Innovative Technology

INTELLIGENCE IN VALIDATION

SMART Coin System

[GA02085]

USER MANUAL

Doc: GA02085 User Manual SMART Coin System Version: 1.3

Document Name:	User Manual SMART Coin System GA02085
Document Version:	1.3
Date of Release:	29.11.2017

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1 DOCUMENT INTRODUCTION

1.1 Related Documents

This document should be read together with the following:

For SSP/eSSP:

Protocol Manual – SSP (GA138): SSP Interface Protocol Specification for integration

SSP Implementation Guide (GA973): Information for programmers and integrators

For other third-party interface protocols please contact support@innovative-technology.com.

1.2 Manual Amendments

Rev.	Date	Amendment Details	Issued by
1.0	05.05.2017	- First Issue	SG
1.1	01.06.2017	- Layout amendments - Wording amendments	SG
1.2	19.06.2017	- Disclaimer added	SG
1.3	29.11.2017	- Updated Cable drawing (CN00389 and CN00398) - Wording amendments - Layout amendments - Energy Profiles added - Product Label Description added	SG

1.3 Copyright

1.4 Limited Warranty

Innovative Technology Ltd warrants each of its hardware products to be free from defects in workmanship and materials under normal use and service for a period commencing on the date of purchase from Innovative Technology Ltd or its Authorized Reseller, and extending for the length of time stipulated by Innovative Technology Ltd.

A list of Innovative Technology Ltd offices can be found on the ITL website. If the product proves defective within the applicable warranty period, Innovative Technology Ltd will repair or replace the product. Innovative Technology Ltd shall have the sole discretion whether to repair or replace, and any replacement product supplied may be new or reconditioned.

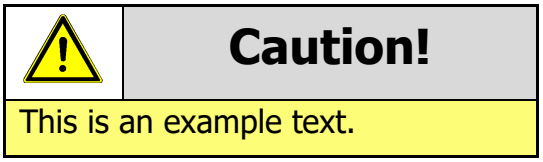
The foregoing warranties and remedies are exclusive and are in lieu of all other warranties, expressed or implied, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose.

Innovative Technology Ltd shall not be liable under this warranty if it's testing and examination disclose that the alleged defect in the product does not exist or was caused by the customer's or any third person's misuse, neglect, improper installation or testing, unauthorized attempts to repair, or any other cause beyond the range of the intended use. In no event will Innovative Technology Ltd be liable for any damages, including loss of profits, cost of cover or other incidental, consequential or indirect damages arising out the installation, maintenance, use, performance, failure or interruption of an Innovative Technology Ltd product, however caused.

1.5 Product Safety Information

Throughout this user manual, we may draw your attention to key safety points that you should be aware of when using or maintaining the product.

These safety points will be highlighted in a box, like this:



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 make or model.

1.6 Disclaimer

Innovative Technology Ltd 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.

Innovative Technology Ltd has a policy of continual product improvement. As a result, the products supplied may vary from the specification described here.

Innovative Technology Ltd does not accept liability for any errors or omissions contained within this document. Innovative Technology Ltd shall not incur any penalties arising out of the adherence to, interpretation of, or reliance on, this standard.

Safety Notice! Read before using this product!

Safety Notice - Warning. Ensure power is removed before allowing access to the inside of this product. Ensure any static build up is discharged before allowing access to any part of this product or media contained. Always earth this product/base plate in accordance with the manual.

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The power supply terminals and/or connectors are: Not investigated for field wiring
- The investigated Pollution Degree is: 2
- The following end-product enclosures are required: Mechanical, Fire

Sicherheitshinweis – Warnung: Es muss sichergestellt werden, dass das Gerät von der Versorgungsspannung getrennt wird, bevor ein Eingriff in das Innere des Gerätes erfolgt. Es muss sichergestellt werden, dass jegliche statische Aufladung des Gerätes entladen wird, bevor auf das Gerät oder auf innerhalb des Gerätes befindliche Objekte zugegriffen wird. Die Erdung des Gerätes muss immer gemäß Handbuch erfolgen.

Nur für die Verwendung in oder mit kompletter Ausstattung, dessen Eignung und Kombination von der UL LLC ermittelt wurde. Bei der Installation in einem Endproduckt, muss folgendes berücksichtigt werden:

- Die Spannungsversorgungsklemmen und/oder Verbinder sind: Feldverkabelung wurde nicht untersucht
- Der untersuchte Verschmutzungsgrad ist: 2
- Folgende Anforderungen an die Gehäuse des Endproduktes sind gefordert: Mechanisch, Feuer

Aviso de seguridad: Asegúrese de que la alimentación está desconectada y de que toda la energía estática es descargada antes de manipular este producto. Conecte a tierra la chapa base de la manera que se indica en el manual.

Solo para uso con dispositivos con los cuales la compatibilidad ha sido certificada por UL LLC. Tras su instalación en producto acabado, tener en cuenta lo siguiente:

- Los conectores y terminales de alimentación son: No se ha investigado/especificado cableado externo.
- El grado de contaminación determinado es: 2
- Los siguientes manuales/certificados de producto final son requeridos: Mecánico, Fuego

Avis de sécurité : Assurez-vous que l'alimentation est coupée et que toute l'énergie statique est déchargé avant de manipuler ce produit. Connecter à la terre, la plaque de base à la manière indiquée dans le manuel.

A utiliser Seulement avec les dispositifs dont la compatibilité a été certifiée par UL LLC. Après son installation dans le produit fini, prendre en considération ce qui suit:-

- Les connecteurs et les bornes d'alimentation sont : cela n'a pas été étudié/spécifié câblage externe.
- Le degré de contamination déterminé est: 2
- Les manuels suivants / les certificats du produit final sont nécessaires : mécanique, incendie

Bezpečnostní upozornění. Před manipulací uvnitř tohoto produktu se ujistěte, že je produkt odpojen od zdroje elektrického napětí. Ujistěte se, že jakýkoliv elektrostatický náboj byl vybit před manipulací s jakoukoliv částí tohoto produktu nebo obsaženým médiem. Vždy uzemněte tento produkt/základovou desku v souladu s návodem.

Pouze pro použití v nebo s kompletním vybavením, kde je přijatelnost kombinace určena UL LLC. Při instalaci v konečném produktu je třeba zvážit nasledující:

- Napájecí svorky a/nebo konektory: Nejsou sledované pro externí kabeláž
- Sledovaný stupeň znečištění je: 2
- Následující krytí konečného produktu jsou požadované: Mechanické, Protipožární

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2 PRODUCT INTRODUCTION

2.1 General Description

The SMART Coin System is a state of the art bulk coin validator, mixed coin hopper and recycler in one. The unit validates, discriminates and stores mixed coins, eliminating coin starvation & the need for multiple hoppers. With a market leading coin hopper capacity and fully audited, efficient refills the SMART Coin System is designed to eliminate coin starvation and significantly reduce operator collection costs. Operating at a market leading 12 coins per second the SMART Coin System improves operator cashflow, significantly reducing collection costs.

2.2 Key Features

- State of the art bulk coin validator, hopper & recycler
- Eliminates coin starvation
- Market leading coin capacity, acceptance and payout speed
- Lowest cost of ownership
- High security - multi frequency sensing technology

2.3 Typical Applications

- Gaming
- Retail & Kiosk

2.4 Component Overview

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3 MECHANICAL INSTALLATION

3.1 Compatibility

3.1.1 Hardware Compatibility

3.1.1.1 Machine Mounting

Assuming the suitable Base Plate is ordered within the SMART Coin System it can be used as fitting replacement for the SMART Hopper 3.

Innovative Technology Ltd. has a policy of continuous product improvement. Due to design changes, older model or product additionals (Baseplate) may not be compatible with the SMART Coin System. However, new product deliveries always include a Base Plate that must be used.

	**Caution!**
Only use Base Plate delivered with the product!	

3.1.1.2 Machine Interfacing

By design the SMART Coin System is pin to pin compatible with the suitable fitting replacement product listed above if you are using the suitable Base Plate for the SMART Coin System. No changes to existing machine harnessing are required.

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3.1.1.3 Power Supply

It is vital that the SMART Coin System is connected to a power supply being able to provide the required power environment. A weak power supply causes malfunctioning of the SMART Coin System such like coin rejects or missing credits. If the SMART Coin System is used as a fitting replacement for an older model or product we recommend to check 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 SMART Coin System. The SMART Coin System might have higher power consumption. Refer to 7.4 for full power requirement details of the SMART Coin System.

	Caution!
	A weak power supply causes malfunctioning!

3.1.2 Software Compatibility

3.1.2.1 Interface Protocols

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

	Caution!
	Timing issues may cause missing events such like credits!

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3.1.2.2 Re-programming

For re-programming the SMART Coin System always use the latest version of Validator Manager available for download on our website. Older versions may not support the SMART Coin System. For further details on Re-programming the SMART Coin System refer to 4.2.

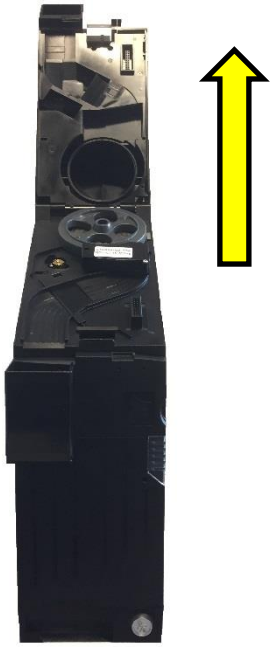
	Caution!
	Older versions of Validator Manager may not support the SMART Coin System!

3.2 Nozzle Mounting

3.2.1 Nozzle Removal

1. **Pressing the Front Latch**
   Press the Latch on the Coin Feeder to open the Lid of the Coin Feeder.

2. **Lift the Lid**
   Lift the Lid of the Coin Feeder back to the End Position.



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3. **Nozzle Removal**
   Move the Nozzle Up until it will release.

3.2.2 Nozzle Fitting

1. **Pressing the Front Latch**
   Press the Latch on the Coin Feeder to open the Lid of the Coin Feeder.

2. **Lift the Lid**
   Lift the Lid of the Coin Feeder back to the End Position.

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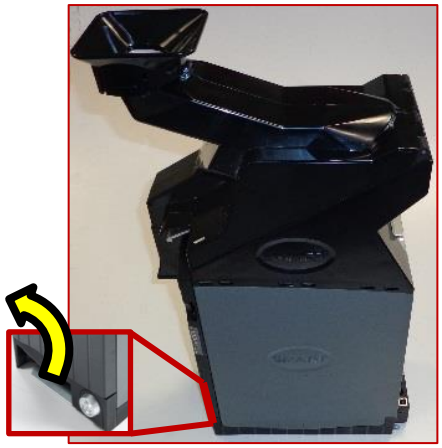
3. **Nozzle Fitting**
   Move the Nozzle Down until it will engage.

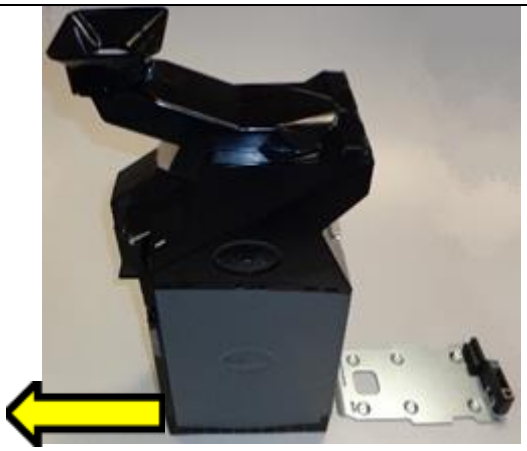
3.3 Baseplate Mounting

3.3.1 Baseplate Removal

1. **Pressing the Latch**
   Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate.



2. **Baseplate Removal**
   Slide the SMART Coin System from the Plate.



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3.3.2 Baseplate Fitting

1. **Baseplate Fitting**
   Slide the SMART Coin System on the Baseplate.

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3.4 Lock Mounting

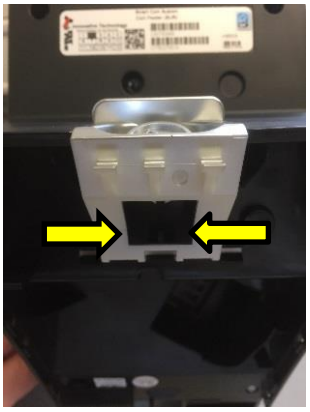
3.4.1 Lock Fitting Coin Feeder

1. **Pressing the Front Latch**
   Press the Front Latch on the Coin Feeder to open the Lid of the Coin Feeder.

2. **Pressing the Rear Latch**
   Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

3. **Detachment of the Coin Feeder**
   Move the Coin Feeder to the SMART Hopper back. Now move the Coin Feeder up.

4. **Removing the Coin Feeder Rear Latch**
   Clip the Latch out of position with a flat screw driver.



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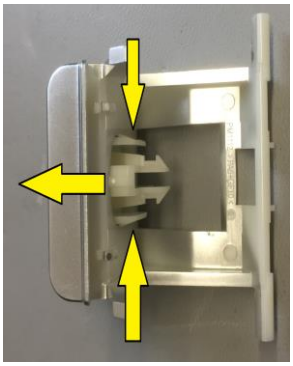
5. **Removing Lock Blank Plug**
   Press the 2 clips on the Left and Right Side of the Plug and press the Plug out of the Latch.



6. **Inserting the Lock**
   Insert the Lock instead of the Plug.

7. **Fixture of the Lock**
   Attach the nut on the Lock to fix the Lock on the Latch.

8. **Lock Cam**
   Attach the Lock Cam on the Lock.

9. **Fixture of the Lock Cam**
   Attach the Nut on the Lock to fix the Cam on the Lock.

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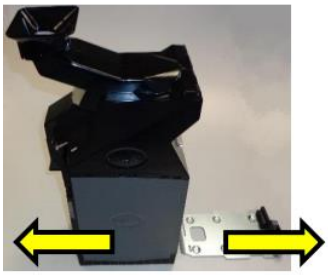
10. **Latch Attachment**
    Clip the Latch with the Lock back to its Position.

3.4.2 Lock Fitting SMART Hopper

1. **Base Plate Removal**
   Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate and slide the SMART Coin System from the Baseplate.



2. **Pressing the Front Latch**
   Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

3. **Pressing the Rear Latch**
   Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

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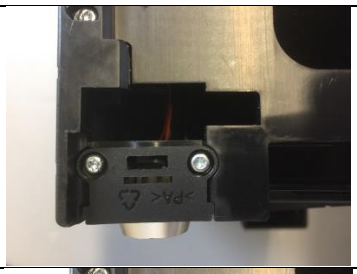
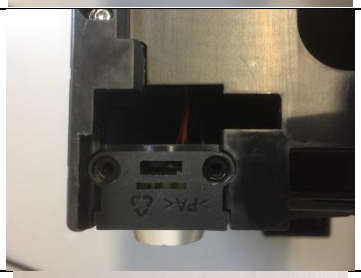
4. **Detachment of the Coin Feeder**
   Move the Coin Feeder to the SMART Hopper back. Now move the Coin Feeder up.

5. **Rotate the SMART Hopper**
   Rotate the SMART Hopper to have the Bottom of the SMART Hopper Up.



6. **Screw Removal**
   Unscrew the 2 Screws which fix the Lock Bracket.



7. **Lock Bracket Removal**
   Remove the Lock Bracket with an flat screwdriver.

8. **Plug Removal and insert the Lock**
   Press the 2 clips on the Left and Right Side of the Plug and press the Plug out of the Bracket Insert the Lock instead of the Plug.

9. **Fixture of the Lock**
   Attach the nut on the Lock to fix the Lock on the Bracket.

10. **Lock Cam**
    Attach the Lock Cam on the Lock.

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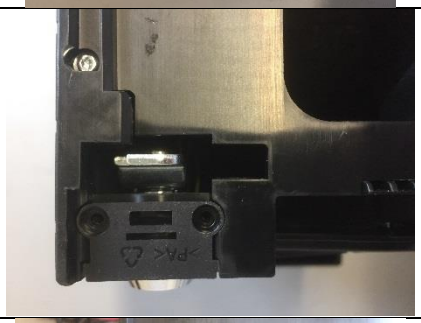
11. Fixture of the Lock Cam

Attach the Nut on the Lock to fix the Cam on the Lock.

12. Bracket Assembly

Insert the Bracket with the Lock back to its position.



13. Screw Onto

Screw on the Bracket with the Lock.

14. Back to Operation

Rotate the SMART Hopper to its original Position, attach the Coin Feeder and slide the SMART Coin System on the Baseplate.

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3.4.3 Lock Removal Coin Feeder

1. **Pressing the Front Latch**
   Press the Front Latch on the Coin Feeder to open the Lid of the Coin Feeder.

2. **Pressing the Rear Latch**
   Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

3. **Detachment of the Coin Feeder**
   Move the Coin Feeder to the SMART Hopper back. Now move the Coin Feeder up.

4. **Removing the Coin Feeder Rear Latch**
   Clip the Latch out of position with a flat screw driver.

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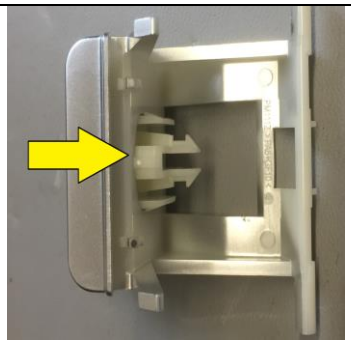
5. **Nut Removal**
   Unscrew the Nut on the Lock.

6. **Lock Cam**
   Detach the Lock Cam from the Lock.

7. **Unscrew the Lock Fixture Nut**
   Unscrew the Nut which hold the Lock in position.

8. **Lock Removal**
   Slide the Lock out of its position.

9. **Blank Plug Fitting**
   Slide the Plug in its position until the clips clip in.



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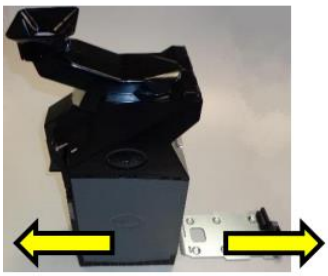
10. Latch Attachment

Clip the Latch with the Plug back to its Position.

3.4.4 Lock Removal SMART Hopper

1. Base Plate Removal

Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate and slide the SMART Coin System from the Baseplate.



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2. Pressing the Front Latch

Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

---

3. Pressing the Rear Latch

Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

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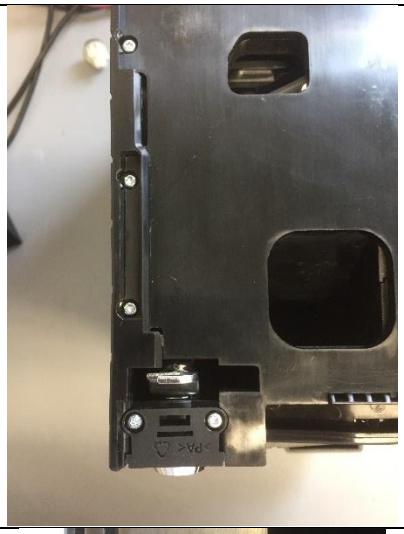
4. Detachment of the Coin Feeder

Move the Coin Feeder to the SMART Hopper back. Now move the Coin Feeder up.

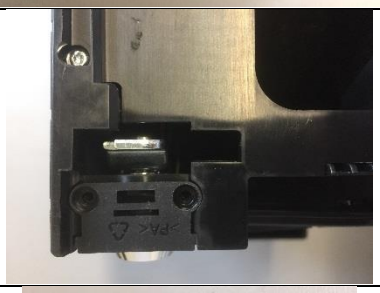
5. Rotate the SMART Hopper

Rotate the SMART Hopper to have the Bottom of the SMART Hopper Up.



6. Screw Removal

Unscrew the 2 Screws which fix the Lock Bracket.



7. Lock Bracket Removal

Remove the Lock Bracket with an flat screwdriver.

8. Nut Removal

Unscrew the Nut on the Lock.

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9. LockCam

Detach the Lock Cam from the Lock.

10. Unscrew the Lock Fixture Nut

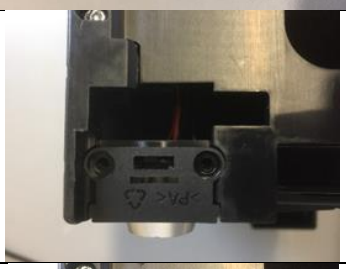
Unscrew the Nut which hold the Lock in position.

11. Lock Removal and Blank Plug Fitting

Slide the Lock out of its position and slide the Plug in its position until the clips clip in.

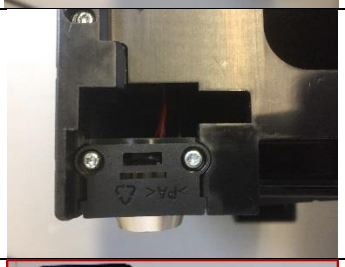
12. Bracket Assembly

Insert the Bracket with the Plug back to its position.



13. Screw Onto

Screw on the Bracket with the Plug.



14. Back to Operation

Rotate the SMART Hopper to its original Position, attach the Coin Feeder and slide the SMART Coin System on the Baseplate.

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3.4.5 Lock Specifications

Locks for the SMART Coin System are available from Innovative Technology Ltd.

ITL Part Number: PA00650

Webshop Link: http://innovative-technology.com/shop/smart-hopper-spares/lock-detail

However, there are various lock manufacturers and distributors. Refer to Appendix 11.2 for lock specification.

3.4.6 Lock Cam

The following Lock Cam needs to be ordered from Innovative Technology Ltd. additionally to the lock for full locking capability.

ITL Part Number:

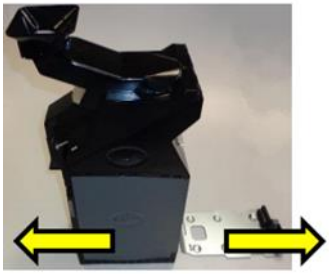
SMART Hopper 4 - MC00211

Coin Feeder - MC00367

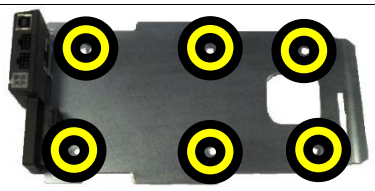
3.5 Machine Mounting

3.5.1 Machine Mounting

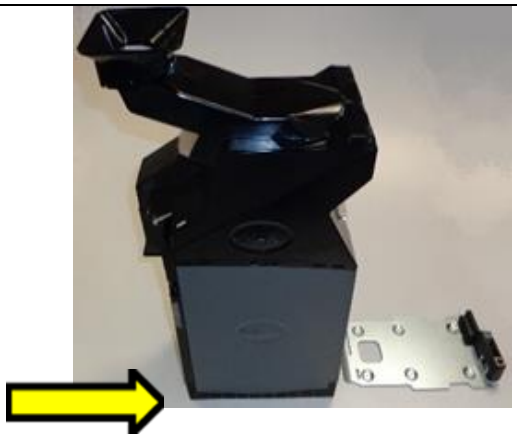
1. **Base Plate Removal**
   Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate and slide the SMART Coin System from the Baseplate.



2. **Base Plate Fixture**
   To Build in the Baseplate in the Host Machine, Screw on the Baseplate with six screws.



3. **Baseplate Fitting**
   Slide the SMART Coin System on the Baseplate.

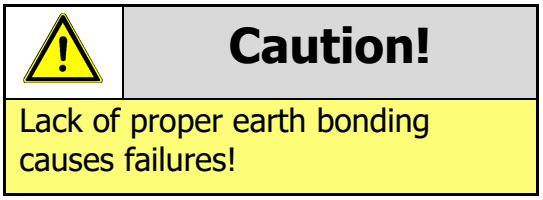


3.5.2 Earth Bonding

It is very important that the SMART Coin System is properly bonded to earth. Lack of proper bonding can cause communication issues and other failures.

The earth bond should be made to any of the 6 holes in the bottom of the base plate and be bonded to mains earth, typically through the Power Supply Unit.

The resistance between the base plate and the Earth pin on the mains plug should be less than 0.7 ohms.



3.5.3 Screw Specifications

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

	Head Diameter		Head Height		Bolt Diameter		Bolt Length	
Type	Min	Max	Min	Max	Min	Max	Min	Max
Flat Head	6mm	11mm	/	3,4mm	/	5mm	/	/
Pan Head	6mm	11mm	/	3,4mm	/	5mm	/	/

4 SOFTWARE INSTALLATION AND CONFIGURATION

4.1 Introduction

The SMART Coin System leaves the factory pre-programmed with the latest dataset and firmware files. However, it is important to ensure your device is kept up to date with the latest dataset and firmware. This section will give you a brief overview of the various update possibilities with the SMART Coin System. For detailed instructions please refer to the relevant manual package supplied with the software or contact support@innovative-technology.com.

4.2 Software Downloads

All software from Innovative Technology Ltd is free of charge and can be downloaded from the website www.innovative-technology.com/support/secure-download once registered and logged in. If you are not registered, please create an account via the Create an account form. A confirmation email will be sent to the registered email address once all contact details have been successfully submitted.

4.3 Drivers

The ITL drivers allow you to connect any of our validators to a compatible Windows device. If you are connecting via an IF17 then you will not need to follow this process as they are signed Microsoft Drivers and should install automatically. If this isn't the case or your computer is disconnected from the network, there is a standalone package included within the driver downloads.

4.4 Dataset/Firmware Programming

4.4.1 Validator Manager

4.4.1.1 General Description

Validator Manager is a utility which allows the user to reprogram any of ITL's validators, hoppers as well as coin and note recycler. Please note that admin rights are required during installation. The validator must be in SSP for the Validator Manager to detect the device.

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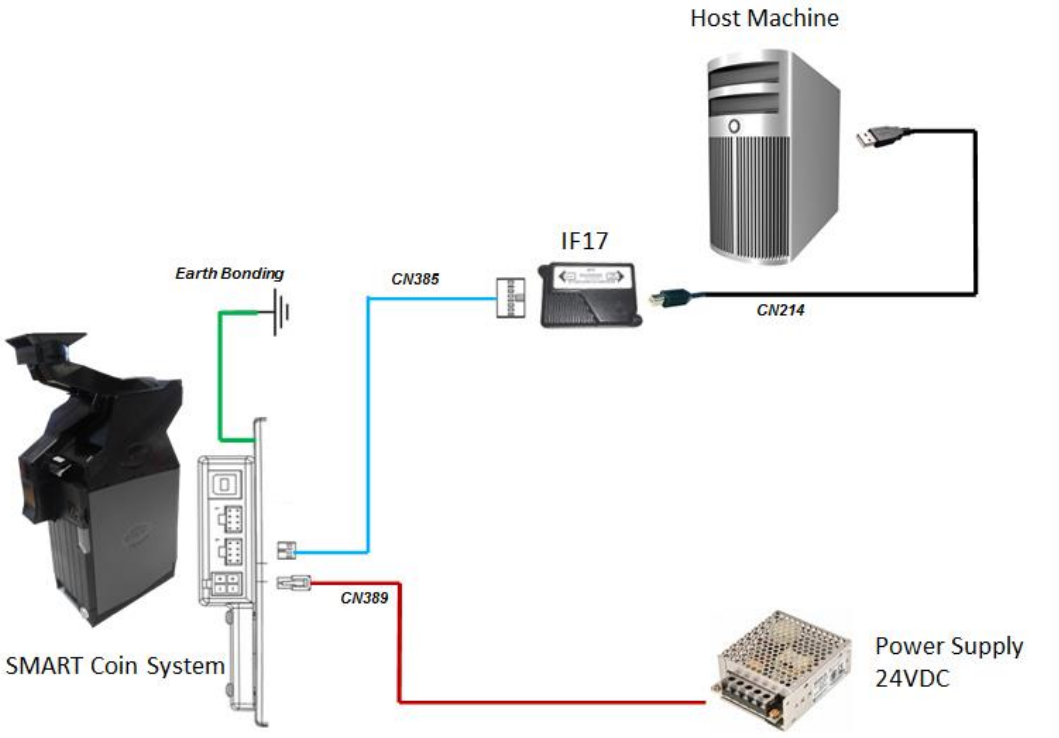
4.4.1.2 System Requirements

- Windows XP SP3 or above
- .Net Framework 4
- 256mb ram
- 50mb hard disk free
- Connected SMART Coin System with active com port

	Caution!
	We have seen instances where one of the dll's (itdata1.dll) used in Validator Manager are flagged 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.

4.4.1.3 Hardware Setup

Connect the power supply to the SMART Coin System. Connect the USB cable to the IF17 and to your computer or laptop. Connect the SMART Coin System to the IF17.



4.4.1.4 Switching to Programming Mode (SSP)

Before programming via the Validator Manager the SMART Coin System needs to be switched to its programming mode (SSP interface). Please refer to APPENDIX 11.3 for the procedure for doing this.

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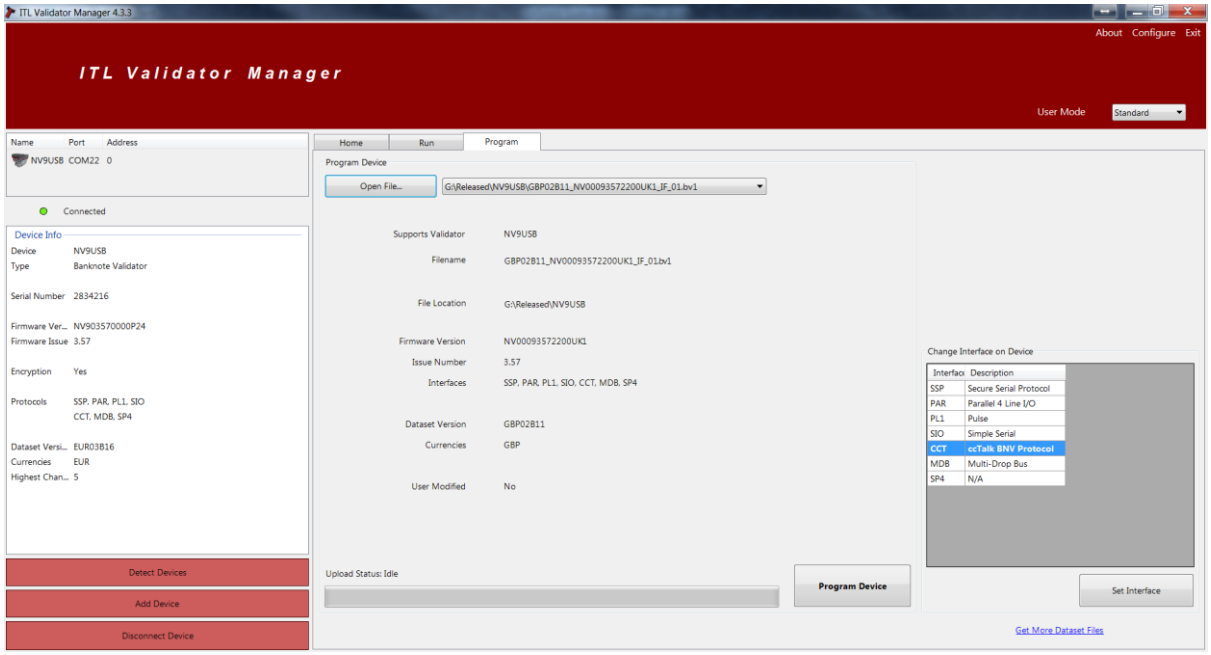
4.4.1.5 Programming the device

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 your SMART Coin System fails to connect please ensure the correct drivers are installed and the unit is in SSP.

By selecting the Program tab, you can reprogram the SMART Coin System. 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 Status LED's will now begin to flash signaling the update has begun (alternating Red/Green).

Caution!

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

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

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4.4.2 SD Card

4.4.2.1 General Description

Updating the SMART Coin System with a SD Card is a very quick and simple process.

You require a SD Card & a computer with a SD Card Reader.

4.4.2.2 Hardware Requirements

- a Class 4 SD Card (or better) formatted in the FAT32 format
- a computer with a SD Card Reader

4.4.2.3 Software Requirements

- The required SMART Coin System Dataset

4.4.2.4 Re-programming via SD Card

Copy the Dataset/Firmware file on to the SD Card with the file renamed as update.cf1. Then place the SD Card in to the SD slot on the front of the Smart Coin System. During the update the LED lights will alternate between green & red. Once the update is completed the SMART coin System will reset, turning the motors in the feeder and then the hopper (this can take between 1 and 3 minutes but typically 90 seconds). Once this has completed it is safe to remove the SD Card.

Caution!

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

4.4.3 Remote Updates

4.4.3.1 General Description

As part of our continued development and improvement, Innovative Technology Ltd periodically releases new dataset or firmware for our validators. This could be for improved acceptance, additional features or security updates. We recommend that network connected cabinets and applications communicating in SSP have the functionality to update the devices attached through the application software. We can provide DLLs and libraries to assist with this development. Please contact your

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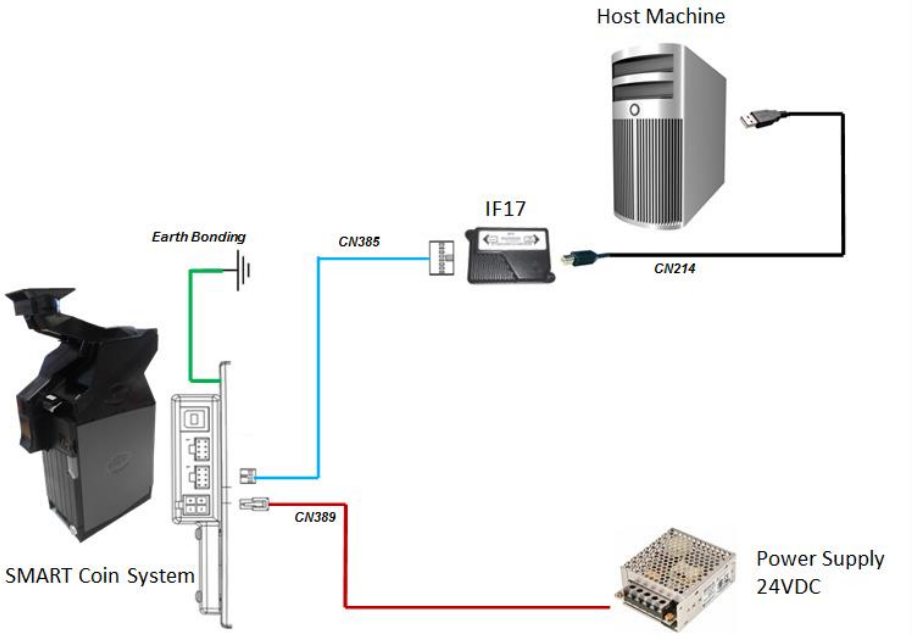
local support office with your requirements for more assistance. This section outlines the software processes involved in updating a validator with a new dataset/firmware file. Implementation of this process allows a validator to be updated from a remote location using the host machine software.

4.4.3.2 Hardware Requirements

Connect the power supply to the SMART Coin System. Connect the USB cable to the IF17 and to your computer or laptop. Connect the SMART Coin System to the IF17.



4.4.3.3 Requirements

- SMART Coin System connected on one com port (typically via IF17)
- SMART Coin System with firmware later than 1.07

4.4.3.4 Re-programming via Remote Updates

Please refer to our GA973 SSP Implementation Guide for details.

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4.5 Managing the Coins – Optimum Use

To get the best from the SMART Coin System, please observe the following:

a) Minimum hopper coin levels: the recommended minimum is 20 pieces of each denomination, the absolute minimum is 10 pieces of each denomination or 50 coins, whichever is less. Less than this will result in extended search times for the correct coin or even time-outs.
b) Maximum hopper coin levels: the maximum is determined by the physical level (height) of the coins held. This is observed and reported by the 'Full Sensor' (optical) in the hopper bowl. It reports using the 'Device Full' 0xCF SSP event. The actual number of coins to reach this level varies with coin sizes and mix. Typical values are approximately 1500 coins.
The host should use the Coin Level Control commands to ensure that the maximum is not exceeded.

4.5.1 Coin Level Control Commands

Coin levels can be controlled using one or more of the following commands:

Float Amount 0x3D:

This will float the unit to leave the requested value in the unit. Its benefits are:

a) Overall Value Control
b) Calculations are done for you by the SCS

Float by Denomination 0x44:

This will float the unit on an individual coin by coin basis to ensure the actual coin levels remain. Its benefits are:

a) Exact coin levels
b) The absolute maximum of the coins is not exceeded (see above)
c) A good mix of coins at all times to meet the payout values required.

Set Cashbox Payout Limit 0x4E

Allows the host to specify a maximum level of each coin, by denomination, to be left in the hopper. Its benefits are:

a) Floating (paying to cashbox) is done 'invisibly'
b) Levels are reached automatically
c) No out-of-service time while floating takes place

4.5.2 Small Coins

Coins below 18mm diameter require special considerations.
During normal operation (payout or stir) the number of €0.01 in the hopper should not exceed 20 or 15% of the total coins – whichever is greater.
If the €0.01 coins exceed this level the SCS will automatically try to dump the excess to cashbox during any payout operation.
If the €0.01 coins exceed this level they should be reduced, as quickly as possible, using the Coin Level Controls commands.

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4.5.3 Large Coins

Large coins (coins larger than the largest in the dataset) can block the recesses in the Coin Feeder disk. In the worst cases this would mean that the normal coins cannot be fed into the hopper.

It is extremely unlikely that this would happen in normal operation. Even so, the SCS monitors for this and if this happens, after a coin feeder activation zero coins are seen in the validation area then the unit will issue a Maintenance Required SSP message (0xC0). This is a warning that the host machine can use to call the site operator to check the unit.

4.5.4 Filling the Unit

When filling with a roll* of coins put only one roll* of coins into the feeder at one time. Wait for the coins to be completely processed before introducing more coins.
If filling with rolls* of different denominations, if possible use the rolls in a mixed order i.e. do not put all the same denomination in at the same time. This will help mix the coins from the start.
When filling with mixed coins, insert 150 coins maximum at one time. Wait for these to be processed before introducing more coins.
Note: During refill some coins may be rejected in the normal way. These should be re-entered once the previous lot have been processed.

*Typical EURO Coin Roll Sizes:

Denomination	Amount of Coins per Roll
0,01€	50 Coins per roll
0,02€	50 Coins per roll
0,05€	50 Coins per roll
0,10€	40 Coins per roll
0,20€	40 Coins per roll
0,50€	40 Coins per roll
1,00€	25 Coins per roll
2,00€	25 Coins per roll

Stirring

Stirring is the way of mixing the coins without paying any coins out.
After filling the SCS it is recommended that the Coin Stir command is issued (0x5D) with a duration of at least 30 seconds. This will help to ensure optimum payout times for the customer.

5 PROTOCOLS AND INTERFACING

5.1 Introduction

The SMART Coin System supports standard industry protocols. Interfaces that are not listed may be available upon request. For any queries regarding interfaces that are not listed please contact support@innovative-technology.com.

Caution!

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

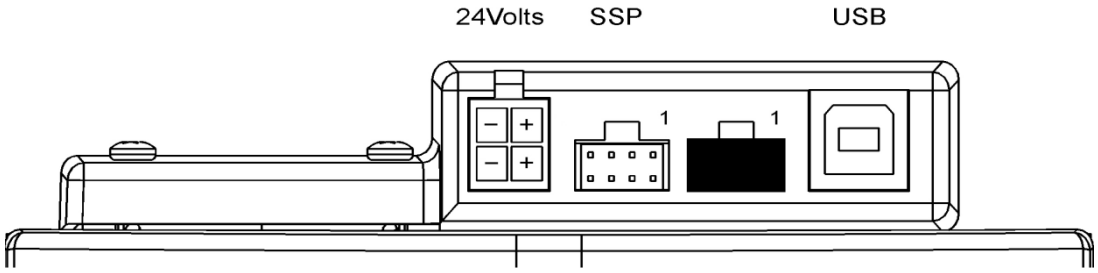
5.2 SSP and eSSP

5.2.1 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 full SDK packages upon request including Interface Specification, Implementation Guide as well as source code examples for C++, C#.NET and Linux. Please contact support@innovative-technology.com for further information.

5.2.2 Pin Assignments

All the connectors needed to set up the SMART Coin System are easily accessible on the bottom base: there are two connectors that are used to allow interfacing and programming:



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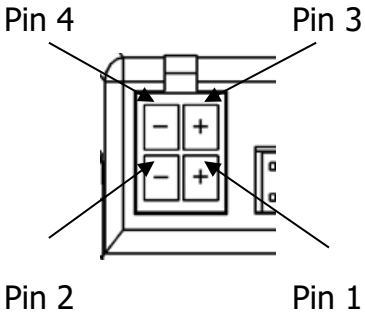
Caution!

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

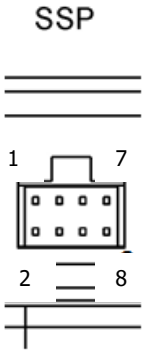
The first connector is a 4-pin socket used to power up the SMART Coin System. The pins 1 & 3 and 2 & 4 are linked and could be used as supply voltage for further devices.



Pin	Description
1	V+ Power connection
2	0V / Ground Connection
3	N/C
4	N/C

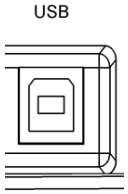
Interface communication from the SMART Coin System unit to the host machine can communicate via SSP or CC2.

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



Pin	Description
7	Serial Data In (Rx)
8	Serial Data Out (Tx)
2	Ground Connection

The USB connector is a standard Type B USB socket. The USB socket can be used for programming the SMART Coin System unit and also bench testing – a USB 2.0 compliant Type 'A' to 'B' lead can be used to do this. USB cables should be electrically shielded and less than 5 metres long. **Please note:** Direct USB should **NOT** be used for Host communications. If USB is required than an IF17 (TTL to USB) should be used.



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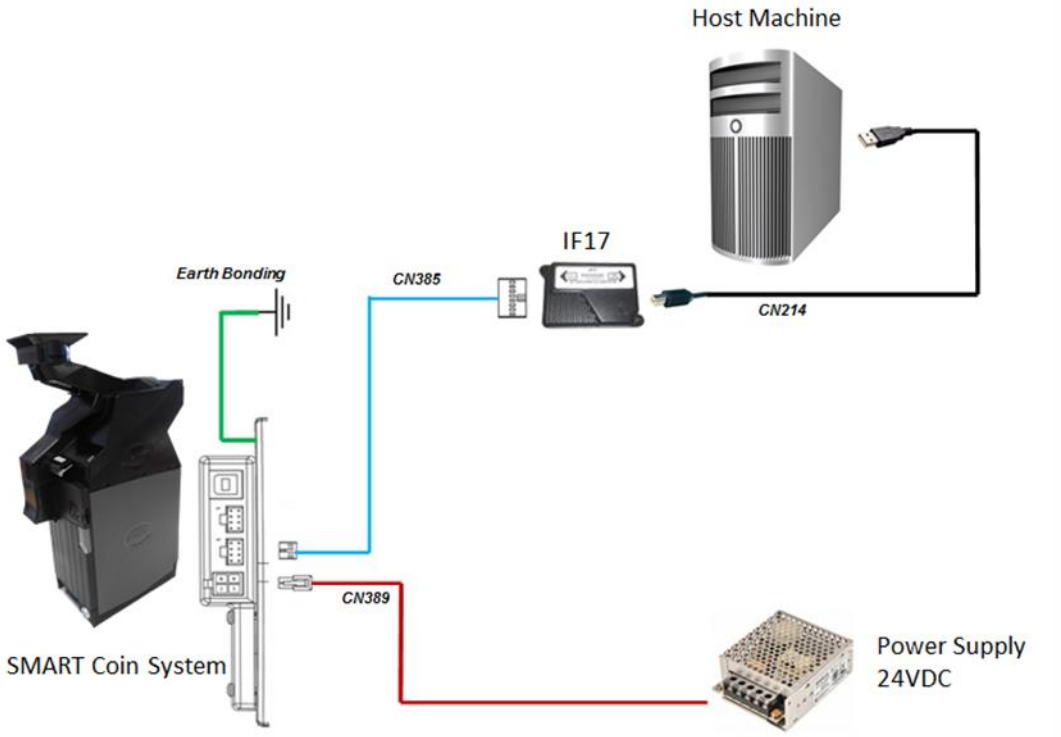
5.2.3 Setup Examples

The drawings below highlights how to connect the SMART Coin System to an SSP or eSSP host machine using available cables and interfaces from Innovative Technology Ltd. For cable drawings please refer to Appendix 11.1.

5.2.3.1 SSP Setup – SMART Coin System



Type	ITL Part Number	Description	Quantity	Details
Interface	IF17	USB Interface Converter	1	http://www.innovative-technology.com/shop/accessories/if17-interface-converter-detail
Cable	CN385	Smart Hopper to IF17 cable	1	http://innovative-technology.com/shop/cables/smart-hopper-to-if17-cable-detail
Cable	CN389	Hopper Interface Power Cable	1	http://innovative-technology.com/shop/cables/smart-hopper-power-cable-detail
Cable	CN214	USB A to B Cable Assembly	1	http://innovative-technology.com/shop/cables/usb-a-to-b-cable-assembly-detail

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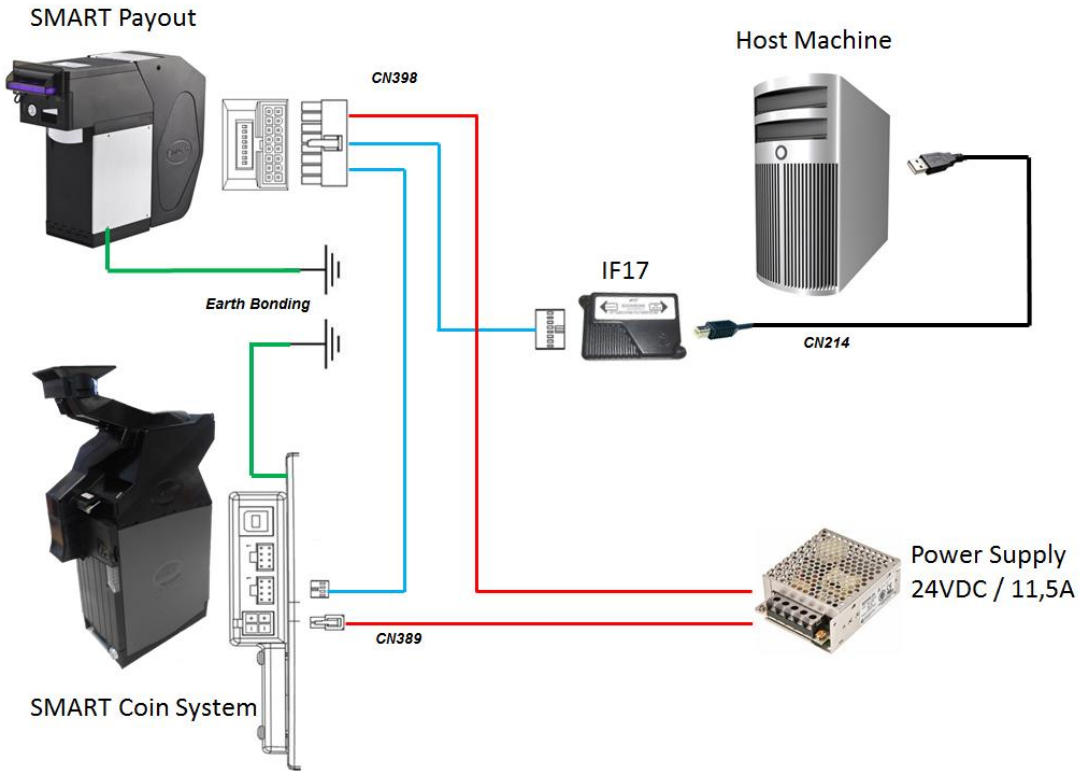
5.2.3.2 SSP Setup – SMART Coin System and SMART Payout



Type	ITL Part Number	Description	Quantity	Details
Interface	IF17	USB Interface Converter	1	http://www.innovative-technology.com/shop/accessories/if17-interface-converter-detail
Cable	CN398	Dual eSSP interface for SMART Hopper & SMART Payout	1	http://innovative-technology.com/shop/cables/dual-essp-interface-for-smart-hopper-a-smart-payout-detail
Cable	CN389	Hopper Interface Power Cable	1	http://innovative-technology.com/shop/cables/smart-hopper-power-cable-detail
Cable	CN214	USB A to B Cable Assembly	1	http://innovative-technology.com/shop/cables/usb-a-to-b-cable-assembly-detail

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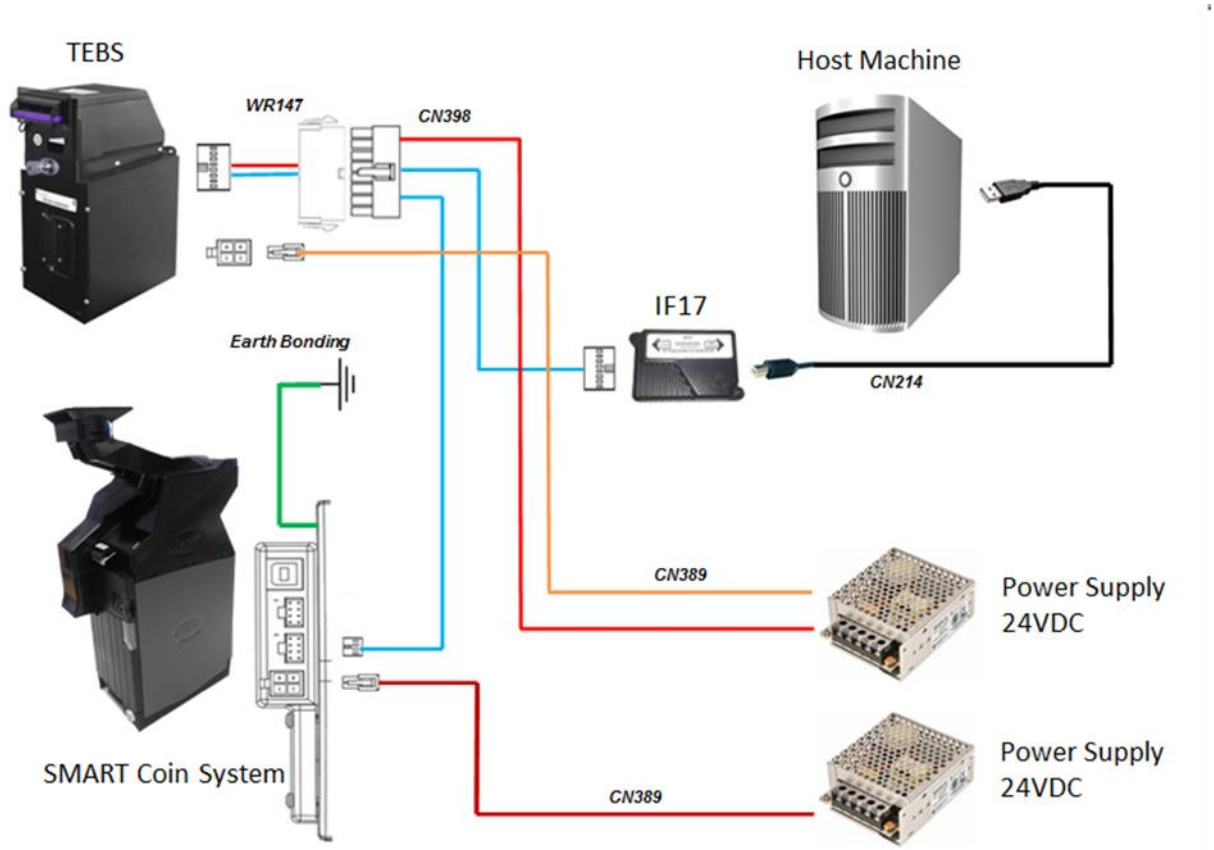
5.2.3.3 SSP Setup – SMART Coin System and TEBS



Type	ITL Part Number	Description	Quantity	Details
Interface	IF17	USB Interface Converter	1	http://www.innovative-technology.com/shop/accessories/if17-interface-converter-detail
Cable	CN398	Dual eSSP interface for SMART Hopper & SMART Payout	1	http://innovative-technology.com/shop/cables/dual-essp-interface-for-smart-hopper-a-smart-payout-detail
Cable	CN389	Hopper Interface Power Cable	2	http://innovative-technology.com/shop/cables/smart-hopper-power-cable-detail
Cable	CN214	USB A to B Cable Assembly	1	http://innovative-technology.com/shop/cables/usb-a-to-b-cable-assembly-detail
Cable	WR147	SMART Payout to NV200 Adaptor	1	http://innovative-technology.com/shop/cables/smart-payout-to-nv200-adaptor-detail

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5.3 CC2

5.3.1 General Description

CC2 was designed by Innovative Technology Ltd. to reduce the development time and effort when implementing the SMART Coin System in software environments with existing ccTalk® infrastructures, without resigning any features and functionality. CC2 provides SSP features and functionality in a ccTalk® packet format. Please contact support@innovative-technology.com for CC2 Interface Specification.

Caution!

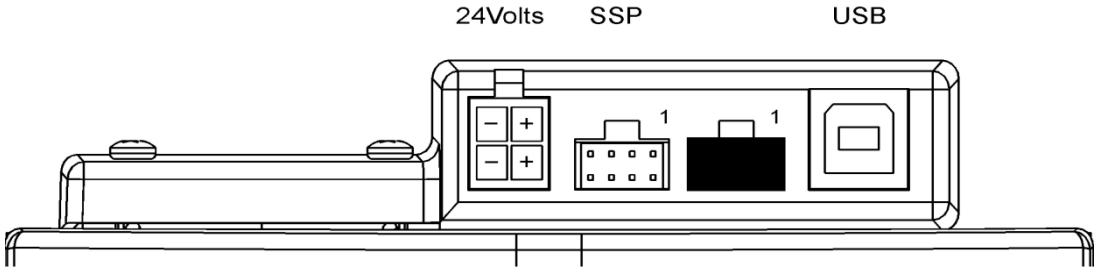
Innovative Technology Ltd. provides full SDK packages including Interface Specification, Implementation Guide as well as source code examples for SSP respectively eSSP only!

5.3.2 Pin Assignments

Caution!

The Pin Layout is identically to the SSP Layout. Depending on your Host System you would need to link the Rx and Tx line to establish a communication.

All the connectors needed to set up the SMART Coin System are easily accessible on the bottom base: there are two connectors that are used to allow interfacing and programming:



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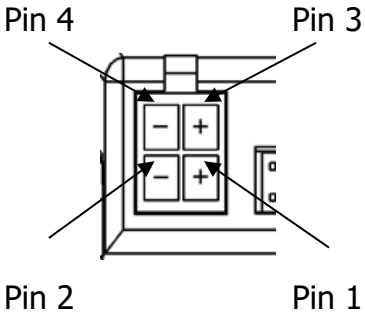
Caution!

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

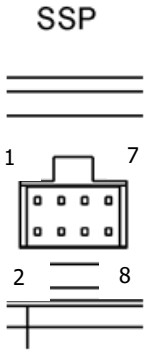
The first connector is a 4-pin socket used to power up the SMART Coin System. The pins 1 & 3 and 2 & 4 are linked and could be used as supply voltage for further devices.



Pin	Description
1	V+ Power connection
2	0V / Ground Connection
3	N/C
4	N/C

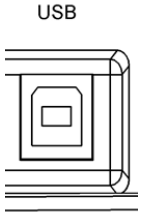
Interface communication from the SMART Coin System unit to the host machine can communicate via SSP or CC2.

The CC2 pin numbering of the socket is shown below, as well as an overview of the socket connections:



Pin	Description
7	Serial Data In (Rx)
8	Serial Data Out (Tx)
2	Ground Connection

The USB connector is a standard Type B USB socket. The USB socket can be used for programming the SMART Coin System unit and also bench testing – a USB 2.0 compliant Type 'A' to 'B' lead can be used to do this. USB cables should be electrically shielded and less than 5 metres long. **Please note:** Direct USB should **NOT** be used for Host communications. If USB is required than an IF17 (TTL to USB) should be used.



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5.3.3 ccTalk® DES Encryption

When using ccTalk® DES encryption, the SMART Coin System 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 SMART Coin System. Please refer to Appendix 11.5 for details.

5.3.4 Setup Example Drawing/s

Please refer to the SSP Setup Example Drawing in Section 5.2.3. Depending on your Host System you would need to link the Rx and Tx line to establish a communication.

6 ROUTINE MAINTENANCE

6.1 Introduction

The SMART Coin System has been designed to minimise any performance variation over time. Much of this is achieved by careful hardware and software design. However, depending upon the environment the SMART Coin System may at some time require cleaning, belt changing or coin path clearing.

6.2 Recommended Cleaning Intervals

Innovative Technology Ltd recommends cleaning the optical lenses every month or as required. Dirt, dust or other residue leads to bad coin acceptance and other performance degradation. Please refer to 8.6 for comprehensive cleaning instructions.

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7 FIRST LEVEL SUPPORT

7.1 Status LED Flash Codes

🔴	Flashing Fast	- In Bootloader
	Flashing Fast at Power up	- Calibrating
	Flashes x 2	- Calibration Error
	Flashes x 3	- Fraud Attempt
	Flashing Slow	- Idle & not enabled (SSP)
🔴 🟢	Flashing Slow	- Idle & not enabled (CC2)
	Alternating Slow	- DES Trusted mode (CC2 DES enabled)
🟢	Flashing Slow	- Enabled

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7.2 Error LED Flash Codes

A summary of the Status Indicator Flash Codes for the SMART Coin System is shown below:

Led Colour	Status	Description	Action
Green	Flashing 1Hz	Enabled and ready to dispense	
Red	1 Flash	Hopper disabled	Host system to send enables command.
Red	2 Flashes	Calibration Fault	Optical sensor contaminated. Operator to clean exit sensor light pipe. If fault persists, return to ITL for service.
Red	3 Flashes	Fraud Attempt detected	Reset SCS. If this persists it indicates a problem with the top pay-out flap, light guide or exit sensor.
Red	4 Flashes	Feeder Calibration Error	Remove power and check the SMART Hopper and Coin Feeder connection. Persistent failure may require returning to ITL for service.
Red	7 Flashes	Dataset/Unit type mismatch	Re-download SCS Firmware. If this persists return to ITL for service.

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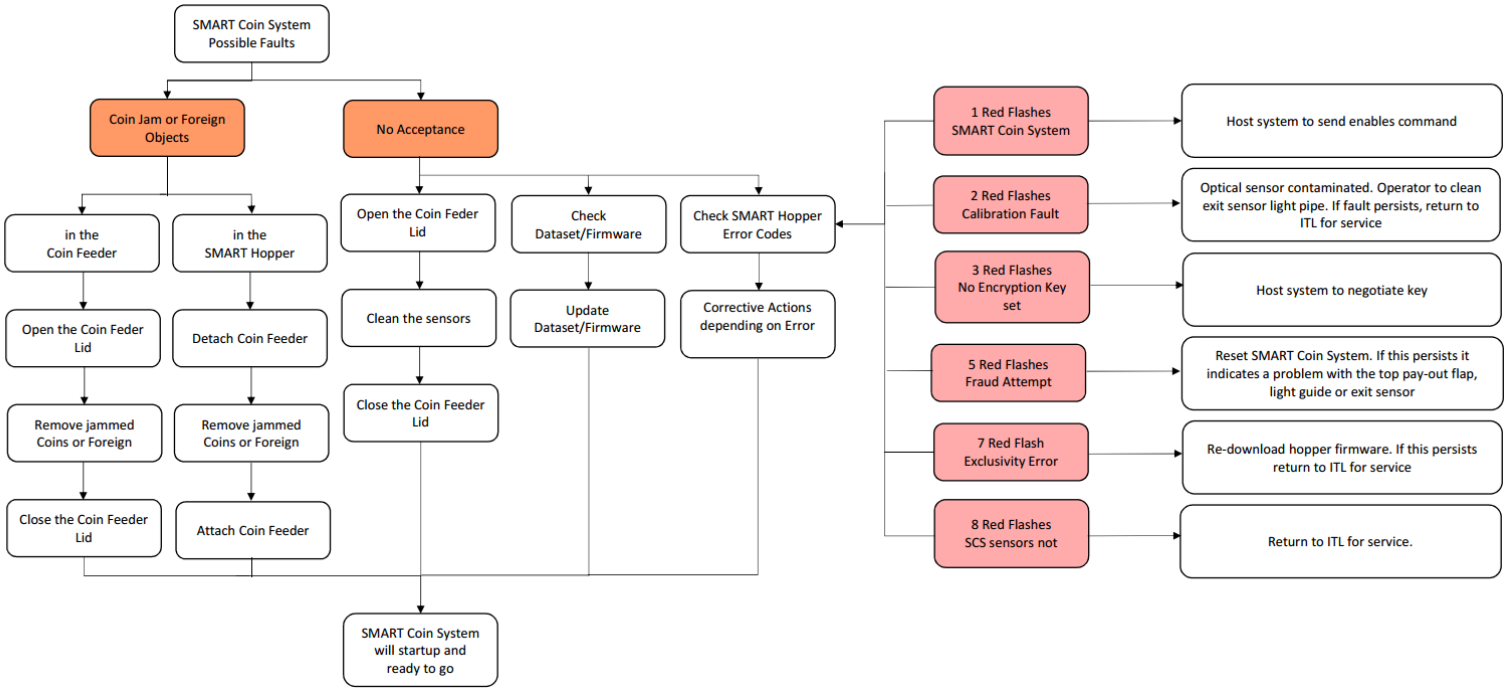
8 SECOND LEVEL SUPPORT

8.1 Introduction

This section contains the essential information that the field engineer needs to clean, maintain and fault find a SMART Coin System that is installed in a host machine.

8.2 Fault Finding Flow Chart



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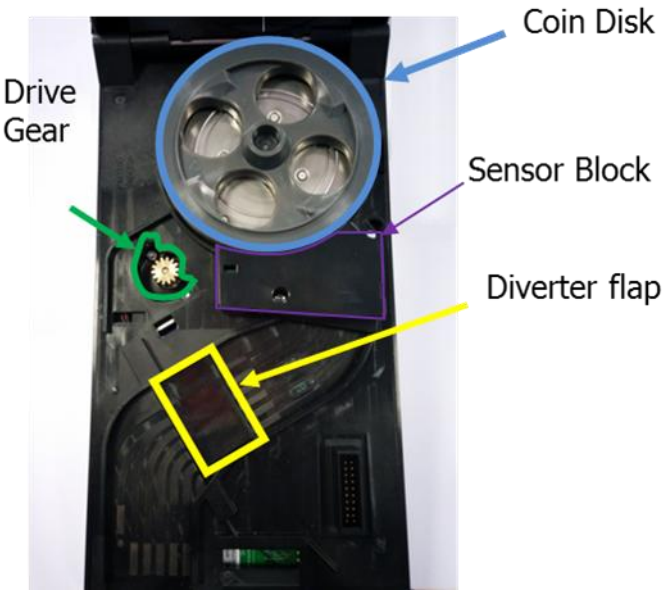
8.3 Clearing a Jam

8.3.1 Clearing a Jam from the Coin Feeder

Before attempting to clear the Jam you must ensure the power has been removed.

1. Empty all coins from the funnel.
2. Lift the catch on the front of the feeder and lift the lid back.
3. Clear the jammed coin from the disk and ensure it is free to rotate.
4. Wipe the track of any coin dust.
5. Ensure the diverter flap is able to move, the flap should be capable of opening onto the coin path.
6. Once all of the coins have been cleared ensure the drive gear isn't impeded.
7. Close the lid of the feeder and reapply power.
8. Check for normal operation.



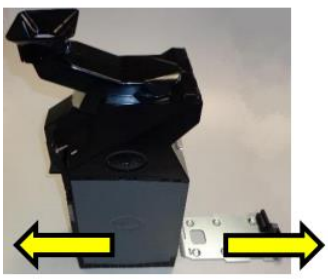
Caution!

Removing the sensor block will require returning to a service center for re-initialisation.

8.3.2 Clearing a Jam from the Hopper

1. Base Plate Removal

Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate and slide the SMART Coin System from the Baseplate.



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2. Pressing the Front Latch

Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

---

3. Pressing the Rear Latch

Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

---

4. Detachment of the Coin Feeder

Move the Coin Feeder to the SMART Hopper back. Now move the Coin Feeder up.

---

5. Empty the Coin Bowl

Empty all Coins from the Coin bowl.

---

6. Clear the Jam

Turn the Disc anti-clockwise but be cautious to avoid harm.

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7. Coin Drop

While turning the disc the coins will drop out here:

8. Back to Operation

Attach the Coin Feeder and slide the SMART Coin System on the Baseplate.

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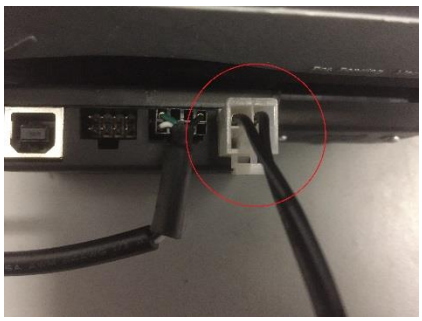
8.4 Checking Power Connections

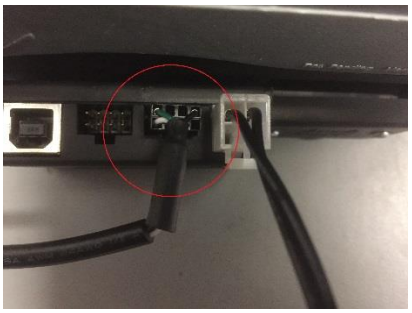
1. **Power Cable**
   Check if the Power Cable is correctly fitted



2. **Power Specification**
   Check if the Power supply meets the specification from chapter 9.4 Power Requirements.

8.5 Checking Communication Connections

1. **Communication Cable**
   Check if the Communication Cable is correctly fitted



2. **Interface Specification**
   Check if the Communication Cable and Machine Setup meets the specification from chapter 5 Protocols and Interfacing.

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8.6 Cleaning the SMART Coin System

8.6.1 Cleaning the Coin Feeder

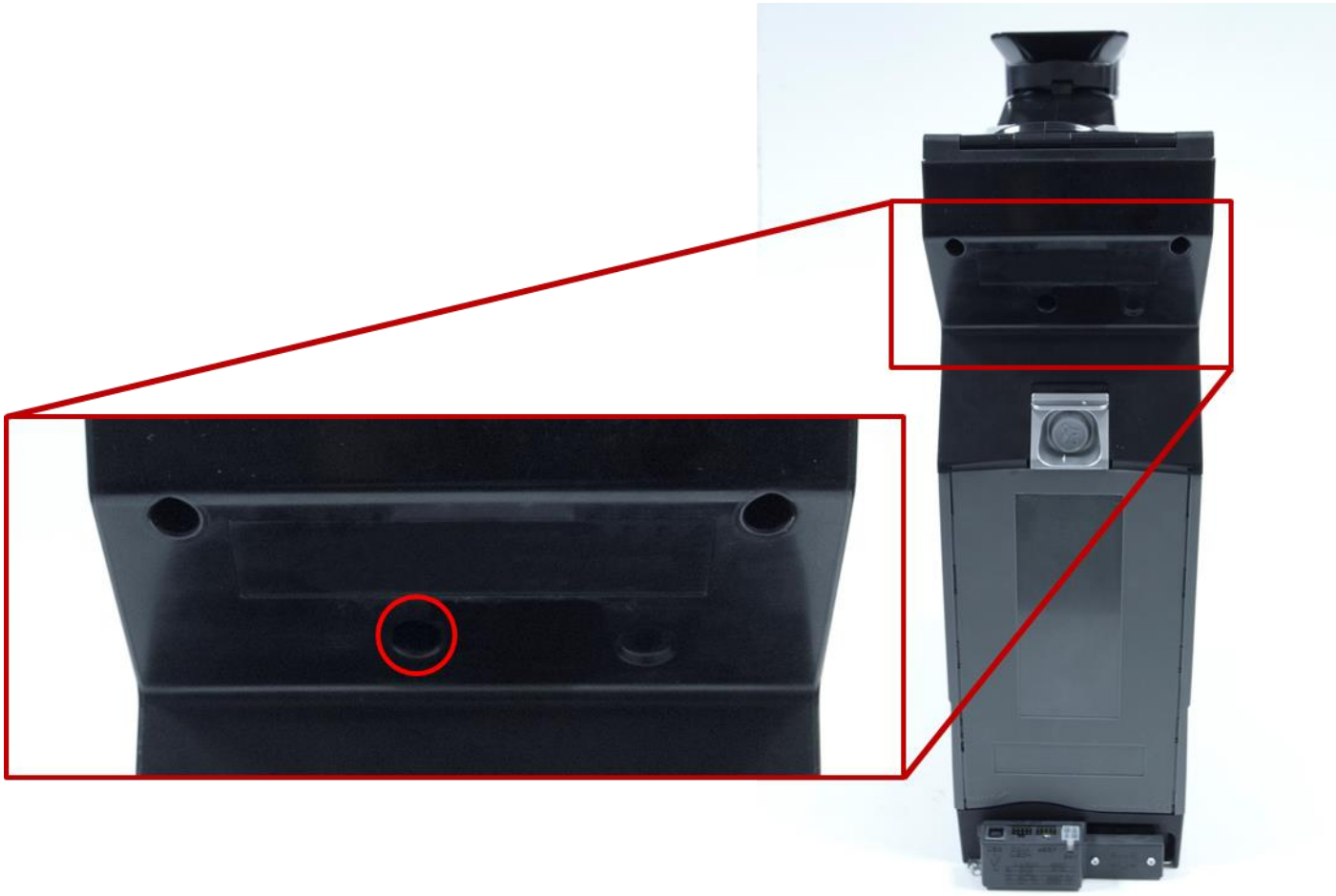
	Caution!
	Do not use solvent based cleaners such as alcohol, petrol, methylated spirits, white spirit or PCB cleaner. This will result in permanent damage to the [Product Name], only use a mild detergent.

8.6.2 Disk Removal

If required, the coin sorting disk can be removed for cleaning and removal of debris which may be trapped under the disk.

Please ensure the power has been disconnected before attempting to remove the coin sorting disk.

To remove the disk the screw highlighted needs to be removed. A T30 Screwdriver will be required.



Once removed the screw will be held captive inside the hole.

Open the Smart Coin System using the catch on the front of the Feeder.

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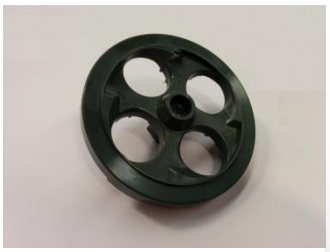

After cleaning the disk the screw requires a small amount of thread locking or stud lock glue is required on the end of the screw and then must be screwed back in to place tightly. Screw Torque Setting 0.60N/m +-5%.

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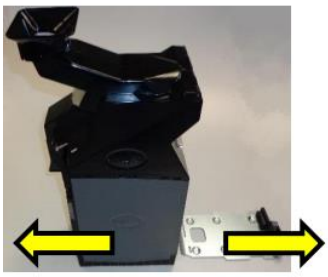
8.6.3 Cleaning the SMART Hopper

1. Base Plate Removal
Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate and slide the SMART Coin System from the Baseplate.



2. Pressing the Front Latch
Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

3. Pressing the Rear Latch
Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

4. Detachment of the Coin Feeder
Move the Coin Feeder to the SMART Hopper back. Now move the Coin Feeder up.

5. Nozzle Removal
Move the Nozzle up until the Nozzle will release.

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6. Remove the Front Panel

From the Top pull down and right (Twist) the Panel and the Panel clips off.

7. Cleaning of the Hopper

The Lightpipe Sensors and the Flap needs to be cleaned frequently.

The Solenoid Actuator needs to be cleaned frequently.

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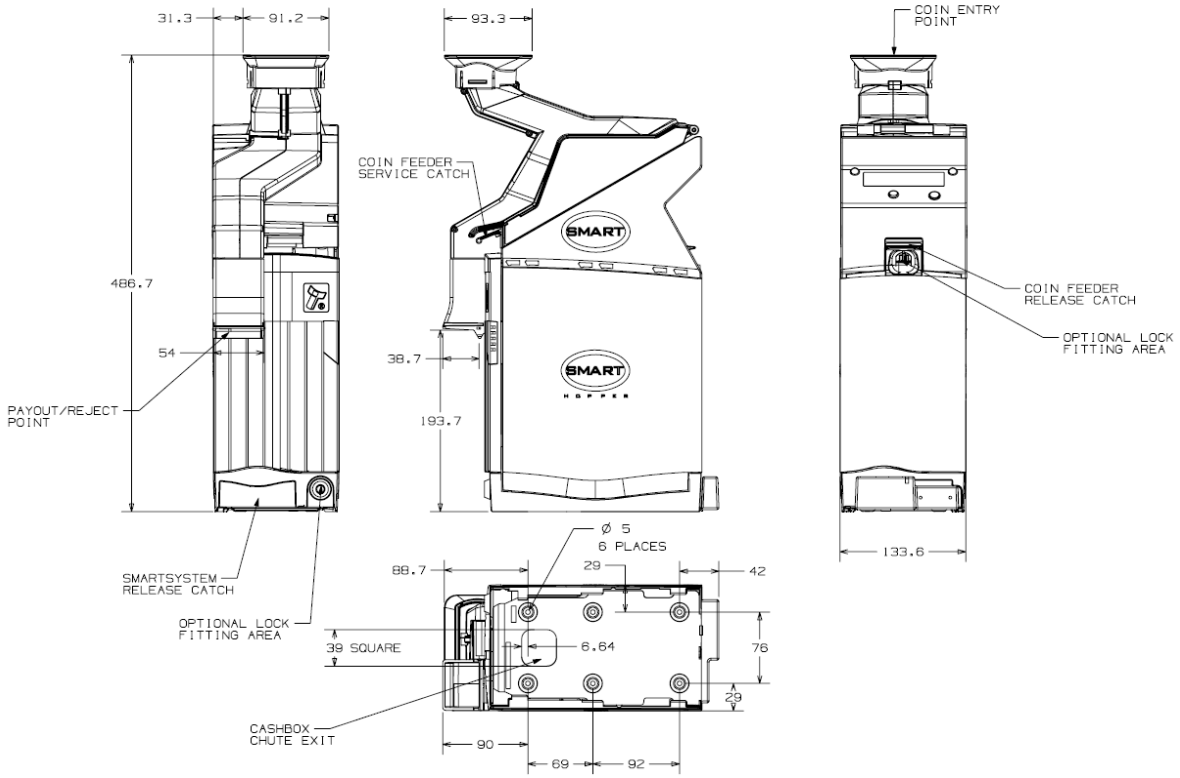
9 TECHNICAL DATA

9.1 Dimensions



9.2 Weight

- SMART Coin System Empty: 4kg
- SMART Coin System Full: 18kg (approx.)

9.3 Environmental Requirements

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

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9.4 Power Requirements

9.4.1 Supply Voltages

Supply Voltage	Minimum	Nominal	Maximum
Supply Voltage (V DC)	+ 21.6 V DC	+ 24 V DC	+ 26.4 V DC
Supply Ripple Voltage	0 V	0 V	0.25 V @ 100 Hz

9.4.2 Supply Currents

Supply Current	Minimum	Nominal	Maximum
Standby	0.4 A	0,4 A	0.7 A
Running	0.4 A	3 A	6.5 A
Peak	0.4 A	3 A	6.5 A

9.4.3 Power Supply Guidance

The SMART Coin System requires a stable 24 V DC / 6.5 A power supply. Please check the power requirements of your host machine and other peripherals to dimension a suitable power environment for your machine setup.

TDK Lambda manufactures suitable power supplies. Please see table below for further details.

Power Supply Unit	Specification	RS Stock Code	Farnell Stock Code
TDK Lambda LS200-24	24V/8.4A	739-7979	1995941

It is very important that the SMART Coin System is properly bonded to earth as described in 3.5.1. Lack of proper bonding can cause communication issues and other failures.

	**Caution!**
Lack of proper earth bonding causes failures!	

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9.5 Interface Logic Levels

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

9.6 Reliability Data

Below is an explanation outlining the Mean Cycles Between Failure (MCBF) & Mean Cycles Between Interruption (MCBI) for the SMART Coin System. Where a cycle is defined as a coin either accepted or paid-out. An example is if a 2€ coin is accepted and a 1€ coin 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 coin jam.

- MCBF: 100,000
- MCBI: available on request

Lifetime is the number of cycles a unit is expected to perform before the cost of repair exceeds cost of unit replacement.

- Lifetime: available on request

Please contact support@innovative-technology.com for further information. Detailed information are available on request.

9.7 Media Requirements

Coin	Min	Max
Diameter	18mm	28.5mm
Thickness	1.65mm	3.2mm

Depending on the Currency a different SMART Coin System Hardware Type is required. Please contact support@innovative-technology.com for further information. Detailed information are available on request.

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10 COMPLIANCES AND APPROVALS

10.1 EC Declaration of Conformity

- RoHS
- EN Directives
- UL
- REACH
- WEEE

Please contact support@innovative-technology.com for further information. Detailed information are available on request.

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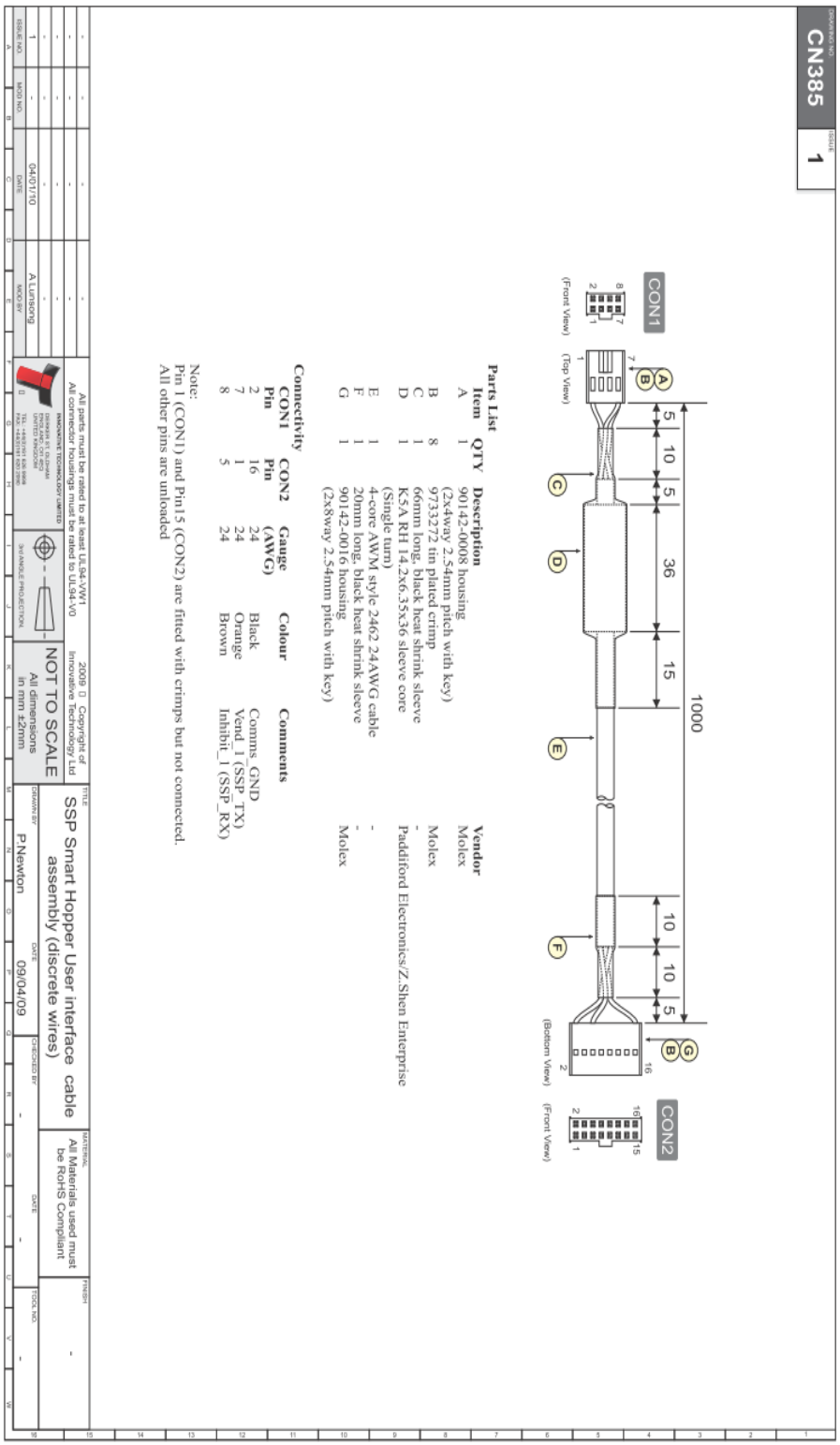
11 APPENDIX

11.1 Cable Drawings

All parts can be purchased as part of the ITL development kit, details of which can be found on our website.



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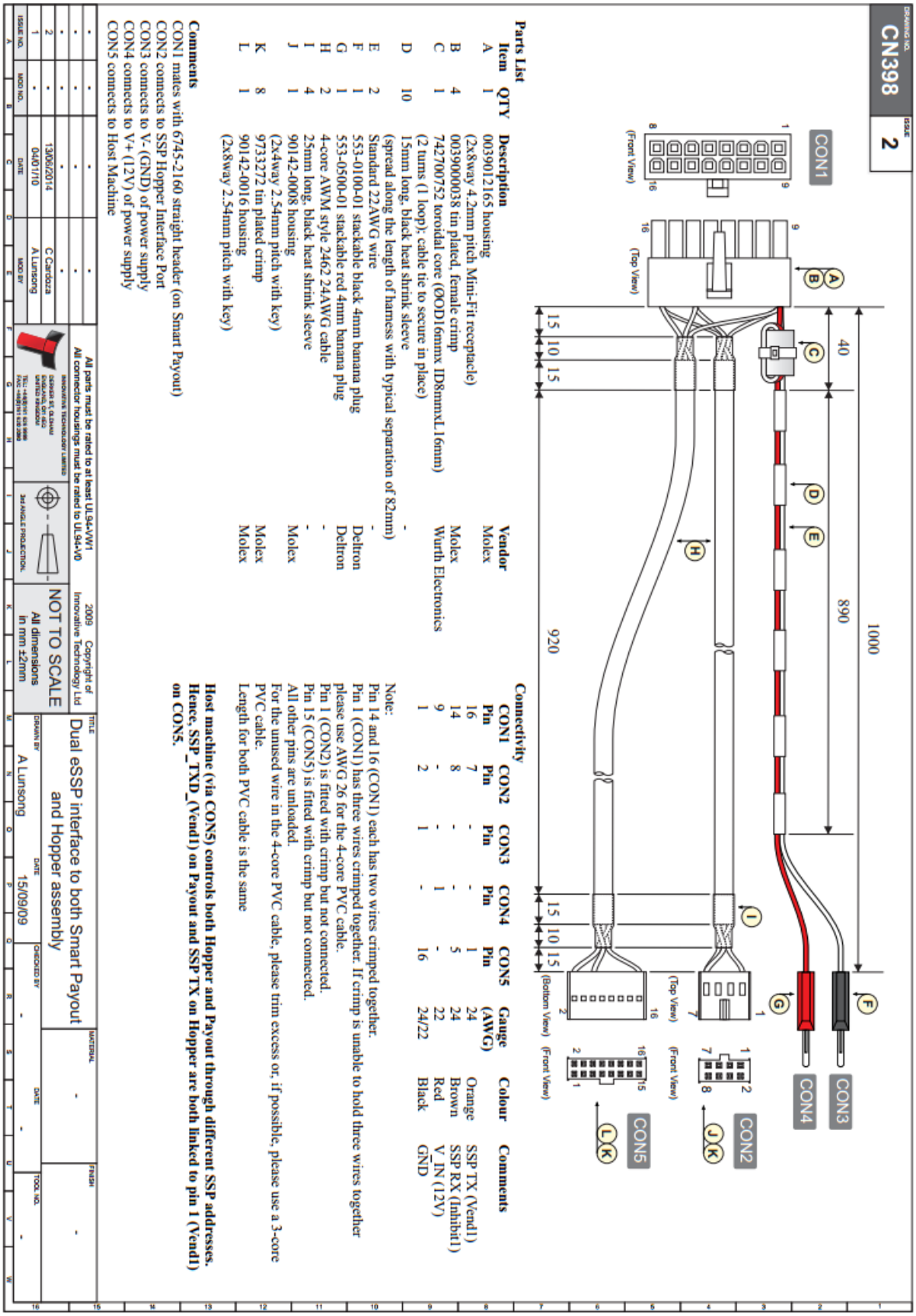

Parts List

Item	QTY	Description	Vendor
A	1	0039012165 housing (2x8way 4.2mm pitch Mini-Fit receptacle)	Molex
B	4	0039000038 tin plated, female crimp	Molex
C	1	742700752 toroidal core (ØOD16mmx ID8mmxL16mm) (2 turns (1 loop); cable tie to secure in place)	Wurth Electronics
D	10	15mm long, black heat shrink sleeve (spread along the length of harness with typical separation of 82mm)	-
E	2	Standard 22AWG wire	-
F	1	553-0100-01 stackable black 4mm banana plug	Deltron
G	1	553-0500-01 stackable red 4mm banana plug	Deltron
H	2	4-core AWM style 2462 24AWG cable	-
I	4	25mm long, black heat shrink sleeve	-
J	1	90142-0008 housing (2x4way 2.54mm pitch with key)	Molex
K	8	9733272 tin plated crimp	Molex
L	1	90142-0016 housing (2x8way 2.54mm pitch with key)	Molex

Connectivity

CON1 Pin	CON2 Pin	CON3 Pin	CON4 Pin	CON5 Pin	Gauge (AWG)	Colour	Comments
16	7	-	-	24	Orange	SSP TX (Vend1)
14	8	-	5	24	Brown	SSP RX (Inhibit1)
9	-	-	-	22	Red	V_IN (12V)
1	2	1	-	16	24/22	Black	GND

Note:
Pin 14 and 16 (CON1) each has two wires crimped together.
Pin 1 (CON1) has three wires crimped together. If crimp is unable to hold three wires together please use AWG 26 for the 4-core PVC cable.
Pin 1 (CON2) is fitted with crimp but not connected.
Pin 15 (CON5) is fitted with crimp but not connected.
All other pins are unloaded.
For the unused wire in the 4-core PVC cable, please trim excess or, if possible, please use a 3-core PVC cable.
Length for both PVC cable is the same

Host machine (via CON5) controls both Hopper and Payout through different SSP addresses. Hence, SSP_TXD_(Vend1) on Payout and SSP TX on Hopper are both linked to pin 1 (Vend1) on CON5.

Comments

CON1 mates with 6745-2160 straight header (on Smart Payout)
CON2 connects to SSP Hopper Interface Port
CON3 connects to V- (GND) of power supply
CON4 connects to V+ (12V) of power supply
CON5 connects to Host Machine

ISSUE NO.	MOD NO.	DATE	MOD BY
-	-	-	-
-	-	-	-
2	-	-	-
1	-	13/06/2014	C Cardoza
-	-	04/01/10	A Lunsong

All parts must be rated to at least UL94-VW1
All connector housings must be rated to UL94-V0

DESIGNED BY, CHECKED AND AUTHORISED BY INNOVATIVE TECHNOLOGY LIMITED

NOT TO SCALE
All dimensions in mm ±2mm

3rd ANGLE PROJECTION

TITLE: Dual eSSP interface to both Smart Payout and Hopper assembly

DRAWN BY: A Lunsong
DATE: 15/09/09
CHECKED BY: -
DATE: -
MATERIAL: -
FINISH: -
TOOL NO.: -

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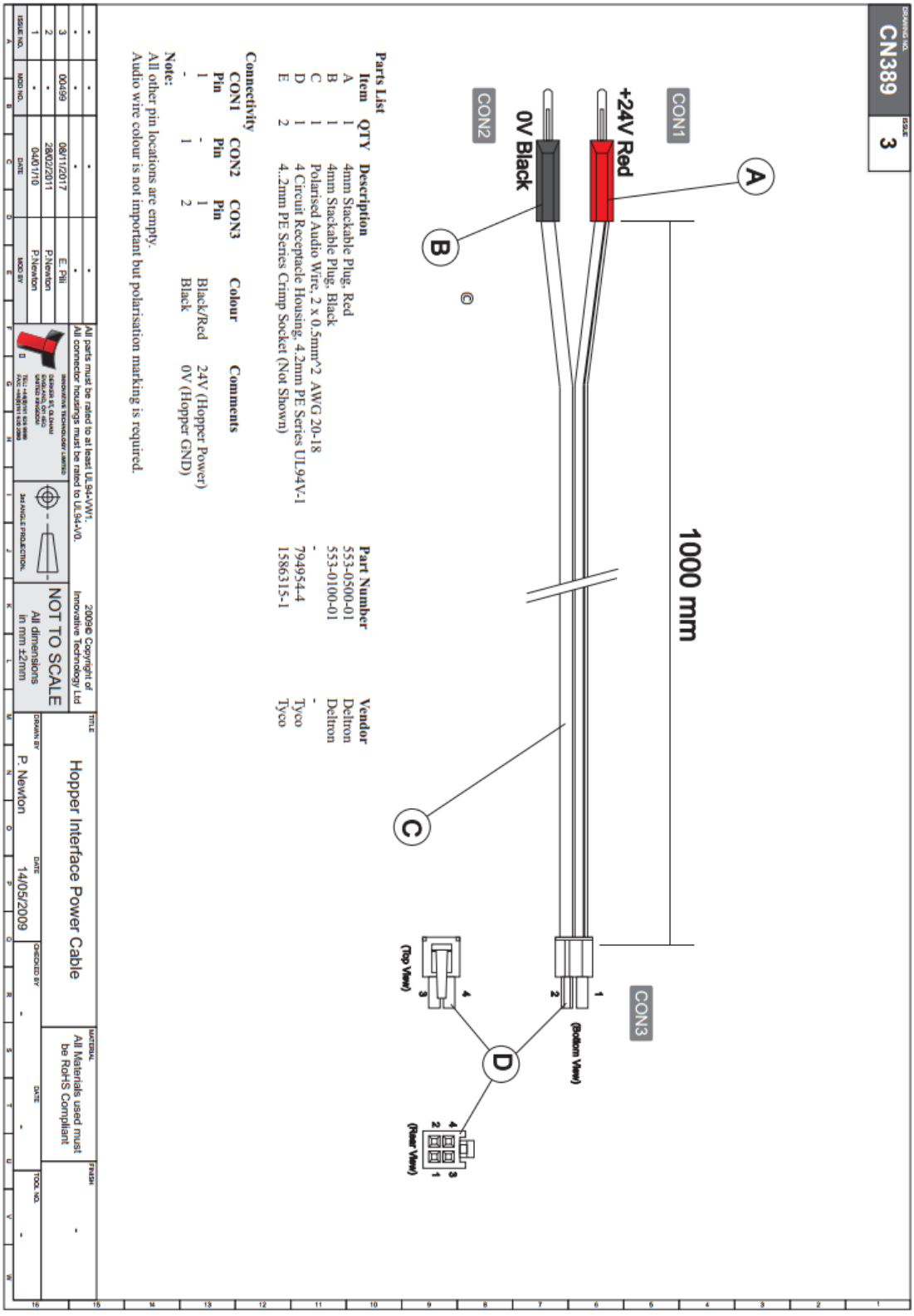

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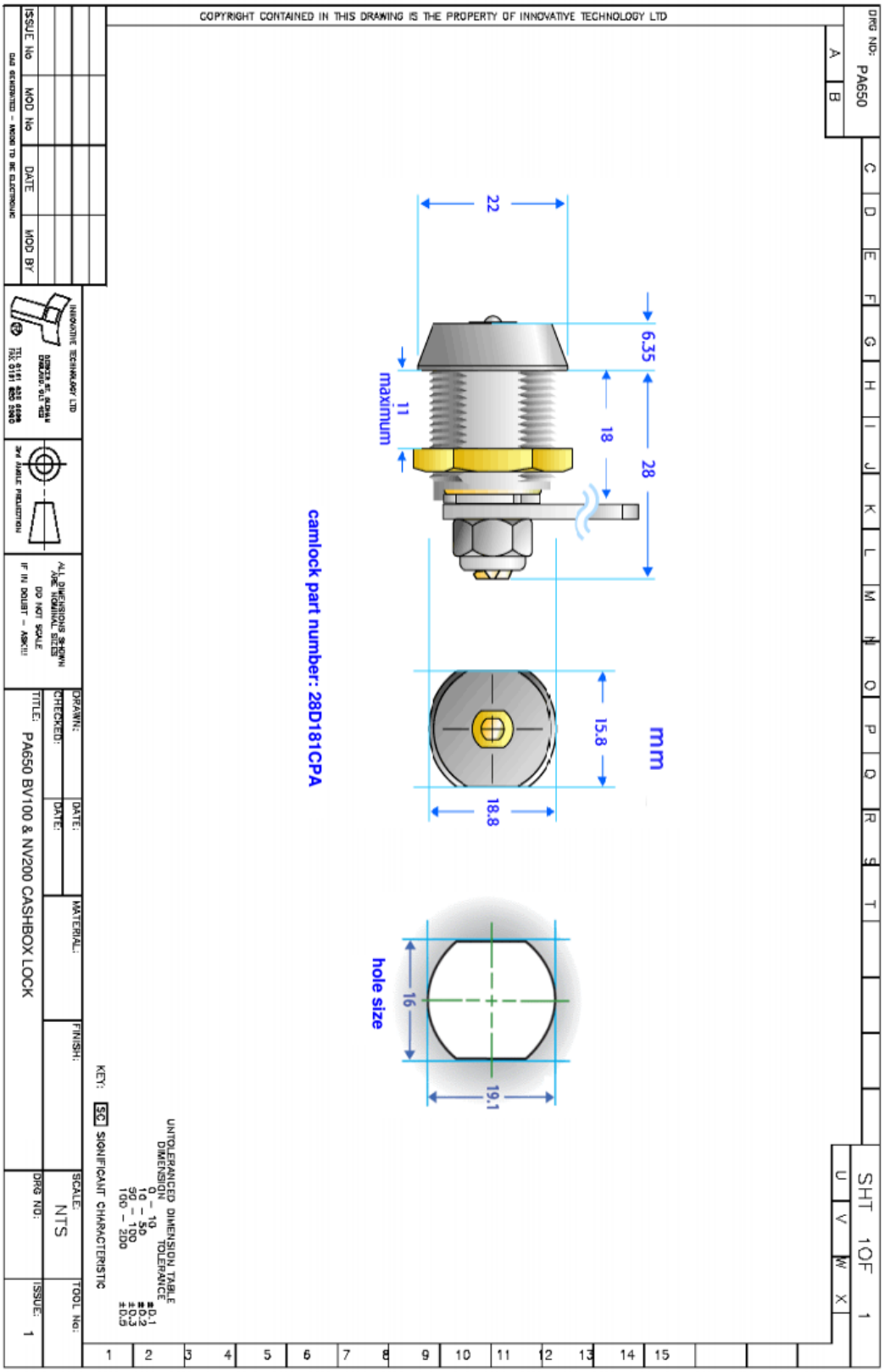
11.2 Lock Specifications



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11.3 Switching to Programming Mode (SSP)

Action	Power Status	Function
Press the button, then press the button again within 5 seconds (do not double click a pause of 2 sec in press is required)	Powered ON	Switches interface between SSP and CC2.

11.4 Free Fall Cashbox Advice

Caution!

Ensure there is space for coins to fall clear.

Ensure that there is space below the **exit chute** to allow the coins to fall clear of the coin exit.

11.5 ccTalk DES Encryption – Trusted Mode

When set to CC2 with DES enabled. DES trusted mode can be entered by resetting all denomination levels to 0. On a power cycle the SMART Coin System will automatically enter DES trusted mode for 2min to allow for pairing to the host. The easiest way to set all levels to zero is to run an empty cycle.

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11.6 Label Description

11.6.1 SMART Hopper

Power Requirements
Please refer to chapter 9.4 Power Requirements.

LED Flash Codes
Please refer to chapter 7 First Level Support.

Production Date
This is the Production Date (Week and Year) of the unit.

Serial Number
This is the Serial Number of the unit.

Hardware Type
This is the Hardware Type of the unit.
Please refer to chapter 9.7 Media Requirements.

Hardware Revision
This is the Hardware Revision of the unit.

Firmware Version
This is the Firmware Version of the unit, which was programmed at delivery.

Dataset Version
This is the dataset Version of the unit, which was programmed at delivery.

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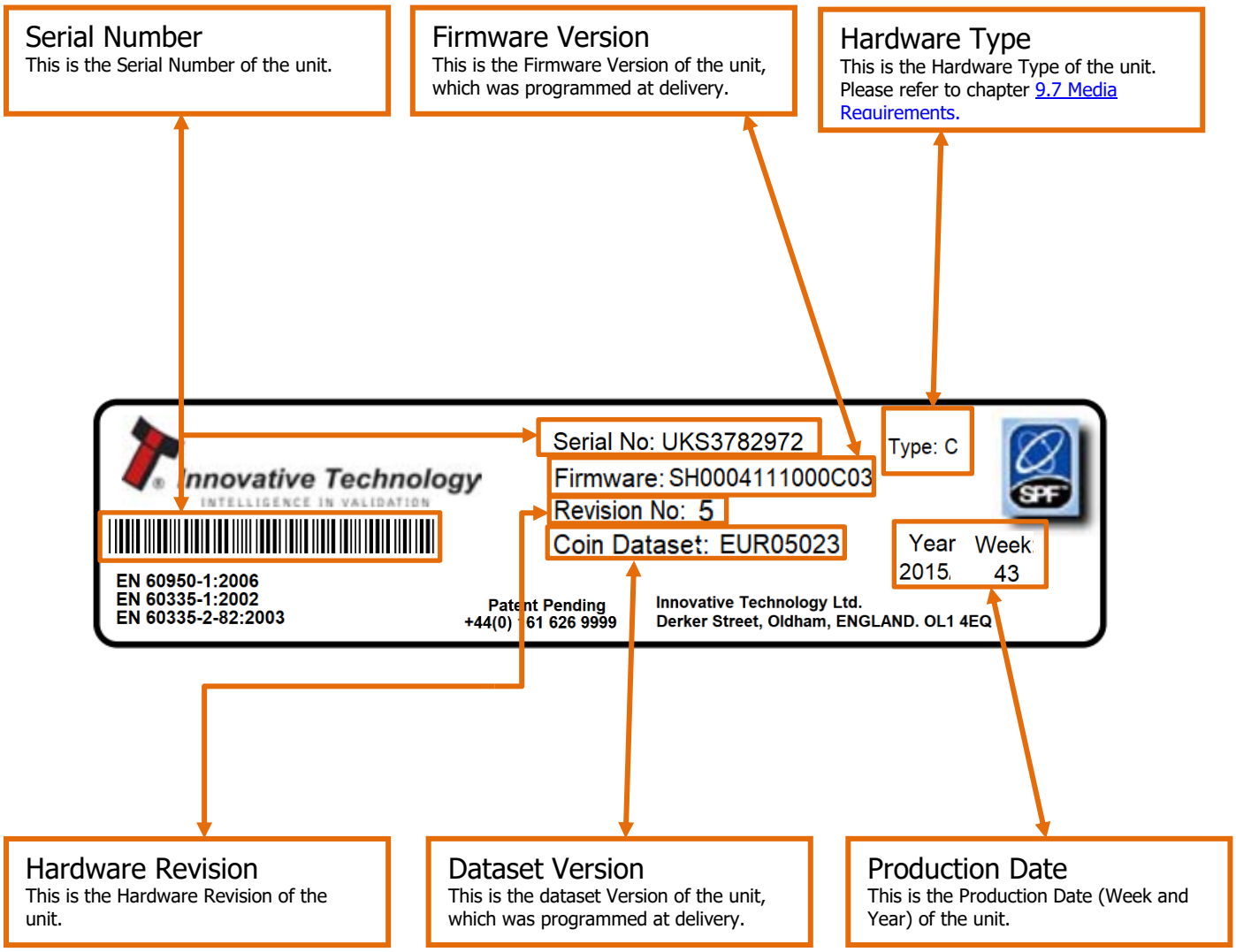
11.6.2 Coin Feeder



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11.7 Configuration Button Functions

Action	Power Status	Function
Press the button, then press the button again within 5 seconds (do not double click, a pause of 2 sec in press is required)	Powered ON	Switches interface between SSP and CC2.
Press and hold for longer than 5 seconds	Powered ON	Switch between USB mode (CDE & HID)

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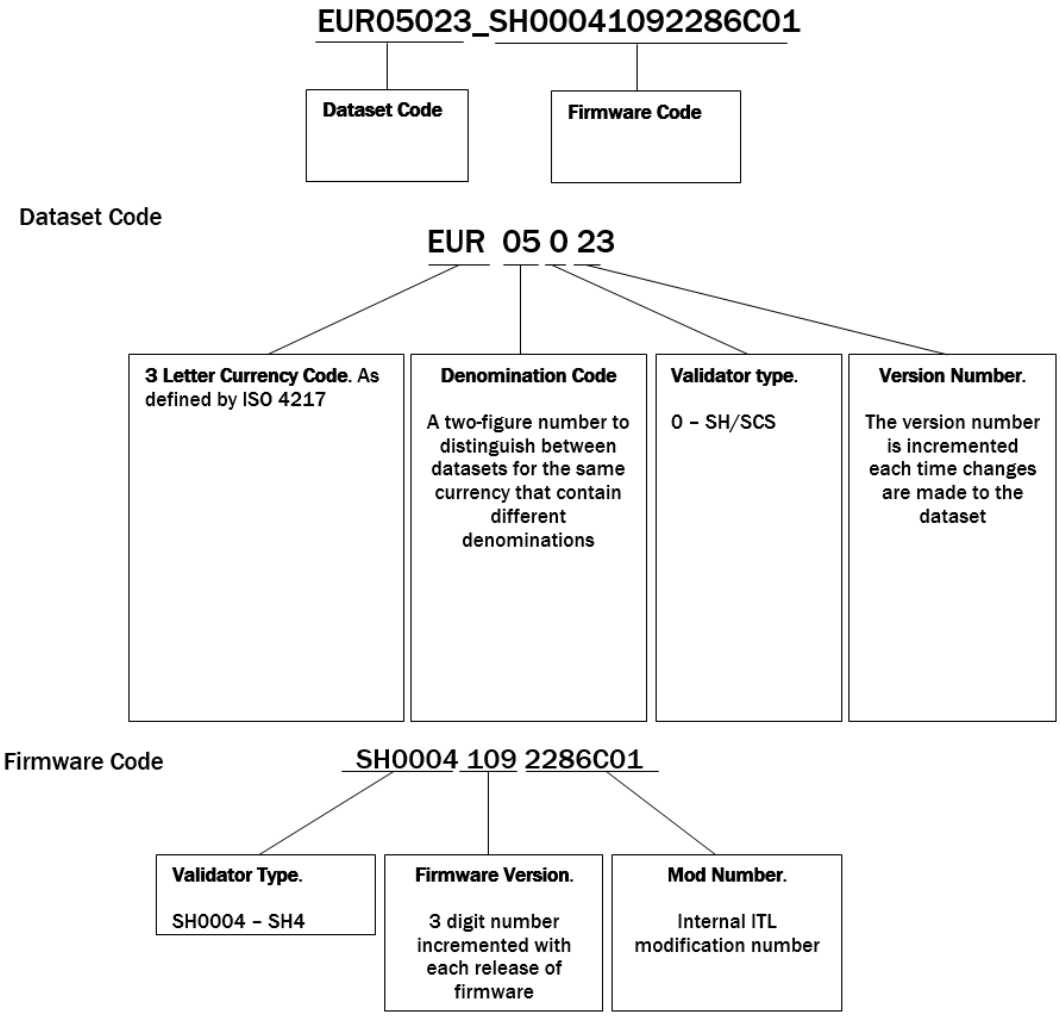
11.8 File Naming Convention



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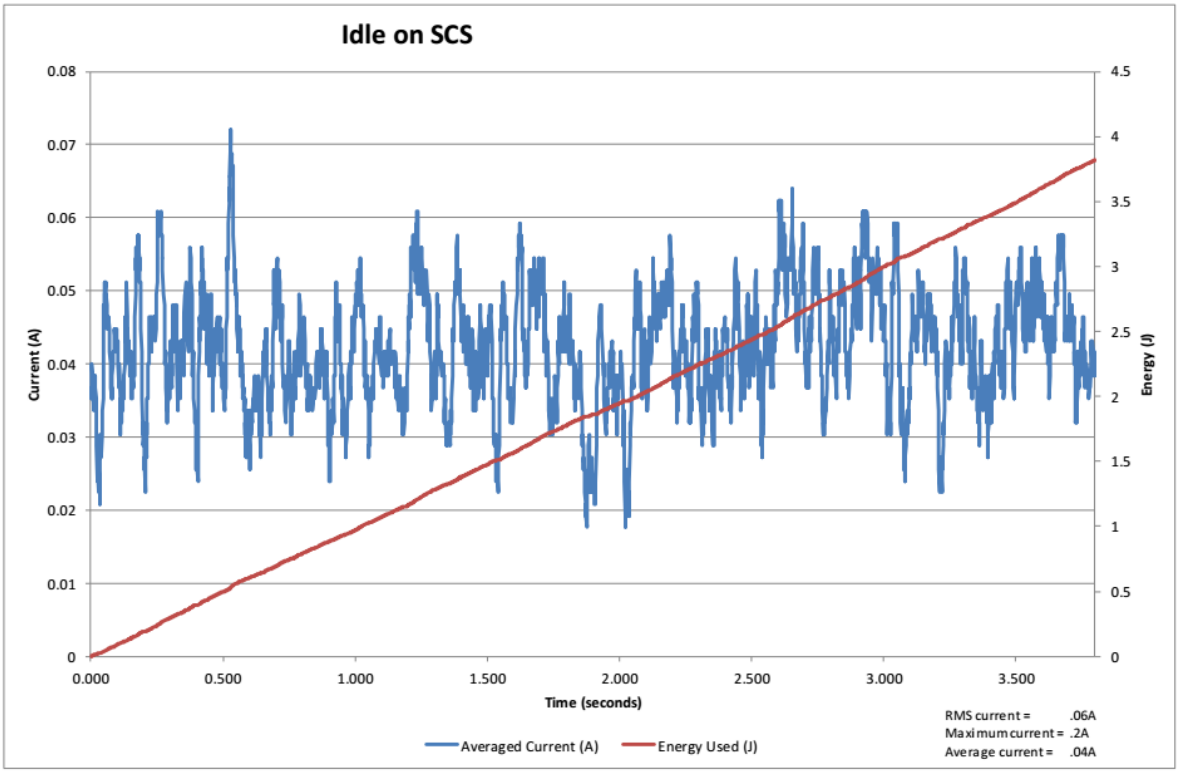
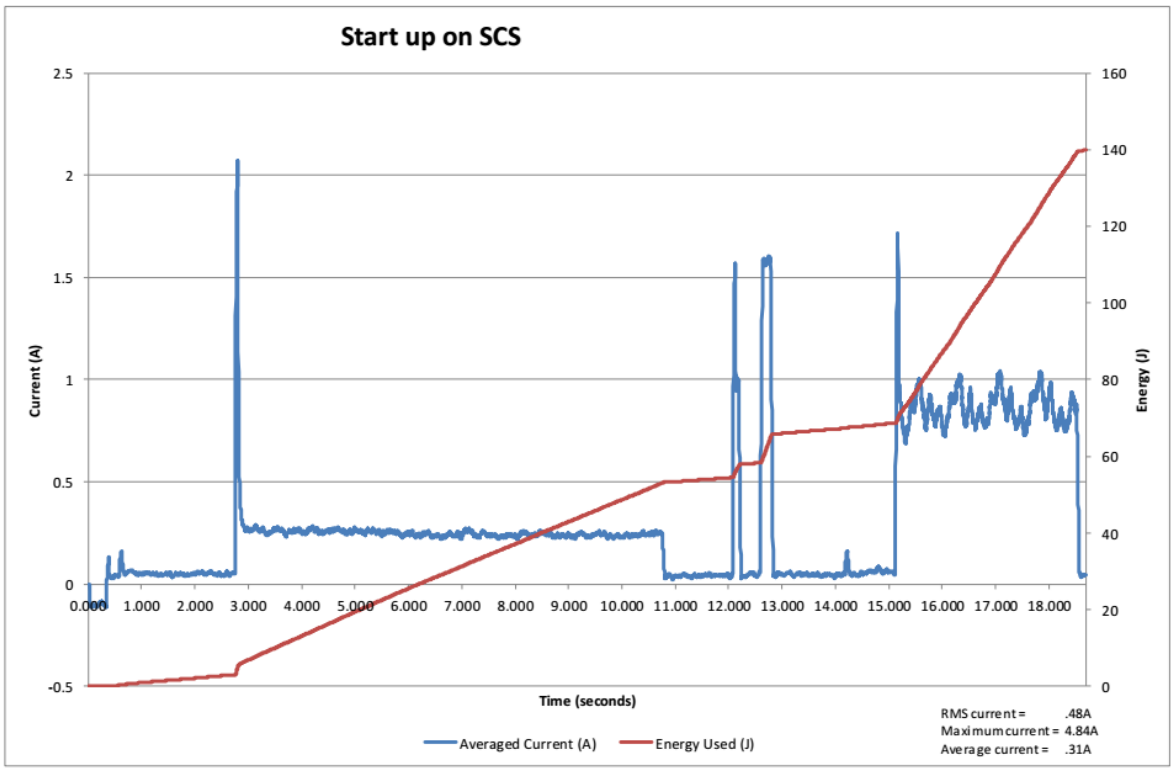
11.9 Energy Profiles

11.9.1 Idle



11.9.2 Power Up



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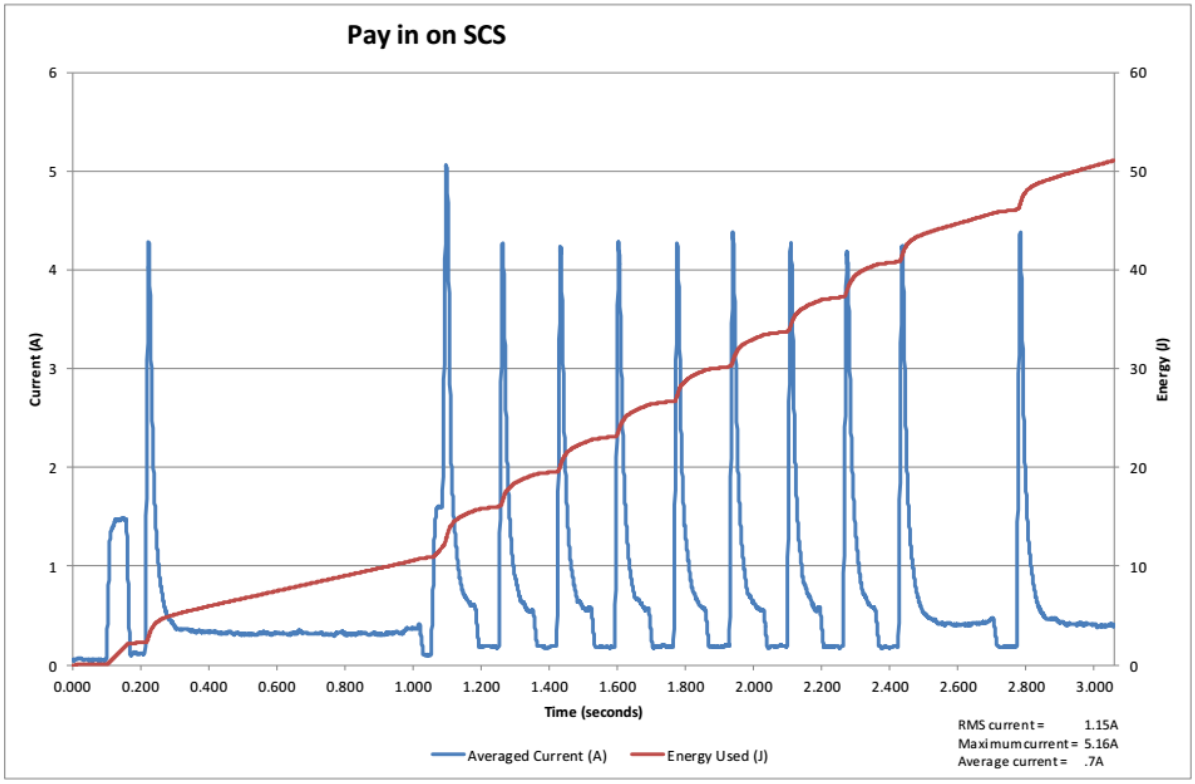
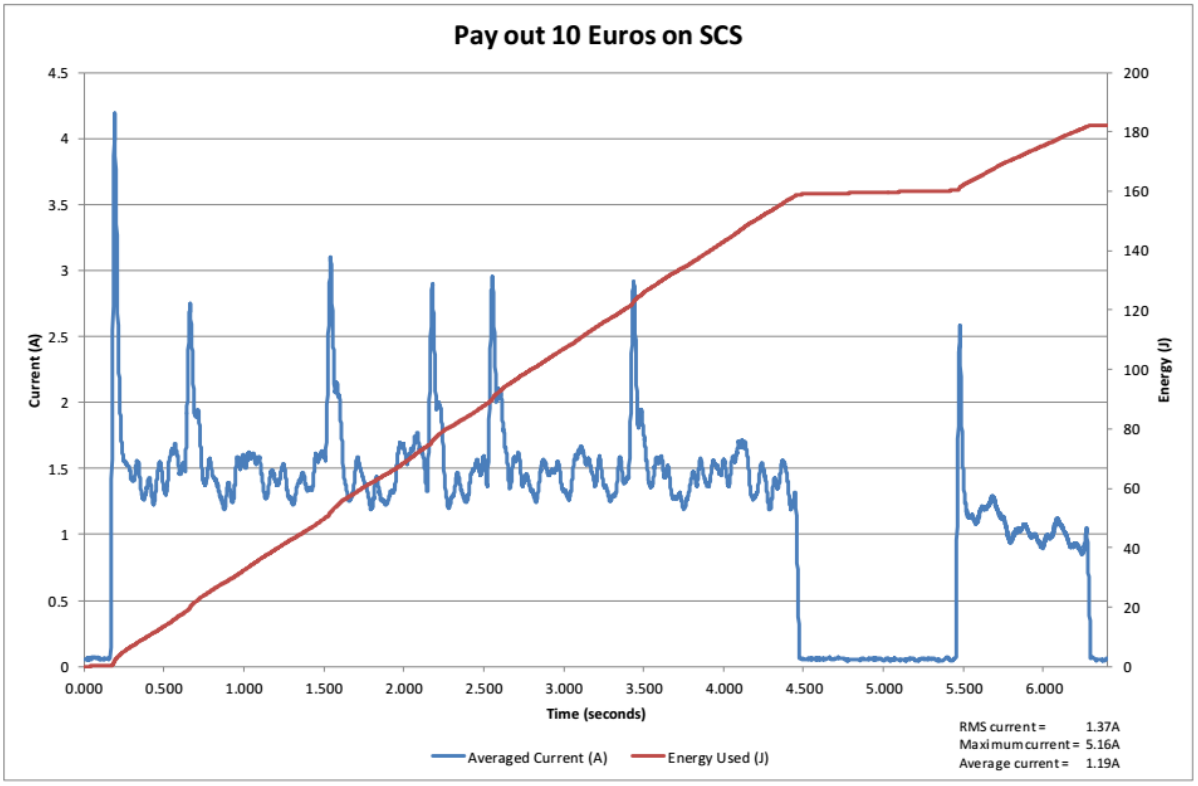
11.9.3 Pay In (10 coins)



11.9.4 Pay Out



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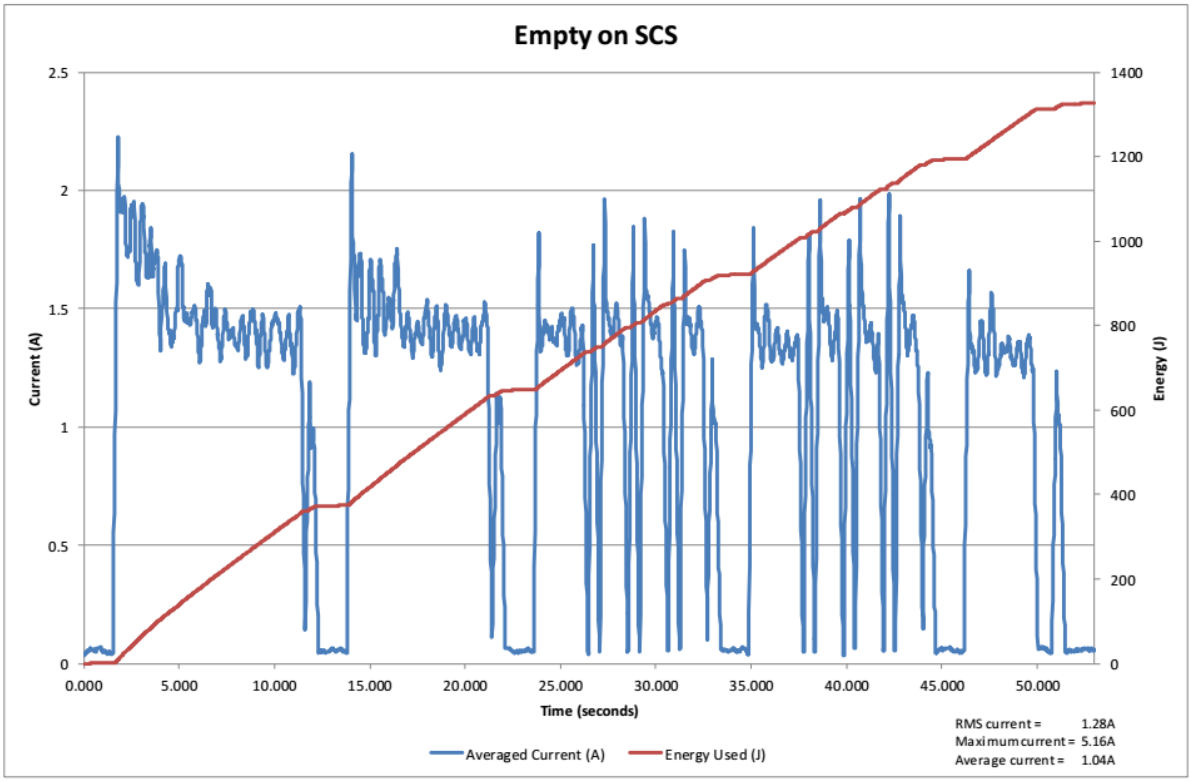
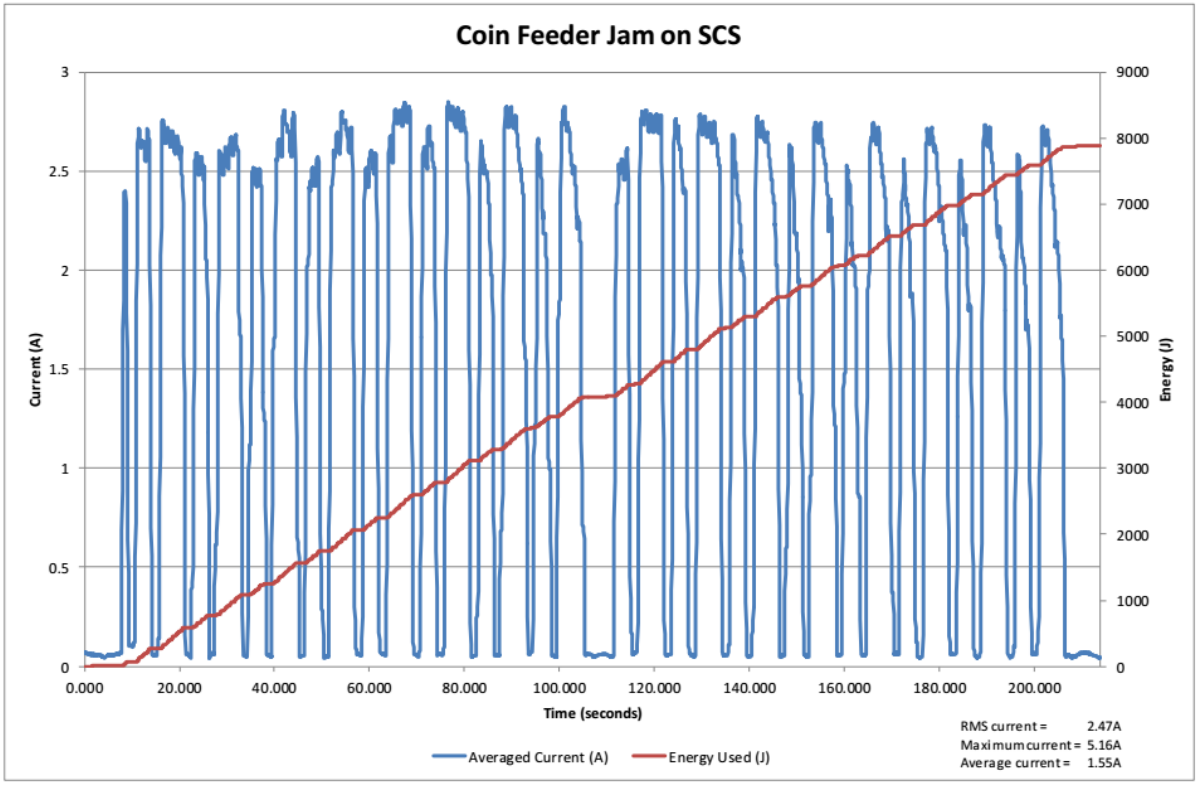
11.9.5 Empty



11.9.6 Coin Feeder Coin Jam



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11.9.7 SMART Hopper Coin Jam