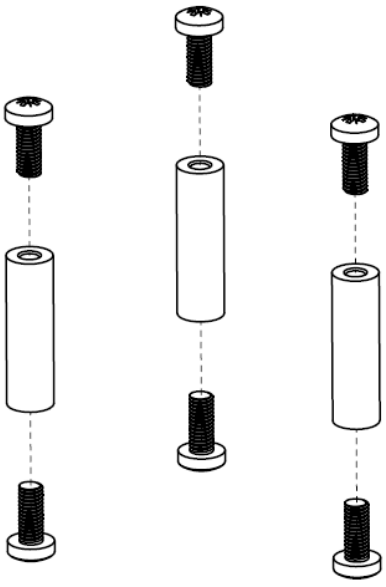
ITL Part Number	Description	Image
PA02887	Spectral Payout Module	

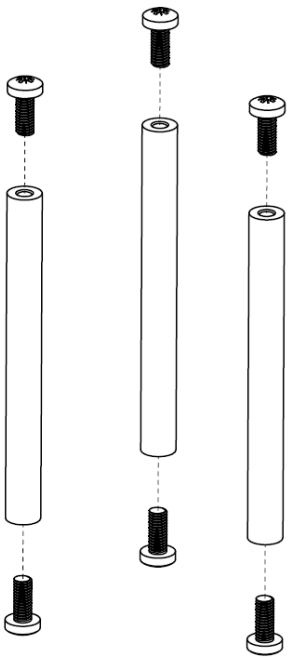
Docking Plate Option

ITL Part Number	Description	Image
PA02014	Docking Plate interface	

Safe Interface Options

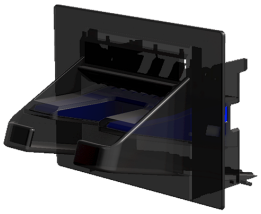
ITL Part Number	Description	Image
PA03007 **Parts:** PA02983 Above Safe Assembly PA02984 Inside Safe Assembly PA02993 27mm Extended Note Path Assembly	Safe Interface (27mm)	

ITL Part Number	Description	Image
PA02982 **Parts:** PA02983 Above Safe Assembly PA02984 Inside Safe Assembly PA02985 80mm Extended Note Path Assembly	Safe Interface (80mm)	
PA03488 **Parts:** PA03489 Outer Safe Assembly PA03490 Note Path Assembly Freefall	Safe Interface Stackerless	
PA03828	27mm Support for Safe Interface (Set of 3)	

ITL Part Number	Description	Image
PA03829	80mm Support for Safe Interface (Set of 3)	

BNF Options

ITL Part Number	Description	Image
PA03120	Bunch Note Feeder (BNF) The Bunch Note Feeder can only be used with the NV200 Spectral and UAP - PA03269. It **cannot** be fitted/retrofitted to a standard NV200 Spectral Head.	
PA04360	Back Office Bezel (Capacity up to 100 banknotes)	

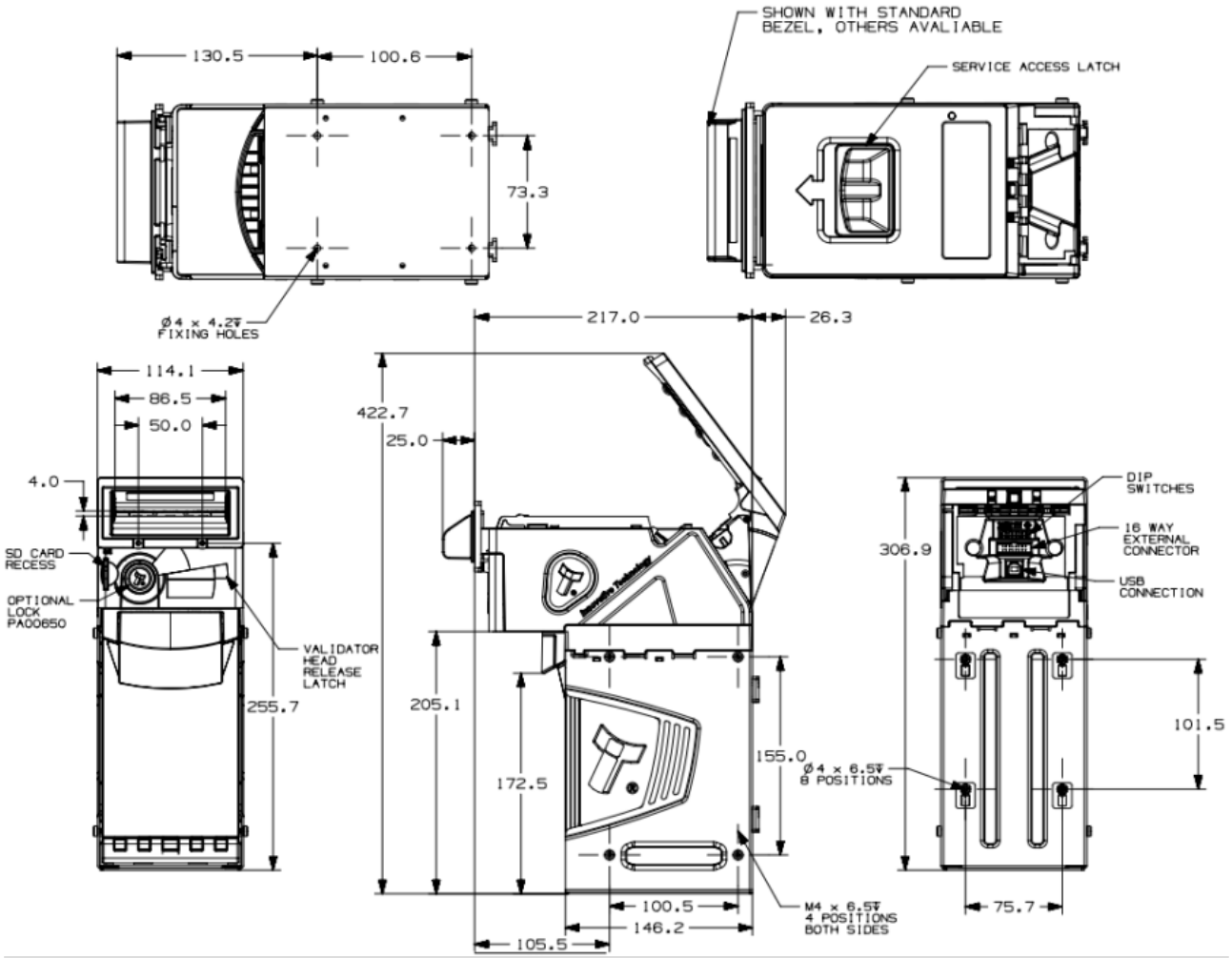
ITL Part Number	Description	Image
PM02792	Outer Bezel Compatible with PA04360 only (Capacity up to 100 banknotes)	
PM02790	BNF Vertical Bezel Lid Compatible with PA04360 only	
PA04354	Customer Facing Bezel (1-2 banknotes in Closed position and up to 30 banknotes in Open)	
PA03523	Bagged Path Inserts Bag of 68mm, 74mm & 82mm inserts Not required for Build Revision ≥ 2.0	

NV200 Spectral Range Technical Data

Contents

Dimensions

The dimensions below are for the NV200 Spectral with 500 note cashbox. Other cashbox / module options will change the dimensions. For dimensional drawings of other configurations contact support@innovative-technology.co.uk



Weights

The tables below show the weights for the individual components of the product.
For example, and NV200 Spectral with Standard Bezel and 500 Note Cashbox with Chassis would weight 3.21Kg (1.20 Kg + 2.01 Kg)

Standard Unit - No Cashbox

Unit	Weight Empty	Weight Full
NV200 Spectral with Standard Bezel	1.20 Kg	N/A

Cashbox Options

Unit	Weight Empty	Weight Full
500 Note Cashbox with Chassis	2.01 Kg	2.46 Kg
1000 Note Cashbox with Chassis	2.19 Kg	3.09 Kg
2200 Note Cashbox with Chassis	3.15 Kg	4.99 Kg

Module Options

Unit	Weight Empty	Weight Full
Spectral Payout Module	2.30 Kg	2.36 Kg
Bunch Note Feeder (BNF)	1.00 Kg	N/A
Safe Interface (27mm)	0.5 Kg	N/A
Safe Interface (80mm)	0.6 Kg	N/A
Safe Interface Stackerless	0.6 kg	N/A

Environmental Requirements

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

Power Requirements

Supply Voltages

Supply Voltage	Minimum	Nominal	Maximum
Supply Voltage (VDC)	+ 10.8VDC / +21.6VDC	+ 12VDC / +24VDC	+ 13.2VDC / +26.4VDC
Supply Ripple Voltage	0V	0V	0.25V @ 100 H

Bunch Note Feeder requires 24V

Supply Currents

NV200 Spectral Module Combination			Cashbox Type	12V DC		
NV200 Spectral	Spectral Payout	Safe Interface	500, 1K, 2K2	Standby (A)	Running (A)	Peak (A)
✓			✓	0.25	2.00	3.00
✓	✓		✓	0.35	4.00	5.50
✓		✓	✓	0.30	2.50	3.50

NV200 Spectral Module Combination				Cashbox Type	24V DC		
NV200 Spectral	Spectral Payout	BNF	Safe Interface	500, 1K, 2K2	Standby (A)	Running (A)	Peak (A)
✓				✓	0.15	2.00	3.50
✓	✓			✓	0.20	2.50	4.00
✓		✓		✓	0.20	2.00	4.00
✓			✓	✓	0.20	2.00	3.50
✓		✓	✓	✓	0.30	3.00	5.00

Power Supply Guidance

Check the power requirements of the host machine and other peripherals to dimension a suitable power environment for the machine setup.
The unit shall be supplied from a source specified as Electrical Energy Source Class 1 (ES1) to IEC/UL 62368-1, or specified as SELV according to IEC/UL 60950-1
TDK Lambda manufactures suitable power supplies. See table below for further details.

Power Supply Unit	Specification	RS Stock Code	Farnell Stock Code	Suitable for use with
TDK Lambda RWS-50B-12	+12 V DC / 4.3 A	839-9626	2452725	NV200 Spectral Standalone

Power Supply Unit	Specification	RS Stock Code	Farnell Stock Code	Suitable for use with
TDK Lambda RWS-150B-24	+24 V DC / 6.3 A	813-9103	2444003	NV200 Spectral with Payout Module

Interface Logic Levels

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

Opto-Isolated Inputs

The NV200 Spectral natively supports Opto-isolated communication, the connection requires a reciprocal circuit to be established on the host side. The pin outs for the opto-isolated inputs can be found in Protocols and Interfacing.

Reliability Data

Below is an explanation outlining the Mean Cycles Between Failure (MCBF) & Mean Cycles Between Interruption (MCBI) for the NV200 Spectral. Where a cycle is defined as a note/ticket either stacked, stored or paid-out. An example is if £20 is accepted and a £10 paid out that would be classed as 2 cycles.
The difference between MCBF and MCBI is that a failure is classed as an event which will require a service call – e.g. unit is seeing poor acceptance. Whereas an interruption is an event which store/site staff could rectify without a trained engineer present – e.g. clearing a note path jam.
The NV200 Spectral is a modular solution and these modules increase the complexity of the system. As such, each time one of these additional modules are attached the current MCBF and MCBI is halved. The MCBF for the NV200 Spectral is 200,000 cycles.

MCBI/MCBF

Below is an explanation outlining the Mean Cycles Between Failure (MCBF) & Mean Cycles Between Interruption (MCBI) for the NV200 Spectral. Where a cycle is defined as a note/ticket either stacked, stored or paid-out. An example is if £20 is accepted and a £10 paid out that would be classed as 2 cycles.
The difference between MCBF and MCBI is that a failure is classed as an event which will require a service call – e.g. unit is seeing poor acceptance. Whereas an interruption is an event which store/site staff could rectify without a trained engineer present – e.g. clearing a note path jam.
The NV200 Spectral is a modular solution, and these modules increase the complexity of the system. As such, each time one of these additional modules are attached the current MCBF and MCBI is halved. The MCBF for the NV200 Spectral is 200,000 cycles.

Duty Cycle

When using the Safe Interface module, there is a maximum duty cycle. If this is exceeded, the operation of the unit will change. The number of notes inserted into the unit is counted for the previous 45 minutes:

Notes Counted	Delay Added Between Note Inserts
0 – 250	0 seconds
400	1 second
500+	1.5 Seconds

Between 250 notes and 400 notes the delay will gradually increase from 0 to 1s

Between 400 notes and 500 notes the delay will gradually increase from 1s to 1.5s

The number of notes inserted is also counted for the previous 5 minutes, the times above are adjusted accordingly:

Notes Counted	Delay Added Between Note Inserts
50+	1 x above delay
25 - 50	0.5 x above delay
0	Zero delay

Media Requirements

The NV200 Spectral is capable of handling multiple denominations simultaneously, the media that can be accepted includes but is not limited to: -

- Paper notes
- Polymer notes
- Windowed notes
- Barcoded tickets

The minimum and maximum dimension for media IN is as follows:

	Minimum	Maximum
Length	110mm	170mm
Width	56mm	85mm

When using the optional Spectral Payout module, the media dimensions for notes routed to the payout are as follows:

	Minimum	Maximum
Length	110mm	170mm
Width	56mm	82mm

Note Quality Guidelines

When loading notes into the validator, ensure that notes are in good condition and are stacked neatly together to ensure optimum performance:

Do not load any of the following notes into the validator, this may cause poor performance or malfunction:

Damaged Notes

Taped Notes

Folded Notes

Torn Notes

Wet Notes

Inserting any of the notes above can cause jams or notes to be left unprocessed in the Bunch Note Feeder

NV200 Spectral Range Mechanical Installation

Contents

Hardware Compatibility

Disconnect the power **BEFORE** any hardware rebuild.

Machine Mounting

Assuming the suitable bezel (and cashbox) type has been ordered the NV200 Spectral can be used as fitting replacement for the following ITL products only:

- NV200

Innovative Technology Ltd. has a policy of continuous product improvement. Due to design changes older model or product bezels (and cashboxes) may not be compatible with the NV200 Spectral.

Specifically, the NV200 Spectral head is not backwards compatible with the NV200 cashbox and chassis. However, new product deliveries always include a bezel (and cashbox) that must be used.

Only use bezel (and cashbox) delivered with the product!

Machine Interfacing

By design the NV200 Spectral is pin to pin compatible with the suitable fitting replacement products listed above. No changes to existing machine harnessing are required.

Power Supply

It is vital that the NV200 Spectral is connected to a power supply able to provide the required power environment. A weak power supply causes malfunctioning of the NV200 Spectral such as note rejects or missing credits. If the NV200 Spectral is used as a fitting replacement for an older model or product we recommend checking the power supply specifications of the machine. The power supply of the machine might be designed for the older model or product but not suitable for the NV200 Spectral. The NV200 Spectral might have higher power consumption. Refer to Power Requirements for full power requirement details of the NV200 Spectral.

A weak power supply may cause malfunction

Software Compatibility

Interface Protocols

When using the NV200 Spectral as a fitting replacement for an older model or product some events such as credits may be given incorrectly. This is due to improved firmware routines and faster motors being used. This may cause missing events such as credits in those host machines where timeouts are defined for the older model or product. Contact the machine manufacturer for full compatibility of the NV200 Spectral.

Timing issues may cause missing events such as credits

Re-programming

For re-programming the NV200 Spectral always use the latest version of Validator Manager available for download on our website. Older versions may not support the NV200 Spectral. For further details on Re-programming the NV200 Spectral refer to Dataset/Firmware Programming.

Older versions of Validator Manager may not support the NV200 Spectral

Bezel Mounting

Open Note Path Pull the top latch in the direction shown to unlock the note path	
Open Upper Note Path When the note path has unlocked, lift the upper part to give clear access to the front	

Attach Bezel Cable
Plug the bezel cable into the connection socket on the front.

Ensure that the notch on the plug aligns with the notch on the socket.

Insert Bezel
Slide the bezel down into the slots on the front of the bezel

Close Note Path
Push the upper note path back down until you hear it click firmly back into place

Cashbox Removal and Opening

500 Note Cashbox

NV200 Spectral
The image to the right shows the NV200 Spectral with 500 note cashbox.

Cashbox Handle
Pull the cashbox handle forward, this will unlatch the cashbox, allowing it to be slid forward from the chassis.

Slide Cashbox Forward
Continue to pull the handle forward, sliding the cashbox completely free from the chassis

Turn Cashbox Over
To access the cash, turn the cashbox as the door is on the bottom.

Open Cashbox
Push the black door latch in and lift the door at the same time.

2200 Note Cashbox

Remove Cashbox From Chassis

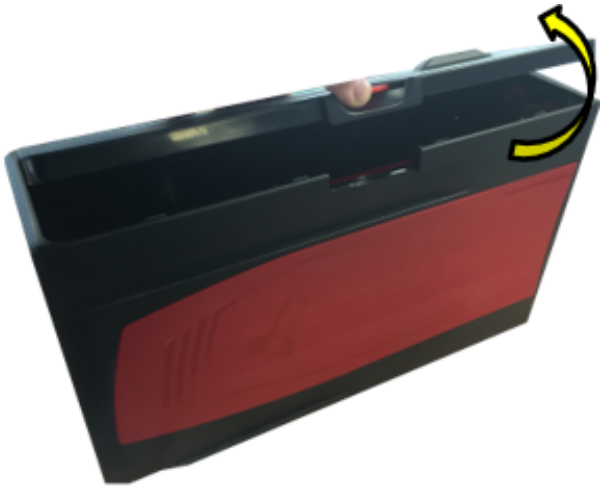
To remove the 2200 note cashbox from the chassis, lift the handle as shown and pull forward

Open the Cashbox Door

Turn the cashbox over and press the red button on the side to open the door.

Lift the door upwards to access the cash.

The push plate inside the cashbox is spring loaded, be careful when removing the contents of the cashbox as the plate can retract quickly and may cause injury



Lock Mounting

NV200 Spectral Head

With the lock correctly fitted to the NV200 Spectral, the key will only turn to around 45 degrees. This is normal and will unlock the Spectral correctly.

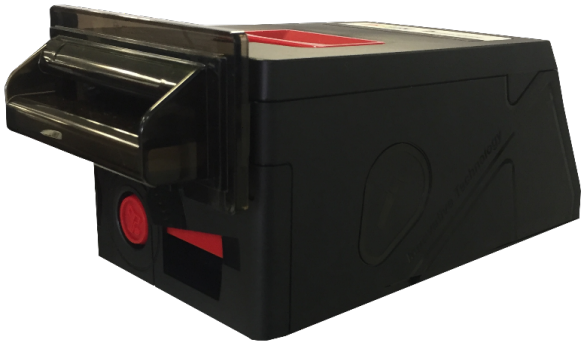
Please do not force the key past 45 degrees as this will damage the unit.

Lock Location

The Lock can be fitted to the front of the NV200 Spectral replacing the red front insert (shown to the right) which ships by default

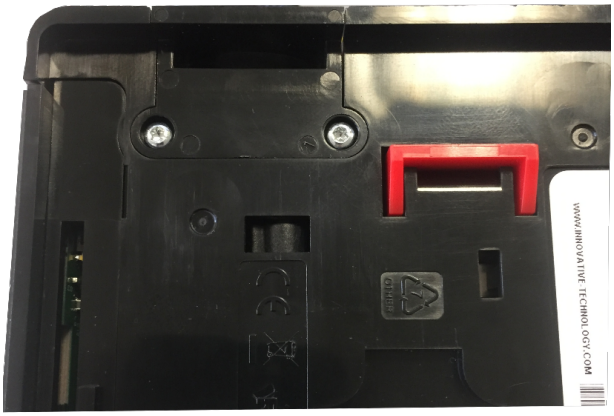
Remove head from chassis

Before the lock can be installed, remove the NV200 Spectral from the cashbox chassis. Lift the latch, slide the head forward and lift the head away from the chassis.



Remove red insert

There are 2xT8 screws located on the underside of the NV200 Spectral, remove those and lift away the plastic insert.



Remove Locking Cam

Press the plastic clip together and remove the locking cam.

Remove Plastic Insert

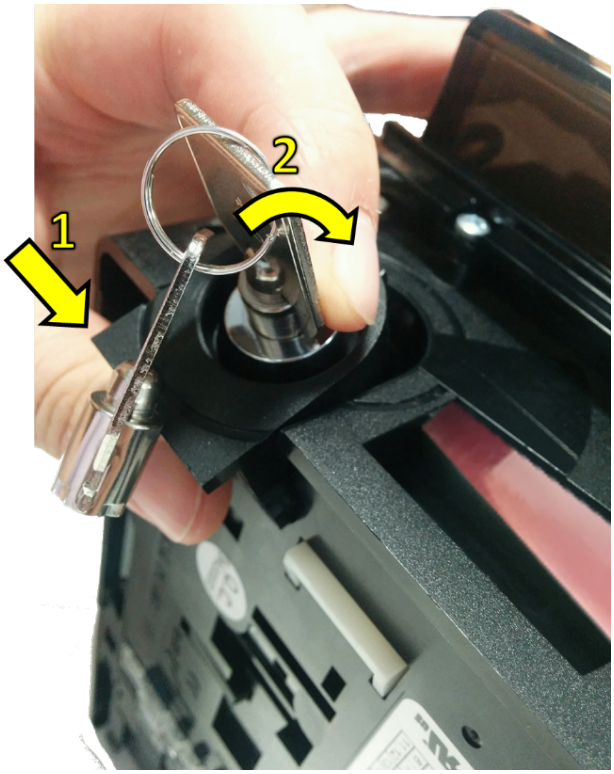
To remove the plastic insert, from the lock mount, press the two clips on the side together and push through. Insert the cam lock in its place.

Re-attach Locking Cam

Re-attach the locking cam onto the barrel of the lock and tighten.

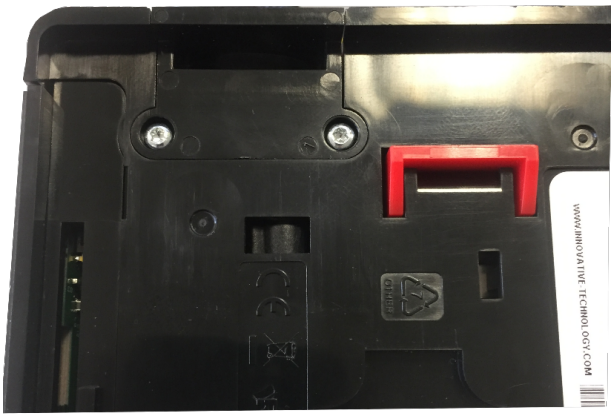
Fit Assembled Lock

To fit the assembled lock into the unit, place the bottom in first then push the top into position.



Screw in place

Turn the unit upside down and screw in the 2xT8 screws previously removed.



Standard Cashbox

Cashbox Lock Location

The standard NV200 Spectral cashbox can be fitted with 2 locks for security. These are located on the bottom of the cashbox on the hinged door.

Remove Blanking Plates and Fit Lock

Similarly, to fitting a lock on the front of the NV200 Spectral remove the locking cam and blanking plate which is there by default and replace with the desired lock.

Finish Installation

With the lock in place add the washer and the locking cam.

Ensure when the keylock is turned the locking cam is inserted in the same position it was previously removed otherwise it can cause interference

Lock Specification

Locks for the NV200 Spectral are available from Innovative Technology Ltd.

ITL Part Number: PA00650

There is also a keyless lock assembly available, this comes as standard on the 1000 note cashbox.
ITL Part Number: PA02713

There are various lock manufacturers and distributors. Refer to Lock Specification for information regarding the lock specification.

Lock Cam

The following Lock Cams are included with the product.

NV200 Spectral Lock Cam Part Number: PM00614

Cashbox Lock Cam Part Number: MC00247

Docking Plate Mounting

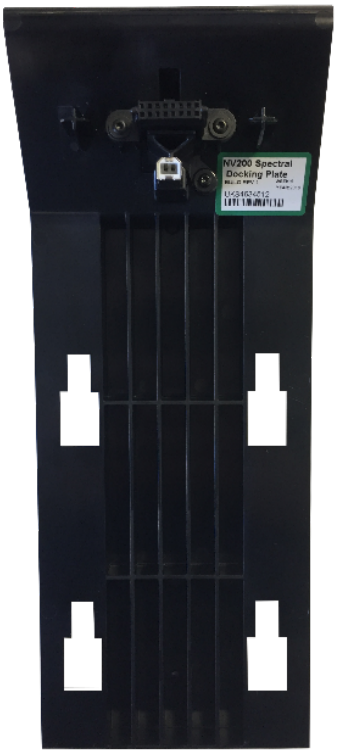
When using the docking plate, you will need a different cable to connect the NV200 Spectral to the power supply, as the connector is different.

Slide NV200 Spectral Forward

Lift the latch on the front of the NV200 Spectral head and slide it forward on the chassis

Attach the docking plate

Align the holes in the docking plate with the mounting points on the back of the NV200 Spectral chassis



Lock Docking Plate in place

Press downwards on the docking plate to lock it into place on the chassis

Dock the NV200 Spectral head

Firmly push the NV200 Spectral back along the chassis until it locks into place on the docking plate connectors.

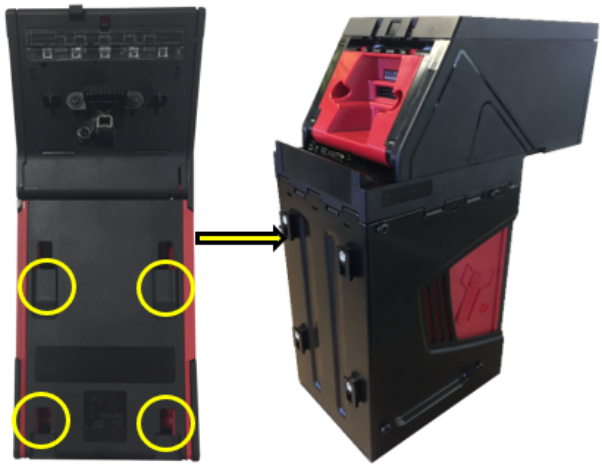
Spectral Payout Mounting

Slide NV200 Spectral Forward

Lift the latch on the front of the NV200 Spectral head and slide it forward on the chassis

Attach Spectral Payout Module

Align the mounting holes on the Spectral Payout with the mounting points on the back of the NV200 Spectral



Lock Spectral Payout In Place

Push the Spectral Payout down to lock the mounting points into place

Dock the NV200 Spectral Head

Firmly push the NV200 Spectral back along the chassis until it locks into place on the Spectral Payout connectors

Bunch Note Feeder Mounting

Please ensure the correct inserts have been fitted before mounting. Refer to BNF Path Guide Inserts for further information.

Open Upper Note Path

When the note path has unlocked, lift the upper part to give clear access to the front.

Mounting BNF

The BNF mounts like a normal bezel, slide the clips into the locating slots

Docking BNF Carefully but firmly push the BNF down onto the UAP so that the connectors dock together. Close the Note path when finished.	

Safe Interface Mounting

Safe Interface

The Safe Interface module consists of three main components. The Outer Safe Docking Plate, the Inner Safe Docking Plate and the Note Transport (either 27mm or 80mm).

When mounting the Safe Interface, it is vital that the Outer and Inner Docking plates line up exactly. If they are out of alignment the Note Transport will not dock correctly.

Attach the Inner Docking Plate

The Inner Docking Plate attaches to the top of the cashbox chassis. The cashbox is mounted inside the safe.

First, position the Inner Docking Plate on top of the cashbox chassis.

It will extend slightly forward of the chassis initially as per the picture.

Ensure that the locating tabs are aligned with the slots on the chassis.

Dock the Inner Docking Plate

With the Inner Docking Plate correctly positioned, push it backwards until it clicks into place.

The aperture on top of the Inner Plate should line up with the cashbox aperture on the chassis

Attach the Outer Docking Plate

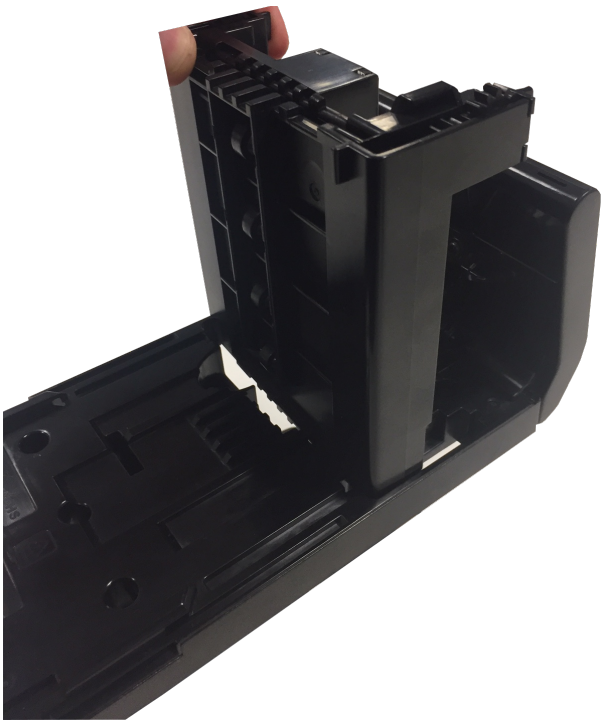
The outer docking plate mounts to the top of the safe, externally.

The aperture for the Note Transport must be cut into the safe and it must line up exactly with the Inner Docking Plate mounted inside the safe.

Insert the Note Transport

The note transport is inserted into the top of the Outer Docking Plate.

It will travel through the aperture in the top of the safe and dock into place on the Inner docking plate inside the safe.



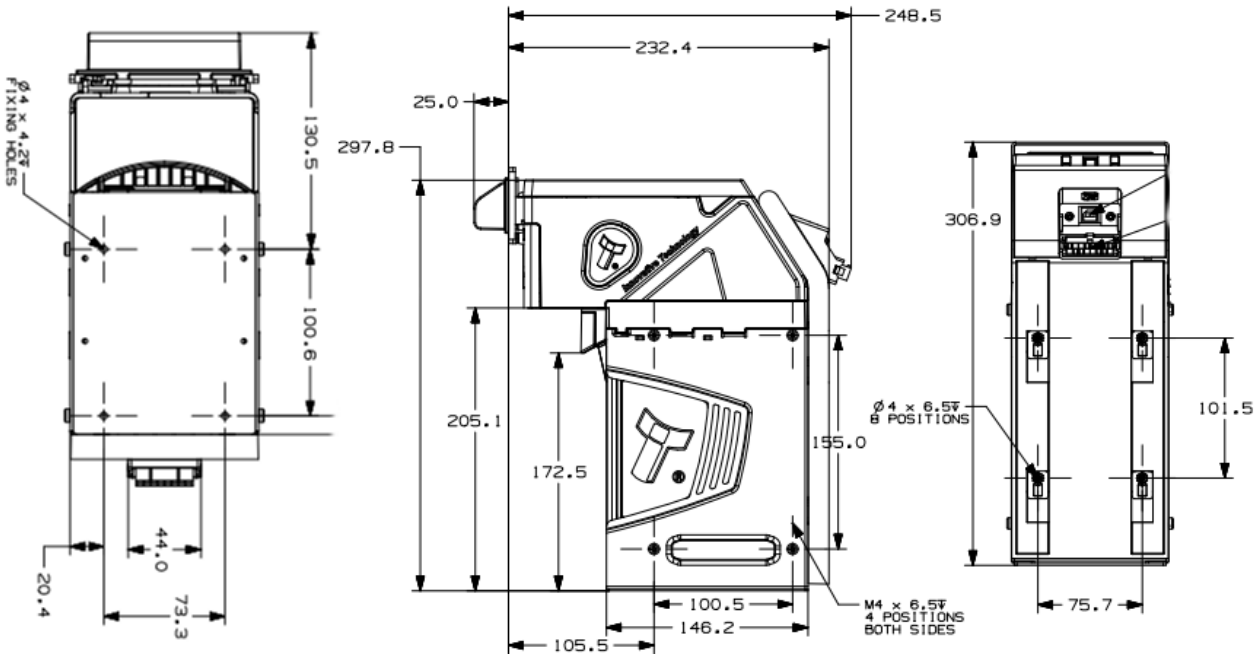
Safe Interface Stackerless (FreeFall)

The Stackerless version of the Safe Interface consists of two parts: The Outer Safe Docking Plate and the Note Transport. This note transport differs from the standard Safe Interface options as it is designed to drop notes directly into a cashbag/box rather than stacking them.

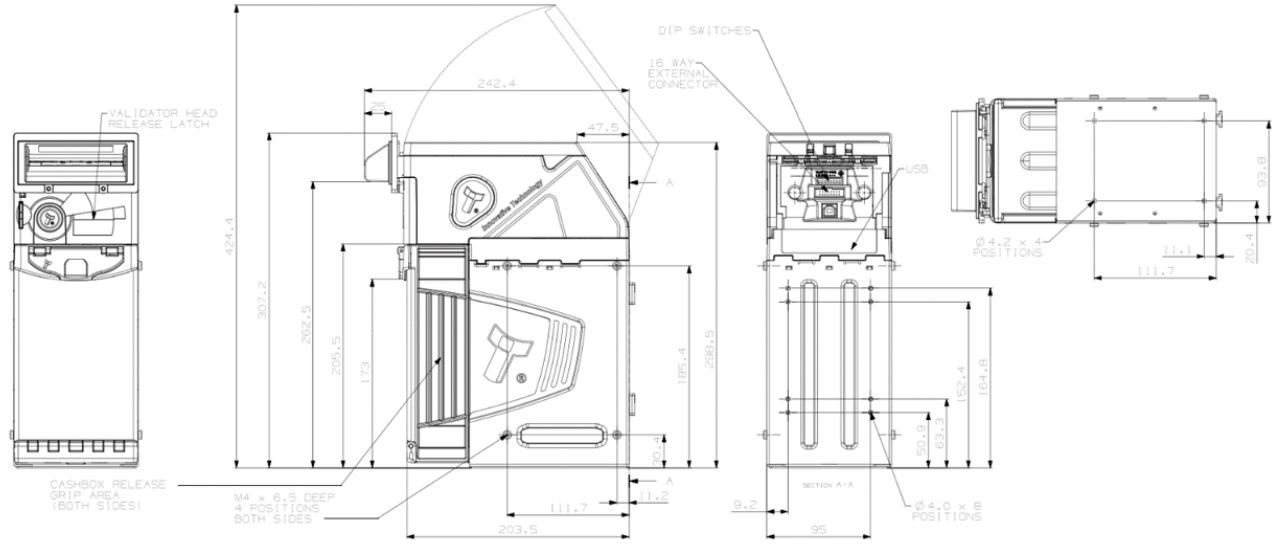
Mounting the Stackerless Safe Interface is easier because it is not necessary to align the Outer Docking Plate with the Inner Docking Plate, only to align an open cashbag/box inside the safe.

Machine Mounting

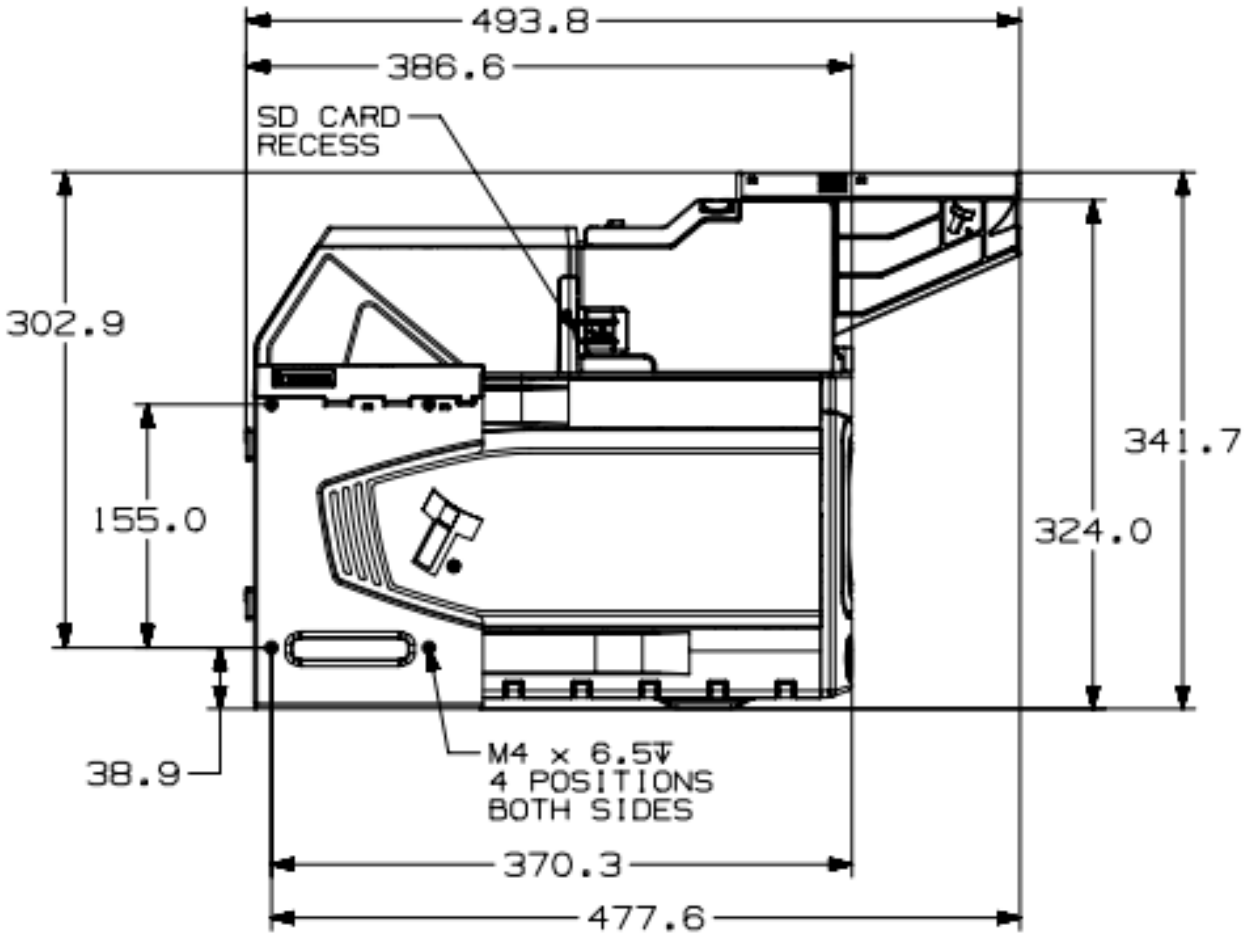
Standard 500 Note Cashbox



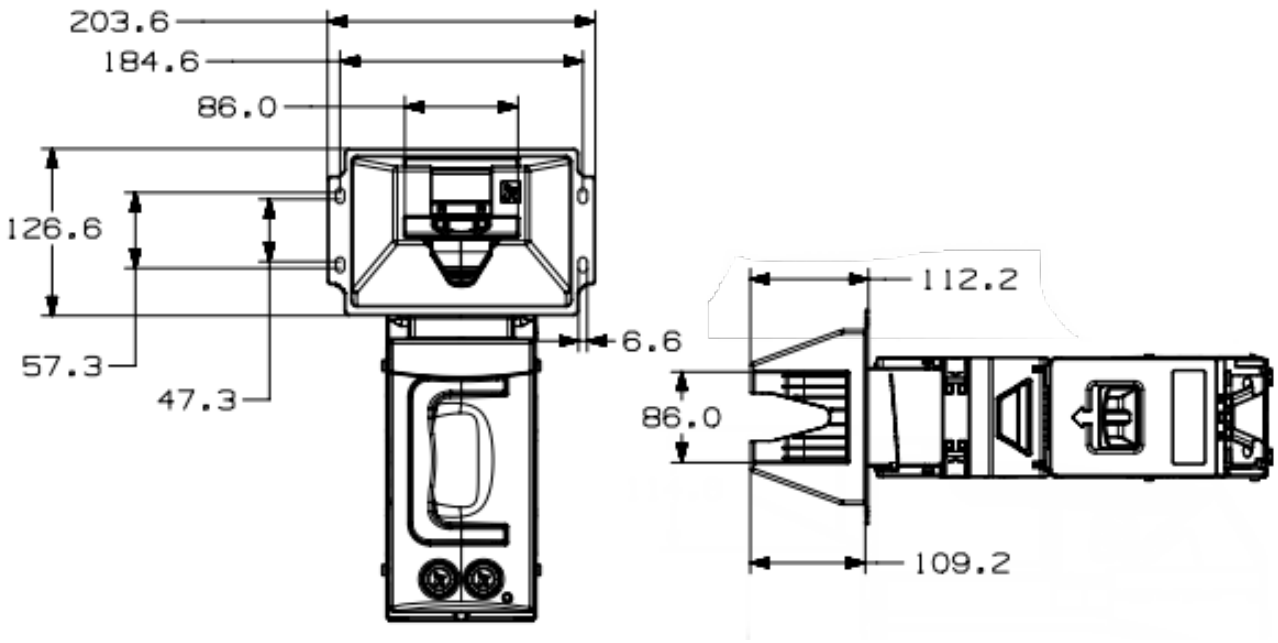
Standard 1000 Note Cashbox



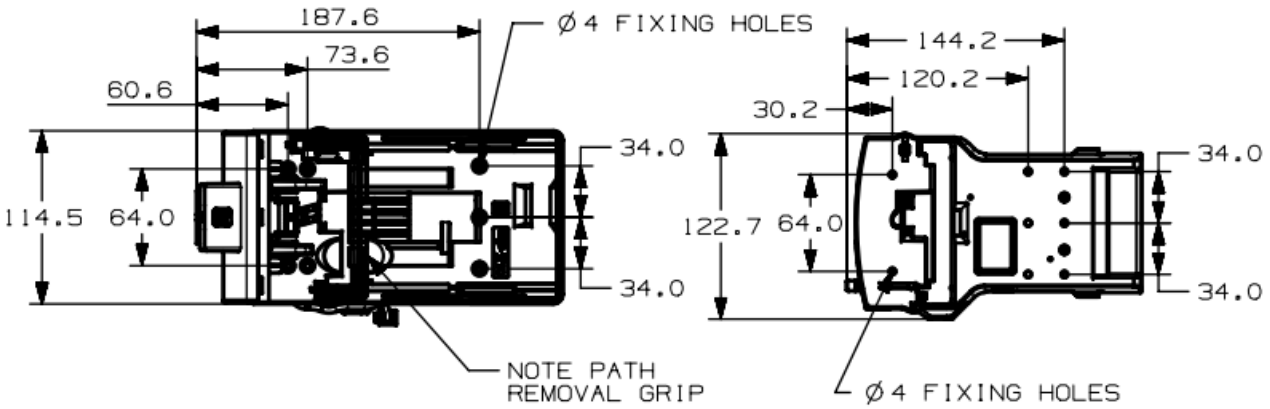
BNF+2200 Note Cashbox

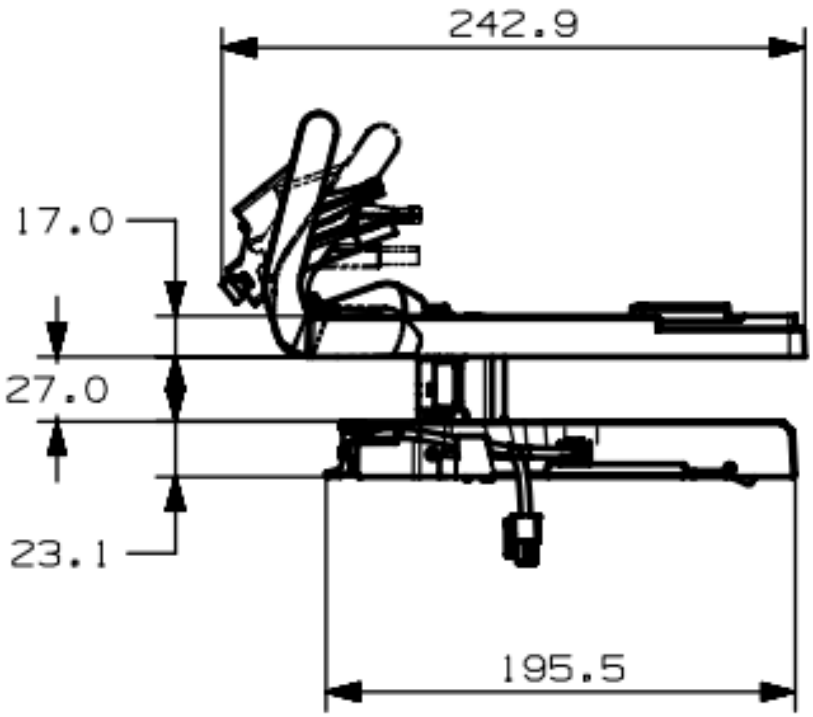


BNF assembly bezel (PA03133) + 2200 Note Cashbox

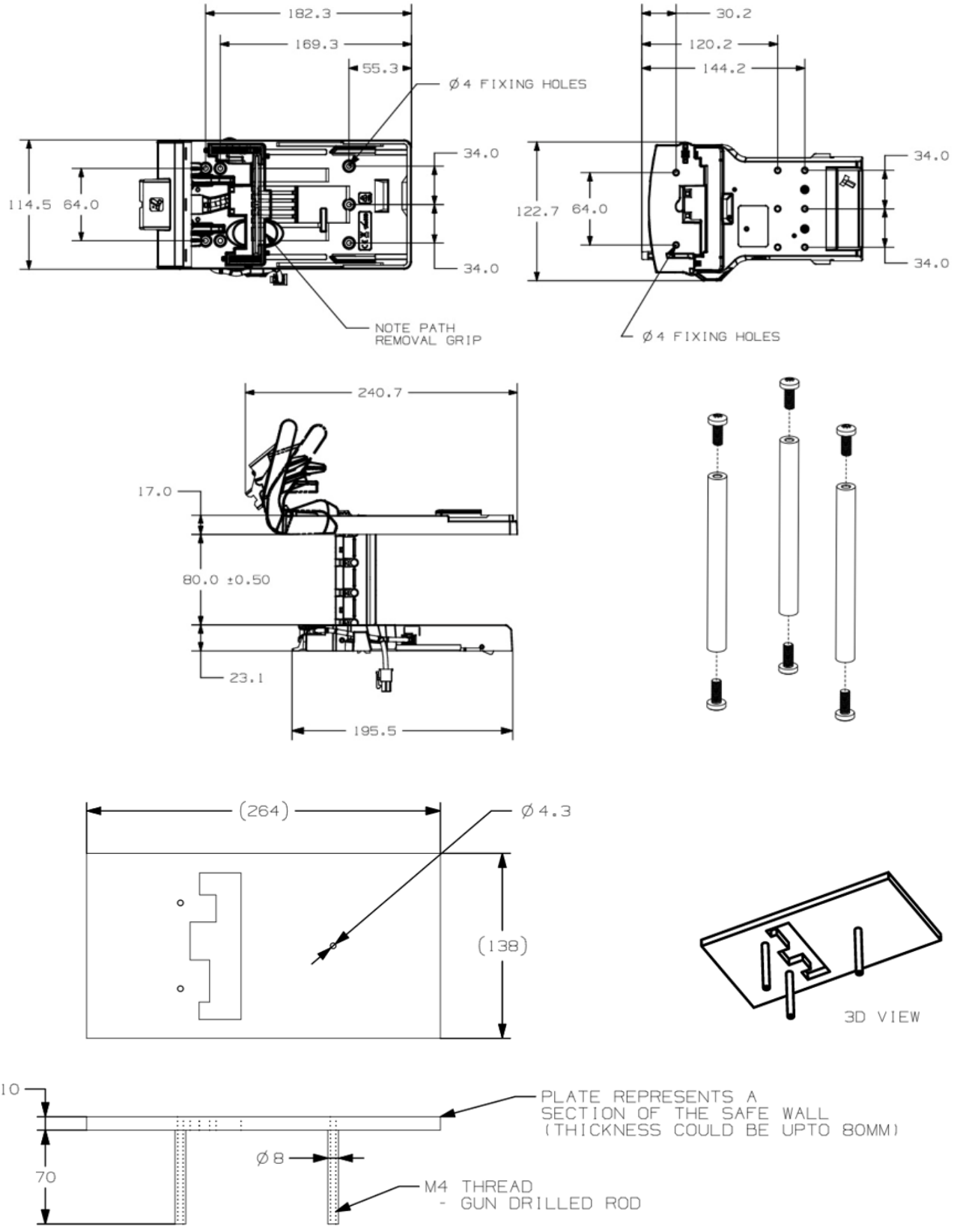


Safe Interface 27mm





Safe Interface 80mm with support pillar (PA03829)



This example suits a nominal 10mm thick safe wall.

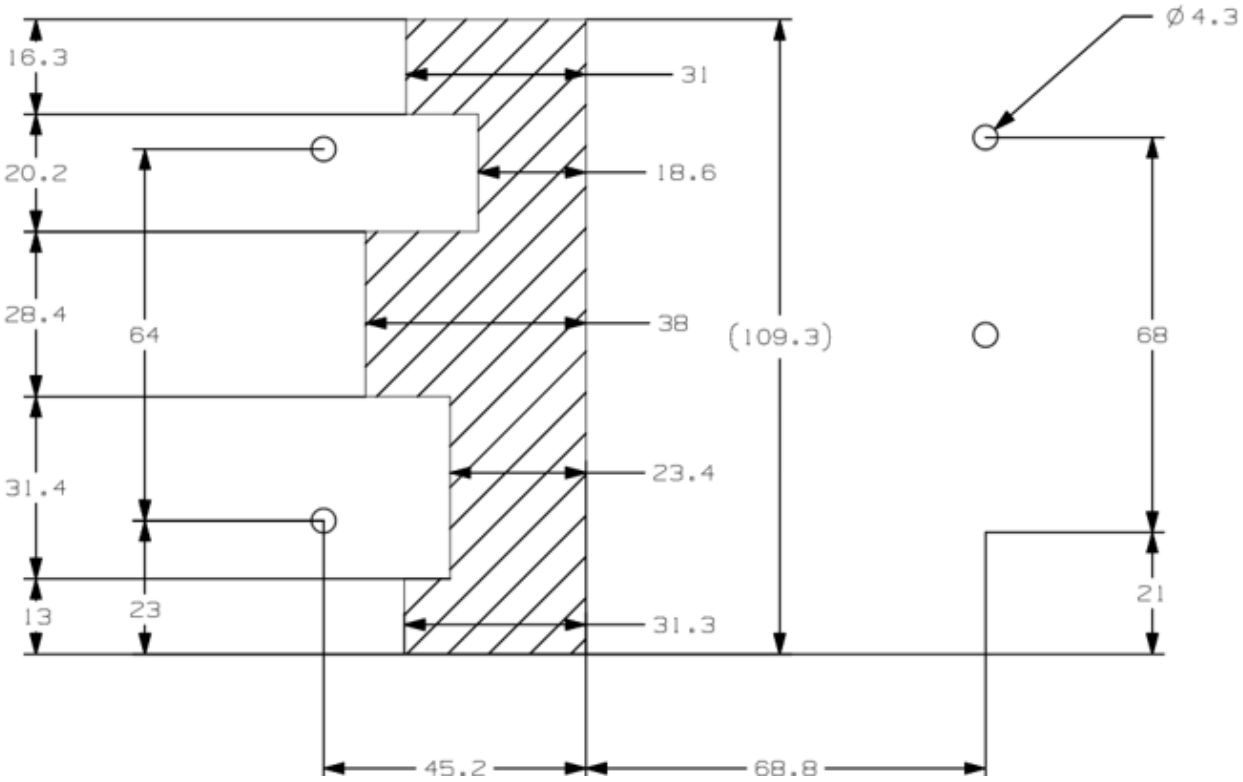
It is critical the top and bottom plates of the safe interface are aligned in X, Y and Z directions to +/- 0.5mm.

Here mounting is achieved by 3x internally threaded 8 mm rods (PA03829) – the length is 80mm minus wall thickness (here 80 - 10 = 70).

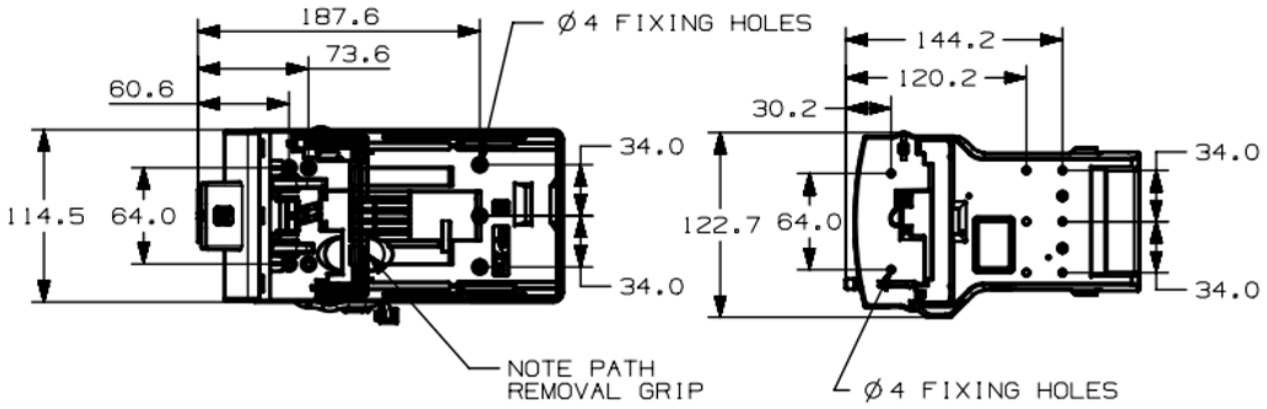
The top plates and bottom plates can be attached simply with 6xM4 pan-head screws.

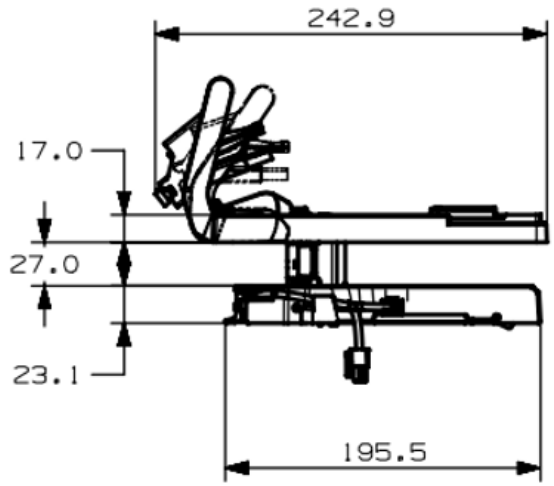
Additionally, to the above a brace should be fitted to the bottom of the NV200 Spectral cashbox chassis.

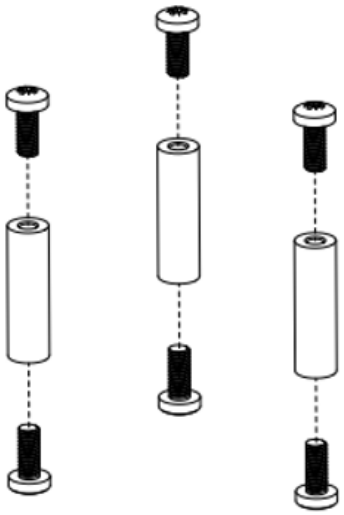
Below profile recommended for sample mounting method above.



Safe Interface 27mm with support pillar (PA03829







Earth Bonding

It is very important that the NV200 Spectral is properly bonded to earth, using one of the earth tabs. Earthing on the standard chassis can be affixed to any of the screw mounting points at the side of the unit:

Lack of proper bonding can cause communication issues and other failures. The resistance between the chassis and Earth should be less than 0.7Ω.

Screw Specifications

The scope of delivery does not include screws for machine mounting. See table below for screw specification reference.

Location	Thread Type	Screw Length
Bezel	M3	12mm
Cashbox	M4	6mm

Things to consider

When mounting an NV200 Spectral there are several things to consider including:

- Weight of a fully loaded unit
- Accessibility – allow enough space to reach all connectors and switches if required.
- Cable management – ensure no connectors are damaged/removed from everyday use.

NV200 Spectral Range Software Installation and Configuration

Contents

Software Downloads

The NV200 Spectral leaves the factory programmed with the latest dataset and firmware files, unless specifically requested. However, it is important to ensure your device is kept up to date with the latest dataset and firmware. All software from Innovative Technology Ltd is free of charge and can be downloaded from the Support Hub once registered and logged in.

Drivers

The ITL driver allows you to connect any of our validators to a compatible Windows device. The IF17 uses the standard Windows FTDI driver. If direct USB is required, please install Validator Manager 5.1 or above. The direct USB driver should install automatically, but if not you can find it in the following directory:

```
C: \ Program Files (x86) \ Innovative Technology Ltd \ ITL Validator Manager \
Drivers
```

For further advice on driver issues, please contact support@innovative-technology.com

Dataset/Firmware Programming

Validator Manager

General Description

Validator Manager is a utility which allows the user to reprogram any of ITL's currently supported devices.

> Admin rights are required during installation. The validator must be in SSP for the Validator Manager to detect the device.

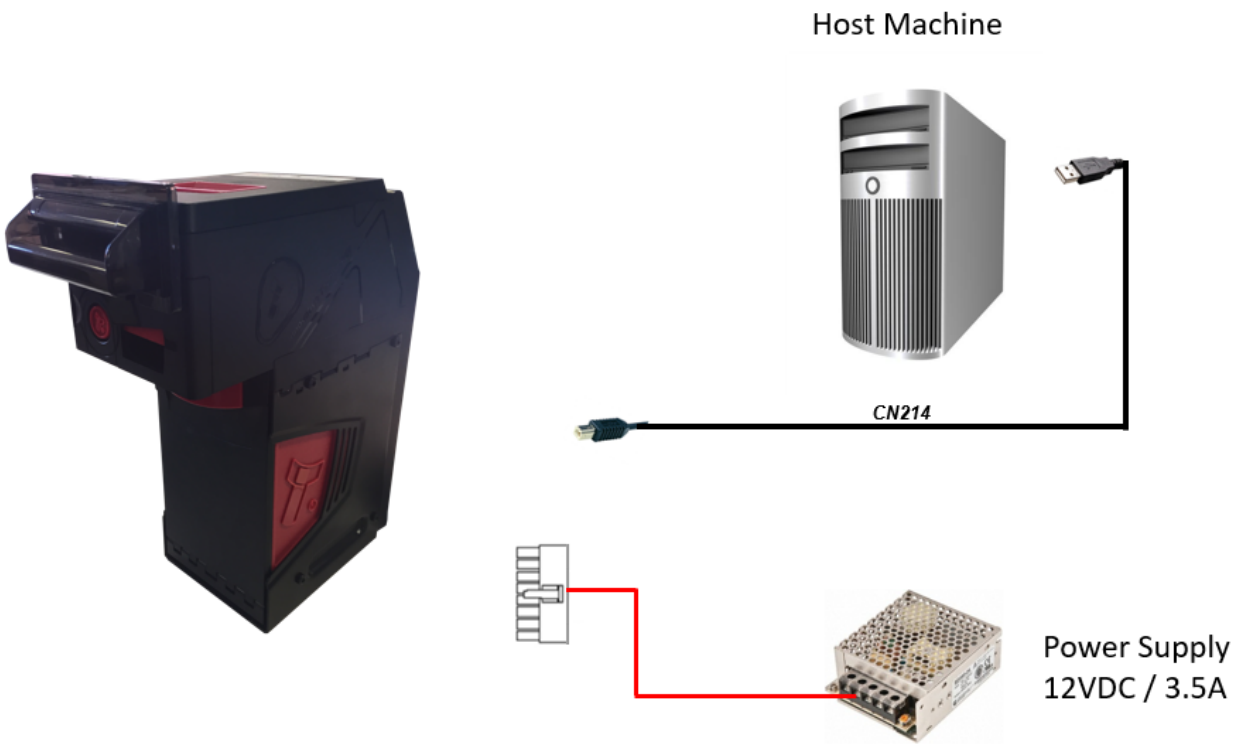
System Requirements

- Windows 8.1 or above
- .Net Framework 4.5 or above
- 2015 C++ Redistributable
- 256mb ram
- 50mb hard disk free
- ITL Drivers
- Connected validator with active com port
- Validator must be in SSP

We have seen instances where one of the dll's (itdata1.dll) used in Validator Manager are classed as a Trojan, this is a false positive and if this happens you will need to add a rule to your antivirus to allow the file to run.

Hardware Setup

The connection example below shows a direct USB connection between the NV200 Spectral and the host machine (PC). This should only be used for programming/testing.

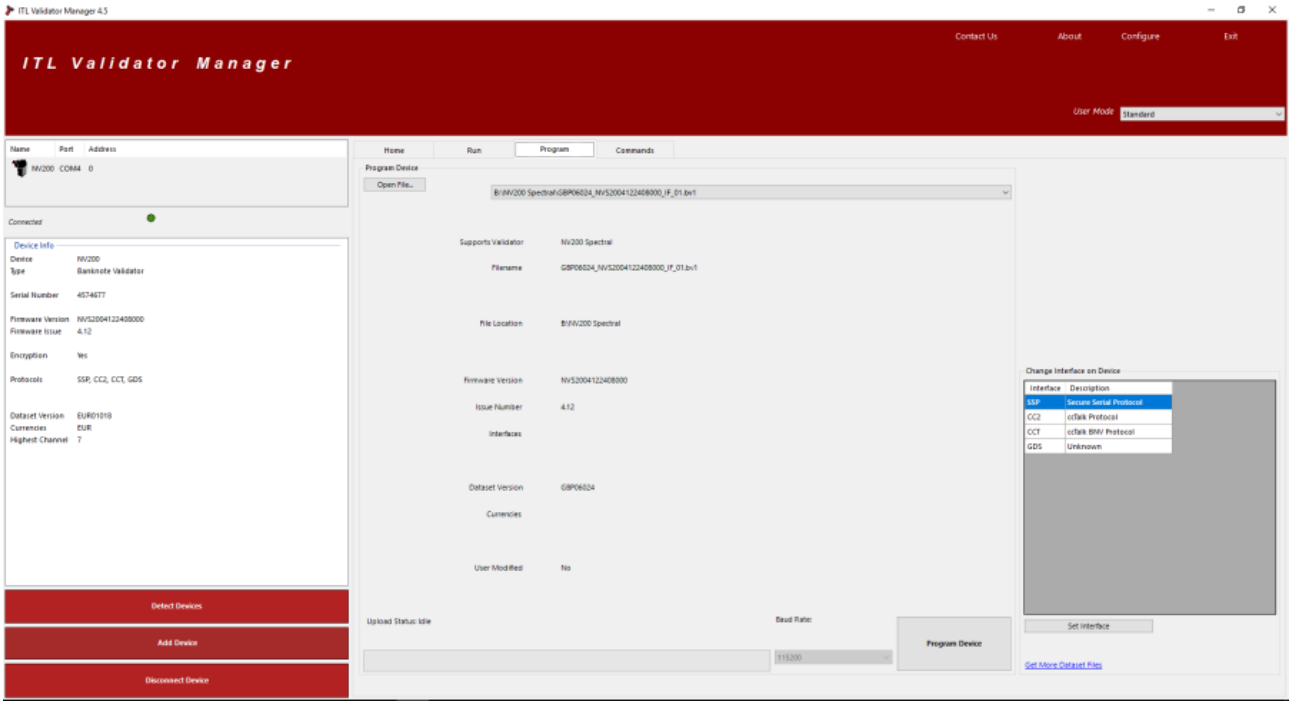


Programming Mode (SSP)

Before programming via the Validator Manager, the NV200 Spectral needs to be switched to its programming mode (SSP interface). Refer to the Appendix for further information.

Programming the Device

Once you have switched the unit into SSP, open Validator Manager and click detect devices. This will scan all active com ports for a unit, if the NV200 Spectral fails to connect ensure the correct drivers are installed and the unit is in SSP.



By selecting the Program tab, you can reprogram the NV200 Spectral. To begin the upload, click open file, then browse to the file location (usually Downloads) before clicking OK.

Once the file has been selected its information will be populated and the Program device tab will become active. Finally, hit 'Program Device', the unit's bezel will now begin to flash signalling the update has begun.

When completed the unit will restart and a pop-up box will appear saying Device Programming Complete.

Interrupting the download process can result in the unit entering a non-functional state, once the process has started it cannot be halted.

SD Card

General Description

The NV200 Spectral can also be reprogrammed through the SD slot on the front of the unit. To do this the SD card must be correctly formatted and meet the hardware requirements defined in Dataset/Firmware Programming below.

Hardware Requirements

The SD card must meet the following hardware requirements:

Minimum: 4GB – Class 4
Maximum: 32GB – Class 10

The following SD card has been tested and recommended for best performance:
https://www.sandisk.co.uk/home/memory-cards/sd-cards/ultra-sd

Re-programming via SD Card

Follow the steps below to set up the SD card and perform the update:

1. Connect the SD card to your PC using an SD card reader.
2. Ensure that the card is FAT-32 formatted and is blank.
3. Create a folder on the SD card called **nv200hs**.

This must be lowercase

4. Inside the folder, place the dataset file that you want to load on to the validator. Datasets can be downloaded from the Innovative Technology website or requested from our support team
5. Ensure the NV200 Spectral is powered on and has booted up
6. Insert the SD card into the slot on the front. The bezel will now start flashing.

Do not unplug the validator during the update process.

6. Wait until the bezel lights solid green. When it does, the SD card can be removed.
7. After the SD card has been removed, the unit will reboot. This takes around 10 seconds. Once it has rebooted the NV200 Spectral will have the new dataset on it and is ready to be used.

If there are modules attached (Payout/TEBS), these will then be updated by the NV200 Spectral, do not unplug the unit during these updates.

Logs obtaining

Procedure described in “Service Guide“ section:

NV200 Spectral Range Service Guide#Obtaining-Logs-using-SD-Card

Refilling Payout module using SD Card

Follow the steps below to refill Payout module –

1. Connect the SD card to your PC using an SD card reader.
2. Ensure that the card is FAT-32 formatted and is blank.
3. Create a folder on the SD card called “**refill**” (lowercase).
4. Insert the SD card into the slot on the front. The bezel will now start shining green. Once Bezel is flashing with multiple colours, you can add denominations to be stored in Payout module for further exchange.

Smart Currency

General Description

This option allows the use of a single NV200 Spectral as a multi-currency operating validator.

Using protocol commands, you may choose the desired currency dataset and switch between these datasets. Validator will work with currency, chosen by user/host.

As part of the enable process the host would tell the device the currency code to load in, this would then load into RAM and configure the validator e.g. adjust any gains or positional info contained in the dataset and enable.

Requirements

1. To be able to operate with the Smart Currency option, the Smart Currency model must be purchased.
2. Firmware ver. 4.30 or above required.
3. Load the NV200 Spectral Datasets onto the SD card, which is inserted into the SD card reader on the front panel of NV200 Spectral head.
4. It is required to set SCU interface in Validator Manager.

Please note, that Smart Currency option may only be used for validators that were prepared for this at the factory.

NV200 Spectral Range Protocols and Interfacing

Contents

Interface Connectors

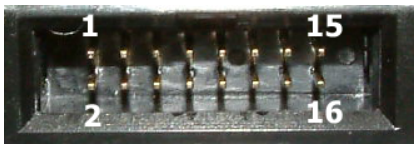
The NV200 Spectral validator or Spectral Payout has two connectors that are used to allow interfacing and programming; these connectors are easily accessible at the back of the validator.

Power always required regardless of connection type. Power is always required on

- pins 15(+V) and 16(0V) of the NV200 validator 16-way connector or
- pins 9(+V) and 1(0V) of the Payout 3 validator 16-way connector

The first connector is a 16-pin socket used to interface the NV200 Spectral to the host machine.

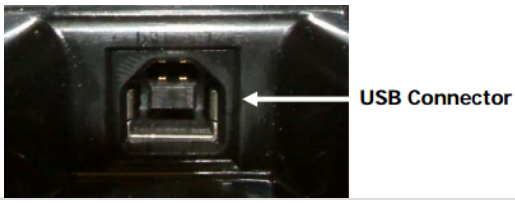
The pin numbering of the socket is shown below, as well as an overview of the socket connections:



Alternatively, when a Payout 3 or Docking Plate is connected, a 16-pin Molex 0039012165 connector will replace the 16-pin Molex 9733272, the Pinout is below:

The USB connector is a standard Type 'B' USB socket which can be used for programming – a USB 2.0 compliant Type 'A' to 'B' lead can be used to do this.

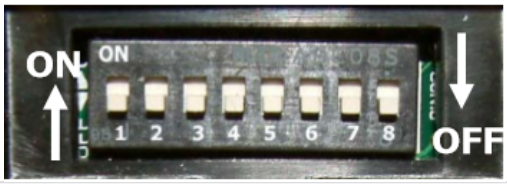
The USB connection is not recommended for use in the final 'live' application.



User Interfaces

NV200 Spectral Dip Switches

The NV200 Spectral has a Dual Inline Package (DIP) switch bank that is used to set the various options for the unit. A summary of the switch options is shown below:



Switch	Option	Switch OFF	Switch ON	Default Setting
1	Disable Barcode	Read enabled	Read disabled	OFF
2	Channel 1 Inhibit	Channel enabled	Channel disabled	OFF
3	Channel 2 Inhibit	Channel enabled	Channel disabled	OFF
4	Channel 3 Inhibit	Channel enabled	Channel disabled	OFF
5	Channel 4 Inhibit	Channel enabled	Channel disabled	OFF
6	Channel 5 Inhibit	Channel enabled	Channel disabled	OFF
7	Channel 6 Inhibit	Channel enabled	Channel disabled	OFF

Switch	Option	Switch OFF	Switch ON	Default Setting
8	Protocol Select	• Toggled ON and OFF to alternate between the primary and secondary protocols. This will cause the unit to reset. • Left on to default to SSP protocol, address 0. • Dip switch 8 up at power up now resets both keys - SSP and CCT (FW version ≥ 4.30).		OFF

Payout 3 Button Functionality

Payout 3 has special configurating button on the top with following functions:

Minimum firmware version of 4.31 required.

Action	Result	Description/Behaviour
2 clicks	Shows current protocol	Validator head flashes a certain number of times (Section Interface Flash Codes)
Press and hold when validator powered up	Sets the baud rate to 9600	Release **Payout Button** once it shines Red constantly. After releasing, Validator Bezel and **Payout Button** will shine Blue for 10-12 sec
Press and hold for 2 seconds	Switch interface between CC2 and SSP (unit resets)	Release **Payout Button** once Validator bezel has *started* shining after pressing
Press and hold for 5 seconds	Runs “Empty”	Release **Payout Button** once validator bezel has *stopped* shining (5-6 sec).

The use of an encrypted protocol (preferably eSSP) is strongly recommended to achieve the highest security!

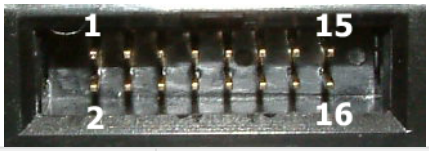
SSP and eSSP

General Description

Smiley® Secure Protocol (SSP) and Encrypted Smiley® Secure Protocol (eSSP) are field proven secure interfaces specifically designed by Innovative Technology Ltd. to address the problems by cash handling systems in gaming machines. Problems such as acceptor swapping, re-programming acceptors and line tapping are all addressed. This interface is recommended for all new designs. Innovative Technology Ltd. provides an API package upon request for use on Windows, Linux and Android. Contact support@innovative-technology.co.uk for further information.

Pin Assignments

NV200 Connector pins description



Pin	Name	Type	Description
1	**TxD TTL**	**Output**	**Serial Data Out (Tx)**
2 - 4	⚠ Not Used		
5	**RxD TTL**	**Input**	**Serial Data In (Rx)**
6	**TxD RS232**	**Output**	**Serial Data Out (Tx)**
7	**RxD RS232**	**Input**	**Serial Data In (Rx)**
8 - 14	⚠ Not Used		
15	**+ Vin**	**Power**	**+12/24VDC Supply**
16	**0V**	**Power**	**0V Supply (GND)**

Payout 3 Connector pins description

Pin	Name	Type	Description
1	**0V**	**Power**	**0V Supply (GND)**
2 - 3	⚠ Not Used		
4	**Rx Opto -**	**Input**	**Opto Rx -**
5	⚠ Not Used		
6	**Rx Opto +**	**Input**	**Opto Rx +**

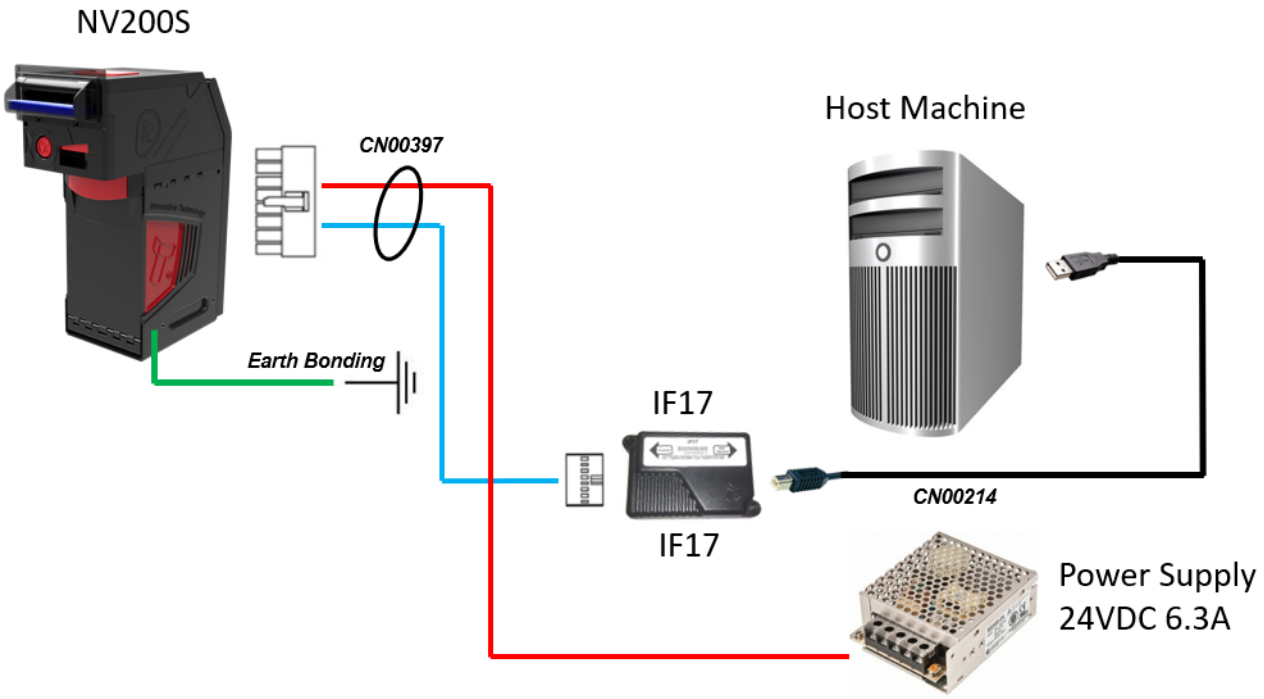
Pin	Name	Type	Description
7	⚠ Not Used		
8	**Tx Opto Emitter**	**Output**	**Opto Isolated Tx Emitter**
9	**+V In**	**Power**	**+12/24V DC Supply**
10	⚠ Not Used		
11	**Rx RS232**	**Input**	**RS232 Rx**
12	⚠ Not Used		
13	**Tx Opto Collector**	**Output**	**Opto Isolated Tx Collector**
14	**Rx**	**Input**	**Serial Data In (Rx)**
15	**Tx RS232**	**Output**	**RS232 Tx**
16	**Tx**	**Output**	**Serial Data Out (Tx)**

+12/24VDC and 0V (GND) must always be connected, also when using USB connections.

Setup Examples

The drawings below highlight how to connect the NV200 Spectral to an SSP host machine using available cables and interfaces from Innovative Technology Ltd. For cable drawings refer to the appendix section Cable Drawings

NV200 Spectral (with docking interface)



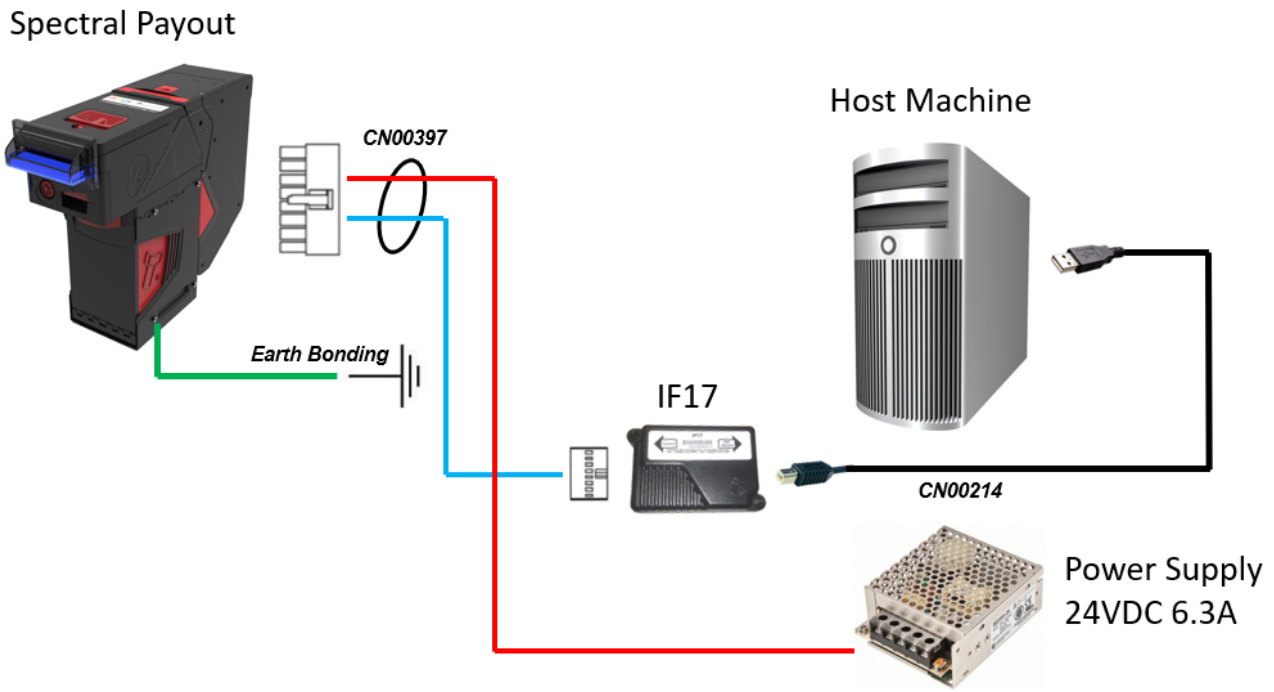
Part Name	Description	Quantity
NV200 Spectral	NV200 Spectral Note Validator	1
PA02014	Docking Interface	1
PA01081	IF17 (TTL to USB Interface Converter)	1
CN00397	Spectral Payout to Host Cable	1
CN00214	USB A to B Cable Assembly	1

Power Requirements

This setup option requires a stable 24VDC / 3.5A power supply for the NV200 Spectral according to the product specification.
Check the power requirements of your host machine and other peripherals to dimension a proper power environment for your system setup.

It is very important that the cashbox chassis of the NV200 Spectral is bonded to earth, as lack of proper bonding can cause communication issues and failures. The earth bond on a NV200 Spectral should be made to the intended connection on the outer Cashbox. The resistance between the cashbox and the Earth pin on the mains plug should be less than 0.7 ohms.

Spectral Payout



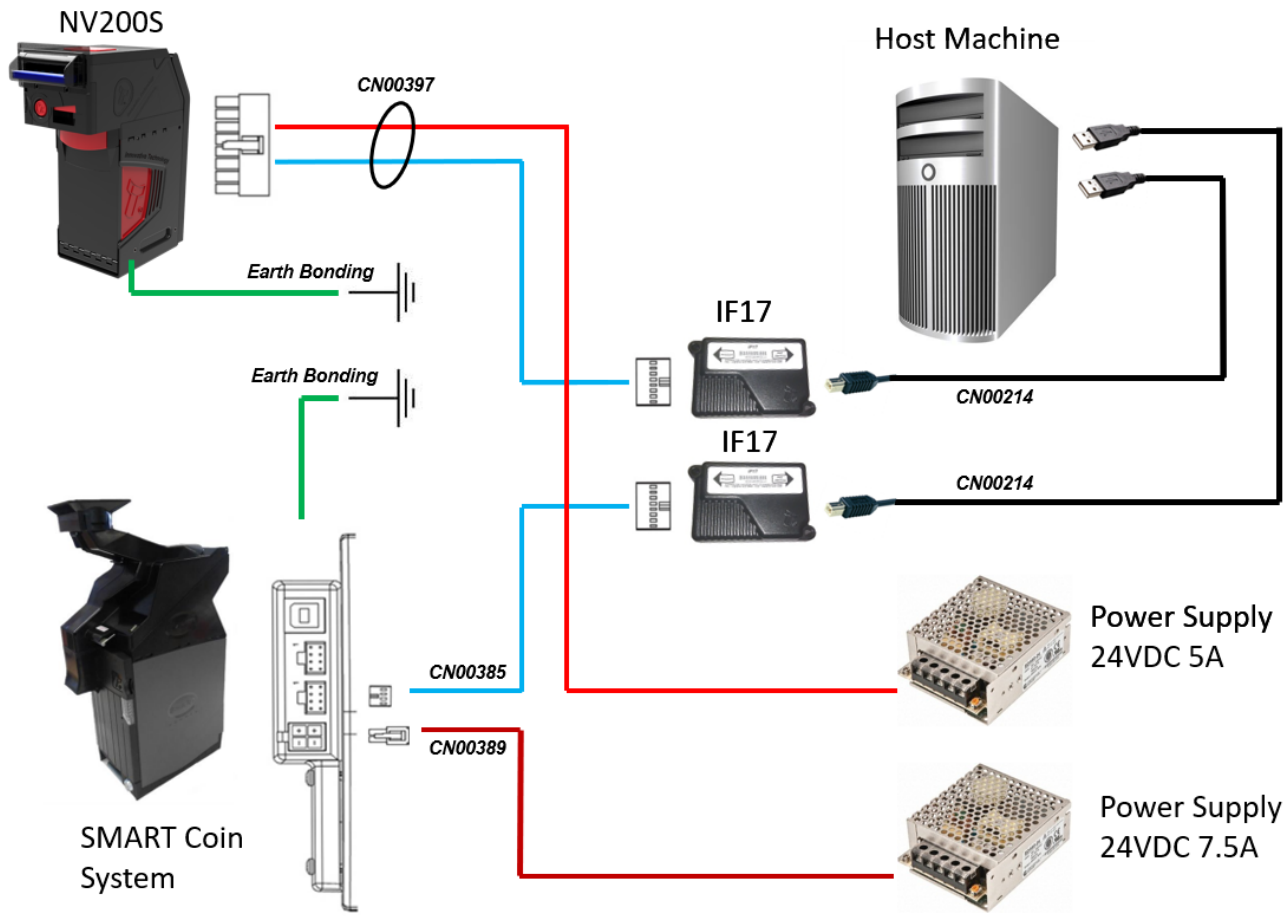
Part Name	Description	Quantity
NV200 Spectral	NV200 Spectral Note Validator	1
PA01081	IF17 (TTL to USB Interface Converter)	1
CN00397	Spectral Payout to Host Cable	1
CN00214	USB A to B Cable Assembly	1

Power Requirements

This setup option requires a stable 24VDC / 4A power supply for the Spectral Payout according to the product specification.
Check the power requirements of your host machine and other peripherals to dimension a proper power environment for your system setup.

It is very important that the cashbox chassis of the NV200 Spectral is bonded to earth, as lack of proper bonding can cause communication issues and failures. The earth bond on a NV200 Spectral should be made to the intended connection on the outer Cashbox. The resistance between the cashbox and the Earth pin on the mains plug should be less than 0.7 ohms.

NV200 Spectral (with docking interface) and Smart Coin System



Part Name	Description	Quantity
NV200 Spectral	NV200 Spectral Note Validator	1
PA02014	Docking Interface	1
PA01081	IF17 (TTL to USB Interface Converter)	2
CN00397	SMART Payout to host assembly	1
CN00385	SMART Hopper SSP user interface cable	1
CN00214	USB A to B Cable Assembly	2
SMART Coin System	SMART Coin System	1
CN00389	Hopper Power Cable	1

Power Requirements

This setup option requires a stable 24VDC / 3.5A power supply for the NV200 Spectral whilst the SCS requires 24V DC 7.5A according to the product specification.
Check the power requirements of your host machine and other peripherals to dimension a proper power environment for your system setup.

It is very important that the cashbox chassis of the NV200 Spectral is bonded to earth, as lack of proper bonding can cause communication issues and failures. The earth bonds on a NV200 Spectral should be made to the intended connection on the outer Cashbox. The resistance between the cashbox and the Earth pin on the mains plug should be less than 0.7 ohms.

ccTalk®

General Description

ccTalk® is a serial communications protocol designed by Money Controls to allow 3-wire interfacing between a host and cash handling peripherals.

Only the NV200 Spectral with standard cashbox and Payout module can communicate via ccTalk.

Previously CC2 protocol was required to support a SMART Payout module, to implement the extra commands used for note recycling. When programmed to ccTalk the NV200 Spectral recognizes when a payout module is connected and automatically supports these extra commands, without needing to reprogram it to the CC2 protocol. For legacy support, the protocol can be locked to CC2 if required.
Contact support@innovative-technology.co.uk for further information.

Innovative Technology Ltd. provides full SDK packages including Interface Specification, Implementation Guide and source code examples for SSP and eSSP only

Pin Assignments

Pin	Name	Type	Description
1	TxD TTL	Output	Serial Data Out (Tx) (optionally link to Pin 5)*1
5	RxD TTL	Input	Serial Data In (Rx) (optionally link to Pin 1)*1
15	+ Vin	Power	+12/24VDC Supply*2
16	0V	Power	0V Supply (GND)*2

*1If true ccTalk communication is required.

*2+12/24VDC and 0V (GND) must always be connected, also when using USB connections.

ccTalk® DES Encryption

When using ccTalk® DES encryption, the NV200 Spectral and host machine must exchange a secret key which forms the basis of the communication encryption. This exchange is performed in a Trusted Mode maintaining security.

The Trusted Mode can only be entered by a physical access to the NV200 Spectral. Refer to the appendix section DES Trusted Mode for details.

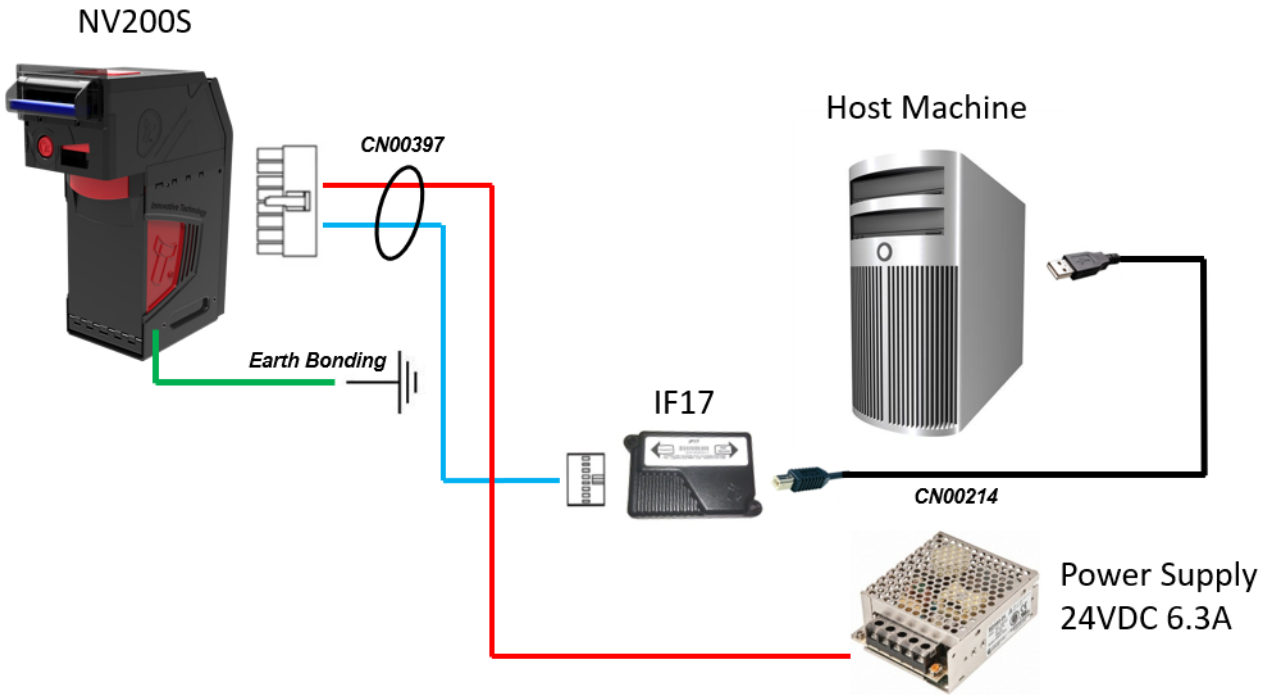
Setup Examples

NV200 Spectral (with docking interface)

The drawing below highlights how to connect the NV200 Spectral (with PA02014 docking interface) to a ccTalk host machine using available cables and interfaces from Innovative Technology Ltd.

> This is not true ccTalk as the Tx and Rx pins are not linked, pin 1 and 5 can be connected if required.

For complete cable drawings refer to the appendix section Cable Drawings.

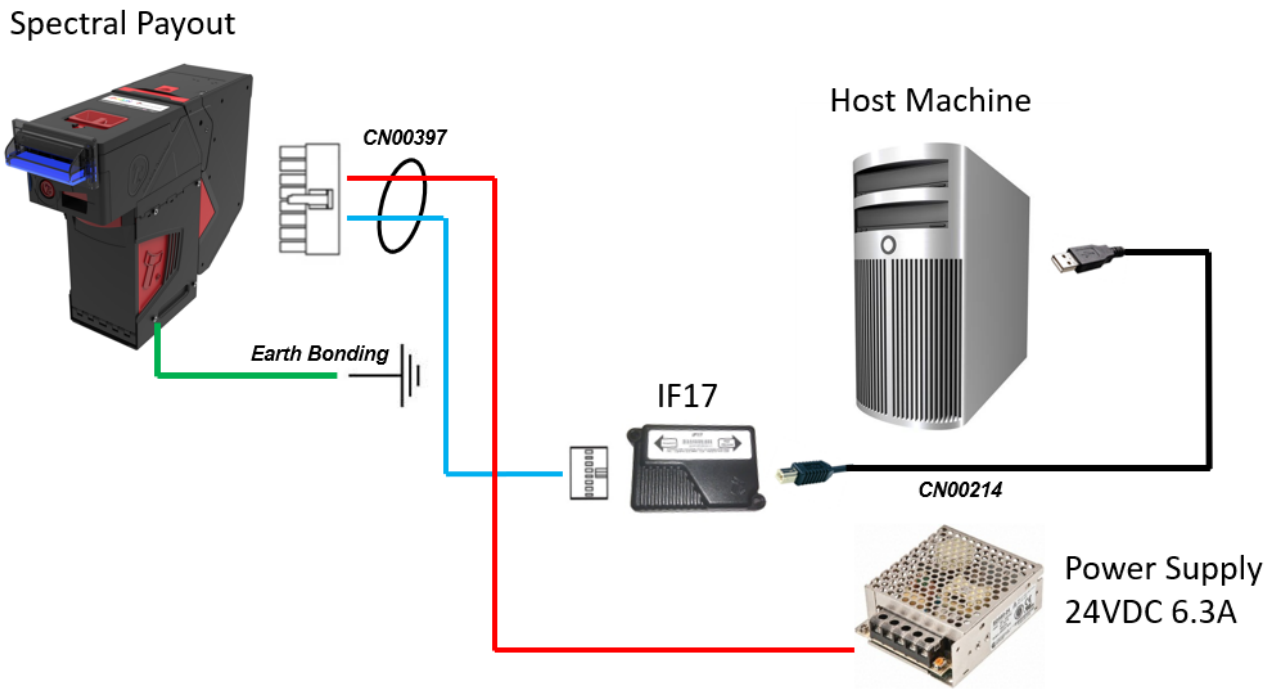


Spectral Payout

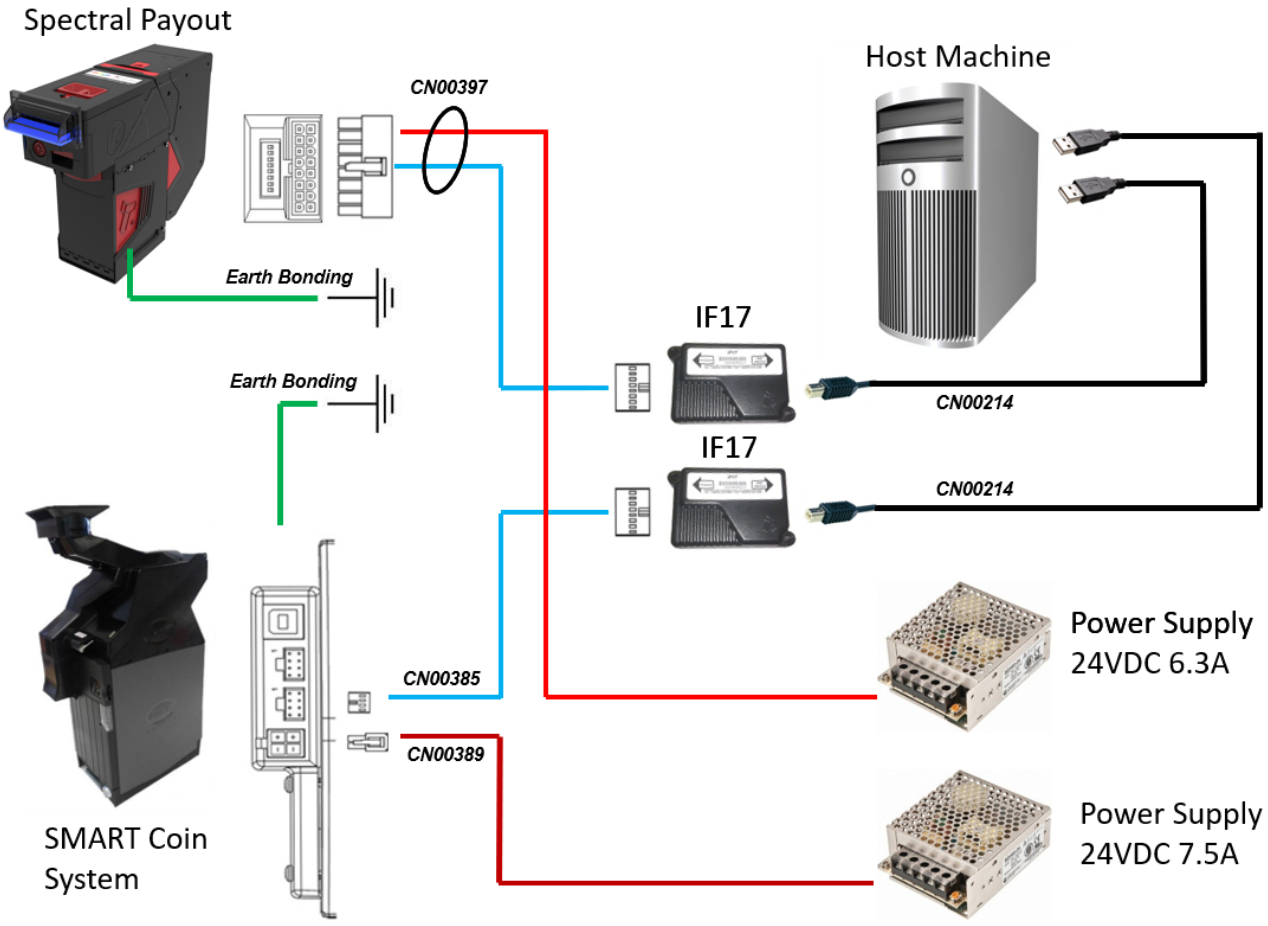
The drawings below highlights how to connect the NV200 Spectral Payout to a ccTalk host machine using available cables and interfaces from Innovative Technology Ltd.

> This is not true ccTalk as the Tx and Rx pins are not linked, pin 1 and 5 can be connected if required.

For complete cable drawings refer to the appendix section Cable Drawings.



Two COM-port connection example for Spectral Payout + Smart Coin System:



IF003

General Description

IF003 is serial protocol that usually requires RS232C Connector for communication.
For host connecting, CN00414 cable may be used.

In case of connecting via UBA, there are 2 special cables created, - for small 16-pin connector, that is using for NV200S and wide 16-pin connector for docking plate (see appendix for details).

Pin Assignments

Pin	Description
2	Interface Ground
3	Interface 12v
4	Validator Transmit
9	Validator Receive
15	Validator +12v
16	GND

SCU (Smart Currency)

General Description

SCU is interface to let NV200 Spectral operate with Smart Currency option.

NV200 Spectral, that operates with Smart Currency, uses SSP protocol for connecting with its extension commands.

Thus, all related parts of document, like *Pin assignments*, *connection ways,* etc, are identical.

SSP protocol additional commands and details are described in Pin Assignments

NV200 Spectral Range Service Guide

Contents

Recommended Cleaning Intervals

The NV200 Spectral has been designed to minimise any problems or performance variations over time. This has been achieved by careful hardware and software design; this attention to the design means there is very little user maintenance required.

Innovative Technology Ltd recommends cleaning the optical lenses and position sensors every month or as required. Dirt, dust or other residue leads to bad note acceptance and other performance degradation. Refer to the section below for detailed cleaning instructions.

Disconnect the power **BEFORE** carrying out any cleaning operations to avoid the risk of causing damage to the validator.

DO NOT use solvent based cleaners on any part of the NV200 Spectral unit such as alcohol, petrol, methylated spirits, white spirit or PCB cleaner. Using these solvents can cause permanent damage to the units; only use a mild detergent solution as directed below.

DO NOT attempt to disassemble the validator head. Trying to do this could cause personal injury and will damage the unit beyond repair.

Cleaning the NV200 Spectral

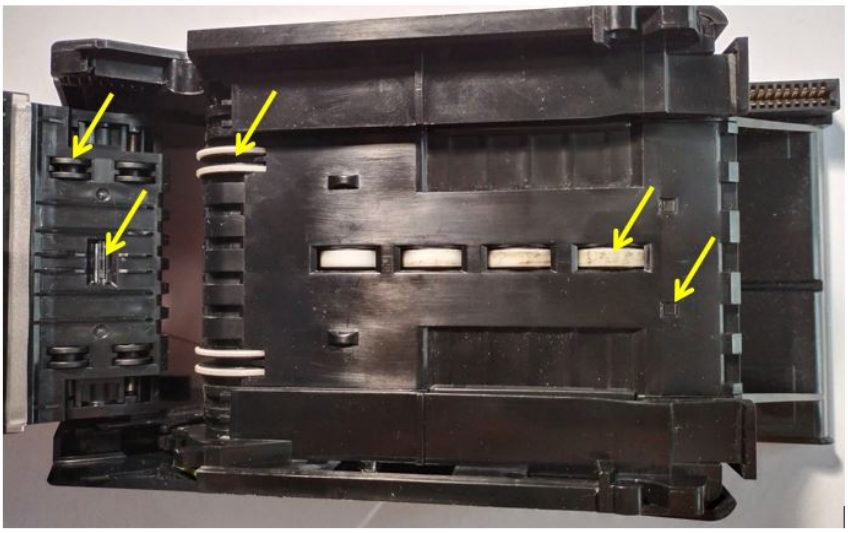
Cleaning the Validator

The NV200 Spectral note path can be cleaned with the head still fitted to the chassis, although it may be easier to remove the head from the chassis assembly.

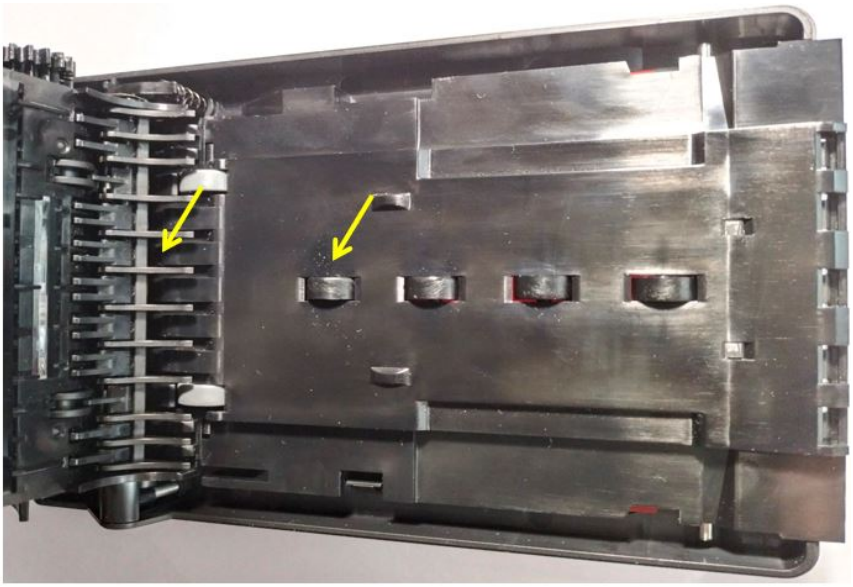
First, remove the NV200 Spectral head unit. Lift the red head release catch located on the front of the NV200 Spectral.

Then, slide the head unit forward and lift it off the chassis

To open the note path cover, pull the top cover release latch forward (towards the bezel) and lift the cover as shown below (it is recommended to also remove the bezel to allow correct cleaning of the note path guides).

	
Clean every wheel and lens carefully.	

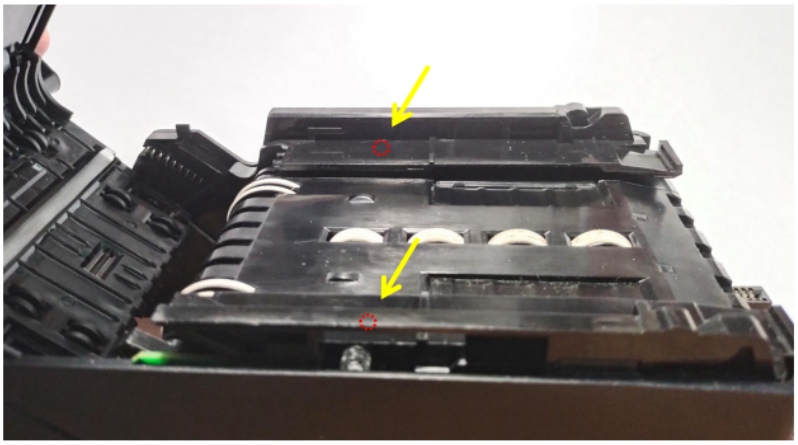
In some cases, dust or residues also build up on the top cover or on the Diverter. This also would need to be checked and cleaned carefully if required.



The note path is now visible and can be cleaned. Carefully wipe the surfaces with a soft lint free cloth that has been dampened (NOT wet) with water, making sure the position sensors highlighted are cleaned. Ensure the surfaces are clean and dry before closing the cover and powering the unit.

DO NOT lubricate any of the note transport mechanism or any part of the note path, as this can affect the operation of the validator.

It is also highly recommended to clean the Stop sensors area.



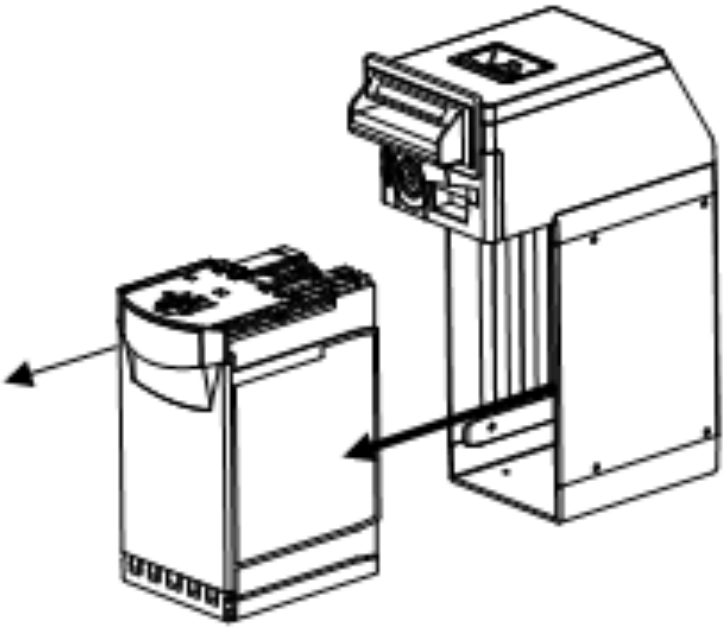
Cleaning the Cashbox

The NV200S cashbox has been designed to minimise any performance variation over time.

To guarantee the function of the NV200S including the cashbox, it must be ensured that all sensors are working properly.

Depending on the application and environment a regular cleaning of the cashbox is recommended.

The cashbox must be removed from the chassis for cleaning.



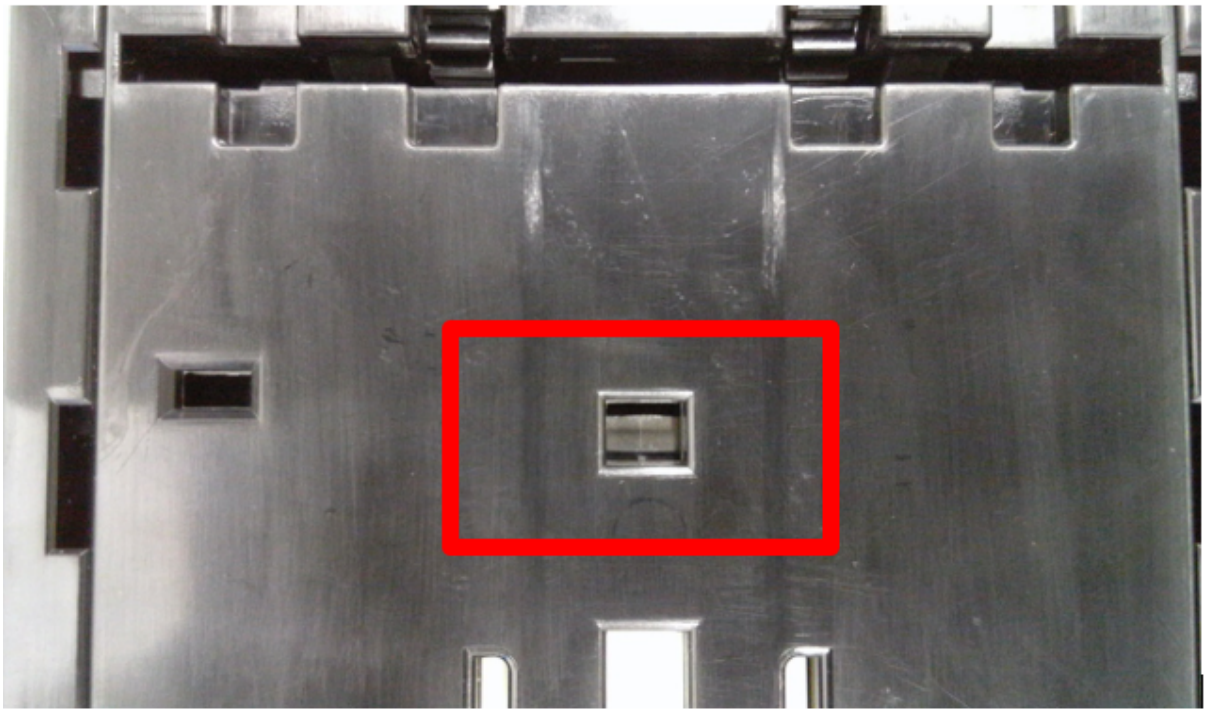
For correct operation the NV200S has sensors included to check e.g. the positioning of the cashbox. Other sensors will detect a filled cashbox.

If there is a contamination in the **RED** marked area, it could cause problems with the identification of the cashbox or with the note routing.

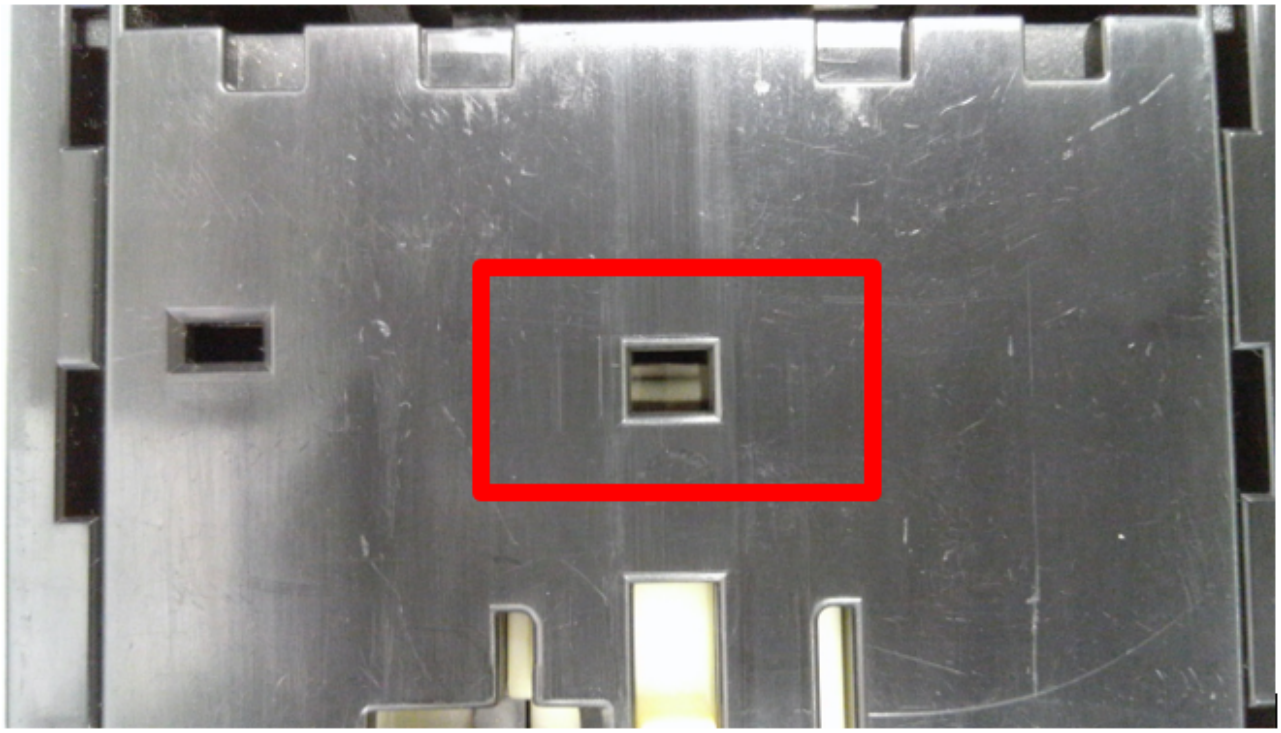
Carefully wipe the surface with a soft lint free cloth that has been dampened (NOT wet) with a water or mild detergent solution.

Do not use solvent based cleaners such as alcohol, petrol, methylated spirits, white spirit or PCB cleaner. Using these solvents can cause permanent damage to the units; only use a mild detergent solution as directed below.

Cleaned:



Contaminated:



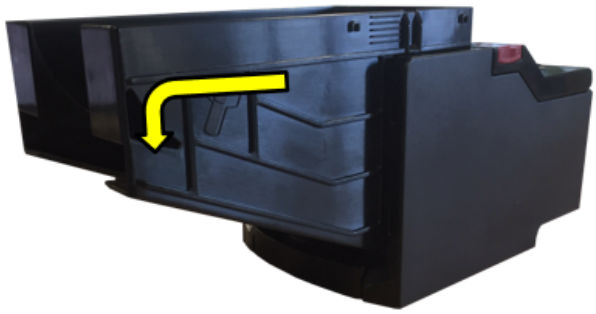
Cleaning the Bunch Note Feeder

To clean the Bunch Note Feeder (BNF) follow the steps below:

Remove the BNF Bezel

Pull the bezel forward and down as shown in the picture to unclip the bezel from the front of the BNF.

When it is unclipped, pull forward to fully remove the bezel

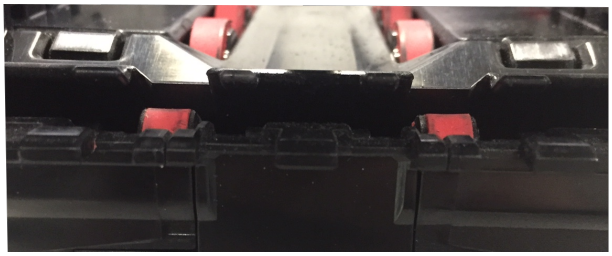
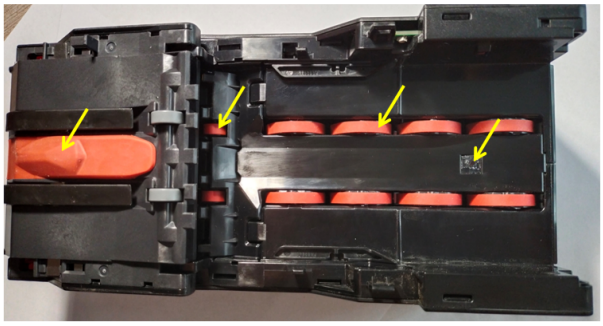


Open the Upper Note Path

Press both red latches together and lift the lid to open the note path.

Clean the note path with a clean dry cloth, ensure that any debris is removed and the tyres are cleaned.

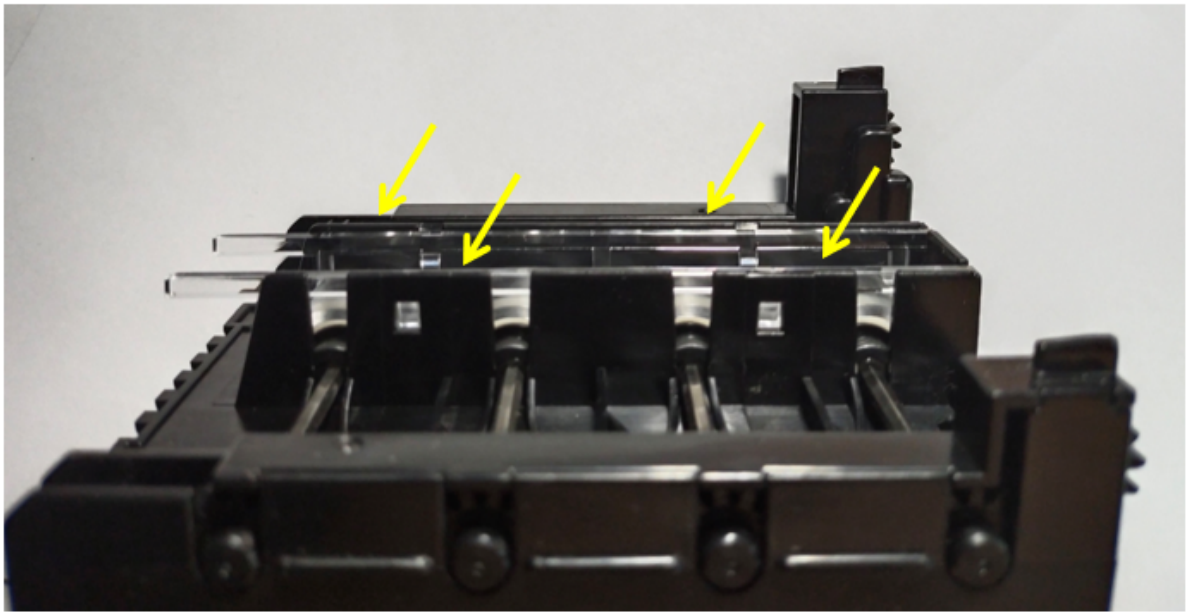
Clean the rubber tongue on the upper lid

Clean the Rear Tyres Clean the pinch wheel tyres at the back of the unit, ensure that the diverter moves easily and is clear.	
Please ensure pointed area is cleaned and have no dust or residues before further usage.	

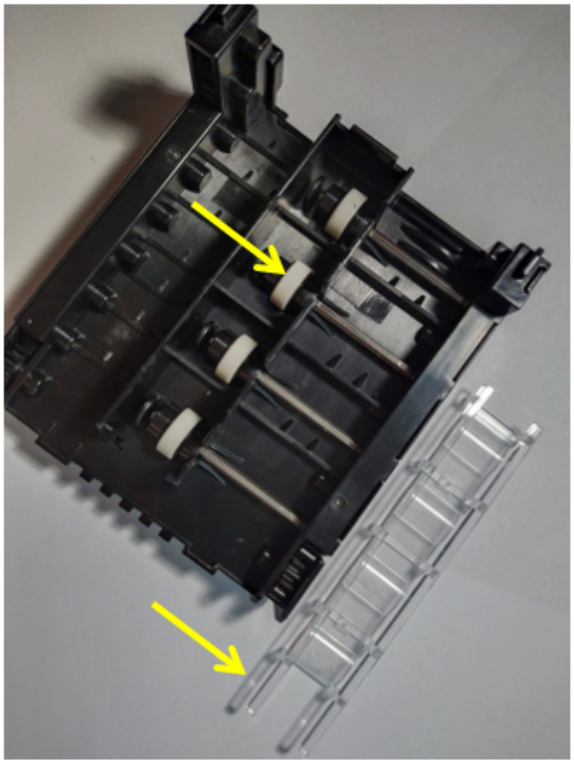
Cleaning the Safe Interface

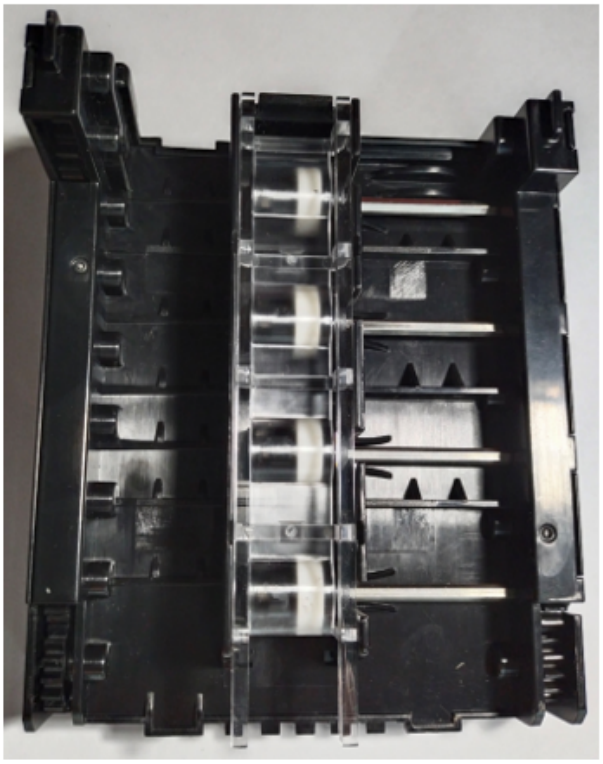
It is also recommended to clean the Safe Interface clear reliable banknote transportation.

To get access to SI wheels, carefully unclip the transparent light pipe out of holders from both sides, using flat screwdriver:



Swipe wheels with a clean dry cloth. Clip in the light pipe back when wheels and light pipe surfaces are cleaned:





Interface Flash Codes

If you double press the Payout 3 button, the bezel will flash a series of times:

Flashes	Interface
1	SSP
3	FSP
6	ccTalk/CC2

Bezel/Status LED Flash Codes

The NV200 Spectral Validator has inbuilt fault detection facilities. If there is a configuration or other error, the NV200 Spectral front bezel will flash in a particular sequence, and a summary of the Bezel Flash Codes for the NV200 Spectral is shown below:

Flashes		Indicated Status / Error	Recommended Action
Red	Blue		
1	1	Note Path Open	Close the lid of the NV200 Spectral validator it will click into place as it shuts.

	2	Note Path Jam Stop sensors covered	1. Power down the NV200 Spectral 2. Open the NV200 Spectral using the red catch on top and inspect the note path for any note debris 3. If there isn't any evidence of a note carefully remove the NV200 Spectral from the base using the red catch on the front. 4. A note could be just sticking out from the cashbox, remove power and the NV200 Spectral head. 5. If a note is visible remove the note. 6. Check Stop sensors area and clean if required according to the Service Guide. 7. Re-attach the head and power. 8. If the jam isn't cleared remove the cash bag.
	3	Unit Not Initialised	The NV200 Spectral will need to be returned to your nearest repair centre for repair BNF needs to be removed for proper initialization procedure
	4	Straightener mechanical failure	The NV200 Spectral will need to be returned to your nearest repair centre for repair
2	1	Cashbox Removed	Insert the cashbox.
	2	Cashbox Jam	Follow the steps as advised in the Service Guide.
	7	Firmware Error	Contact ITL support.
3	1	Firmware Checksum Error	There has been an issue with the attempted download, retry the download with the recovery section on validator manager, if this fails arrange for the unit to be returned to the nearest repair centre; details of which can be found on our website.
	2	Interface Checksum Error	The firmware loaded doesn't contain the primary interface from the previous firmware. Download with the IF file containing the correct protocol.
	3	EEPROM Checksum Error	There has been an issue with the attempted download, retry the download with the recovery section on validator manager, if this fails arrange for the unit to be returned to the nearest repair centre; details of which can be found on our website.
	4	Dataset Checksum Error	
4	1	Power Supply too Low	Check the voltage on your power supply is within the specified voltage range as outlined in the Technical Data. If the voltage appears to be correct, check to ensure the power supply voltage doesn't vary by more than 10% under maximum current draw.

	2	Power Supply too High	Check the voltage on your power supply is within the specified voltage range as outlined in the Technical Data. If the voltage appears to be correct, check to ensure the power supply voltage doesn't vary by more than 10% under maximum current draw.
	3	Card Format	The SD card inserted is incorrect. Please refer to SD card requirements.
	4	Payout Reset	The Spectral Payout is in the process of resetting, wait for it to recover.
5	1	Firmware Mismatch	The Firmware on the device connected doesn't match the firmware on the NV200 Spectral. Ensure the Firmware supports the connected device.
	2	Payout Jam	The spectral payout has encountered an issue and a note has jammed, follow the steps as described in the Service Guide.
	4	Payout Jam recovery in progress	The spectral payout encountered a jam and is attempting to recover. 5 notes will be moved to the cashbox, from the payout. Once the unit has completed this it will go back in service.
	5	Safe Interface not detected	Check the connection to the Safe Interface module.
6	4	Bunch Note Feeder	The Bunch Note feeder requires 24V DC. Please check the Bunch Note Feeder connection.

In some cases it is possible to get more detailed error description.

For this, following expansion SSP command must be sent: **30 00 60.**
If failure detected, SSP code **F0 10 XX XX XX XX** will be received as reply.
Turning 4 informative bytes from HEX to DEC, it is possible to get error reason:

Unique error	**Byte (DEC)**
Unit not initialised	81
Calibration fail	86
PSU Low	13
PSU High	12
Reject jam	210
Payout jam	101
Stacker jam	104

Unique error	Byte (DEC)
SI not detected	74
BNF not detected	183

Module Flash Codes

Each additional module for the NV200 Spectral has its own flash codes, outlined in the subsections below.

Spectral Payout Module Flash Codes

The LED on top of the Spectral Payout can flash error codes to aid troubleshooting.

Flashes		Indicated Status / Error
Long	**Short**	
2	2	Motor error
3	2	Sensor error
	3	Tape error
	4	Diverter Error
	5	EEPROM Error
	1	Other

Flashes		Indicated Status
Colour	**Flash**	
Green	Slow	Waiting for host machine to enable the payout module
Green	Fast	Idle
Blue	Fast	Busy – A payout/float/empty/pay-in is in progress
Turquoise	Fast	Waiting for NV200S to Send the Start-up Command
Red	Fixed	Spectral Payout firmware cannot be updated. Please, contact with ITL Support for details

BNF Module Flash Codes

LED strips on the front of the BNF module can flash error codes to aid troubleshooting.

Flashes		Indicated Status / Error	Recommended Action
Yellow	Cyan		
1	1	BNF Lid Open	Close the BNF Lid
	2	Pay In Path Jam	Check the upper note path (where notes are inserted), clear any jams/debris
	3	Pay Out Path Jam	Check the upper note path (where notes are returned), clear any jams/debris
2	1	Note Transit	Open BNF lid, check that path is clear then close lid.
	2	Note Out Error	Open feeder and NV200 Spectral lid, clear out note from inside feeder, check reject tray for note half rejected, close lid to clear error
	3	Motor Stall	Open feeder lid, clear out notes from under tongue, close lid to reset
3	1	PSU Voltage	Power supply is above or below the operational range. Use power supply that meets the requirements.
	2	Note In Calibration Fail	Remove all notes from tray, clean lightpipe in tray, power cycle to reattempt startup, if issue persists return to nearest service centre
	3	Note Out Calibration Fail	Remove all notes from tray, power cycle to reattempt startup, if issue persists return to nearest service centre
	4	Note In Motor Speed Fail	Remove all notes and power cycle to reattempt calibration, if persists return to nearest service centre
	5	Note Out Motor Speed Fail	Remove all notes and power cycle to reattempt calibration, if issue persists return to nearest service centre
4	2	EEPROM Initialisation Fail	Return to nearest service centre
	3	Download Fail	NV200 Spectral could not update BNF, power cycle to reattempt download

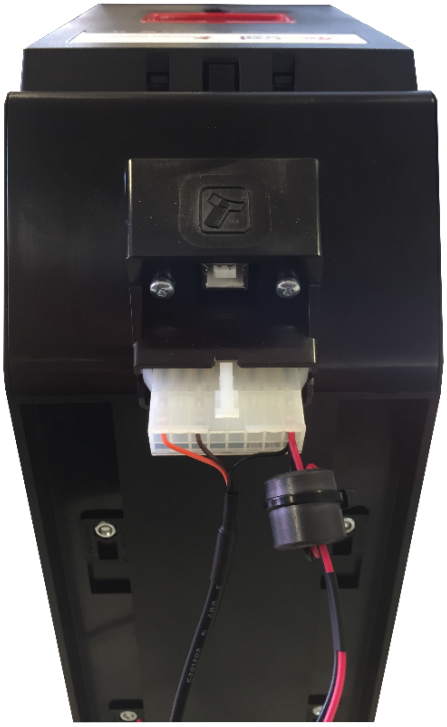
Checking Power Connections

Check to ensure the power cables are correctly connected to the unit as shown in the sections below.

NV200 Spectral Connections

Ensure the NV200 Spectral has power applied, the pin-outs for the relevant connection can be found in Interface Connectors

The NV200 Spectral connector and the IF17 connector are similar, the only difference is the power cables in pins 15 & 16 on the NV200 Spectral connector.



Spectral Payout Connection

The Spectral Payout has a 16-pin molex connector and a USB Type B socket.

These connectors are located on the rear of the module at the bottom

Checking the Supply Voltage

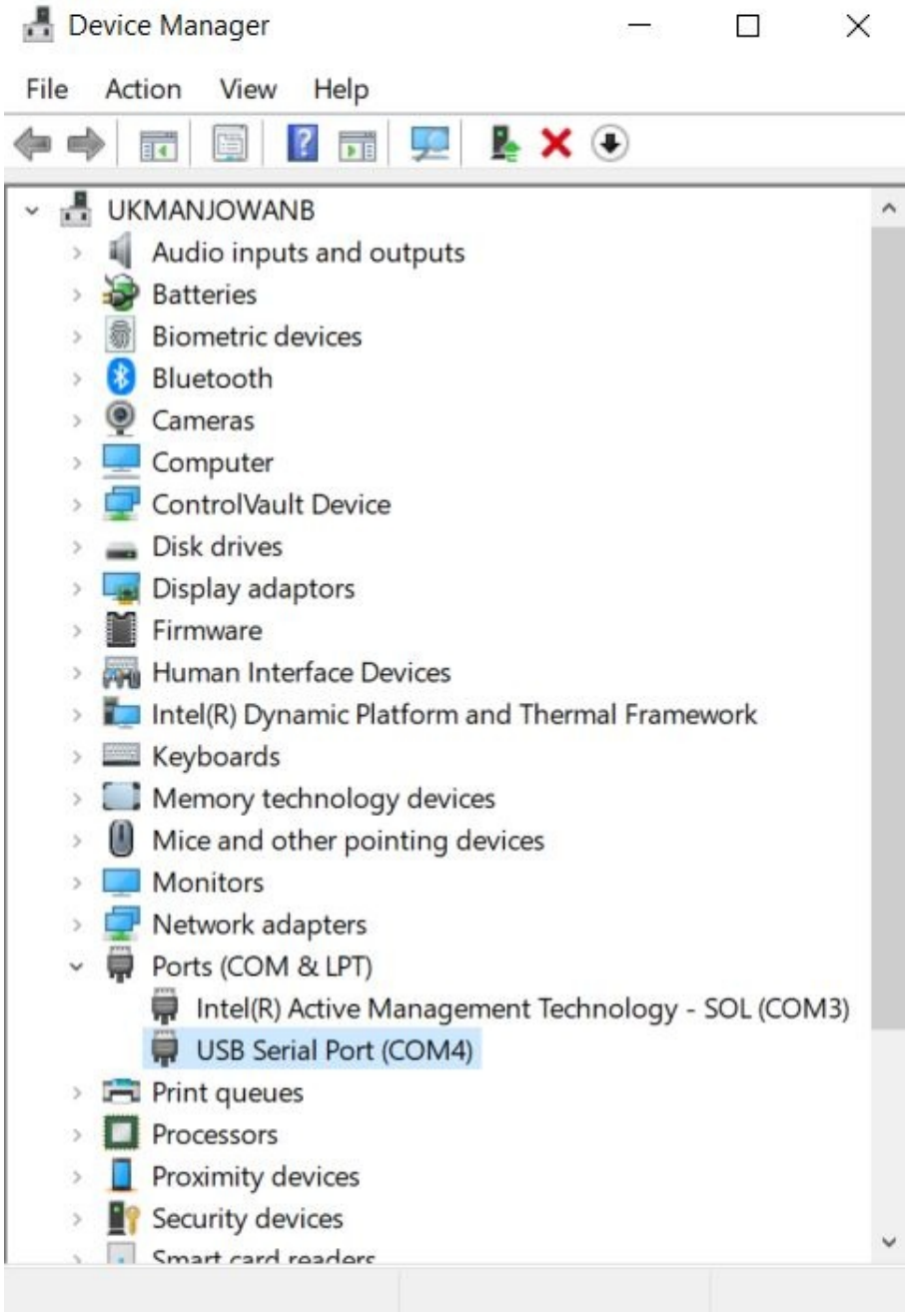
If the power supply seems to be powered and connections to the unit are in place, yet the unit isn't powered, check the voltage output from the power supply is sufficient and the polarity is correct. If this isn't the issue replace the cable as it may have been damaged. Should this not resolve the issue, contact your local repair centre, details of which can be found on our website.

Host Communication

If there is no communication with the host check the communication cable, typically this will be the IF17 and the port on the host system.

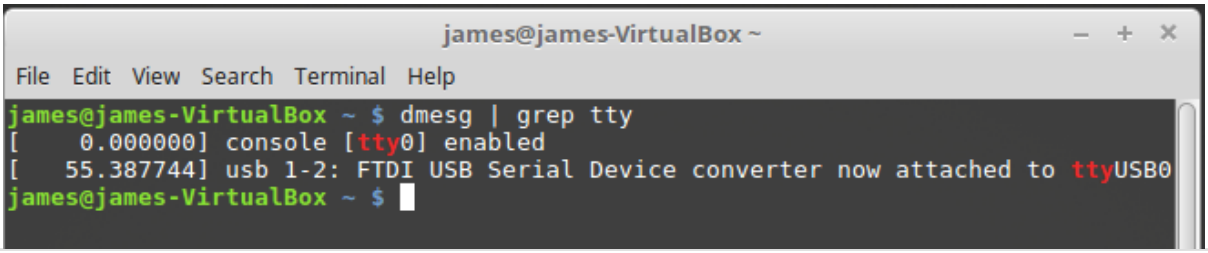
Ensure the cable is connected to the IF17 correctly, so the connectors are fully seated, and the USB cable is connected to the computer.

If the unit is connected, enter device manager and check the active com ports, there should be a device labelled as USB Serial. If no com port is present replace the IF17 and a new device will register.



Check the connection to the host software, if there is still an issue replace the IF17 or switch com ports on the PC. If the unit is detected but there is a yellow triangle next to the serial port, then the drivers should be reinstalled.

For Linux use the dmesg console command as shown below:



Obtaining Logs using SD Card

The NV200 Spectral has 128MB internal memory which is used to capture event and performance logs.

Follow the steps below to retrieve the logs from the NV200 Spectral internal memory:

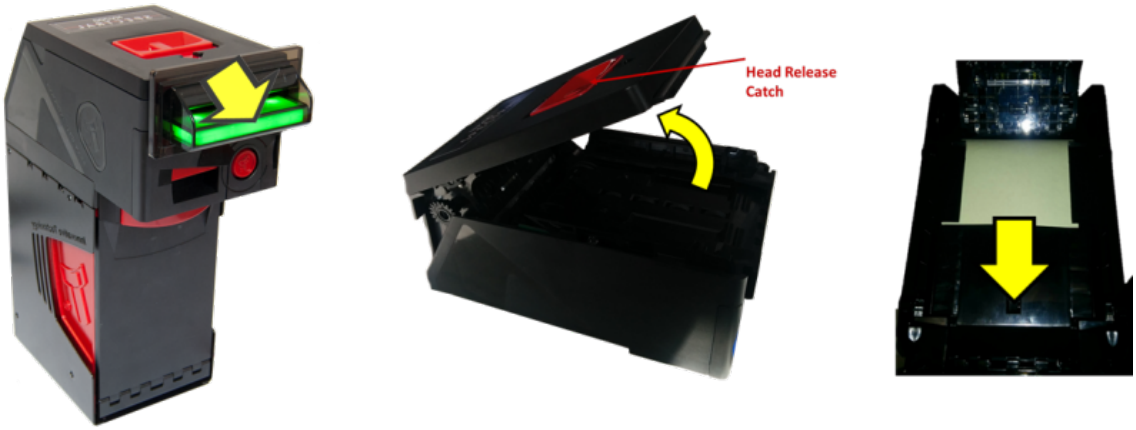
1. Insert blank SD card (FAT32 formatted) into SD slot on front of validator head.
2. Validator bezel will flash alternating colours copying data onto the SD Card.
3. Ones bezel shines green constantly (data copying takes 1-2 minutes usually) remove SD card.
4. Insert this SD card into other units if require.
5. Copy data from SD to your PC, archive and send to ITL support for analysing.

See Dataset/Firmware Programming for the hardware requirements for the SD Card.

Clearing a Jam from the NV200 Spectral

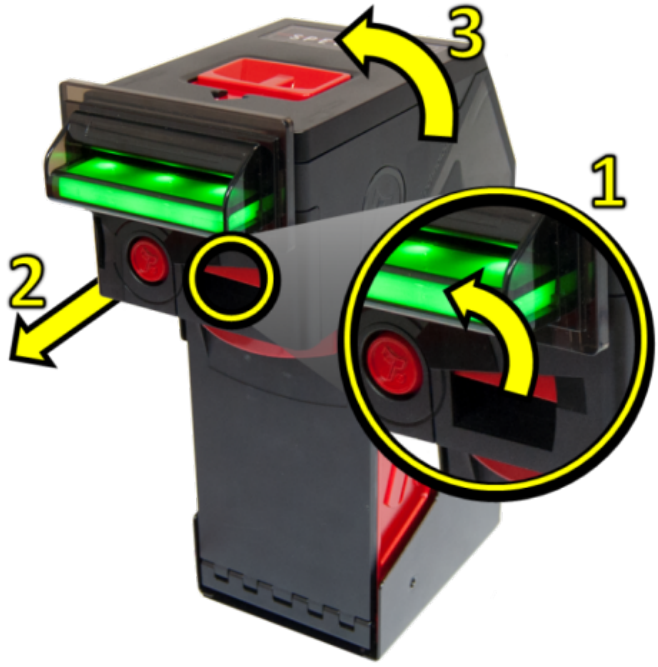
Note is in the note path

If the note is jammed in the note path it is possible to clear the jam by simply lifting the lid by pulling the catch toward you as shown in the picture below. Once the note path is clear you can then carefully pull the note out of the unit. Now shut the head and the unit should re-initialise.



Note is visible once the NV200 Spectral has been removed

To clear this type of jam you will need to disconnect the power and then remove the NV200 Spectral head. Once you remove the head as explained in the picture below, check to see if the note is protruding from the cashbox. If it is, this means the note hasn't been driven down into the cashbox, this jam can be cleared by winding the drive gears on the left of the unit and slowly pulling the note out. Once the note has been removed, replace the NV200 Spectral head and reconnect the power.



Note isn’t visible once the NV200 Spectral has been removed

If the note isn't visible then there is a jam in the cashbox, remove the cashbox by pulling the handle on the front of the cashbox and sliding it forward. Turn the keyless lock to release the barn door, you will now have access to the cashbox to manually remove the note. Usually the note will be resting on or underneath the stack of notes and may be folded or torn. Once the note has been identified slowly pull the note out of the unit. Replace cashbox and the unit should run through internal diagnostics and then be back in service.

Clearing a Jam from the BNF

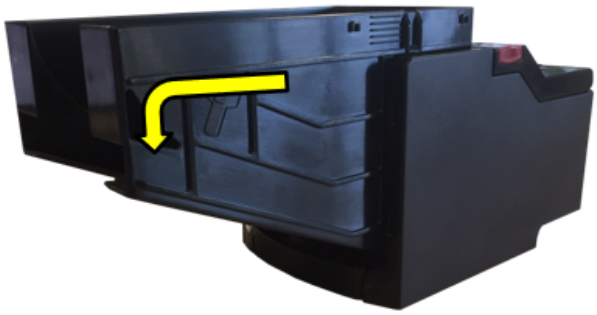
In case of a jam event in the Bunch Note Feeder (BNF), follow the instructions below to clear the note paths.

Ensure the power is removed from the unit before attempting to clear a jam

Remove the BNF Bezel

Pull the bezel forward and down as shown in the picture to unclip the bezel from the front of the BNF.

When it is unclipped, pull forward to fully remove the bezel



Open the Upper Note Path

If the note is jammed on the way into the validator, remove all notes from the BNF bezel.

Open the upper note path by pinching both red latches and lifting the lid. Remove the note or any debris

Clearing a Jam from the Payout Module

If a jam occurs in the Spectral Payout module, the device will attempt to run a jam recovery process, do not interrupt the device while it is doing so. If the jam recovery is unsuccessful the unit will report a Jammed event. Notes than can then be removed manually from the module.

First remove the NV200 Spectral head from the device as described above, then slide the Spectral Payout module upwards to remove it from the chassis.

With Spectral Payout module removed from the chassis, follow the steps below:

Open the access doors

The Spectral Payout has two access doors to allow better serviceability, making
it easier to clear a note jam.
To open the top door: slide the red latch on top of the module forwards, pinch
against the raised edge and lift the door, as per the picture.

To open the second door, press the red latch inside the first door as per the picture.

The second door will spring open.

Notes can now be removed from both areas where visible. Once the notes are removed follow the next step to ensure that tapes are properly tensioned.

Tension tapes

Using the small hex key that comes with the module, wind the tapes slightly until the tapes are properly tensioned. If they are already correctly tensioned then you do not need to wind tapes.

Empty cycle
Once all banknotes are removed from the tape and jam is cleared, it is recommended to run Empty cycle operation to ensure no missed banknotes left
inside.
“Empty” (0x3F) command could be sent to the device from “Valdiator Manager” program, “Commands” tab after your Spectral Payout has been connected to power and finished initial test.

Ensure the power is removed from the unit before attempting to clear a jam

Clearing a Jam from the Safe Interface Module

Clearing a jam from the upper area of the Safe Interface Module is possible without access to the safe.

If a jam occurs between the Note Transport and the cashbox, access to the safe will be required.

Clear Lower Area

Follow the steps above to remove the NV200 Spectral head and Note Transport

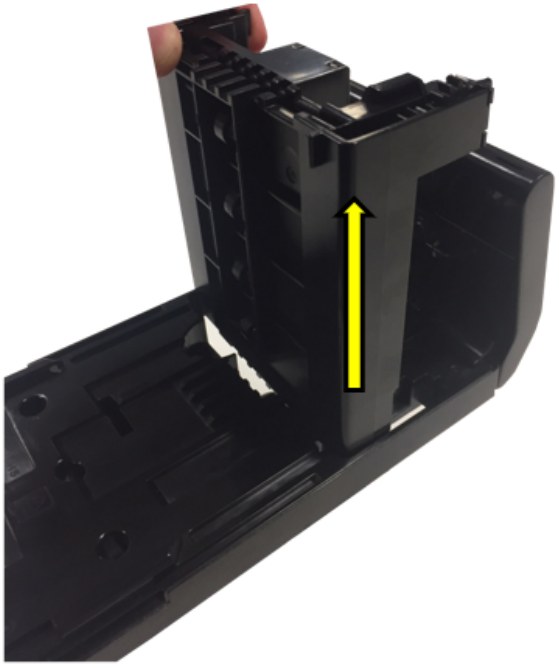
Remove the Inner Docking Plate

Press the red latch on the Inner Docking Plate to unlock it, then slide forward to remove the docking plate from the cashbox chassis

Remove any jammed notes

With the Safe Interface fully removed, clear any jammed notes or debris. Re-assemble in reverse order once cleared.

Clear Upper Area

Remove the NV200 Spectral Head To remove the NV200 Spectral head from the Outer Docking Plate, lift the red latch on the front of the unit and slide the NV200 Spectral Head forward	
Remove the Note Transport With the NV200 Spectral head removed, the Note Transport can be lifted upwards to remove it from the safe. Check the Note transport for jammed notes before inserting back into Outer Docking Plate and re-attaching the head	

Testing after Error Clearance

Once an error has been cleared, ensure the device is tested by inserting bills and paying out notes/tickets where applicable.

A recommended test is 10 notes in and 10 notes/tickets out, this will help limit the number of repeat calls for the same issue.

NV200 Spectral Range Compliances and Approvals

Declaration of Conformity

The NV200 Spectral is fully compliant with the below standards.

- CE
- UKCA
- FCC
- UL
- IEC CB
- RoHS
- REACH

For full details on compliance and to download the certificates, please visit the NV200 Spectral Range Support Hub page.

Central Bank Approvals

As part of continual product improvement central banks are regularly visited to gain product certification.

The NV200 Spectral has received independent validation from the European Central Bank (ECB) and Bank of England (BoE).

WEEE

The European Union's directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) was adopted by the European Council and Parliament in 2003 with a view to improving the collection and recycling of Waste Electrical and Electronic Equipment throughout the EU, and to reduce the level of non-recycled waste. The directive was implemented into law by many EU member states during 2005 and 2006. Products and packaging that display the symbol (shown left) indicates that this product must NOT be disposed of with other waste. Instead it is the user's responsibility to dispose of their Waste Electrical and Electronic Equipment by handing it over to an approved re-processor, or by returning it to the original equipment manufacturer for reprocessing.

NV200 Spectral Range Appendix

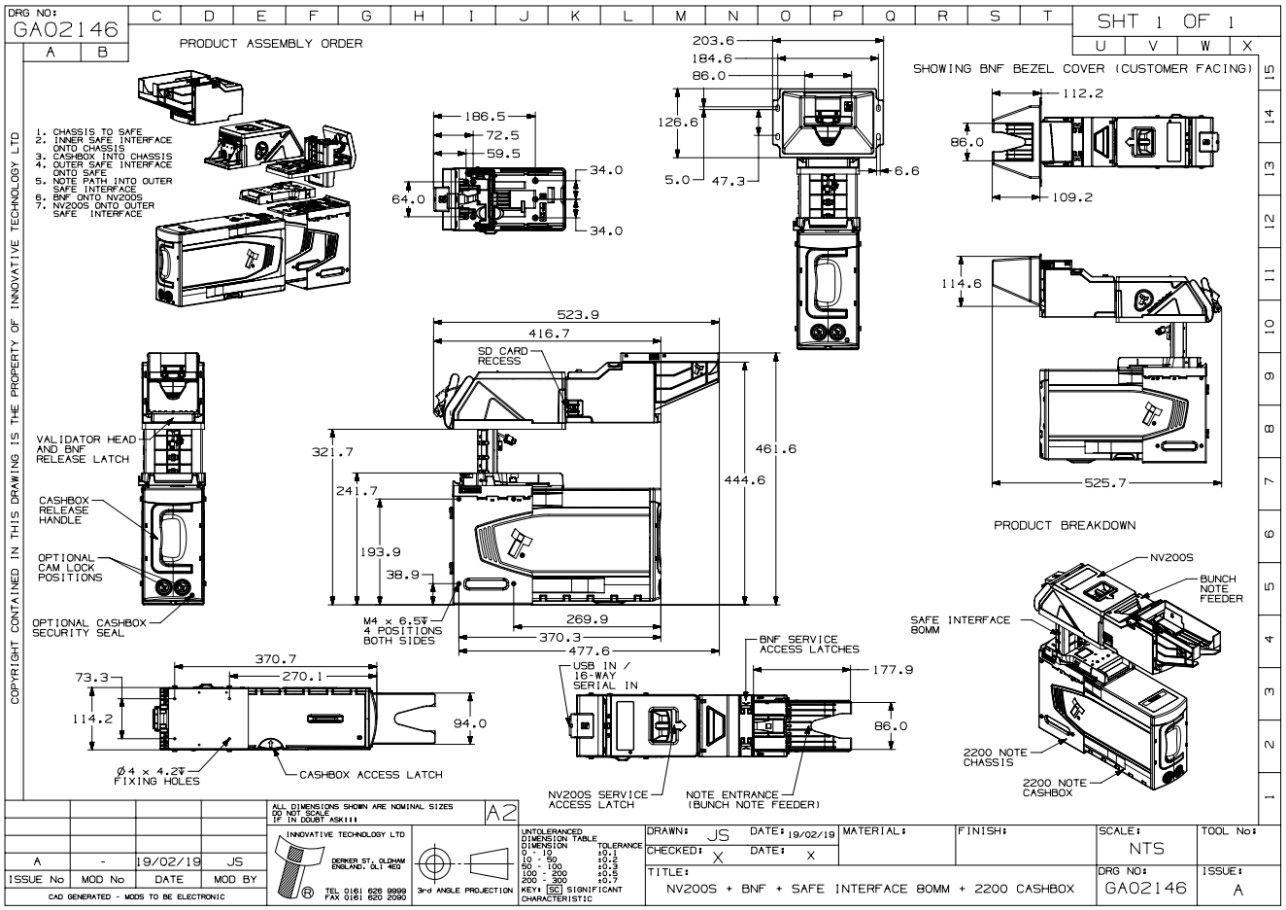
Contents

Cable Drawings

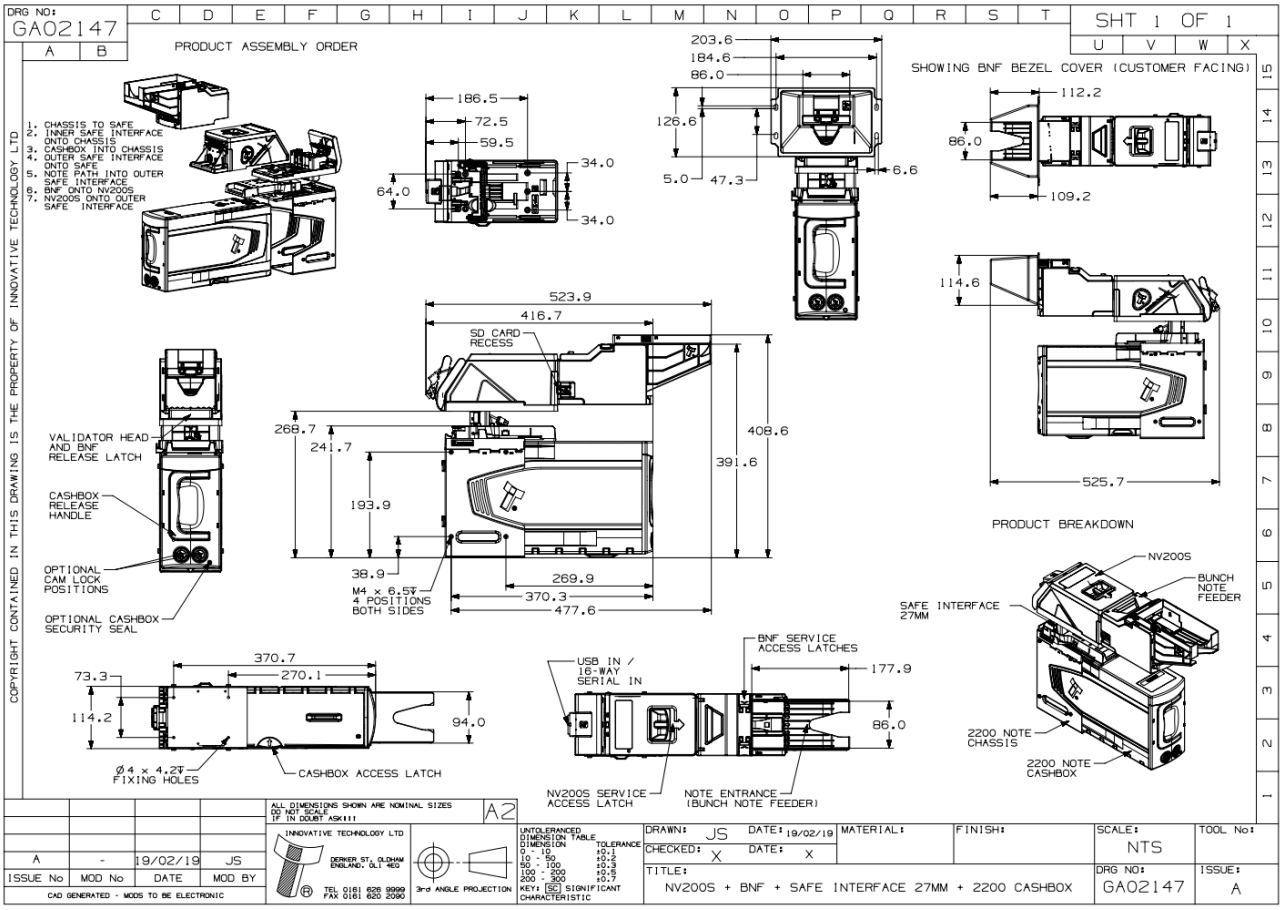
Dimensional Drawings

If required, .stp 3D models are available on request from ITL technical support.

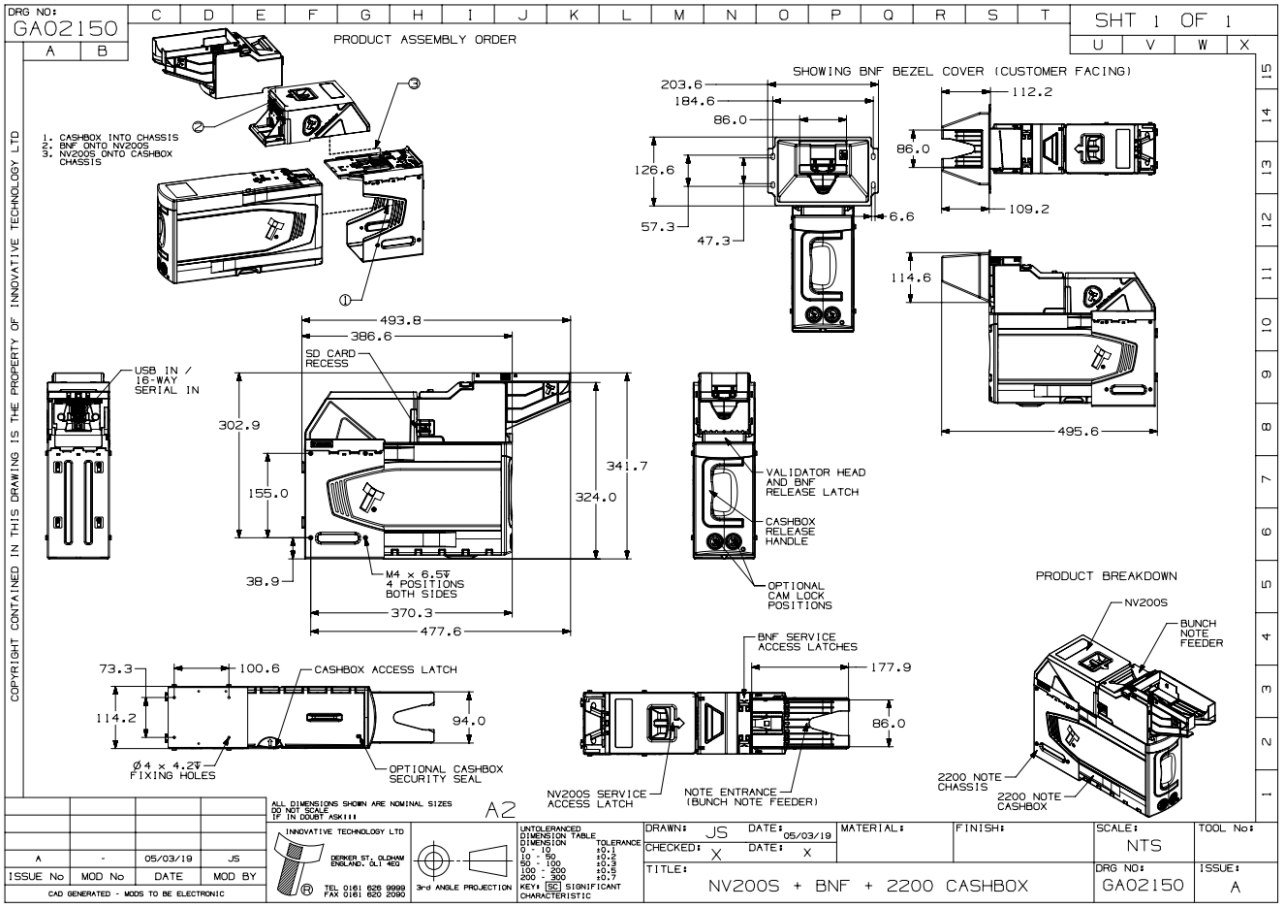
NV200S + BNF + 80mm Safe Interface + 2200 Cashbox



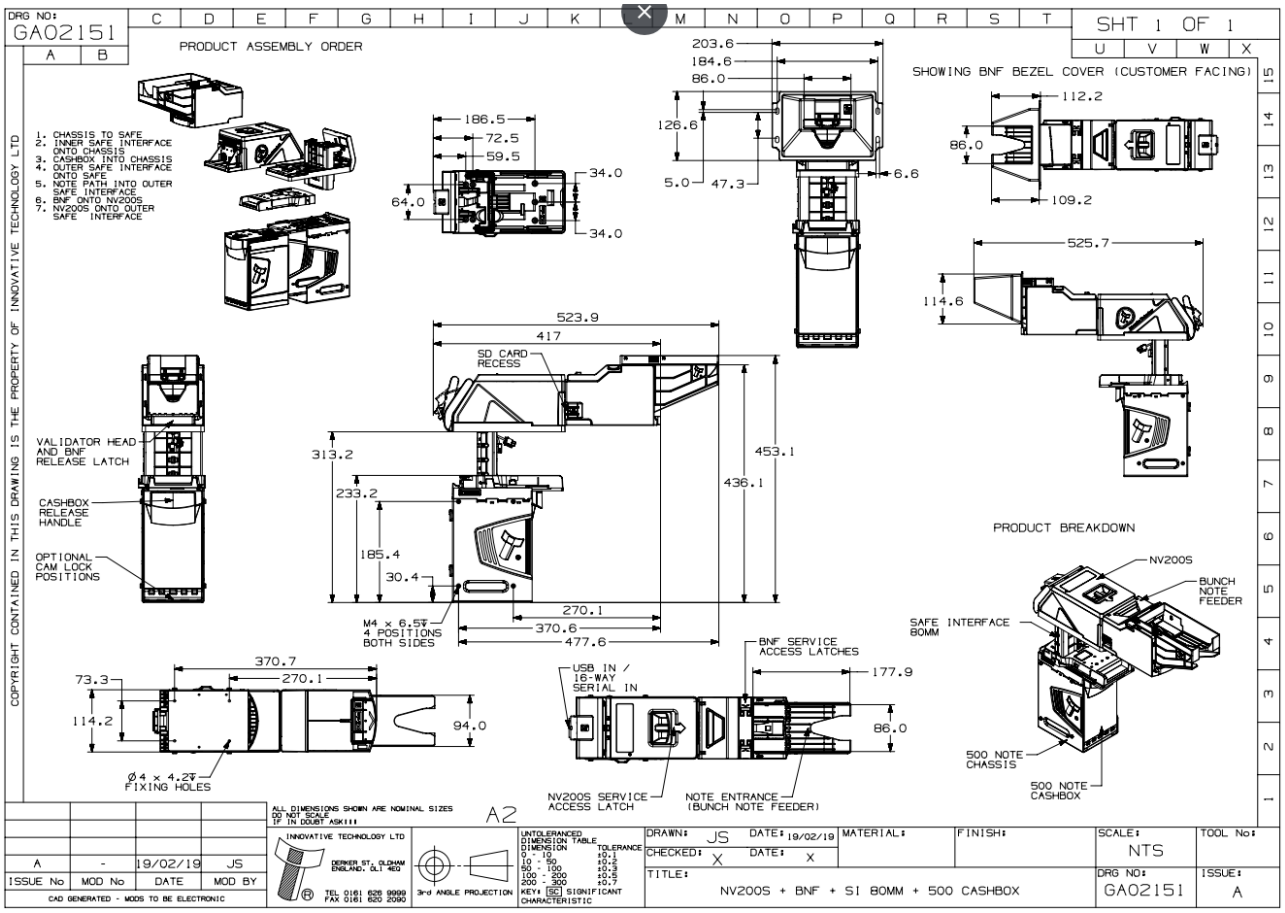
NV200S + BNF + 27mm Safe Interface + 2200 Cashbox



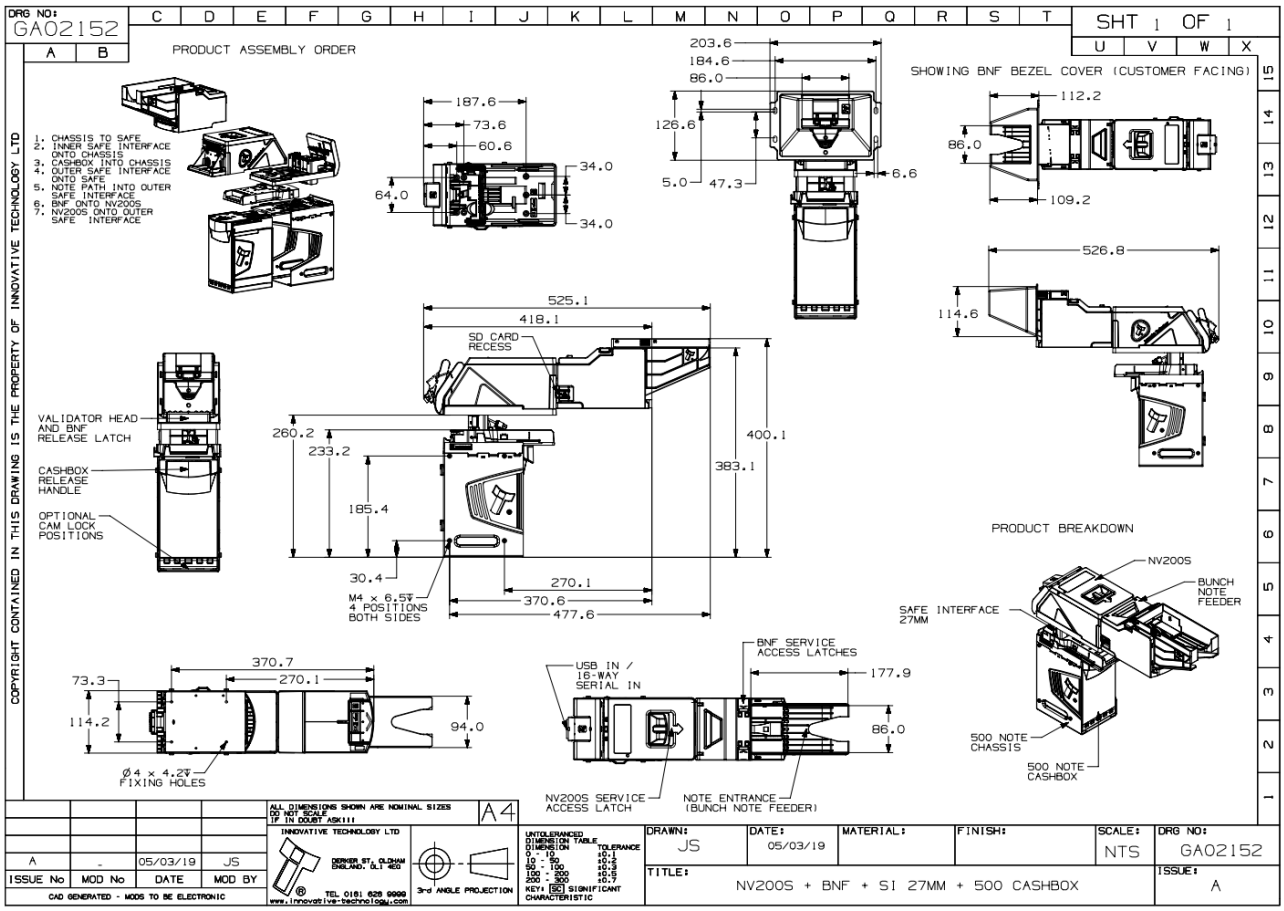
NV200S + BNF + 2200 Cashbox



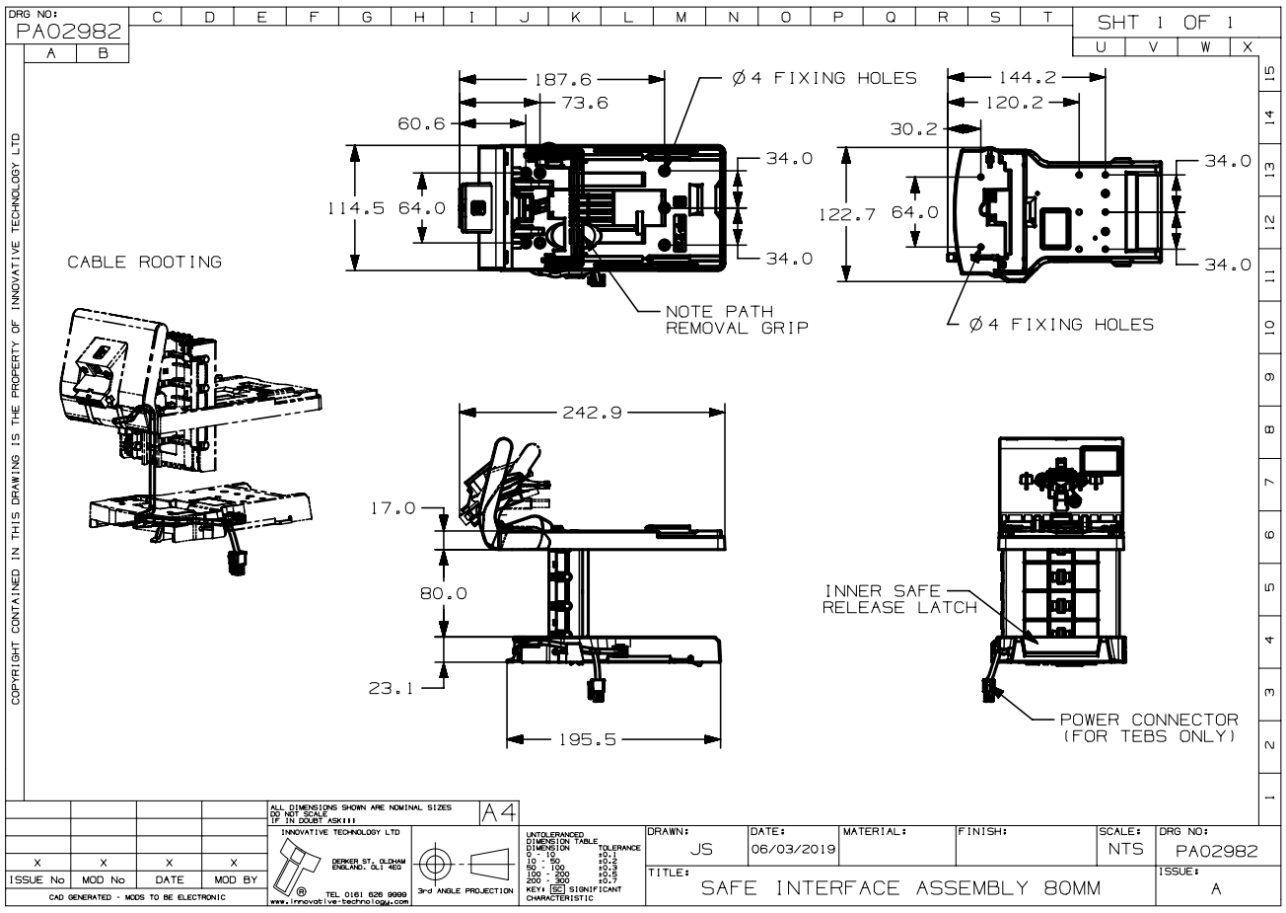
NV200S + BNF + 80mm Safe Interface + 500 Cashbox



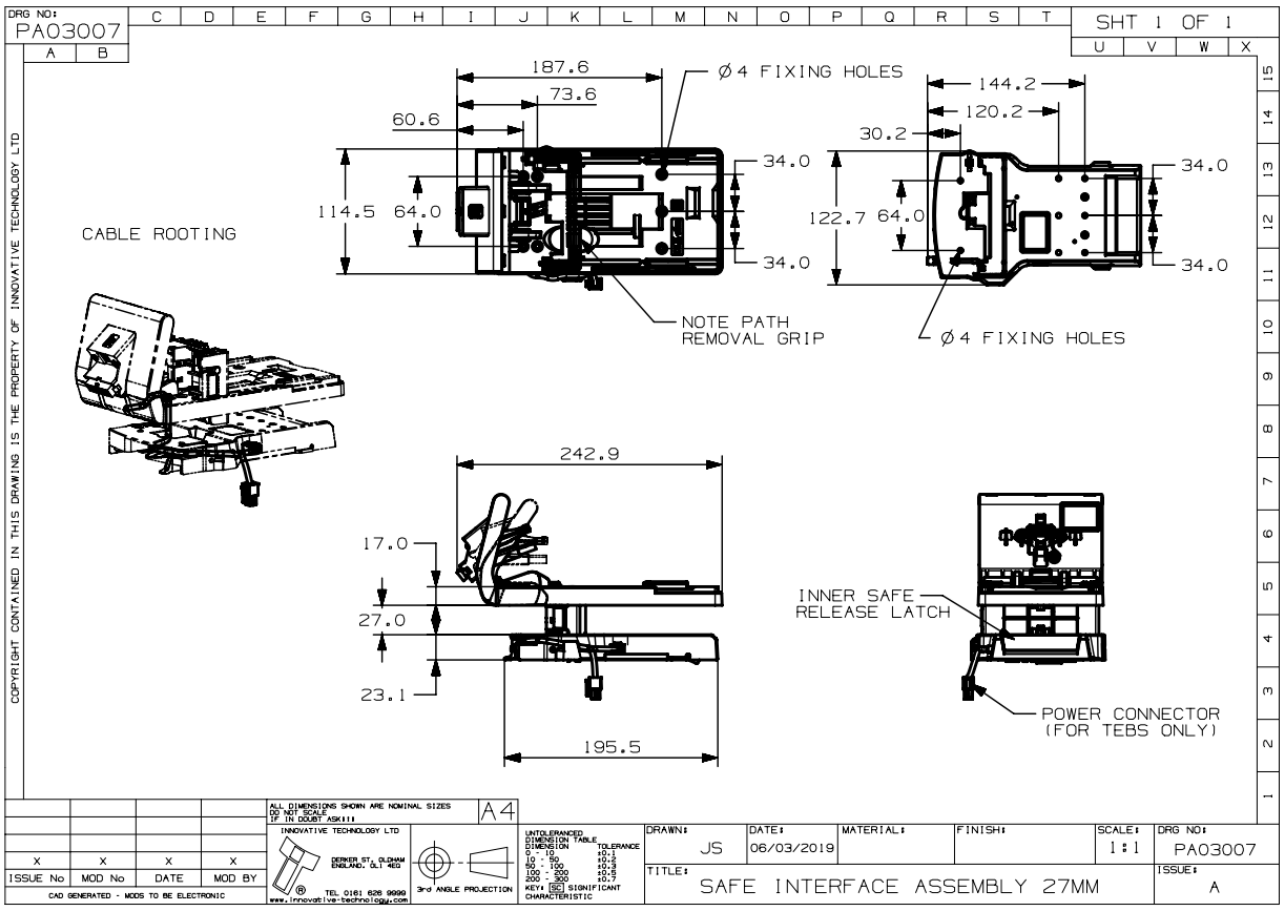
NV200S + BNF + 27mm Safe Interface + 500 Cashbox



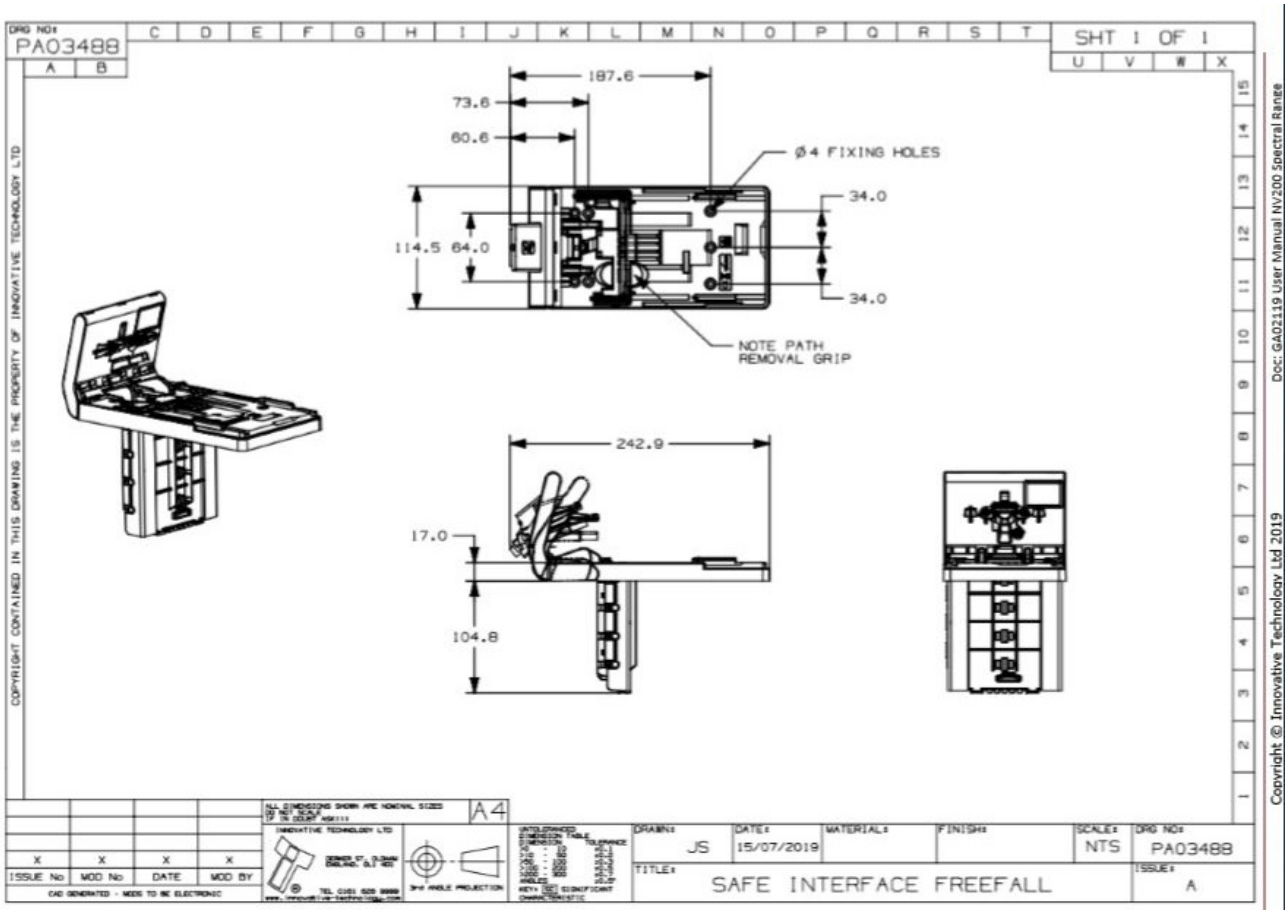
80mm Safe Interface



27mm Safe Interface

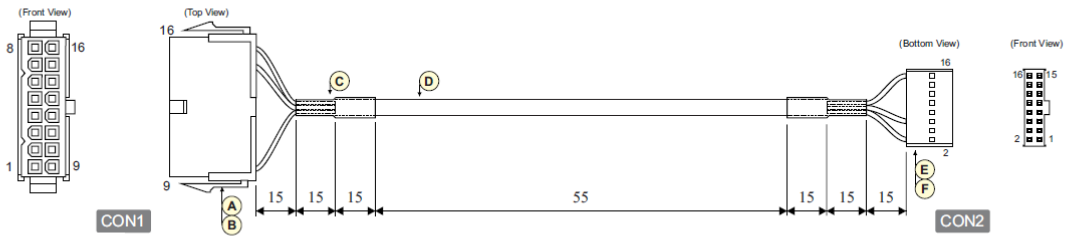


Safe Interface Stackerless



WR00147 - SMART Payout to NV200 Adapter

DRAWING NO. WR147 ISSUE A1



Parts List

Item	QTY	Description	Vendor
A	1	0039012166 plug housing (2x8way 4.2mm pitch Mini-Fit Jr)	Molex
B	4	0039000126 male crimp (phosphor bronze, tin plated, 18-24AWG)	Molex
C	2	30mm long, black heat shrink sleeve	-
D	1	4-core AWM style 2462 22AWG cable	-
E	1	90142-0016 housing (2x8way 2.54mm pitch with key)	Molex
F	4	9733272 tin plated crimp	Molex

Connectivity

CON1 Pin	CON2 Pin	Gauge (AWG)	Colour	Comments
16	1	24	White	SSP_TXD_(Vend1)
14	5	24	Green	SSP_RXD_(Inhibit1)
9	15	22	Red	V_IN
1	16	24/22	Black	GND

Note to Manufacturers

Certificates are needed for the following:

■ RoHS compliance ■ UL94-V0 rated (connector housing) ■ UL94-VW1 rated (all other parts)

All dimensions are in mm ±5mm, unless specified

INNOVATIVE TECHNOLOGY LTD
DERVENT ST, OLDHAM
ENGLAND, OL1 4RD
UNITED KINGDOM
TEL: +44(0)161 626 9999
FAX: +44(0)161 626 2580
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3rd Angle Projection — NOT TO SCALE

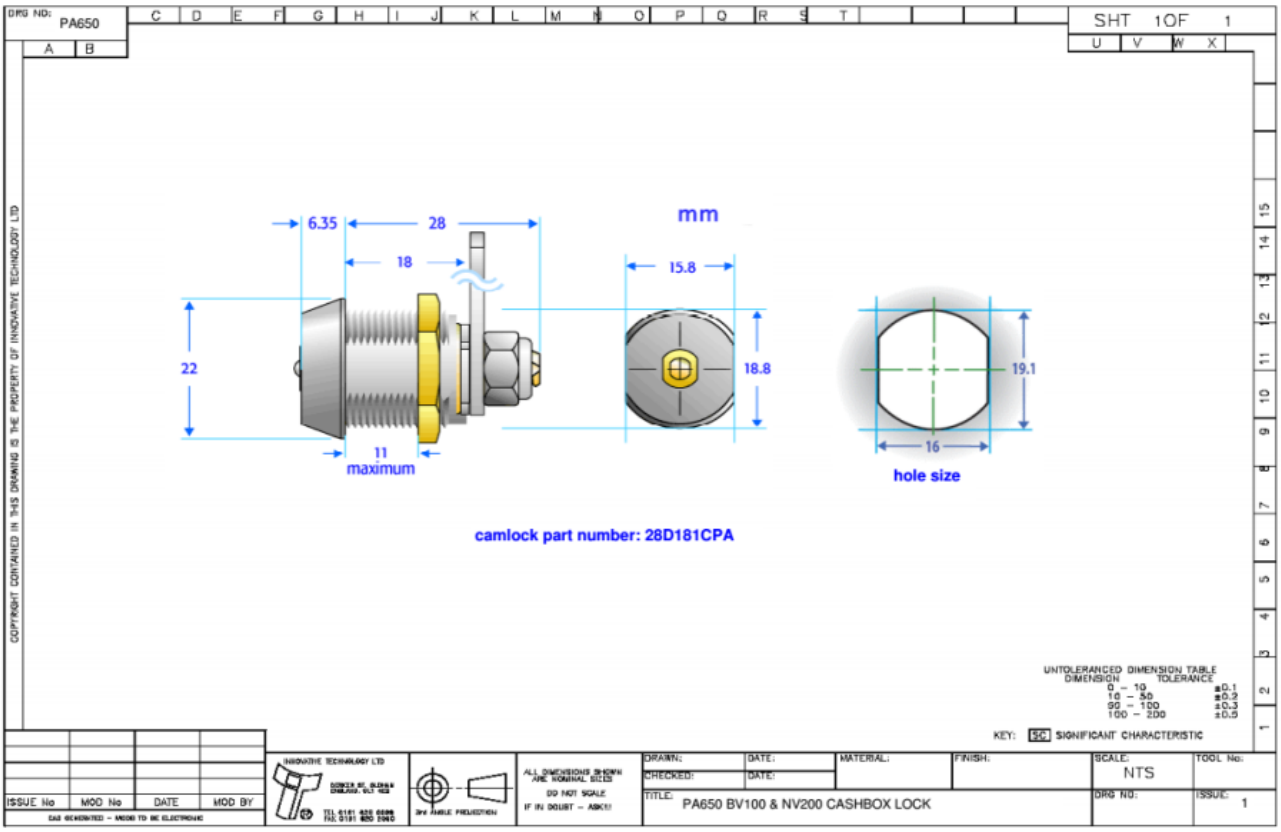
TITLE: Smart Payout to NV200 adapter harness

DRAWN BY	DATE	MATERIAL
A Lunsong	02/10/12	All parts must be rated to at least UL94-VW1. All connector housings must be rated to UL94-V0. Must be RoHS compliant.
CHECKED BY	DATE	FINISH
-	-	-

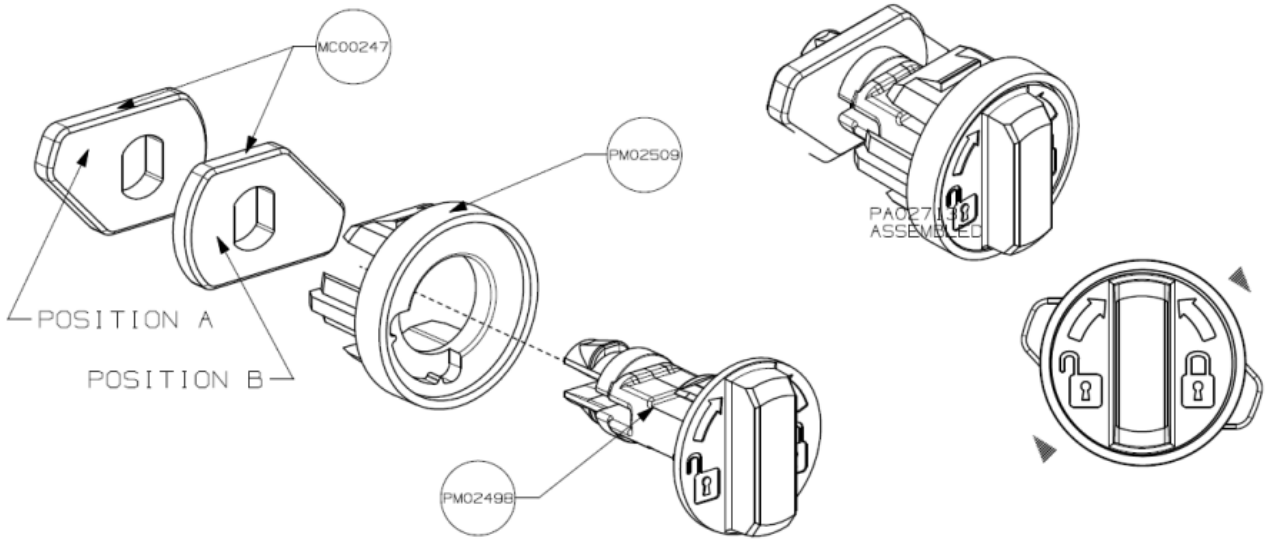
ISSUE NO.	MOD NO.	DATE	MOD BY
-	-	-	-
-	-	-	-
A1	-	02/10/12	A Lunsong

Lock Specifications

PA00650 Camlock



Keyless Locking Cam



Connector Specifications

Type	Vendor	Part Number	Pins	Pitch	Polarising
Housing	Leotronics	2652-2161	2x8	2.54mm	With Key

Type	Vendor	Part Number	Pins	Pitch	Polarising
Crimp	Leotronics	2653-2000			Female
Housing	Molex	90142-0016	2x8	2.54mm	With Key
Crimp	Molex	90119-2121			Female

Switching to Programming Mode (SSP)

If fitted, remove the Payout or Ticket modules. Power the NV200 Spectral, once the unit has initialised toggle **dip-switch 8** up and down.

To switch the unit back repeat the procedure explained above.

> Risk of unit damage
>
> When in programming mode and performing an update, do not turn off the power before the operation is complete as this could make the unit unusable.

Freefall Cashbox Advice

The NV200 Spectral cashbox and TEBS cash bag has been designed to remain intact after an impact of 75cm onto a concrete floor. Dropping the cashbox multiple times can result in physical damage to the cashbox/bag.

ccTalk DES Encryption - Trusted Mode

Ensure the NV200 Spectral has been configured to use DES encryption in Validator Manager, this setting can be found on the options tab. To pair the NV200 Spectral with a DES trusted machine follow the steps below:

1. Remove power from the unit then remove the cashbox
2. Re-power the unit, once the unit has started it should be in pairing mode.

> If a Spectral Payout module is connected the unit must be empty before it can pair to the host.

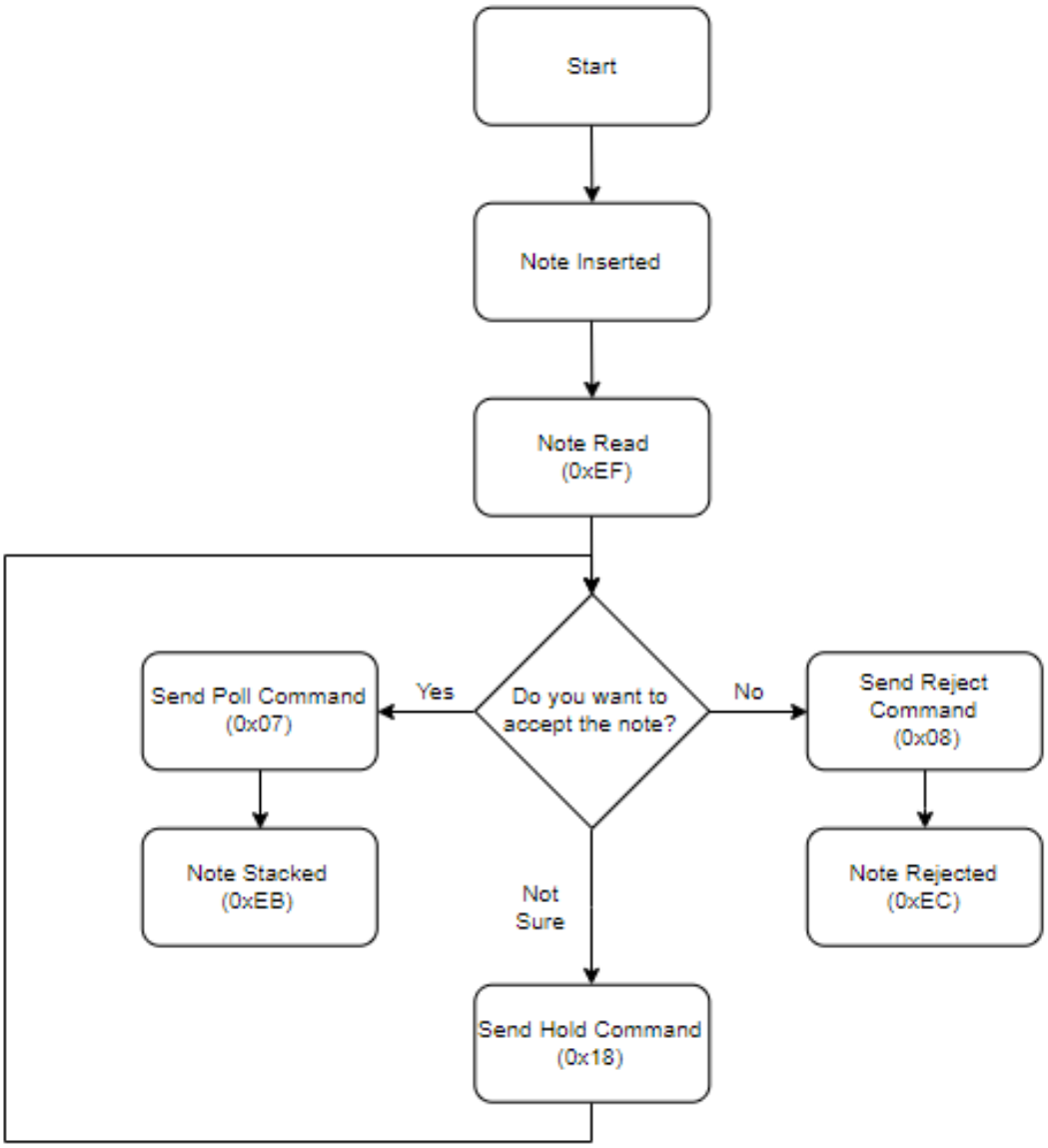
Escrow

The NV200 Spectral has a single note escrow facility. This allows the NV200 Spectral to hold onto the note once validated, and only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. If no confirmation of the Vend is received, the note will be returned to the user after 30 seconds.

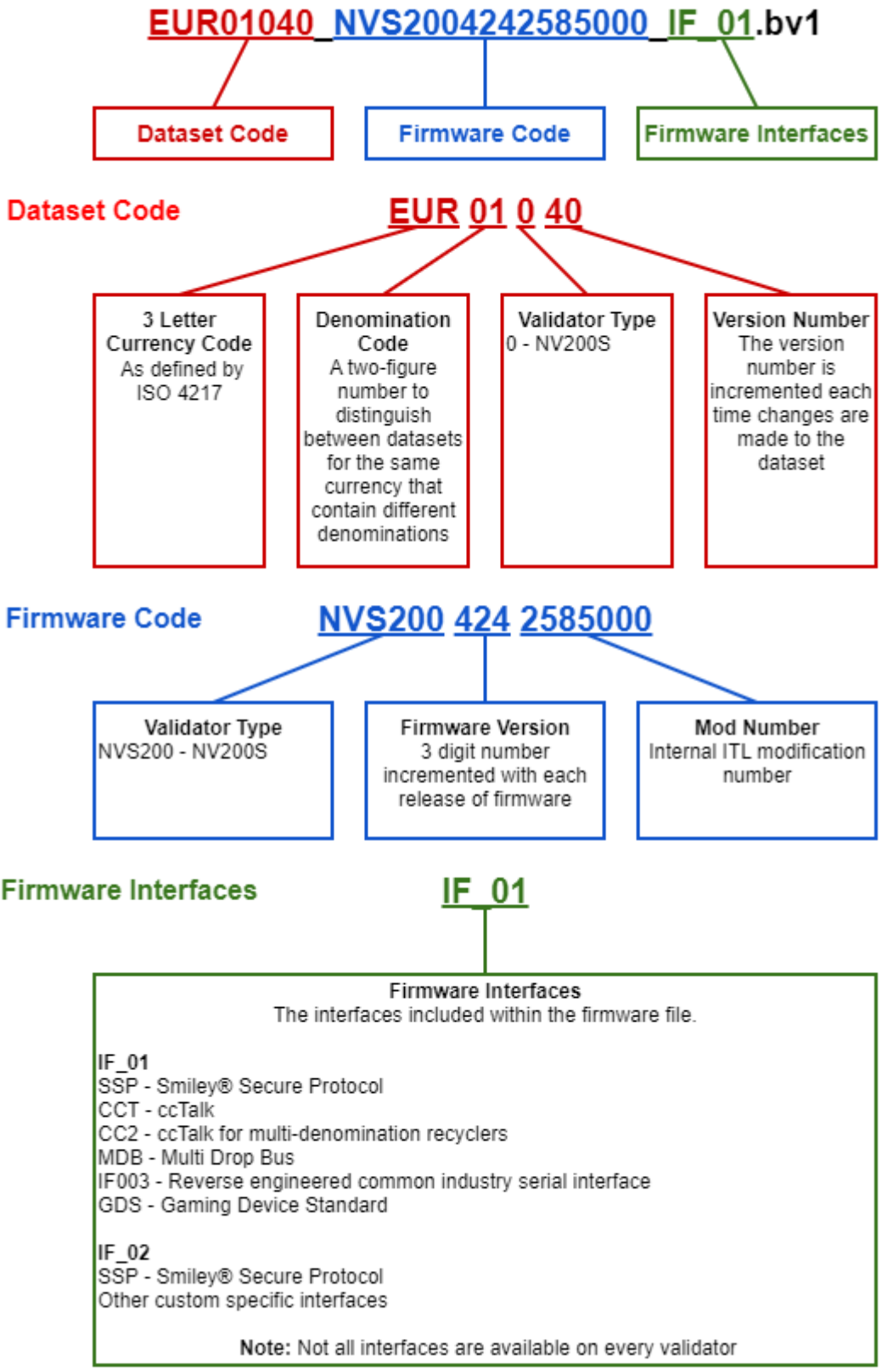
If the host machine itself aborts the transaction by sending the reject command (0x08). Similar commands can be sent depending on the protocol used. For information relating to other protocols contact support.

Escrow Control

The NV200 Spectral has a single note escrow facility. This allows the NV200 Spectral to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the vend operation has been completed. The sequence of operation is as follows:


Start
Note Inserted
Note Read
(0xEF)
Do you want to
accept the note?
Yes
No
Not
Sure
Send Poll Command
(0x07)
Note Stacked
(0xEB)
Send Reject
Command
(0x08)
Note Rejected
(0xEC)
Send Hold Command
(0x18)

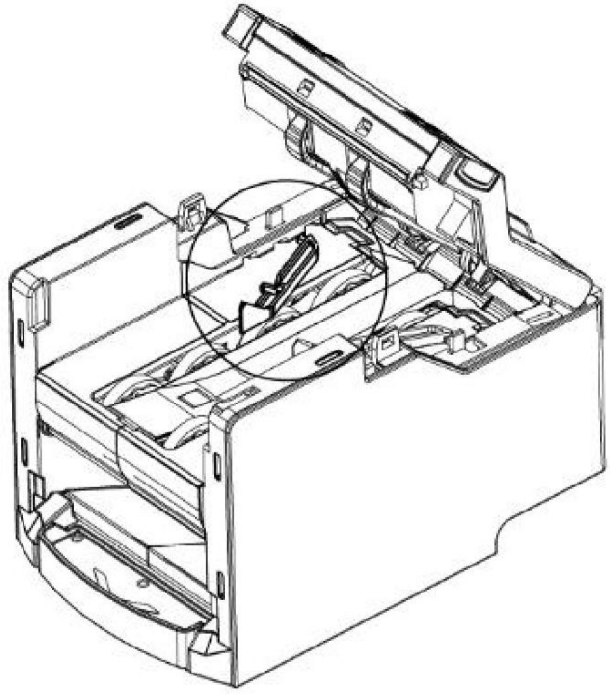
File Naming Convention

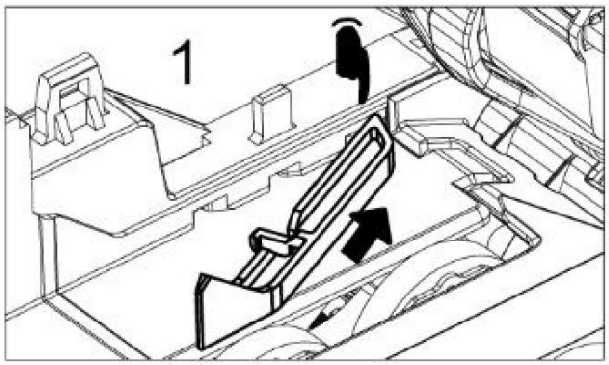


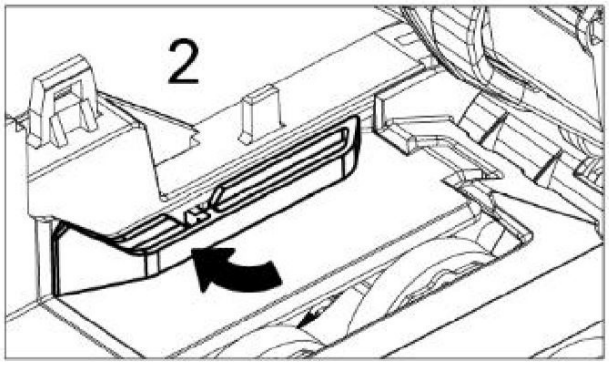
BNF Path Guide Inserts

Not required for Build Revision ≥ 2.0

The Bunch Note Feeder is supplied with a set of plastic inserts that can be clipped into the note path.



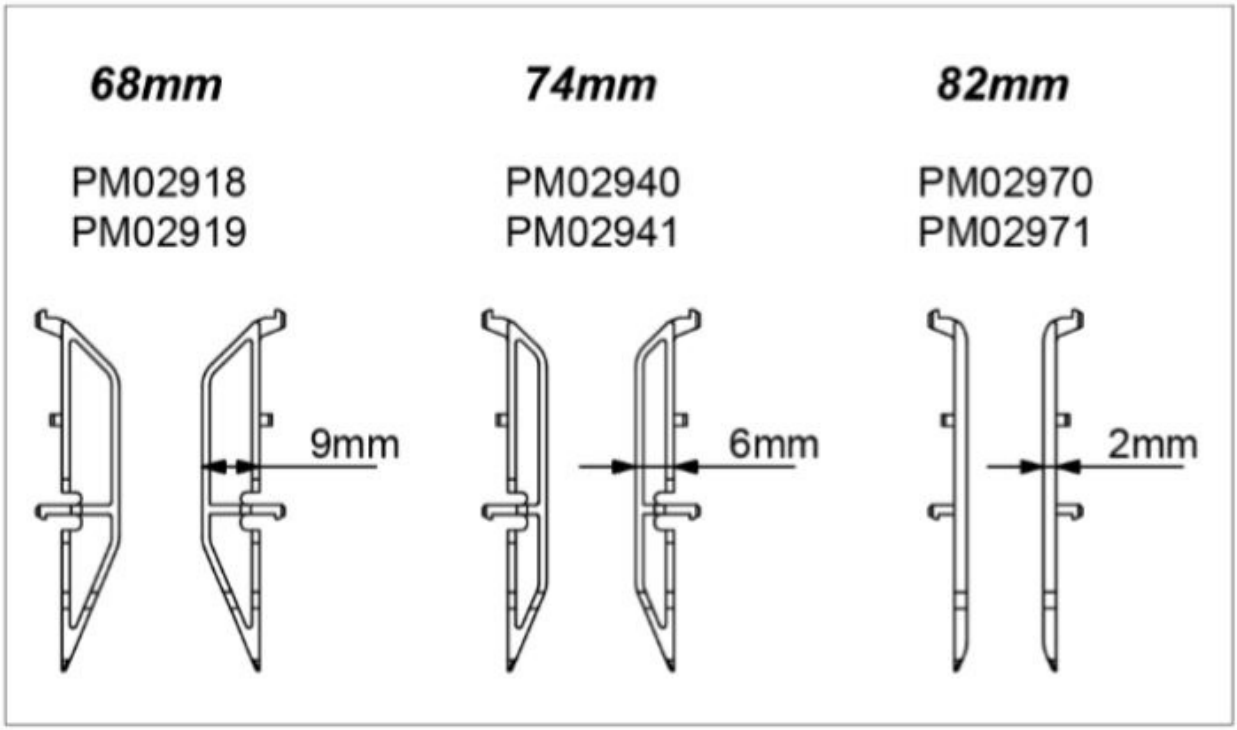




These adjust the note path width to optimise performance for different currencies. The table below shows the recommended path inserts for some of the different currencies*:

Required path insert	Currency datasets
68mm	ARS, AUD, CRC, IDR, MDL, MXN, PHP, SEK, USD
74mm	AED, AZN, BOB, BRL, BYN, CAD, CHF, CLP, COP, CZK, DKK, HUF, INR, MYR, NOK, PEN, RUB, SAR, THB, TRY, TWD, ZAR
82mm	BGN, CNY, EUR, GBP, JPY, KZT, PLN, RON, RSD, SGD, UAH, UZD

***Recommended inserts shown for datasets with most of denominations included.**



If the currency you are using is not listed, use the insert that is closest to the maximum width denomination of that currency. If the maximum note width is bigger than the widths shown above, do not attach any of the inserts.

2200 Note Cashbox Lock Inserts

The 2200 note cashbox can be fitted with a range of coloured inserts around the locks as shown in the picture below:

These are fitted in the same way as the lock, refer to Lock Mounting for instructions.

NV200 Spectral Range Disclaimer and Safety Information

Contents

Disclaimer

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The contents of this manual set may be subject to change without prior notice.

Product Safety Information

Throughout this user manual, attention should be drawn to key safety points when using or maintaining the product.

These safety points will be highlighted in a box:

This is an example text.

This user manual and the information it contains is only applicable to the model stated on the front cover and must not be used with any other model.

⚠ **Danger!**	**IR and UV Radiation**
	• Possible skin or eye damage due to presence of IR and UV radiation internally. Disconnect power before servicing • Use PPE measures • Follow safety precautions given in IEC 62471