Innovative Technology

INTELLIGENCE IN VALIDATION

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SMART Coin System Range

[GA02085]

USER MANUAL

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1 DOCUMENT INTRODUCTION

1.1 Contact Information

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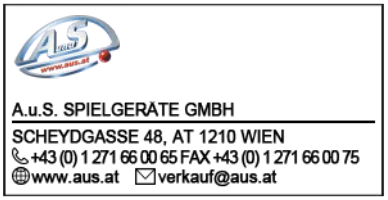

Further Innovative Technology Ltd. representatives can be found on our website.

www.innovative-technology.com

1.2 Related Documents

This document should be read together with the following documents:

For SSP/eSSP:

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

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

ITL Customer Software Guide (GA02037): Information about the Usage of Innovative Technology Customer Software

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

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1.3 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
1.4	20.04.2018	- Layout amendments - Wording amendments - Storage Temperature added	SG
1.5	02.04.2019	- Twin SMART Coin System added - Troubleshooting via SD Card added - Layout amendments - Wording amendments	SG
1.6	22.05.2019	- Twin SMART Coin System Error Codes added - Silicone Lubricant Instruction added - Coin Feeder Path Insert Exchange Instruction added - Layout amendments - Wording amendments	SG
1.7	17.12.2019	- SD Card Recommendation added - Coin Feeder Path Insert Part Numbers added - Layout amendments - Wording amendments - Small Coins Restriction amendments - Earth Bonding Advice amendments	SG
1.8	20.03.2020	- new button function to change the USB mode added - new Coin Feeder product label added - Contact Information added - Recommended Cleaning and Maintenance Intervals/Tasks Overview added - Wording amendments - Layout amendments	SG
1.9	09.12.2020	- Wording amendments - Layout amendments - currency/hardware type overview added - Twin SMART Coin System Lid Lock Mounting Instruction added	SG

1.4 Copyright

1.5 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.

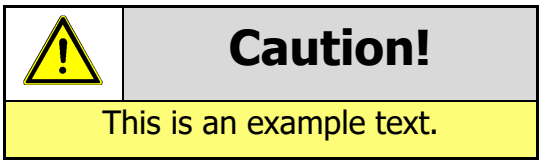
The foregoing warranties and remedies are exclusive and are in lieu of all other warranties, expressed or implied, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose.

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.

1.6 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.

1.7 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 následující:

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

Caution!

Accessibility to children not evaluated. To be evaluated in end product application.

2 PRODUCT INTRODUCTION

2.1 SMART Coin System

2.1.1 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.

2.1.2 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

2.1.3 Typical Applications

- Gaming
- Retail & Kiosk

2.1.4 Component Overview

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2.2 Twin SMART Coin System

2.2.1 General Description

The Twin SMART Coin System is a state-of-the-art bulk coin validator, with two mixed coin hoppers and two recyclers 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 Twin SMART Coin System is designed to eliminate coin starvation and significantly reduce operator collection costs. Operating (Payout) at a market leading up to 24 coins per second the Twin SMART Coin System improves operator cashflow, significantly reducing collection costs.

2.2.2 Key Features

- Combined bulk coin validator, 2x mixed coin hoppers & recyclers
- Eliminates coin starvation
- Market leading coin capacity, acceptance and payout speed
- Lowest cost of ownership
- High security - multi frequency sensing technology

2.2.3 Typical Applications

- Gaming
- Retail & Kiosk

2.2.4 Component Overview

3 MECHANICAL INSTALLATION

3.1 Compatibility

3.1.1 SMART Coin System

3.1.1.1 Hardware Compatibility

3.1.1.1.1 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.

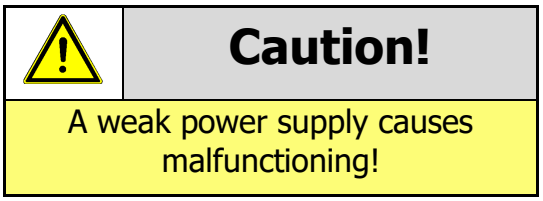
	Caution!
Only use Base Plate delivered with the product!	

3.1.1.1.2 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.

3.1.1.1.3 Power Supply

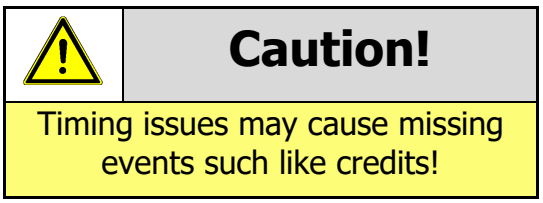
It is vital that the SMART Coin System is connected to a power supply being able to provide the required power environment. A weak power supply causes malfunctioning of the SMART Coin System such like coin rejects or missing credits. If the SMART Coin System is used as a fitting replacement for an older 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 9.4 for full power requirement details of the SMART Coin System.



3.1.1.2 Software Compatibility

3.1.1.2.1 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.



3.1.1.2.2 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 4.4.

Caution!

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

3.1.2 Twin SMART Coin System

3.1.2.1 Hardware Compatibility

3.1.2.1.1 Machine Mounting

The Twin SMART Coin System can not be used as fitting replacement for the SMART Hopper or SMART Coin System and the machine housing would need a re-design.

Caution!

Only use Base Plate delivered with the product!

3.1.2.1.2 Machine Interfacing

By design the TWIN SMART Coin System is not pin to pin compatible with the SMART Coin System or SMART Hopper. Changes to existing machine harnessing are required.

3.1.2.1.3 Power Supply

It is vital that the Twin 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 Twin SMART Coin System such like coin rejects or missing credits. If the Twin 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 Twin SMART Coin System. The Twin SMART Coin System might have higher power consumption. Refer to 9.5 for full power requirement details of the Twin SMART Coin System.

⚠	**Caution!**
A weak power supply causes malfunctioning!	

3.1.2.2 Software Compatibility

3.1.2.2.1 Interface Protocols

When using the Twin 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 Twin SMART Coin System.

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

3.1.2.2.2 Re-programming

For re-programming the Twin SMART Coin System always use the latest version of Validator Manager available for download on our website. Older versions may not support the Twin SMART Coin System. For further details on Re-programming the Twin SMART Coin System refer to 4.4.

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

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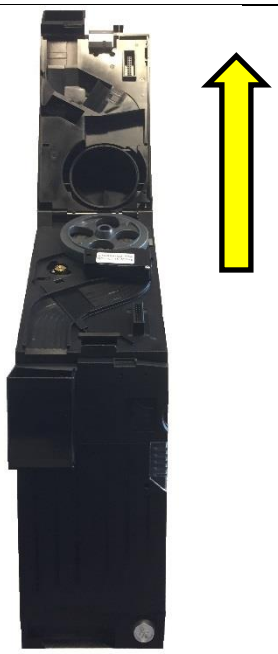
3.2 Nozzle Mounting

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.

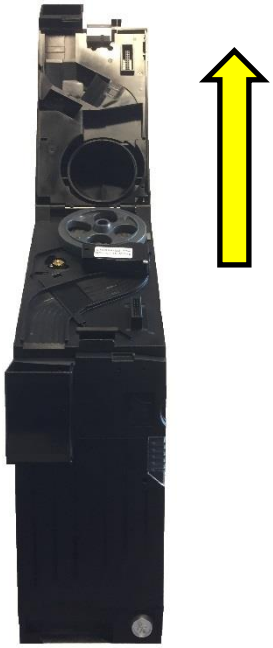


3. **Nozzle Removal**
   Move the Nozzle Up until it will release.

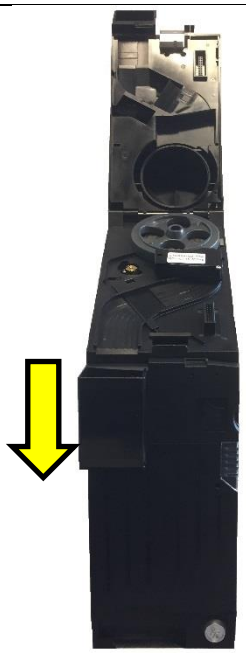
3.2.2 Nozzle Fitting

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.



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



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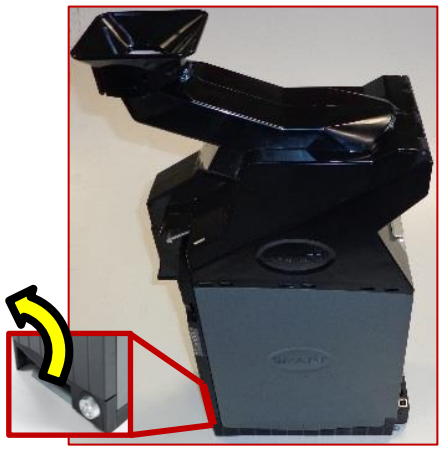
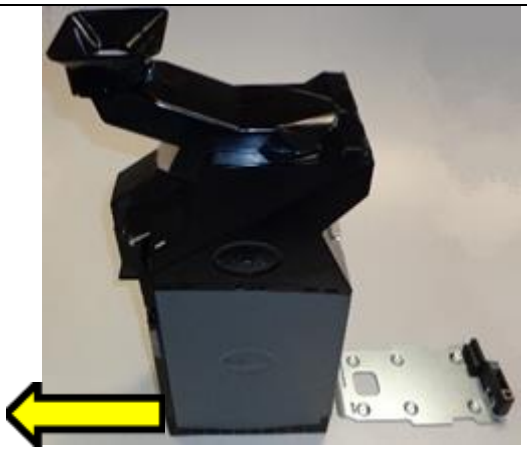
3.3 Baseplate Mounting

3.3.1 Baseplate Removal SMART Coin System

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

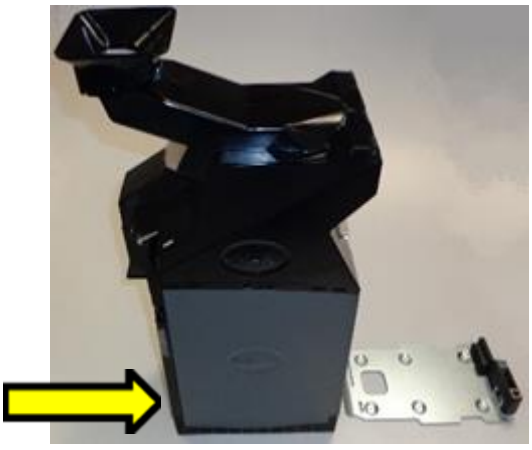


2. **Baseplate Removal**
   Slide the SMART Coin System from the Plate.



3.3.2 Baseplate Fitting SMART Coin System

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



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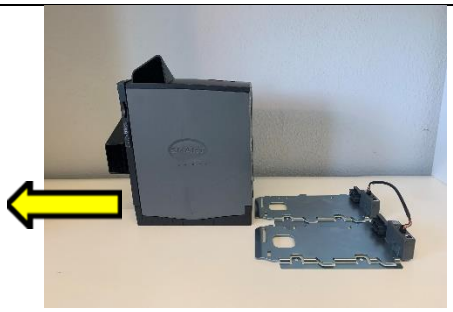
3.3.3 Baseplate Removal TWIN SMART Coin System

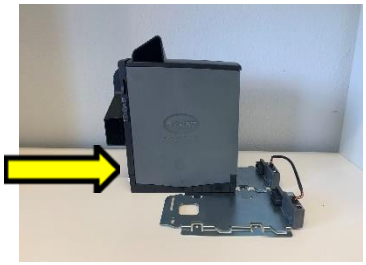
1. **Base Plate Removal Master**
   Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate and slide the SMART Coin System from the Baseplate.

2. **Base Plate Removal Slave**
   Press the Latch on the SMART Hopper to release the SMART Hopper from the Baseplate and slide the SMART Hopper from the Baseplate.



3.3.4 Baseplate Fitting TWIN SMART Coin System

1. **Baseplate Fitting Slave**
   Slide the SMART Hopper on the Baseplate.



2. **Baseplate Fitting Master**
   Slide the SMART Coin System on the Baseplate.

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3.4 Lock Mounting

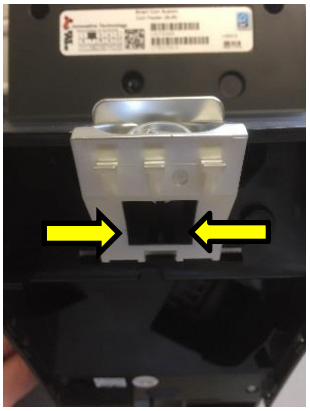
3.4.1 Lock Fitting Coin Feeder

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

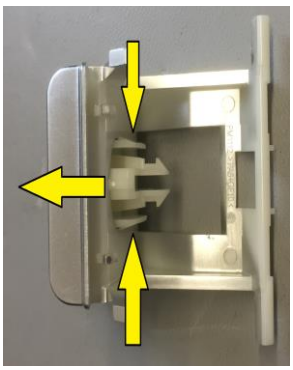
2. **Pressing the Rear Latch**
   Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

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.



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.

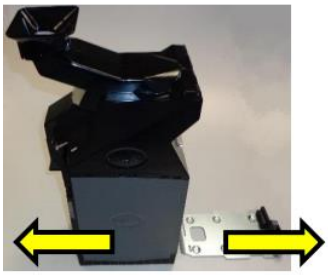
8. **Lock Cam**
   Attach the Lock Cam on the Lock.

9. **Fixture of the Lock Cam**
   Attach the Nut on the Lock to fix the Cam on the Lock. Details about the Lock Cam can be found at 3.4.7 Lock Cam.

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.

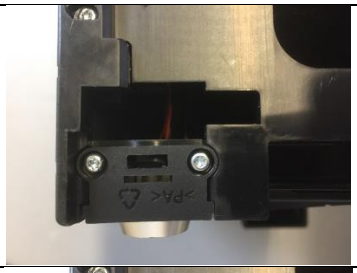


2. **Pressing the Front Latch**
   Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

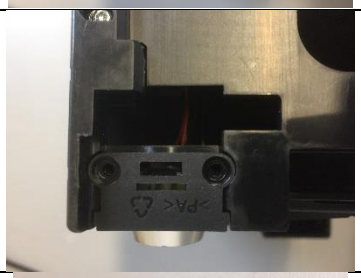
3. **Pressing the Rear Latch**
   Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

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 a 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.

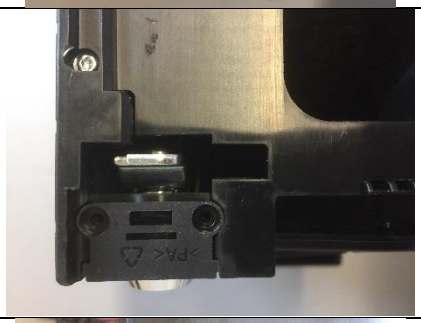
10. **Lock Cam**
    Attach the Lock Cam on the Lock. Details about the Lock Cam can be found at 3.4.7 Lock Cam.

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.

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.

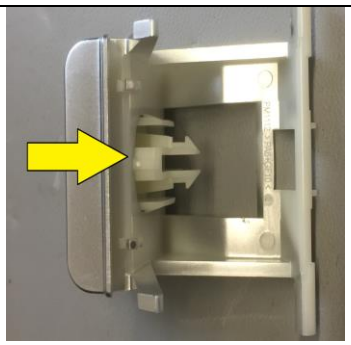
5. **Nut Removal**
   Unscrew the Nut on the Lock.

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.



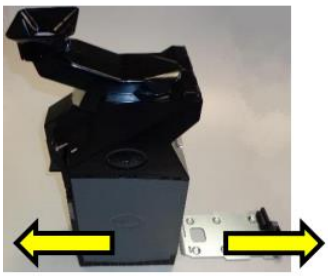
10. Latch Attachment

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.



---

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

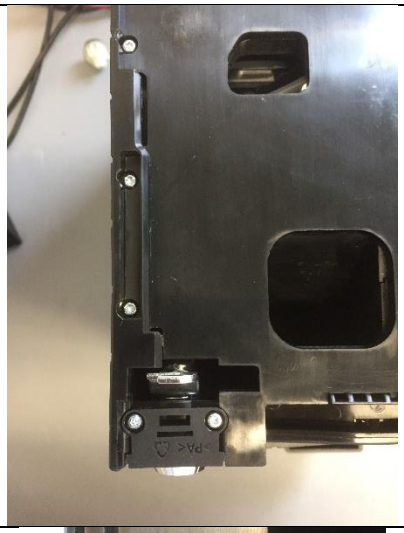
Press the Rear latch on the Coin Feeder rear to Remove the Coin Feeder from the SMART Hopper.

4. Detachment of the Coin Feeder

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

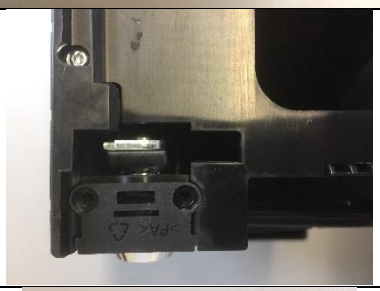
5. Rotate the SMART Hopper

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 a flat screwdriver.

8. Nut Removal

Unscrew the Nut on the Lock.

9. LockCam

Detach the Lock Cam from the Lock.

10. Unscrew the Lock Fixture Nut

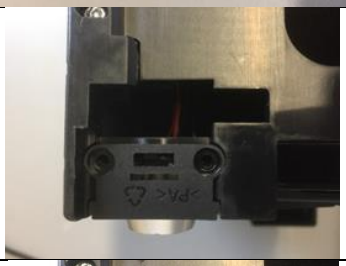
Unscrew the Nut which hold the Lock in position.

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.

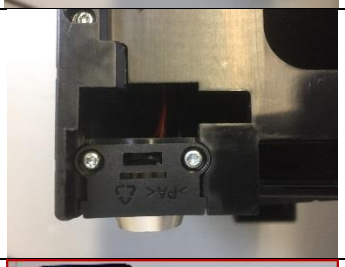
12. Bracket Assembly

Insert the Bracket with the Plug back to its position.



13. Screw Onto

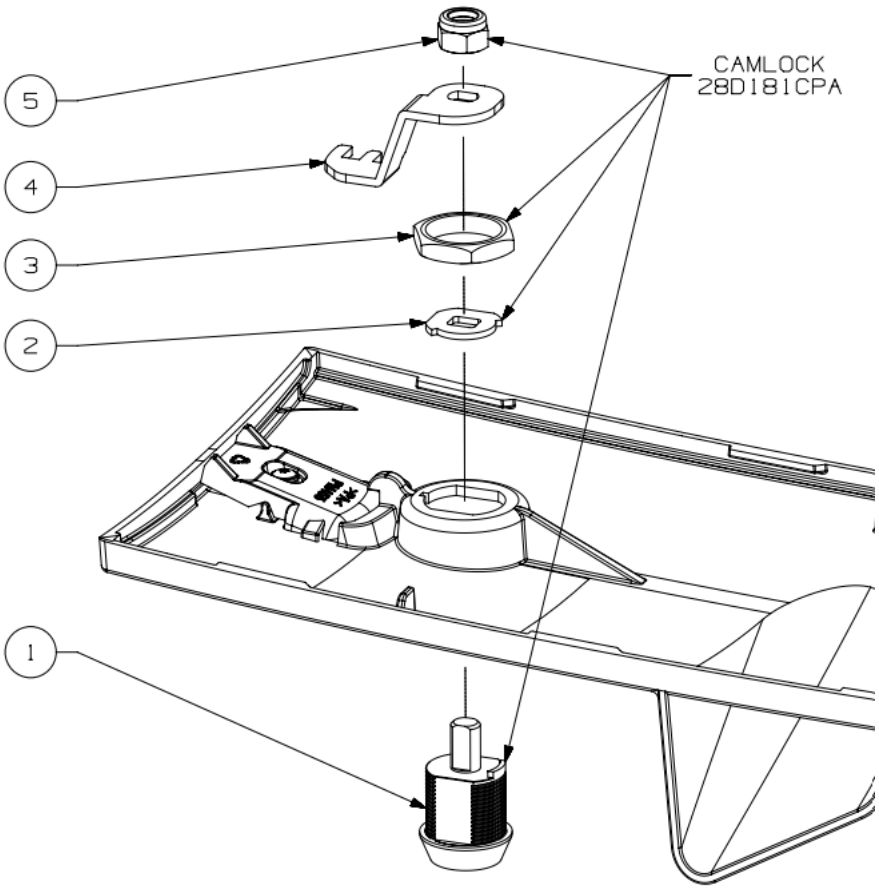
Screw on the Bracket with the Plug.



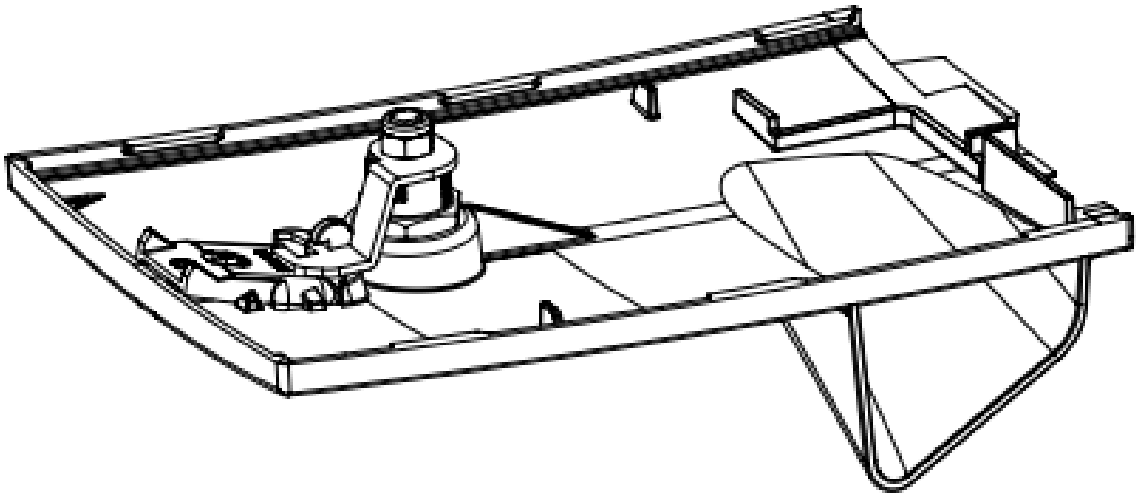
14. Back to Operation

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

3.4.5 Twin SMART Coin System Lid Lock Mounting



1. Remove the lock blank and insert the lock body.
2. Position the lock plate correctly.
3. Retain it with the lock Locknut.
4. Assemble the lock cam. Details about the Lock Cam can be found at 3.4.7 Lock Cam.
5. Fix the lock cam with the lock nut.



3.4.6 Lock Specifications

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

Part Number: 9930100414 PA02540

Webshop Link: Round Key Lock KD PA02540

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

3.4.7 Lock Cam

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

Part Number:

9930100438 SMART Hopper 4 - MC00211

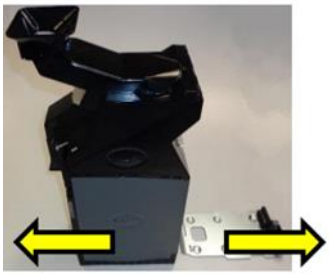
9930100439 Coin Feeder - MC00367

9930100446 Twin SMART Coin System Lid – MC00229

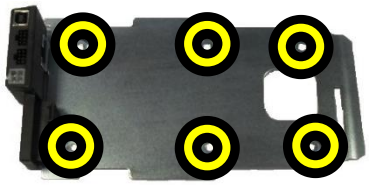
3.5 Machine Mounting

3.5.1 Machine Mounting SMART Coin System

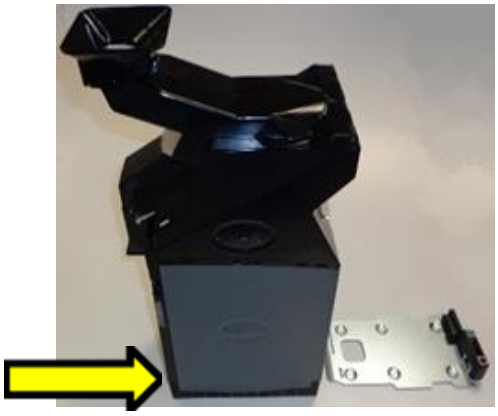
1. **Base Plate Removal**
   Press the Latch on the SMART Hopper to release the SMART Coin System from the Baseplate and slide the SMART Coin System from the Baseplate.



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



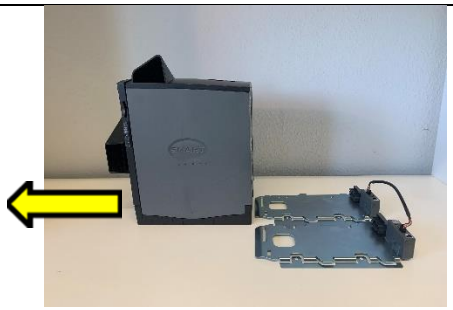
3. **Baseplate Fitting**
   Slide the SMART Coin System on the Baseplate.



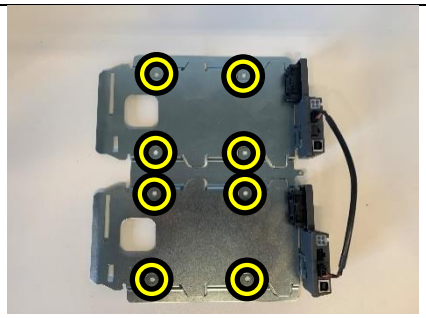
3.5.2 Machine Mounting Twin SMART Coin System

3. **Base Plate Removal Master**
   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.

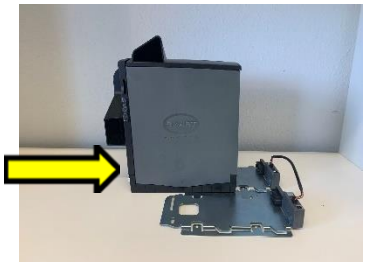
4. **Base Plate Removal Slave**
   Press the Latch on the SMART Hopper to release the SMART Hopper from the Baseplate and slide the SMART Hopper from the Baseplate.



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



6. **Baseplate Fitting Slave**
   Slide the SMART Hopper on the Baseplate.



7. **Baseplate Fitting Master**
   Slide the SMART Coin System on the Baseplate.

3.5.3 Earth Bonding

3.5.3.1 SMART Coin System and TWIN SMART Coin System

It is very important that the SMART Coin System and TWIN 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.

	Caution!
	Lack of proper earth bonding causes failures!

3.5.3.2 Additional Earth Bonding in Machine Housing

Where used in a machine where metal parts are in use around the areas where coins are handled (e.g. Coin Input Funnel, Coin Output Bowls or Cashboxes), it is essential that these parts are properly earthed to prevent ESD (Electro Static Discharge) on other host peripherals or the SMART Coin System and TWIN SMART Coin System itself.

Where used in a machine that has a metal host PC box & cover, it is essential that these parts are also properly earthed to prevent ESD on other host peripherals or the SMART Coin System and TWIN SMART Coin System itself.

3.5.3.3 Additional Recommendations

It is recommended to use shielded cables to prevent ESD issues in the machine. Cables without shielding have a lower resistance than shielded cables and they are more responsive to ESD.

We recommend using suitable cable lengths in the machine housing. A longer cable than required will show more potential sources of error. There is a high potential that an excessively long cable could act as a wireless receiver to ESD.

3.5.4 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 and TWIN 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 and TWIN 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 the drivers should install automatically as they are signed Microsoft Drivers. If this isn't the case or your computer is disconnected from the network, there is a standalone package included within the driver downloads.

The driver package can be found in our download section on our website:

https://innovative-technology.com/index.php/support/secure-download

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.

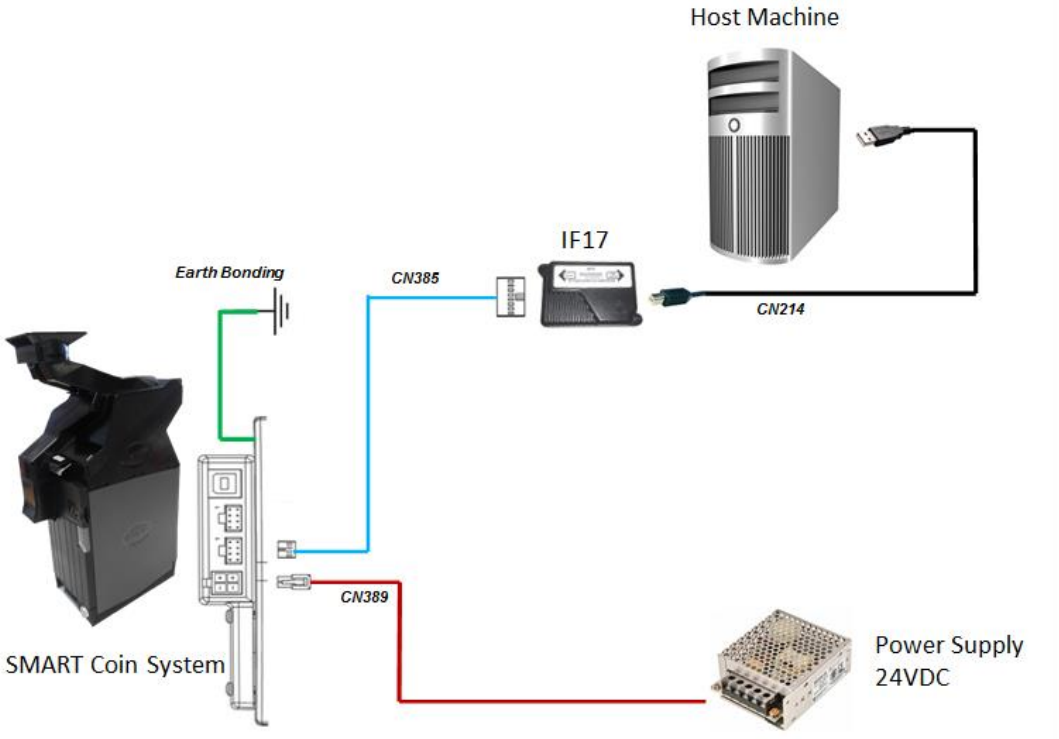
4.4.1.2 System Requirements

- 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.	

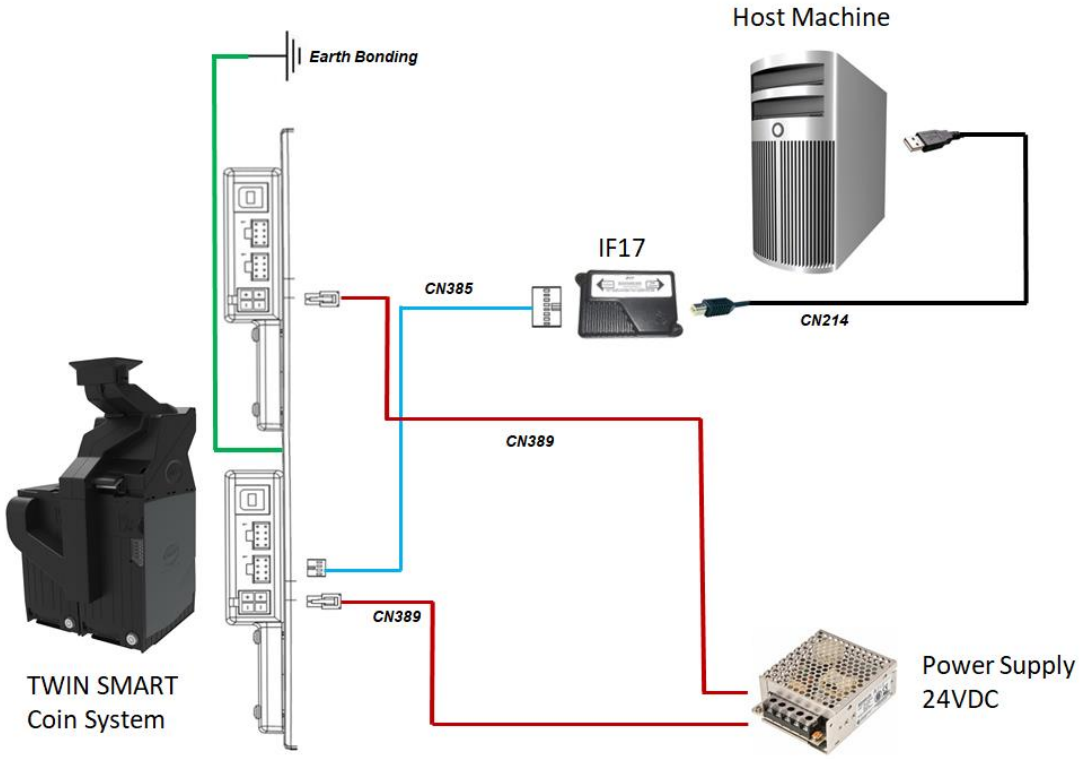
4.4.1.3 Hardware Setup SMART Coin System

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 Hardware Setup TWIN SMART Coin System

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



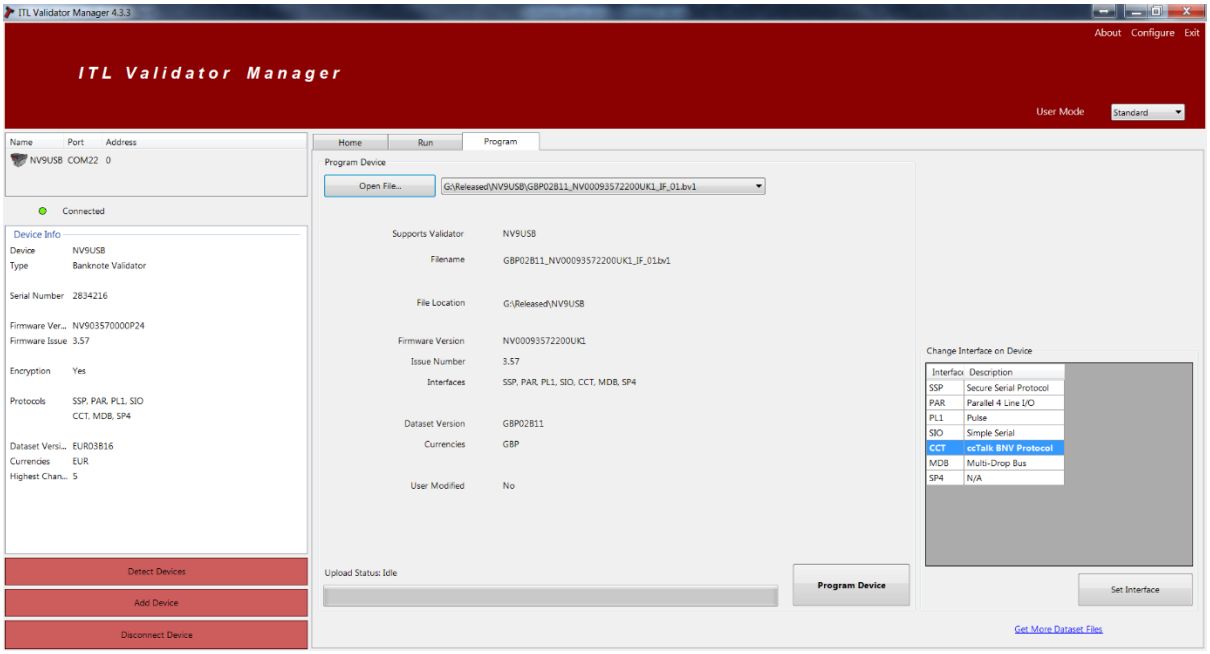
4.4.1.5 Switching to Programming Mode (SSP)

Before programming via the Validator Manager the SMART Coin System and TWIN 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.

4.4.1.6 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 and TWIN 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 or TWIN 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.

4.4.2 SD Card

4.4.2.1 General Description

Updating the SMART Coin System and TWIN 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.

	**Caution!**
Please note that the Slave and the Master needs to be updated separate.	

4.4.2.2 Hardware Requirements

- a Class 4 SD Card (or better) formatted in the FAT32 format
  - Sandisk, Kingston Technology, Transcend cards have been tested
  - Class 10 cards are not supported
- a computer with a SD Card Reader

4.4.2.3 Software Requirements

- The required SMART Coin System and TWIN 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.

Repeat this process for the SMART Hopper if you update a TWIN SMART Coin System in Single Device Mode (with Removed Link between devices).

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

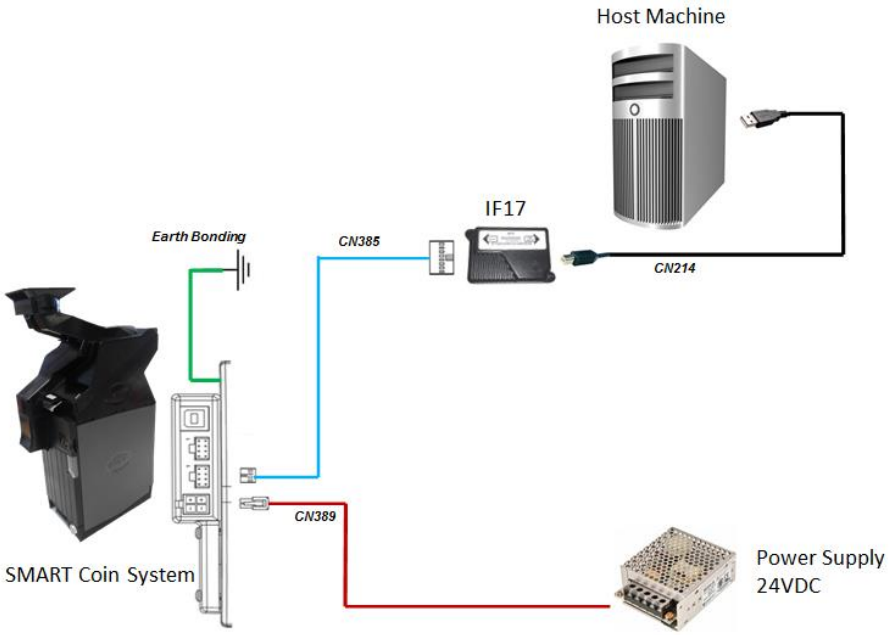
4.4.3 Remote Updates

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 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.

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.

Caution!

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 the below specified coins in the hopper should not exceed a specified amount or percentage of the total coins – whichever is greater.

If the small coins exceed this level, the SCS will automatically try to dump the excess to cashbox during any operation.

If the small coins exceed this level they should be reduced, as quickly as possible, using the Coin Level Controls commands.

The restrictions are implemented for the following currencies:

Currency	Denomination	Percentage of all coins	Max amount of coins if no other coins in device
EUR (Euro)	0.01€	14,29%	20
THB (Thai baht)	50 Satang	14,29%	20

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.

4.5.5 Coin Routing TWIN SMART Coin system

4.5.5.1 Coin Routing via SSP Commands

For the optimum coin handling on the TWIN SMART Coin System, two new Routing commands are added to the SSP protocol.

Sorter Set Routing (0x85)

A command to setup the desired route used for a coin denomination accepted by the Feeder. The coin route can be to the master hopper or to the slave hopper.

Structure: HEADER BYTES + Expansion header (0x30) + 0x05 + Expansion Command (0x85) + 1 byte of desired sorter path (0x00= Master Route,0x01= Slave Route) + 4 bytes of coin value + 3 bytes of country code.

Data received: ACK (0xF0) if all ok + 1 byte of data (0x00= Master Route, 0x01= Slave Route), command not processed (0xF5) otherwise.

The command not processed can be received in the following situations:

- The command is sent during a pay-in or a pay-out.
- The routes sent are different to the available (0x00) or (0x01).
- The coin value and/or the country code is not available in the dataset.
- The SCS is not in Twin Mode

Sorter Get Route (0x86)

A command to request the sorter route setting of a coin denomination value in the Feeder.

Structure: HEADER BYTES + Expansion header (0x30) + 0x05 + 1 byte of Expansion Command (0x86) + 4 bytes of coin value + 3 bytes of country code.

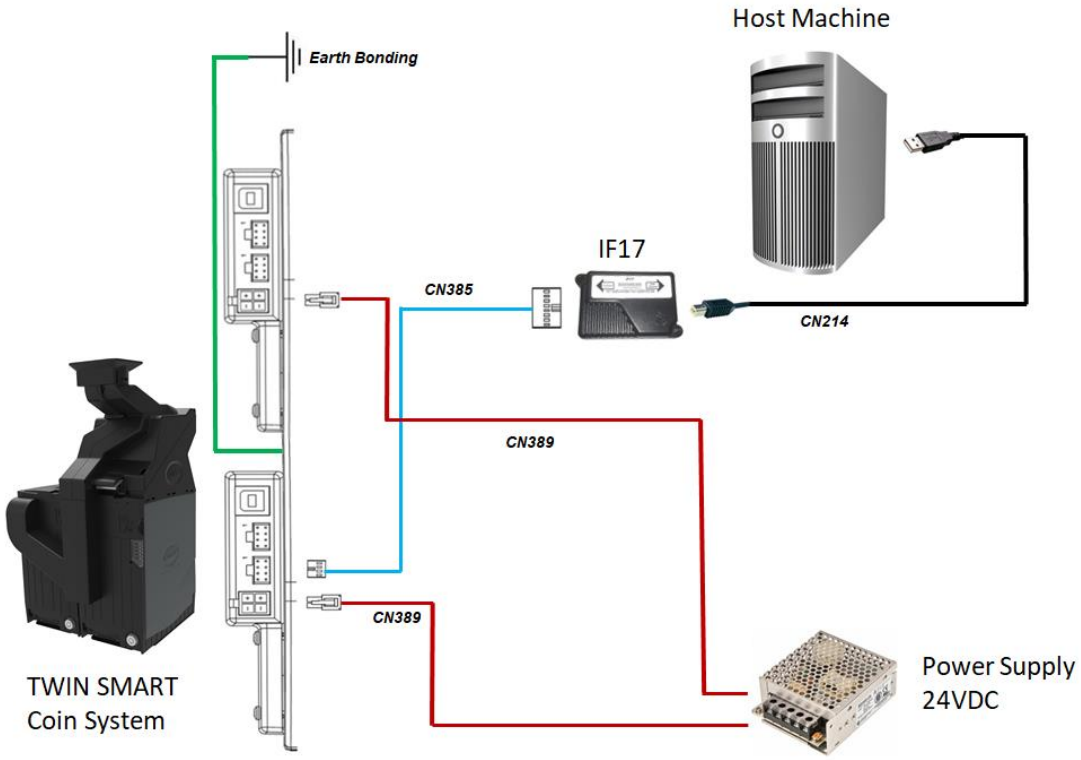
Data received: ACK (0xF0) if all ok + 1 byte of data (0x00= Master Route, 0x01= Slave Route), command not processed (0xF5) otherwise.

The command not processed can be received in the following situation:

- The coin value and/or the country code is not available in the dataset.

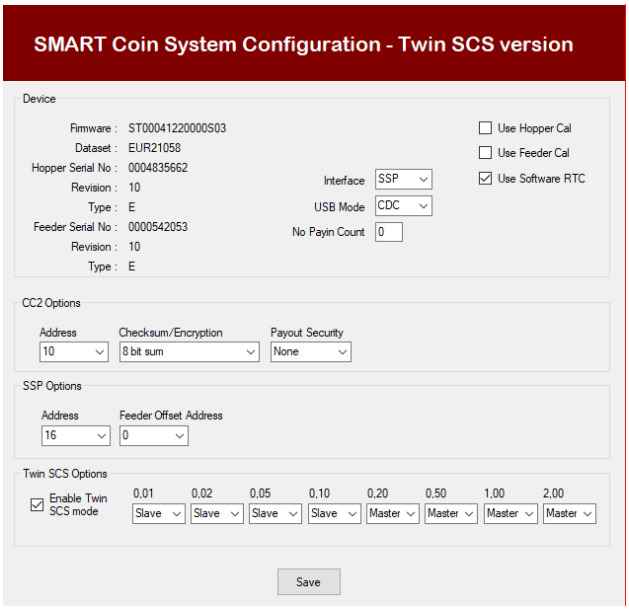
4.5.5.2 Coin Routing via TWIN SMART System Config

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



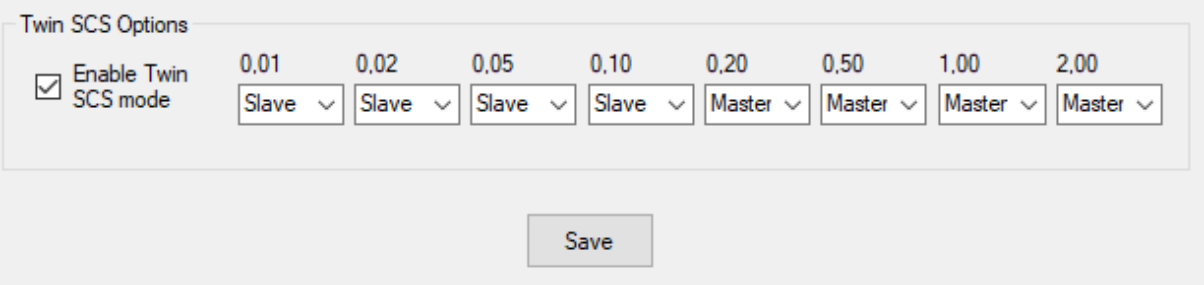
Once you have switched the unit into SSP, open TWIN SMART System Config and click detect devices. If your TWIN SMART Coin System fails to connect please ensure the correct drivers are installed and the unit is in SSP.

If the unit is connected the following screen will appear:

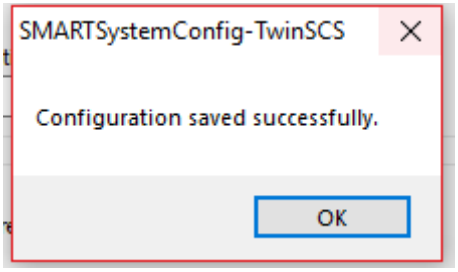


In the section TWIN SCS Options the channel routing can be set (Slave or Master):

If the required channel routing is set, confirm your setting on the Save Button:



If the routing was successfully set a confirmation message will be displayed:



5 PROTOCOLS AND INTERFACING

5.1 Introduction

The SMART Coin System and TWIN 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!

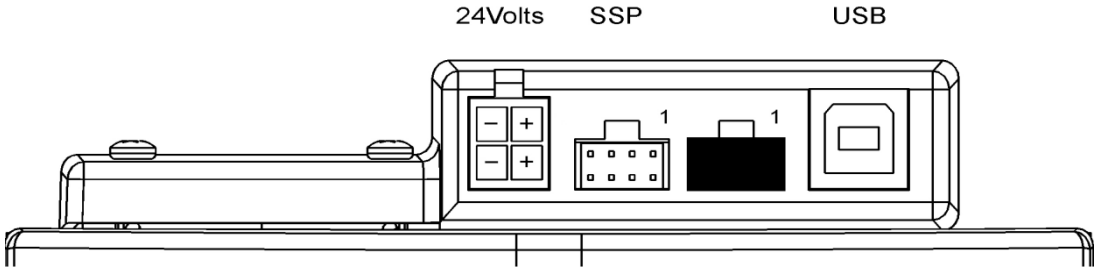
5.2 SSP and eSSP

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

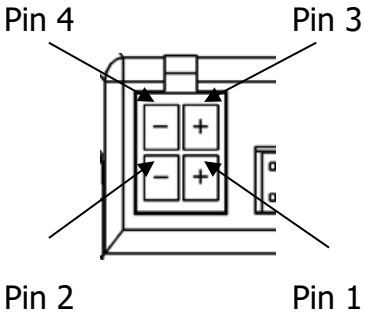
All the connectors needed to set up the SMART Coin System and TWIN SMART Coin System are easily accessible on the bottom base: there are two connectors that are used to allow interfacing and programming:



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 or TWIN SMART Coin System. The pins 1 & 3 and 2 & 4 are linked and could be used as supply voltage for further devices.



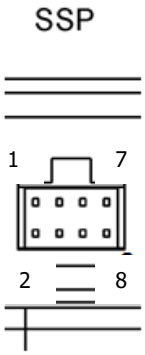
Pin	Description
1	V+ Power connection
2	0V / Ground Connection
3	N/C
4	N/C

Caution!

+24VDC and 0V (GND) must always be connected on the **Slave and Master.**

Interface communication from the SMART Coin System and TWIN 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

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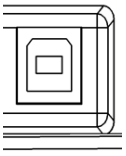
The USB connector is a standard Type B USB socket. The USB socket can be used for programming the SMART Coin System and TWIN SMART Coin System unit and also bench testing – a USB 2.0 compliant Type 'A' to 'B' lead can be used to do this. USB cables should be electrically shielded and less than 5 metres 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.

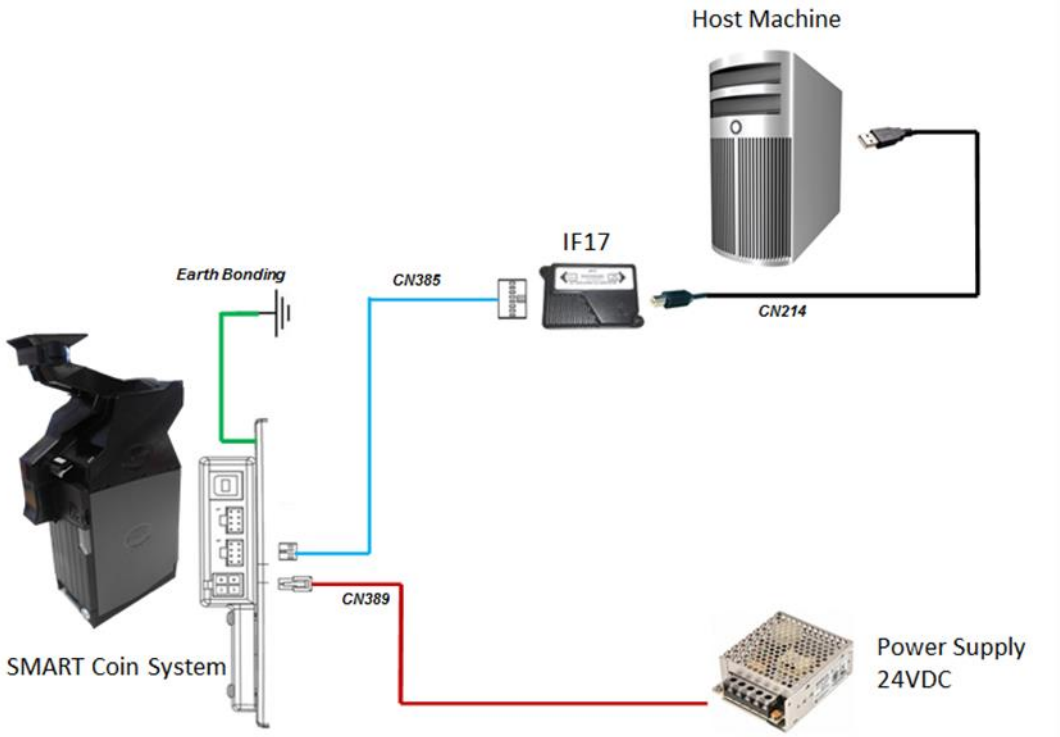
USB



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	USB Interface Converter IF17
Cable	CN385	Smart Hopper to IF17 cable	1	Smart Hopper to IF17 cable
Cable	CN389	Hopper Interface Power Cable	1	Hopper Interface Power Cable
Cable	CN214	USB A to B Cable Assembly	1	USB A to B Cable Assembly

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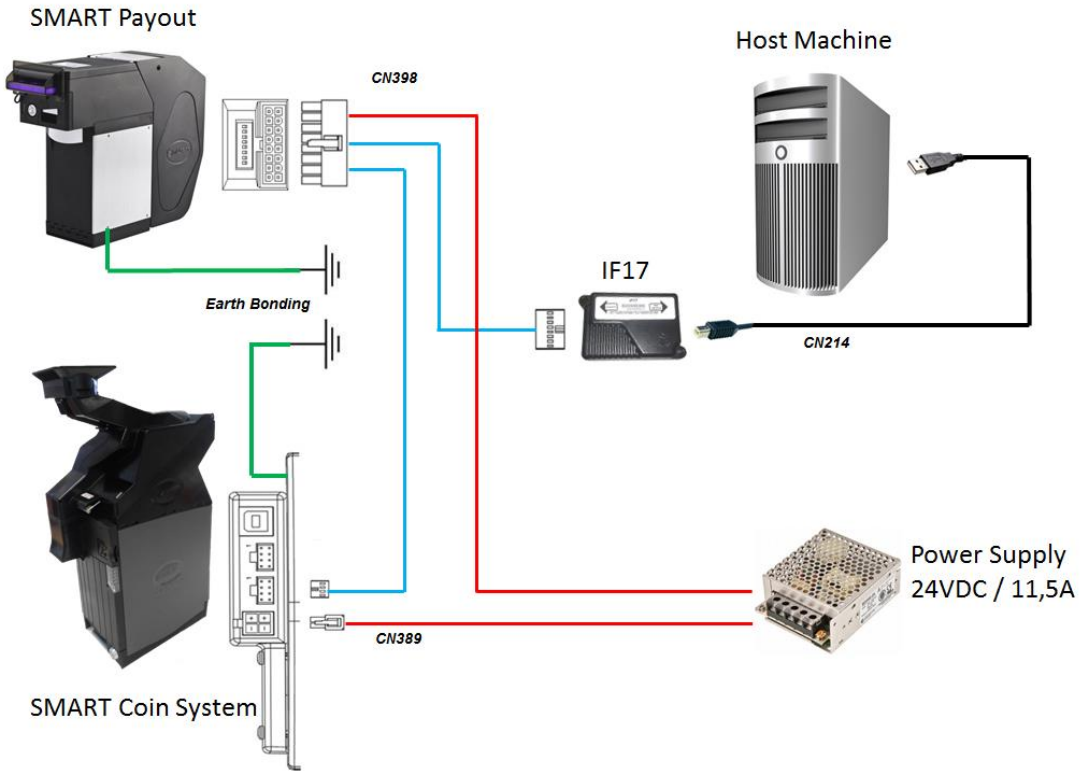
5.2.3.2 SSP Setup – SMART Coin System and SMART Payout



Type	ITL Part Number	Description	Quantity	Details
Interface	IF17	USB Interface Converter	1	USB Interface Converter IF17
Cable	CN398	Dual eSSP interface for SMART Hopper & SMART Payout	1	Dual eSSP interface for SMART Hopper & SMART Payout
Cable	CN389	Hopper Interface Power Cable	1	Hopper Interface Power Cable
Cable	CN214	USB A to B Cable Assembly	1	USB A to B Cable Assembly

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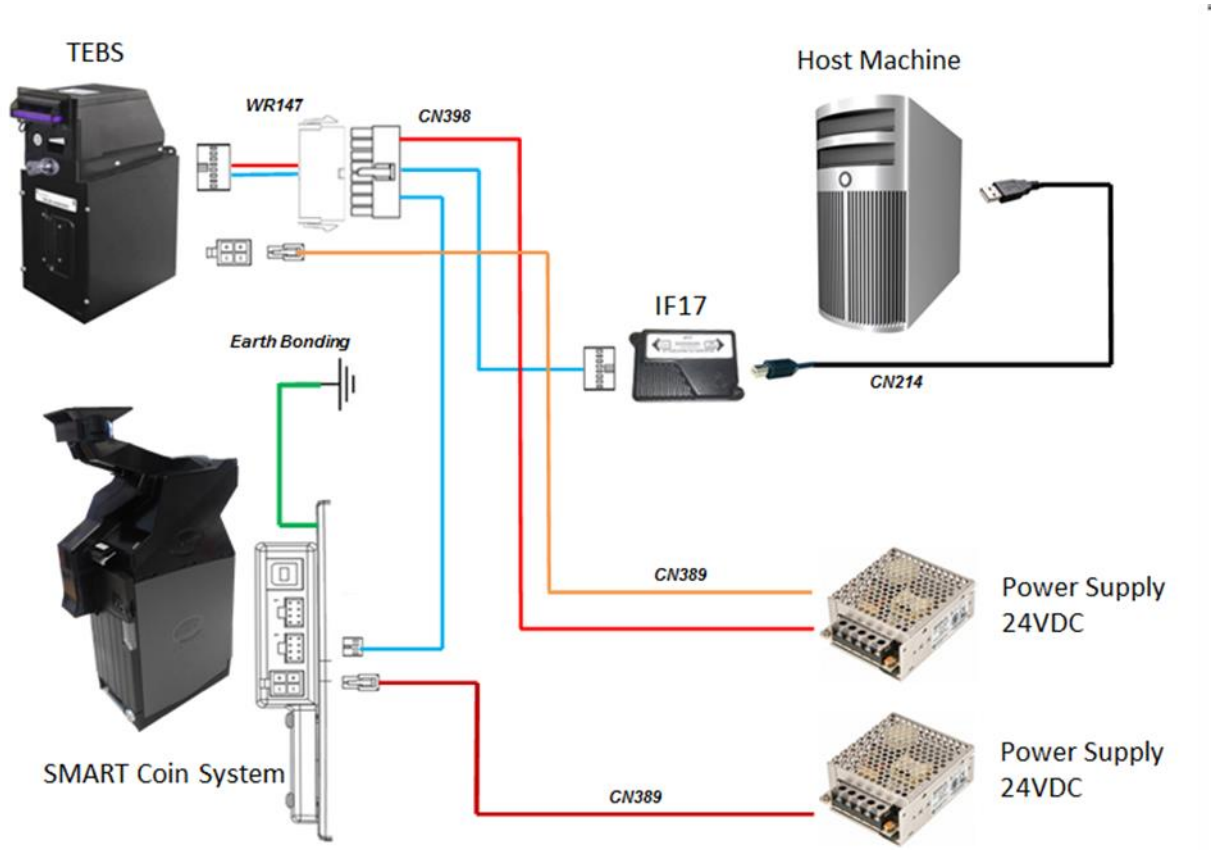
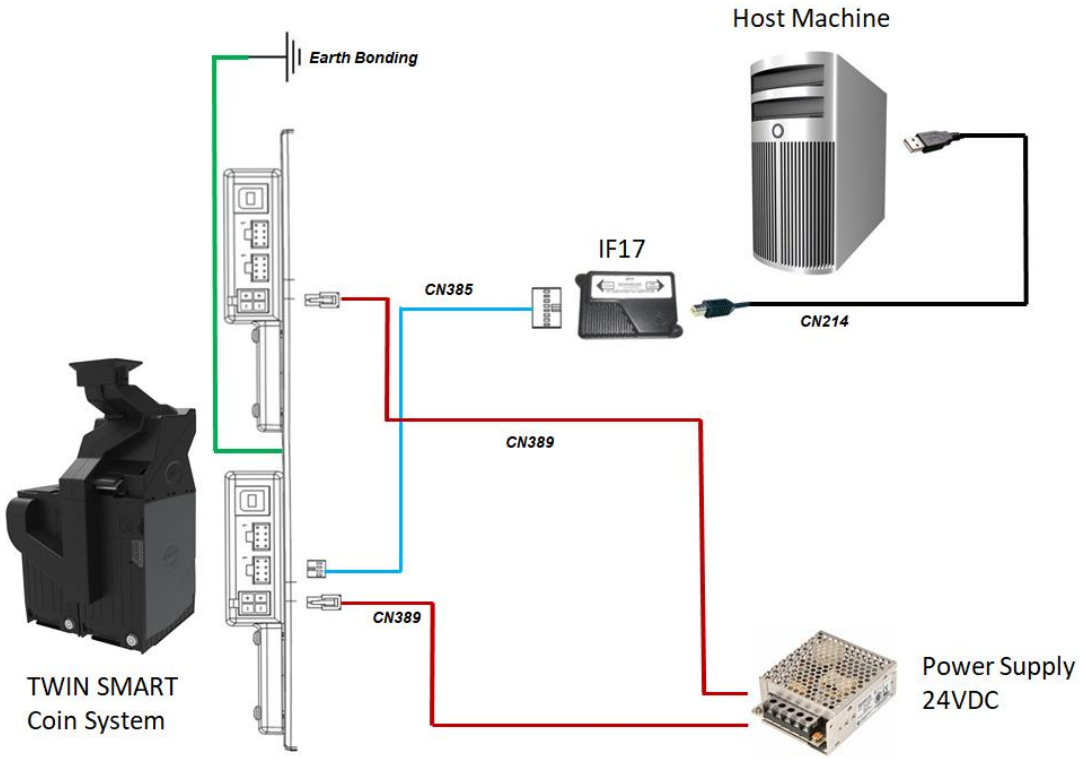
5.2.3.3 SSP Setup – SMART Coin System and TEBS



Type	ITL Part Number	Description	Quantity	Details
Interface	IF17	USB Interface Converter	1	USB Interface Converter IF17
Cable	CN398	Dual eSSP interface for SMART Hopper & SMART Payout	1	Dual eSSP interface for SMART Hopper & SMART Payout
Cable	CN389	Hopper Interface Power Cable	2	Hopper Interface Power Cable
Cable	CN214	USB A to B Cable Assembly	1	USB A to B Cable Assembly
Cable	WR147	SMART Payout to NV200 Adaptor	1	SMART Payout to NV200 Adaptor

5.2.3.4 SSP Setup – TWIN SMART Coin System



Type	ITL Part Number	Description	Quantity	Details
Interface	IF17	USB Interface Converter	1	USB Interface Converter IF17
Cable	CN385	Smart Hopper to IF17 cable	1	Smart Hopper to IF17 cable
Cable	CN389	Hopper Interface Power Cable	2	Hopper Interface Power Cable
Cable	CN214	USB A to B Cable Assembly	1	USB A to B Cable Assembly

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 and TWIN 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!

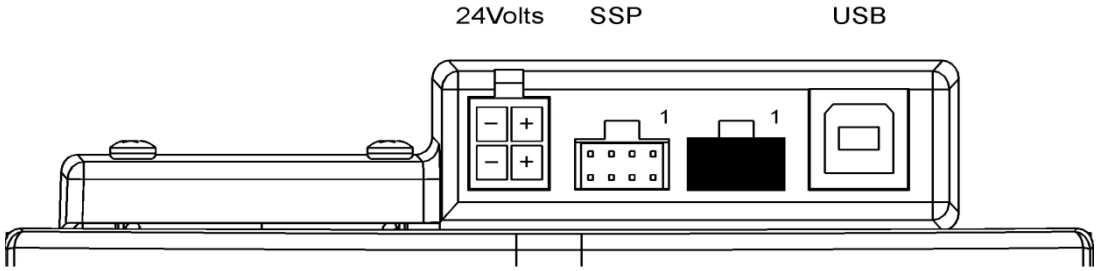
Innovative Technology Ltd. provides full SDK packages including Interface Specification, Implementation Guide as well as source code examples for SSP respectively eSSP only!

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.

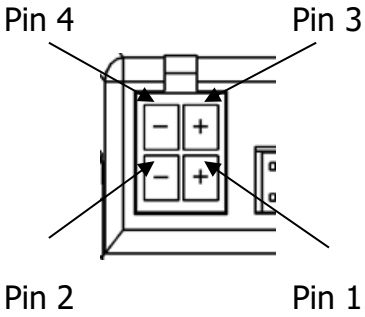
All the connectors needed to set up the SMART Coin System and TWIN SMART Coin System are easily accessible on the bottom base: there are two connectors that are used to allow interfacing and programming:



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 or TWIN SMART Coin System. The pins 1 & 3 and 2 & 4 are linked and could be used as supply voltage for further devices.



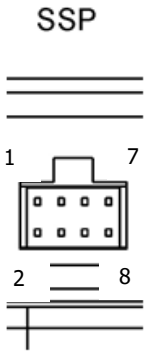
Pin	Description
1	V+ Power connection
2	0V / Ground Connection
3	N/C
4	N/C

Caution!

+24VDC and 0V (GND) must always be connected on the **Slave and Master.**

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

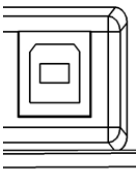
The CC2 pin numbering of the socket is shown below, as well as an overview of the socket connections:



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 and TWIN 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.

USB



5.3.3 ccTalk® DES Encryption

When using ccTalk® DES encryption, the SMART Coin System and TWIN 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 and TWIN 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 and TWIN 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 and TWIN 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.

6.2.1 Recommended Cleaning and Maintenance Intervals/Tasks Overview

Recommended Interval	Affected Component	Affected Hardware Type	Recommended Task	Details can be found in Section
monthly	SMART Hopper	All	Remove the Coin Dust, foreign objects or dirt with a paintbrush, compressed air or a cloth with mild detergent.	8.8.3 Cleaning the SMART Hopper
monthly	Coin Feeder	All	Remove the Coin Dust, foreign objects or dirt with a paintbrush, compressed air or a cloth with mild detergent.	8.8.1 Cleaning the Coin Feeder
every 250,000 coins	Coin Feeder	All	Exchange the Coin Sorting Disk.	8.8.2 Disk Removal Coin Feeder
every 50,000 coins	Coin Feeder	All	Renew the coated surface.	8.9 Silicone Lubricant Instruction
every 250,000 coins	Coin Feeder	SMART Coin System Type F, G and H TWIN SMART Coin System Type E and F	Exchange the Coin Path Insert.	8.10 Coin Feeder Path Insert

7 FIRST LEVEL SUPPORT

7.1 Status LED Flash Codes SMART COIN System

🔴	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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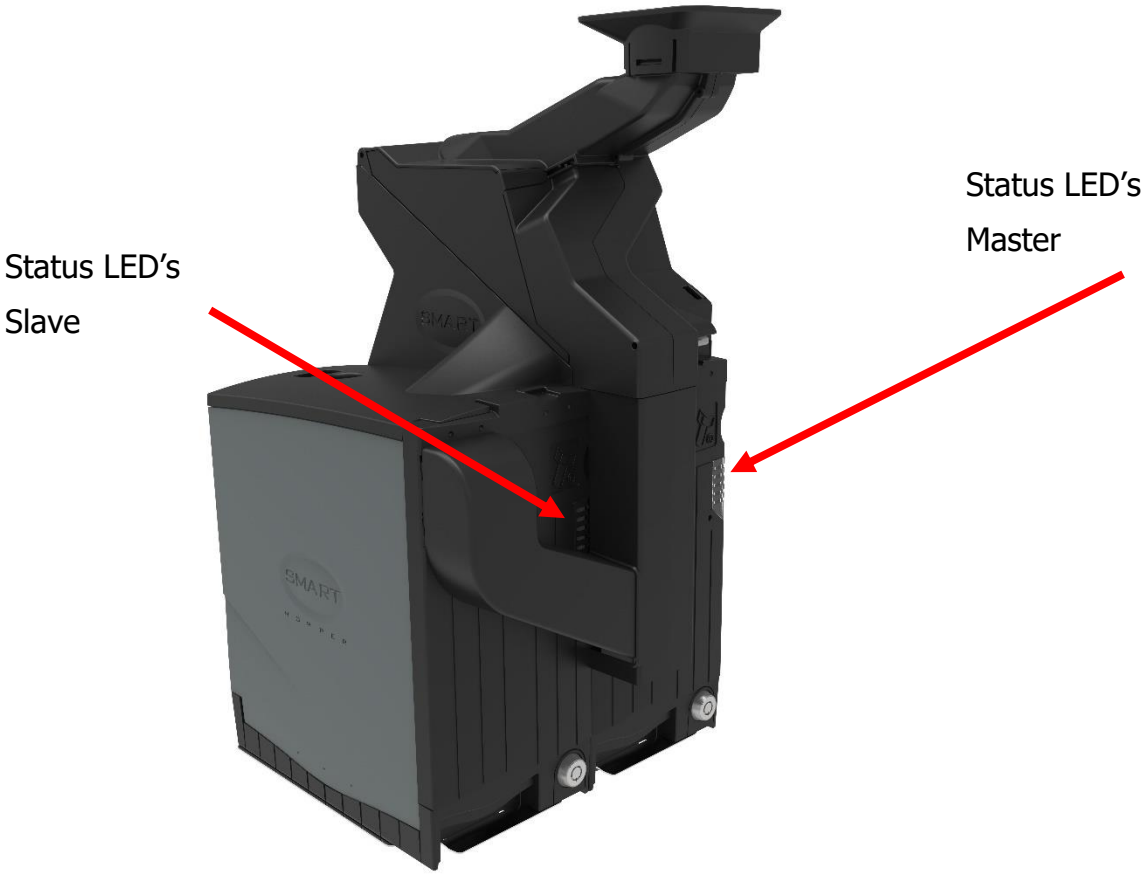
7.2 Status LED Flash Codes TWIN SMART COIN System



🔴	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

The Slave status LED will flash green and red in Idle state as the Slave is set to CC2 to allow the communication via the Coin Mech Port of the Master.

7.3 Error LED Flash Codes

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

Led Colour	Status	Description	Action
Green	Flashing 1Hz	Enabled and ready to dispense	n/a
Red	1 Flash	Hopper disabled	Host system to send enables command.
Red	2 Flashes	Calibration Fault	Usually optical sensor contaminated. Operator to clean exit sensor light pipe. If fault persists, return to ITL for service. On TWIN SMART Coin System also the Link between Master and Slave could be defective or missing.
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	5 Flashes	Not in Use	
Red	6 Flashes	Not in Use	
Red	7 Flashes	Dataset/Unit type mismatch	Re-download SCS Firmware. If this persists return to ITL for service.

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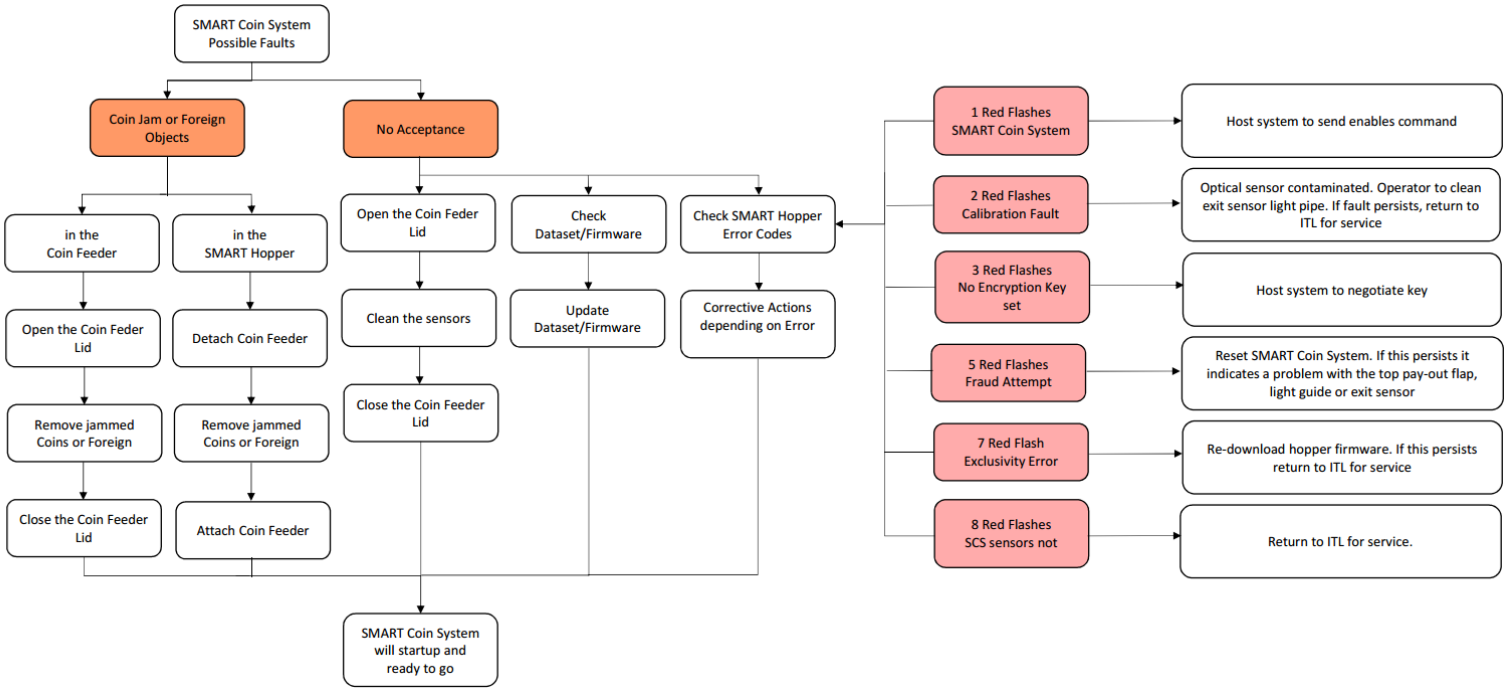
8 SECOND LEVEL SUPPORT

8.1 Introduction

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

8.2 Fault Finding Flow Chart



8.3 Troubleshooting via SD Card

8.3.1 General Description

Starting with firmware 1.21 a new SD Card function was added to the SMART Coin System and TWIN SMART Coin System firmware. This new function allows the user to gather unit information like dataset version, firmware version and the last 8 error codes.

Caution!

Please note that the Slave and the Master data needs to be collected separate.

8.3.2 Hardware Requirements

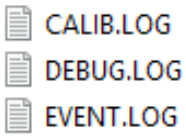
- a Class 4 SD Card (or better) formatted in the FAT32 format
  - Sandisk, Kingston Technology, Transcend cards have been tested
  - Class 10 cards are not supported
- a computer with a SD Card Reader

8.3.3 Data Collection

- Insert the prepared SD Card into the SD Card slot on the device
- Perform a Power Reset on the device
- Wait until the Setup Routine is finished (all motors stopped turning) and remove the SD Card from the SD Card slot

8.3.4 Analyse the SD Card Data

- Insert the SD Card into the SD Card Reader
- Open the SD Card content and the following data will be shown:



  - CALIB.LOG consist of the latest Calibration Data of the Device
  - DEBUG.LOG consist of the latest Debug information
  - EVENT.LOG consist of the required data for the device troubleshooting

- Open the EVENT.LOG and you will see the following content:

```
01:55:03 01/01/80 -- Card inserted
00:00:00 01/01/80 -- Card inserted
00:00:00 01/01/80 -- SMART Coin System SH4
00:00:00 01/01/80 -- Firmware version : SH00041222435C01 1.
00:00:00 01/01/80 -- Dataset version  : EUR05058
00:00:00 01/01/80 -- Hopper Serial: 4771816  Rev: 14  Type: E
00:00:00 01/01/80 -- Feeder Serial: 4813263  Rev: 14  Type: E 2.
00:00:00 01/01/80 -- Detector version: 0101
00:00:00 01/01/80 -- Validation Version: 3
00:00:00 01/01/80 -- Power on reset
00:00:00 01/01/80 -- System running at 24V
00:00:00 01/01/80 -- BOR off
00:00:00 01/01/80 -- RDP level 1
00:00:00 01/01/80 -- System codes: 2:18 2:18 2:18 2:18 2:18 2:18 2:18 2:18 3.
00:00:00 01/01/80 -- FeederCoins=3376 FeederRejects=34 FeederJams=0 HopperCoins=2766 HopperJams=0 CalFails=61 FraudAttempts=5 Resets=119 4.
00:00:00 01/01/80 -- Hopper Dataset  Val: 3  Type: E
00:00:00 01/01/80 -- Feeder Dataset  Val: 3  Type: E
00:00:00 01/01/80 -- Feeder Trigger Version : 1
```

1. Firmware and Dataset version of the device.
2. Serial and Hardware type of the device.
3. Last 8 device system error codes.
4. Statistic of the complete device (data is stored in the SMART Hopper; this means the Feeder statistic will not be reset if the Feeder is exchanged)

8.3.5 Interpreting System Error Codes

The following system error code types could be listed:

Number	Error Type
0	OK
1	POWER ON INIT
2	CALIBRATION ERROR MASTER SCS (if Twin Smart Coin System) or Smart Coin System
3	FRAUD ATTEMPT MASTER SCS (if Twin Smart Coin System) or Smart Coin System
4	MASTER – SLAVE INTERFACE ERROR (if Twin Smart Coin System)
5	CALIBRATION ERROR SLAVE HOPPER (if Twin Smart Coin System)
6	FRAUD ATTEMPT SLAVE HOPPER (if Twin Smart Coin System)

Each of this error code types have sub error codes. A sub error code overview is shown on the next pages:

8.3.5.1 CALIBRATION_ERROR (2:xx and 5:xx)

ERROR TYPE (1st byte, 2 = Calibration fault Master, 5 = Calibration fault Slave)	ERROR CODE (2nd byte of the RX message)	DESCRIPTION	RECOMMENDED ACTION
2/5	1	The coin Pay-Out flap cannot be cleared at power on	Check for obstruction on the coin Pay-Out path
2/5	2	Hopper sensor could not be calibrated	Software reset
2/5	3	The hopper sensors cannot detect a free gap on the belt (could be something covering the coils in the path)	Software reset
2/5	4	Hopper sensor could not be calibrated	Software reset
2/5	5	Hopper sensor could not be calibrated	Software reset
2/5	6	Hopper sensor could not be calibrated	Software reset
2/5	7	The coin Pay-Out flap could not be calibrated	Check for obstruction in Hopper Pay-Out flap
2/5	8	The coin Pay-Out detection could not be calibrated	Check for obstruction in Hopper Pay-Out area
2	9	The feeder metal detector could not be calibrated	Software reset (check feeder connection)
2	10	There is something covering the coin path of the feeder that could not be cleared, right after leaving the motor disk	Check feeder for stuck coins in coin path

2	11 - 15	Feeder sensor could not be calibrated	Software reset (check feeder connection)
2	16	Lateral output sensor of Feeder could not be calibrated	Check for obstruction in the feeder lateral path
2	17	Accept Pay-Out sensor of Feeder could not be calibrated	Check for obstruction in the feeder main path and flap
2/5	18	PSU voltage out of range	Check PSU voltage
2	19	Pay-In Flap of Feeder not in correct position	Check for obstruction in the feeder main path and flaps
2/5	20	Unknown coins remain in the hopper after an Empty	Remove the unknown coins before continuing
2	21	Internal Hopper-Feeder comms failed	Software reset (check feeder connection)
2	22	Not in Use	
2	23	Pay-In Flap of Feeder not in correct position	Check for obstruction in the feeder main path and flaps
2	24	Not in Use	
2	25	Path Jam	Check if a path sensor is covered while the unit is idle.

8.3.5.2 FRAUD_ATTEMPT (3:xx and 6:xx)

ERROR TYPE (1st byte, 3 = Fraud attempt Master, 6 = Fraud attempt Slave)	ERROR CODE (2nd byte of the RX message)	DESCRIPTION	RECOMMENDED ACTION
3/6	1	During Pay-Out related activity, the hopper Pay-Out flap was active when it should not	Reset SCS. If this persists it indicates a hardware problem.
3/6	2	During Pay-Out related activity, the hopper Pay-Out opto was active when it should not	Reset SCS. If this persists it indicates a hardware problem.
3/6	3/4/5/6/7/8	Not in Use	
3/6	9	During idle (unit should be enabled), the hopper Pay-Out flap was active when it should not	Reset SCS. If this persists it indicates a hardware problem.
3/6	10	During idle (unit should be enabled), the hopper Pay-Out opto was active when it should not	Reset SCS. If this persists it indicates a hardware problem.
3/6	11	Not in Use	
3/6	12	Unit ID not matching the dataset	Re-download the correct dataset/firmware.
3/6	13	Unit ID not matching the device type	Connect suitable hardware types.

8.3.5.3 Master-Slave Interface Error (4:xx)

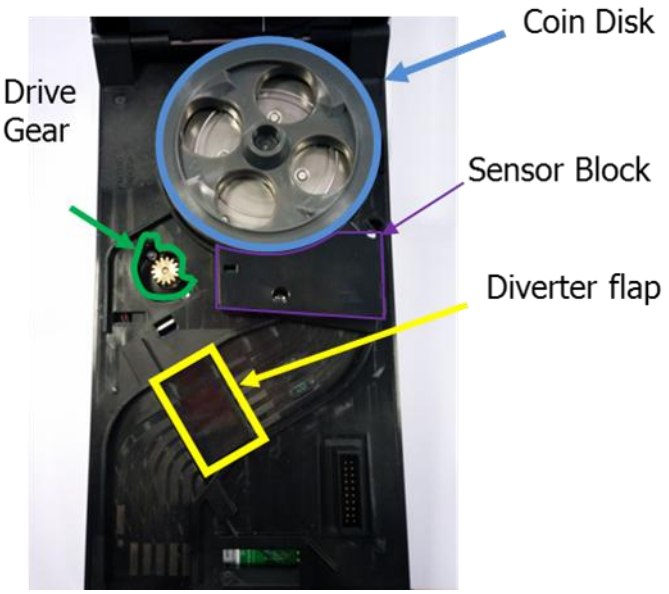
ERROR TYPE (1st byte, 4 = Twin interface)	ERROR CODE (2nd byte of the RX message)	DESCRIPTION	RECOMMENDED ACTION
4	1/2/5/8/9/10/11/12	Comms fault in the Master-Slave interface	Software reset, check the master-slave interface cable, check the slave comms configuration
4	3	FW version of slave different to the master	Check the FW version of the slave device
4	4	Dataset version of slave different to the master	Check the dataset version of the slave device
4	6/7	Not in Use	

8.4 Clearing a Jam

8.4.1 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.	

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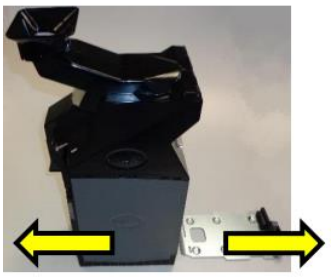
8.4.2 Clearing a Jam from the Hopper

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.



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.

7. Coin Drop

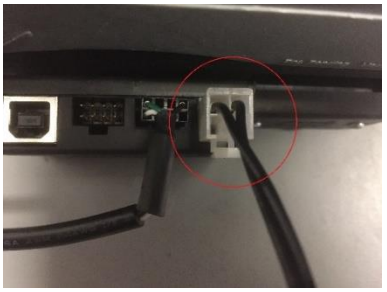
While turning the disc the coins will drop out here:

8. Back to Operation

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

8.5 Checking Power Connections

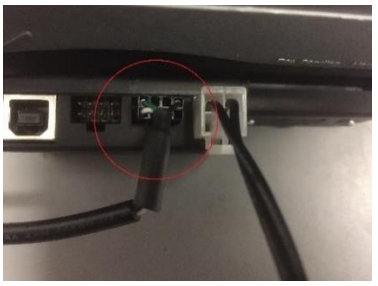
1. **Power Cable**
   Check if the Power Cable is correctly fitted



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

8.6 Checking Host Communication Connections

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



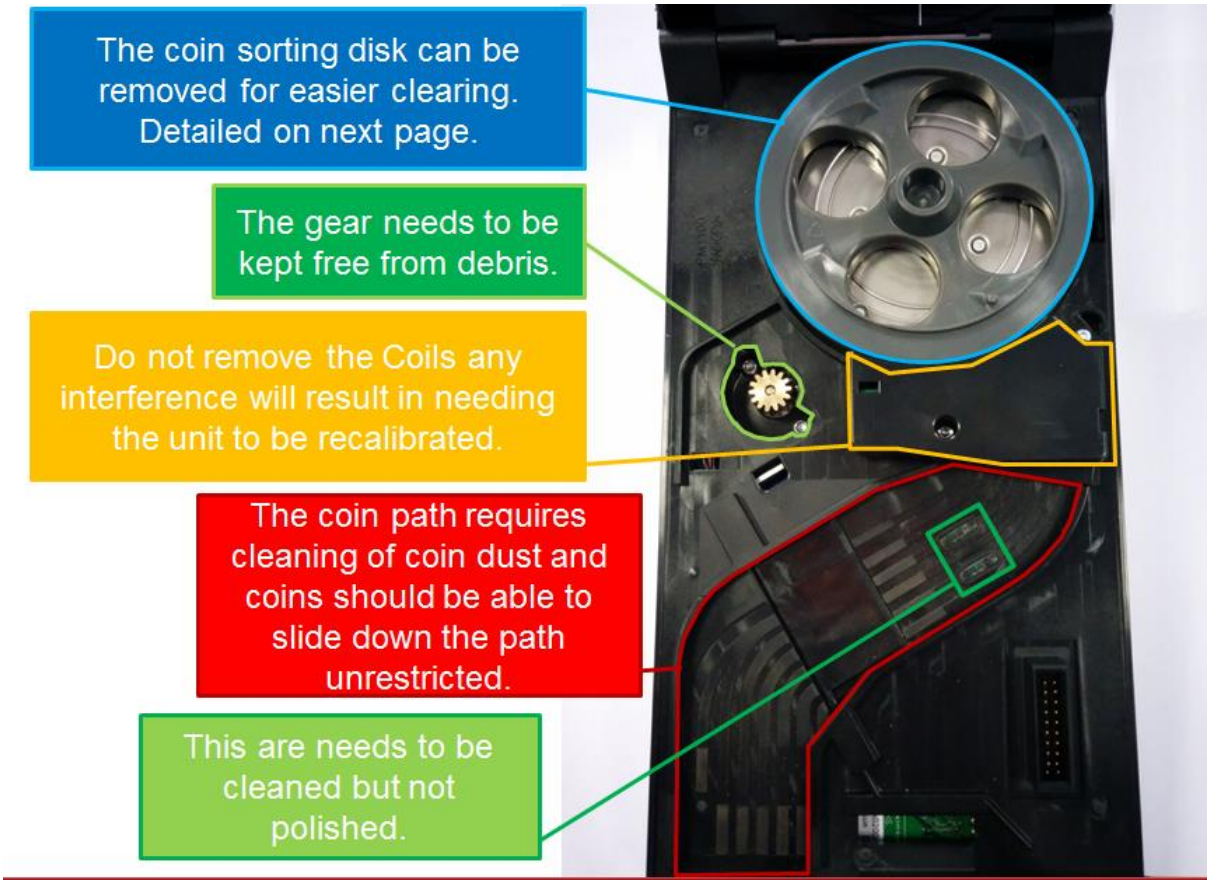
2. **Interface Specification**
   Check if the Communication Cable and Machine Setup meets the specification from chapter 5 Protocols and Interfacing.

8.7 Checking Master and Slave Link

1. **Master and Slave Link**
   Check if the Master and Slave Link is correctly fitted.

8.8 Cleaning the SMART Coin System

8.8.1 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 SMART Coin System, only use a mild detergent.

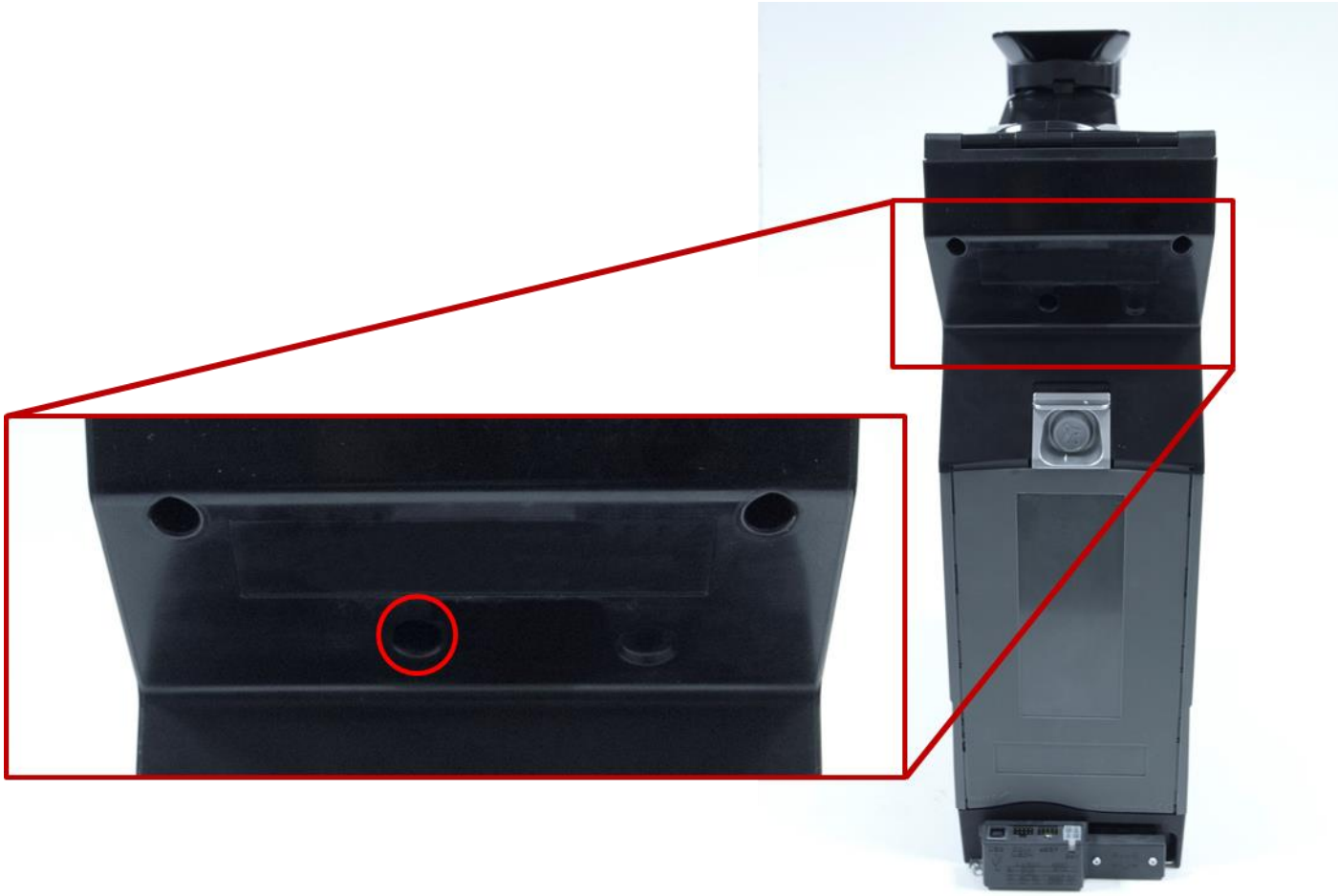
An overview of all recommended Cleaning and Maintenance Intervals/Tasks can be found in section 6.2.1 Recommended Cleaning and Maintenance Intervals/Task.

8.8.2 Disk Removal Coin Feeder

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

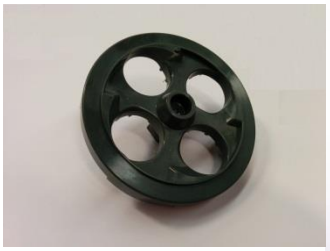
Please ensure the power has been disconnected before attempting to remove the coin sorting disk.

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.



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%.

It is recommended to exchange the disk every 250,000 coins to guarantee the best performance of the Coin Feeder.

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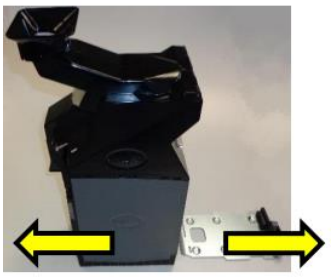
8.8.3 Cleaning the SMART Hopper

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.

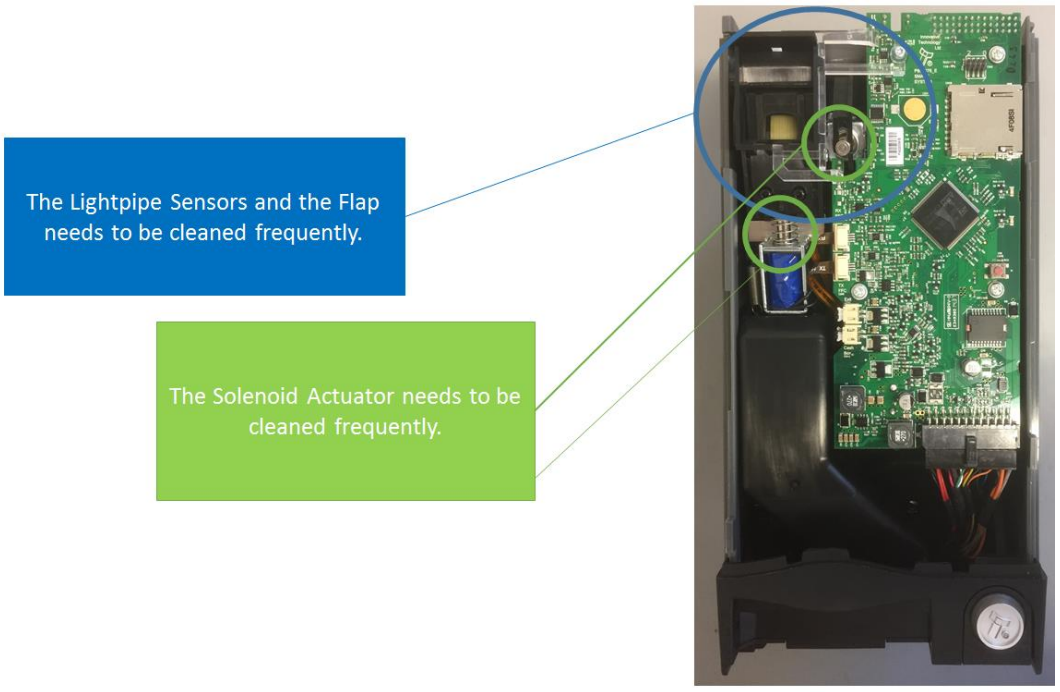
5. Nozzle Removal

Move the Nozzle up until the Nozzle will release.

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



An overview of all recommended Cleaning and Maintenance Intervals/Tasks can be found in section 6.2.1 Recommended Cleaning and Maintenance Intervals/Task.

8.9 Silicone Lubricant Instruction

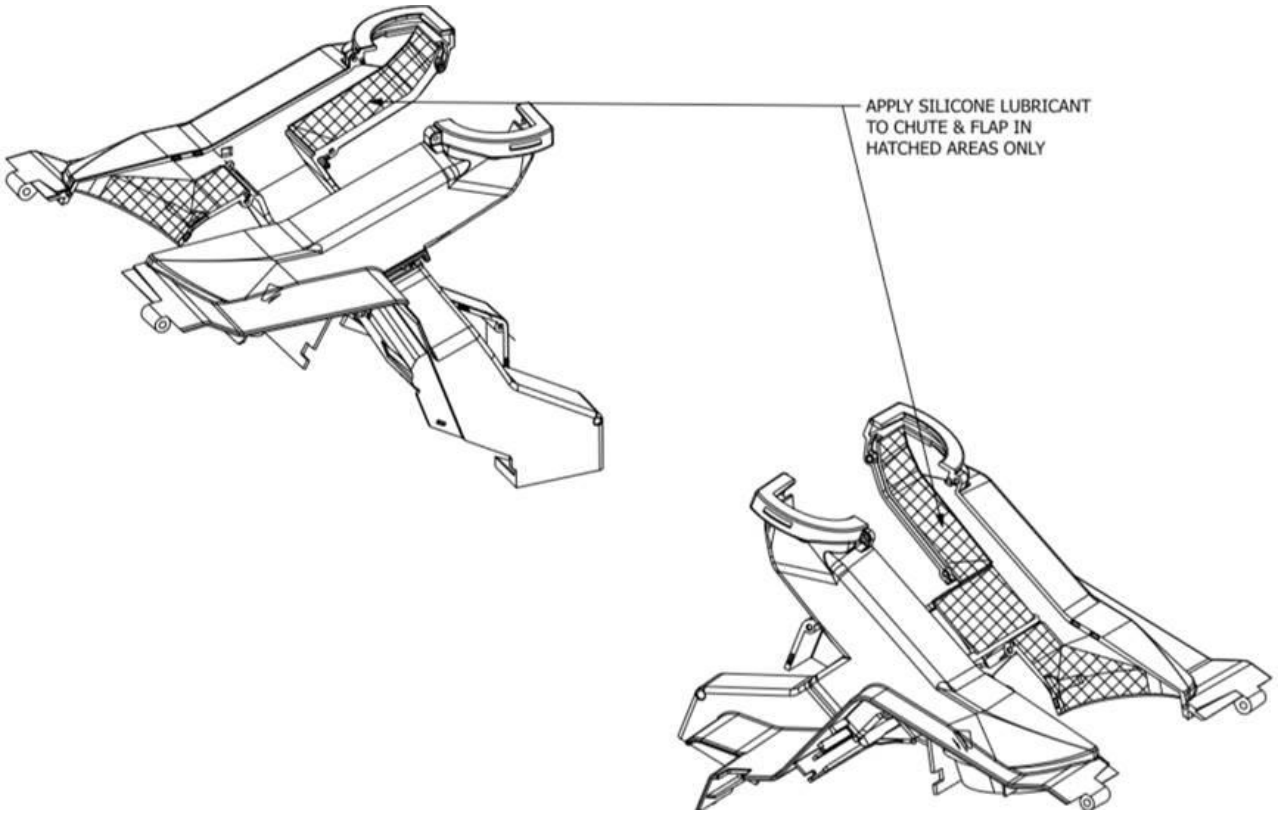
As soon as the Coin Feeder is cleaned as described in chapter 8.8 Cleaning the SMART Coin System, it is required to renew the coated surface with Silicone Lubricant. This procedure is required every 50,000 coins to guarantee the best performance of the Coin Feeder.

The coated surface is required to prevent coins stick on the path and to prevent dirt and grease building up on the plastic path surface.

The recommended and tested Silicone Lubricant to renew the coated surface is Ambersil AMS4 Silicone Grease.

8.9.1 Coin Feeder Top Assembly

Apply the Silicone Lubricant only in the hatched areas shown in the drawing below:

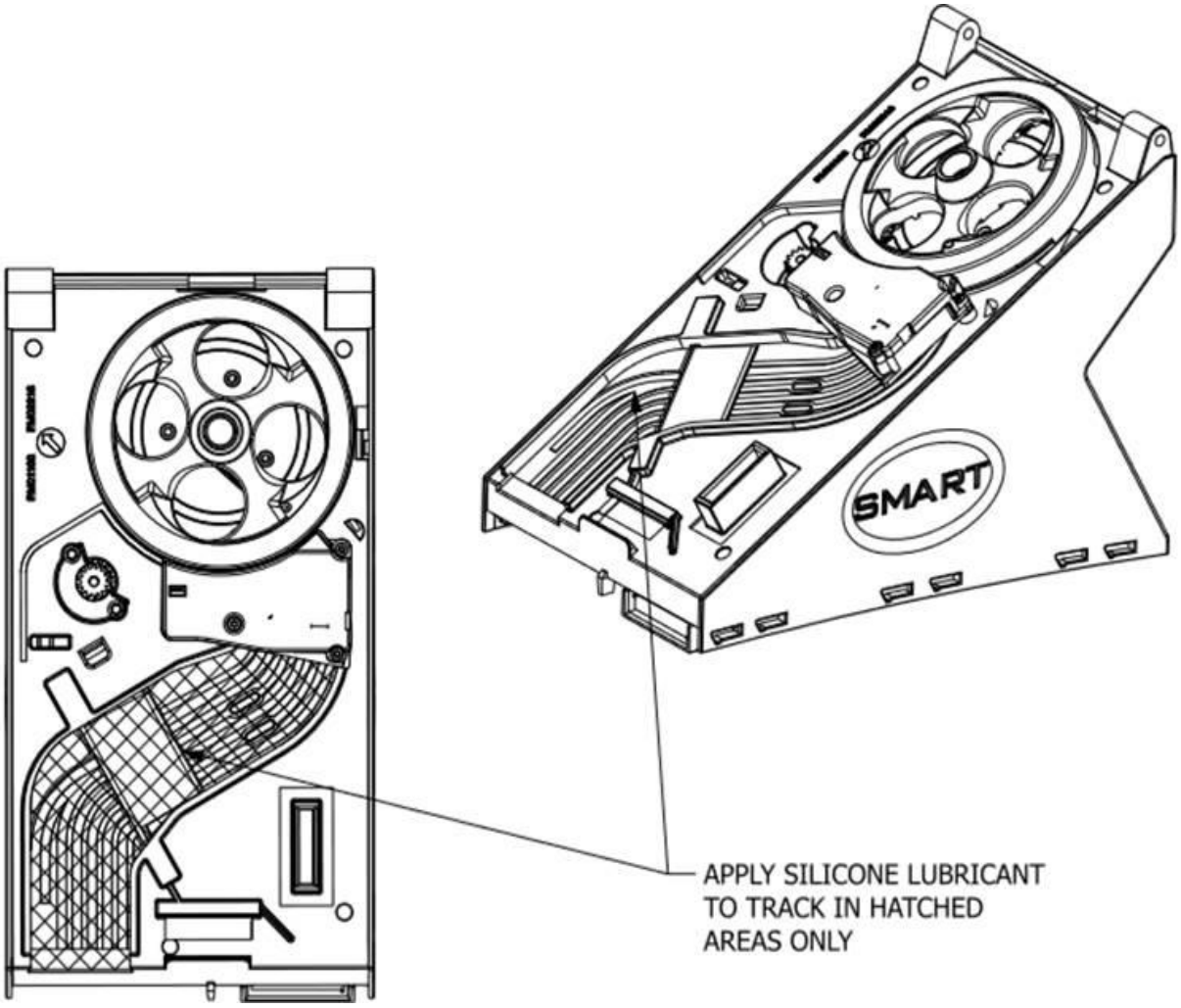


Caution!

Apply Silicone Lubricant only in the hatched areas and do not disassemble the device to prevent a malfunction of the device.

8.9.2 Coin Feeder Base Assembly

Apply the Silicone Lubricant only in the hatched areas shown in the drawing below:



	Caution!
	Apply Silicone Lubricant only in the hatched areas and do not disassemble the device to prevent a malfunction of the device.

An overview of all recommended Cleaning and Maintenance Intervals/Tasks can be found in section 6.2.1 Recommended Cleaning and Maintenance Intervals/Task.

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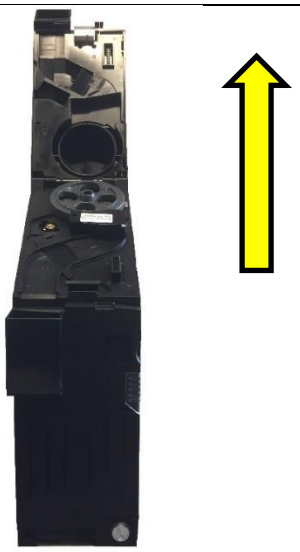
8.10 Coin Feeder Path Insert

8.10.1 Exchange Instruction

Innovative Technology Ltd has a policy of continuous product improvement. As a result, the SMART Coin System Range have on the latest Revision an exchangeable Coin Path Insert. This Coin Path Insert is used in the area of the Coin Feeder where the coin path is usually most worn. The exchange of this part is required every 250,000 coins to guarantee the best performance of the Coin Feeder. If the below described procedure is followed, no re-initialization of the Coin Feeder is required.

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.



3. **Sensor Box Removal**
   Unscrew the 2 Screws which fix the Sensor Box and Lift the Sensor Box up.

4. **Remove the Coin Feeder Path Insert**
   Lift up the Coin Feeder Path Insert with a flat screwdriver at the marked position.

5. **Cleaning the Coin Path**
   This area can now be cleaned but not polished.

	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 SMART Coin System, only use a mild detergent.	

6. **Add the new Coin Feeder Path Insert**
   Clip in the new Coin Feeder Path Insert.

7. **Add the Sensor Box back to the original position**
   Add the Sensor Box back to the original position and screw on the two screws at the marked position.

8.10.2 Coin Feeder Path Insert Part Numbers

SMART Coin System – Coin Feeder

Hardware Type	Path Insert Part Number
Type A	no Insert in current Revision
Type C	no Insert in current Revision
Type D	no Insert in current Revision
Type E	no Insert in current Revision
Type F	PM02994
Type G	PM02993
Type H	PM02993

TWIN SMART Coin System – Coin Feeder

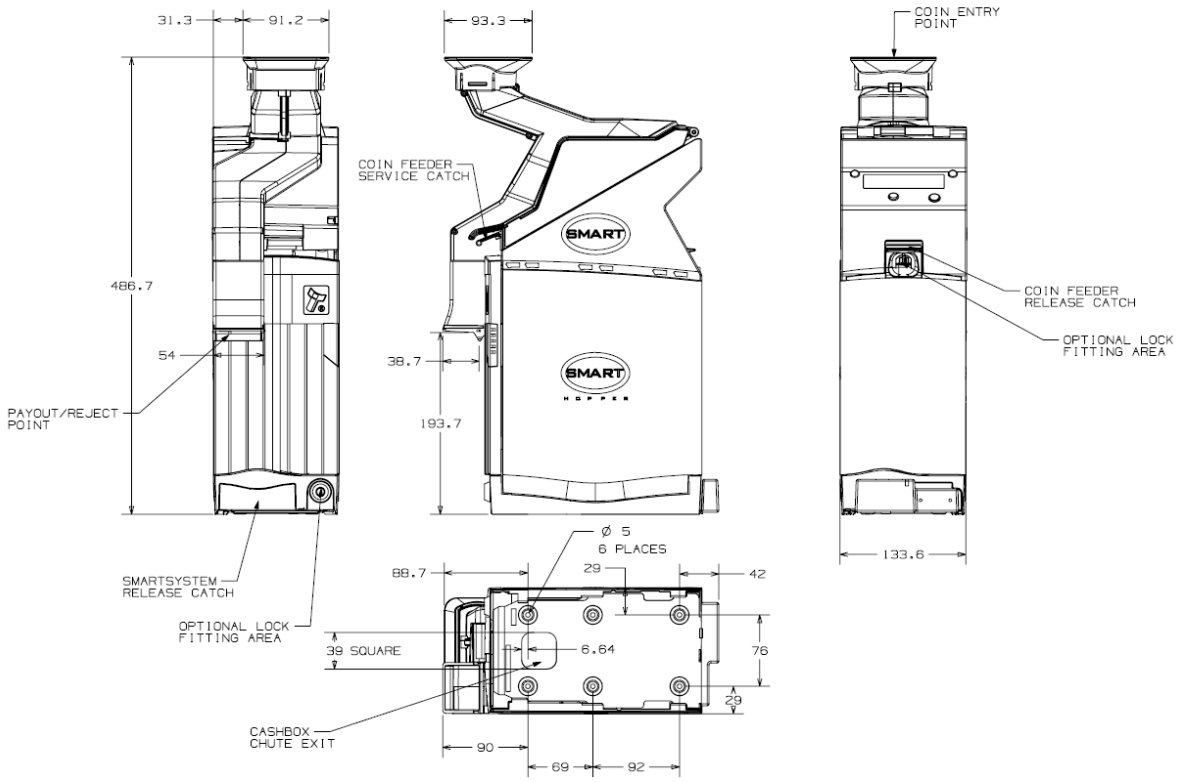
Hardware Type	Path Insert Part Number
Type E	PM02993
Type F	PM02994

An overview of all recommended Cleaning and Maintenance Intervals/Tasks can be found in section 6.2.1 Recommended Cleaning and Maintenance Intervals/Task.

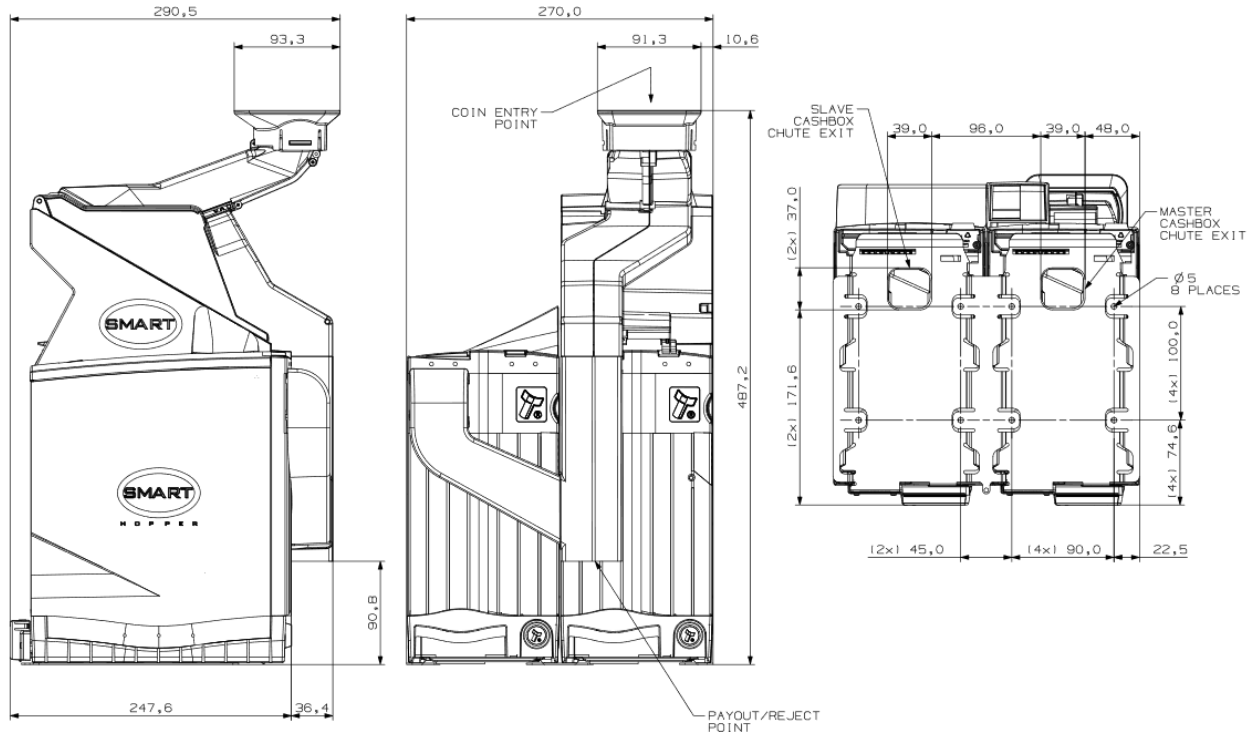
9 TECHNICAL DATA

9.1 Dimensions

9.1.1 SMART Coin System



9.1.2 TWIN SMART Coin System



9.2 Weight

- SMART Coin System Empty: 4kg
- SMART Coin System Full: 18kg (approx.)
- TWIN SMART Coin System Empty: 6,5kg
- TWIN SMART Coin System Full: 31kg (approx.)

9.3 Environmental Requirements

9.3.1 Operation

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

9.3.2 Storage

Environment	Minimum	Maximum
Temperature	+0°C	+70°C
Humidity	5%	95% Non-condensing

9.4 Power Requirements SMART Coin System

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

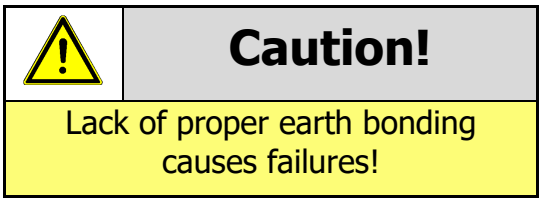
9.4.3 Power Supply Guidance

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.



9.5 Power Requirements TWIN SMART Coin System

9.5.1 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

9.5.2 Supply Currents

Supply Current	Minimum	Nominal	Maximum
Standby	0.3 A	0.3 A	0.3 A
Running	0.3 A	4 A	11.2 A
Peak	0.3 A	4 A	11.2 A

9.5.3 Power Supply Guidance

The Twin SMART Coin System requires a stable 24 V DC / 6,5 A power supply for every device (Slave and Master). 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 Twin SMART Coin System is properly bonded to earth as described in 3.5.2. Lack of proper bonding can cause communication issues and other failures.

	Caution!
	Lack of proper earth bonding causes failures!

9.6 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	

9.7 Reliability Data

Below is an explanation outlining the Mean Cycles Between Failure (MCBF) & Mean Cycles Between Interruption (MCBI) for the SMART Coin System and TWIN 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 is available on request.

9.8 Media Requirements

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

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

10 COMPLIANCES AND APPROVALS

10.1 EC Declaration of Conformity

- RoHS
- EN Directives
- UL
- REACH
- WEEE

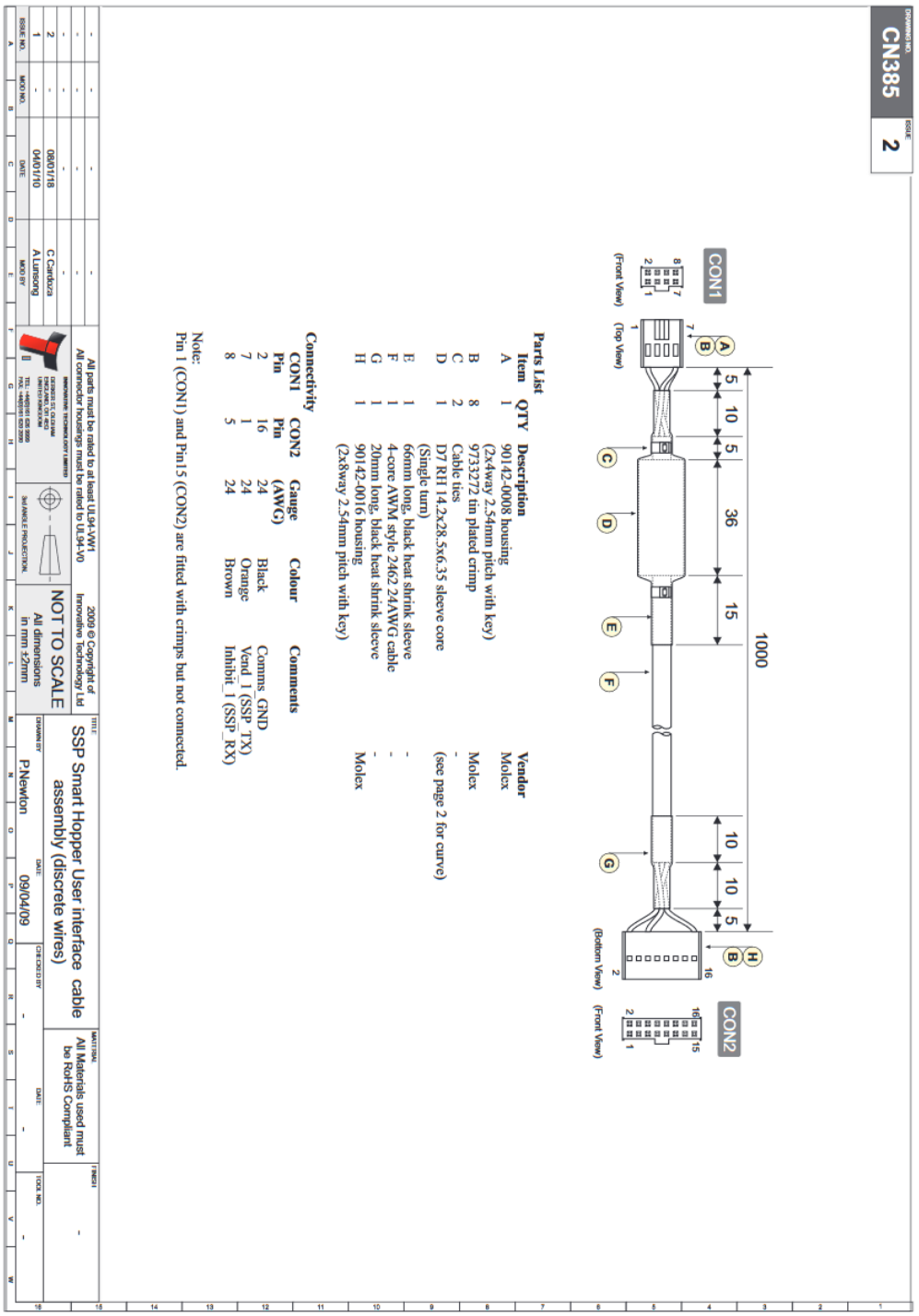
Please contact support@innovative-technology.com for further information. Detailed information is available on request.

11 APPENDIX

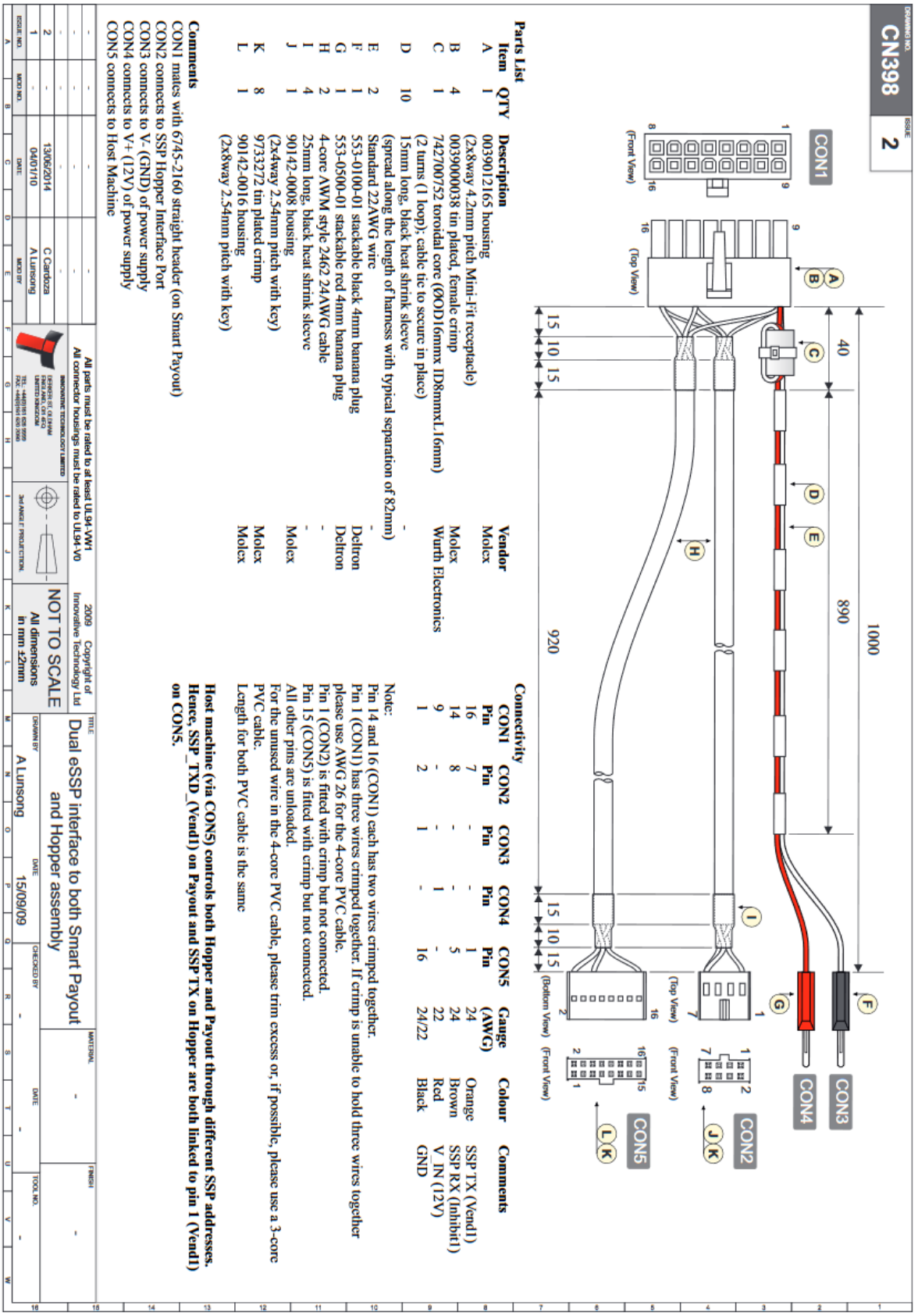
11.1 Cable Drawings

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

11.1.1 CN00385 - Hopper SSP User Interface Cable Assembly



11.1.2 CN00398 – Dual eSSP Interface



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	74270752 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	-	-	1	-	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

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

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.

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

INNOVATIVE TECHNOLOGY LIMITED

NOT TO SCALE
All dimensions in mm ±2mm

3rd ANGLE PROJECTION

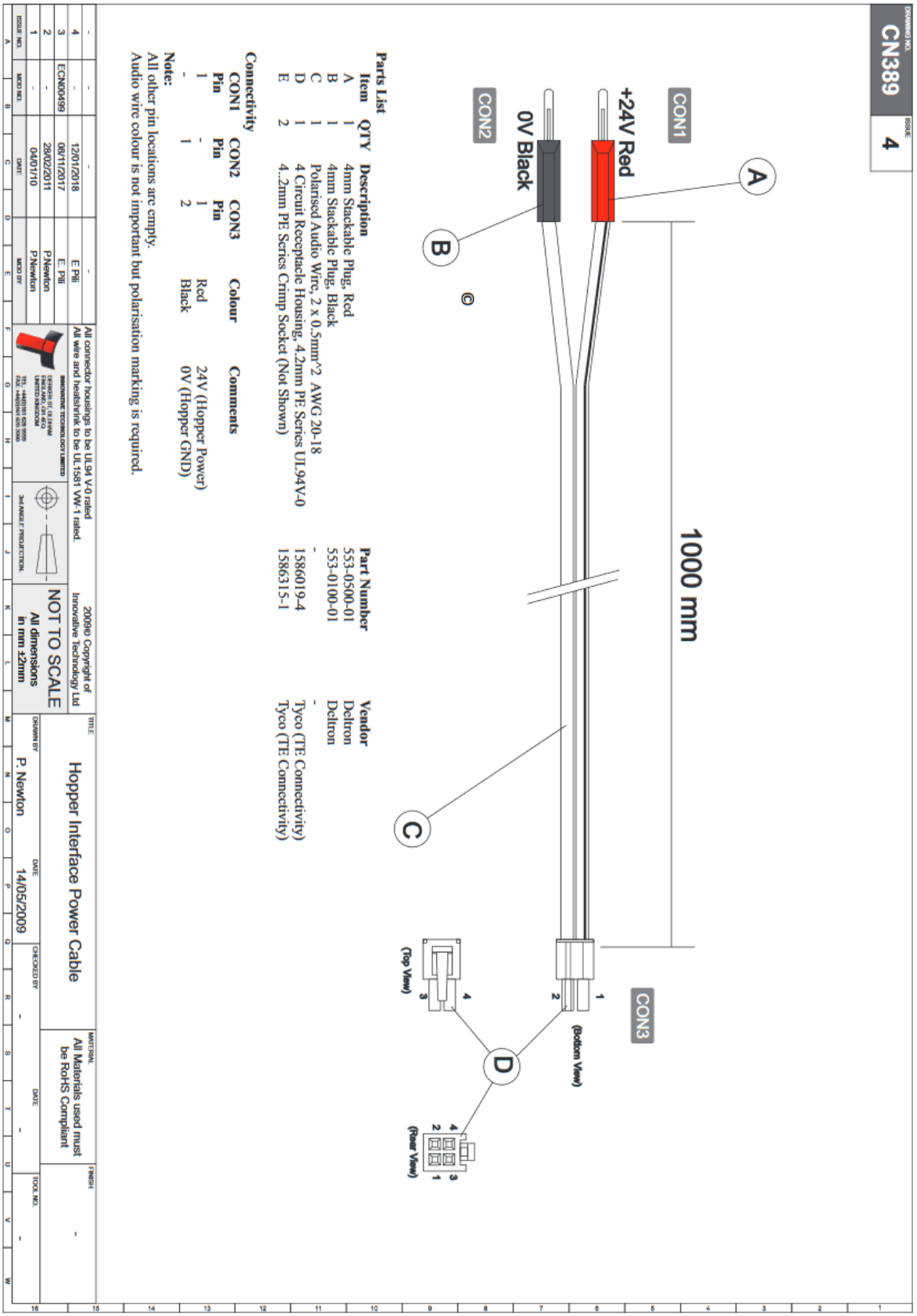
Copyright of Innovative Technology Ltd 2009

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

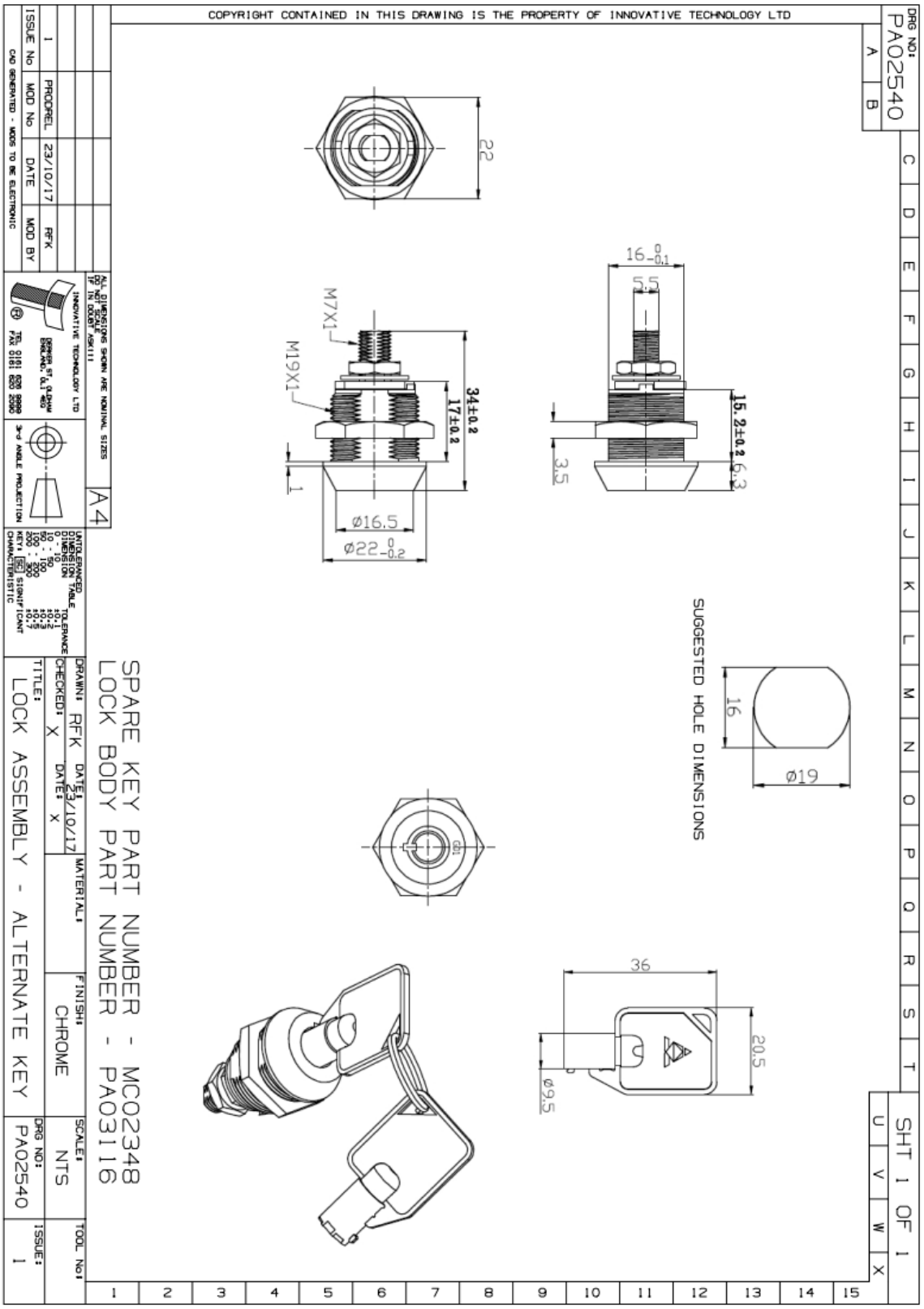
ISSUE	MOD NO.	DATE	MOD BY
2	-	13/06/2014	C Cardozza
1	-	04/01/10	A Lunsong

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

11.1.3 CN00389 – Hopper Interface Power Cable



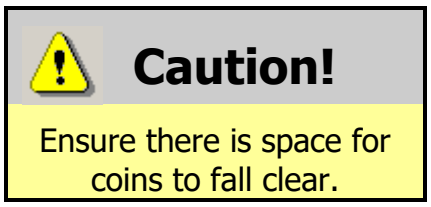
11.2 Lock Specifications



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



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 and TWIN 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.

With FW ≥1.23 the trusted mode can be entered by removing all coins manually from the unit and powering up the device. If the device doesn't see any coins, it will enter trusted mode.

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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.

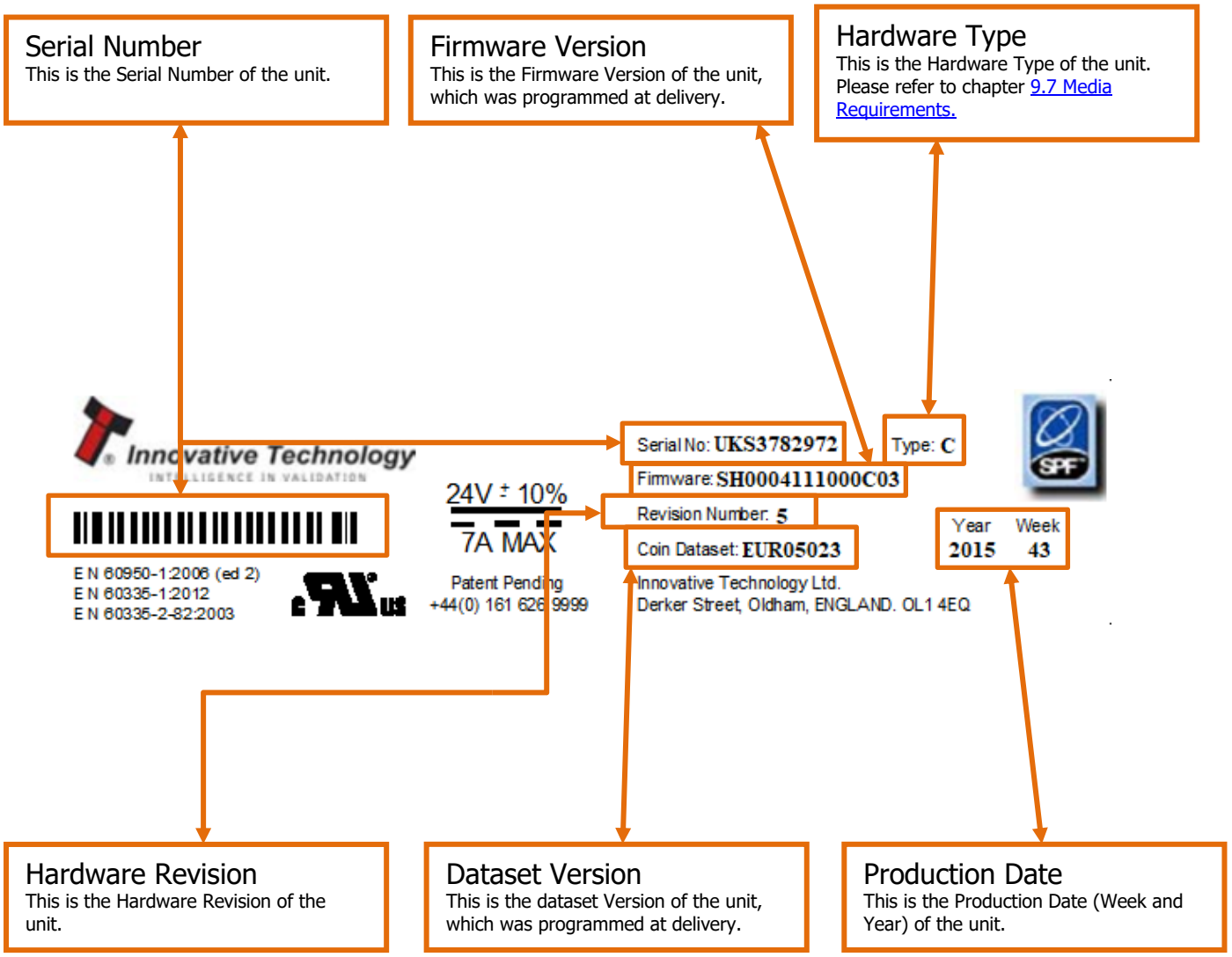
Hardware Type
This is the Hardware Type of the unit.
Please refer to chapter 9.7 Media Requirements.

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.

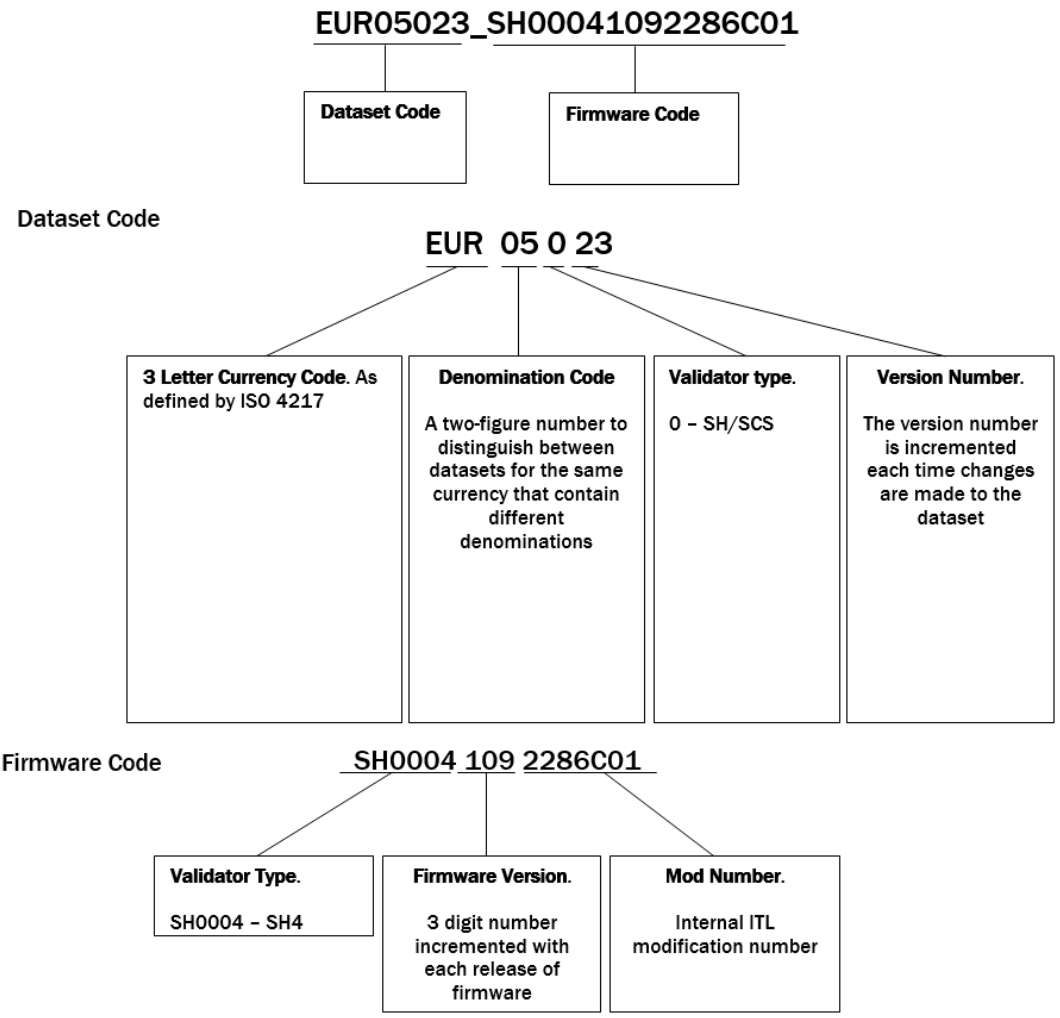
11.6.2 Coin Feeder



11.7 Configuration Button Functions

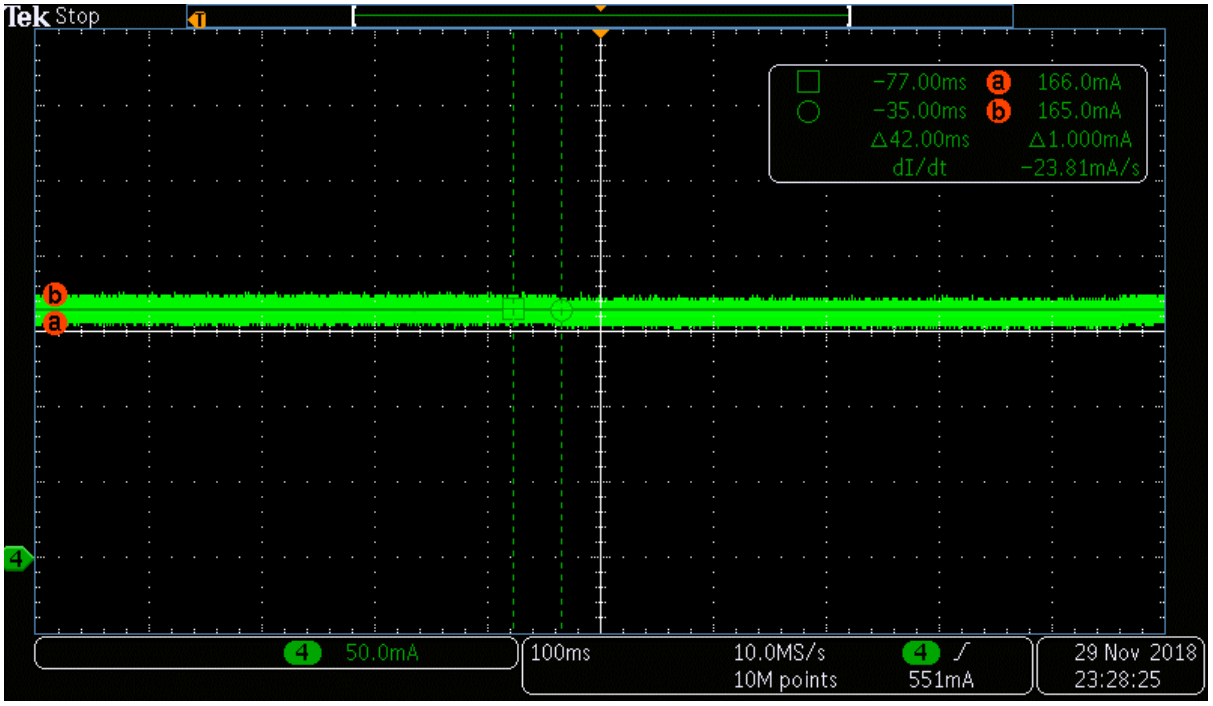
Action	Power Status	Function
Press the button, then press the button again within 5 seconds (do not double click, a pause of 2 sec in press is required)	Powered ON	Switches interface between SSP and CC2.
Press and hold for longer than 5 seconds	Powered ON	Switch between USB mode with FW <1.25 (CDE & HID)
Press and hold for 10 seconds	Powered ON	Switch between USB mode with FW ≥1.25 (CDE & HID)

11.8 File Naming Convention



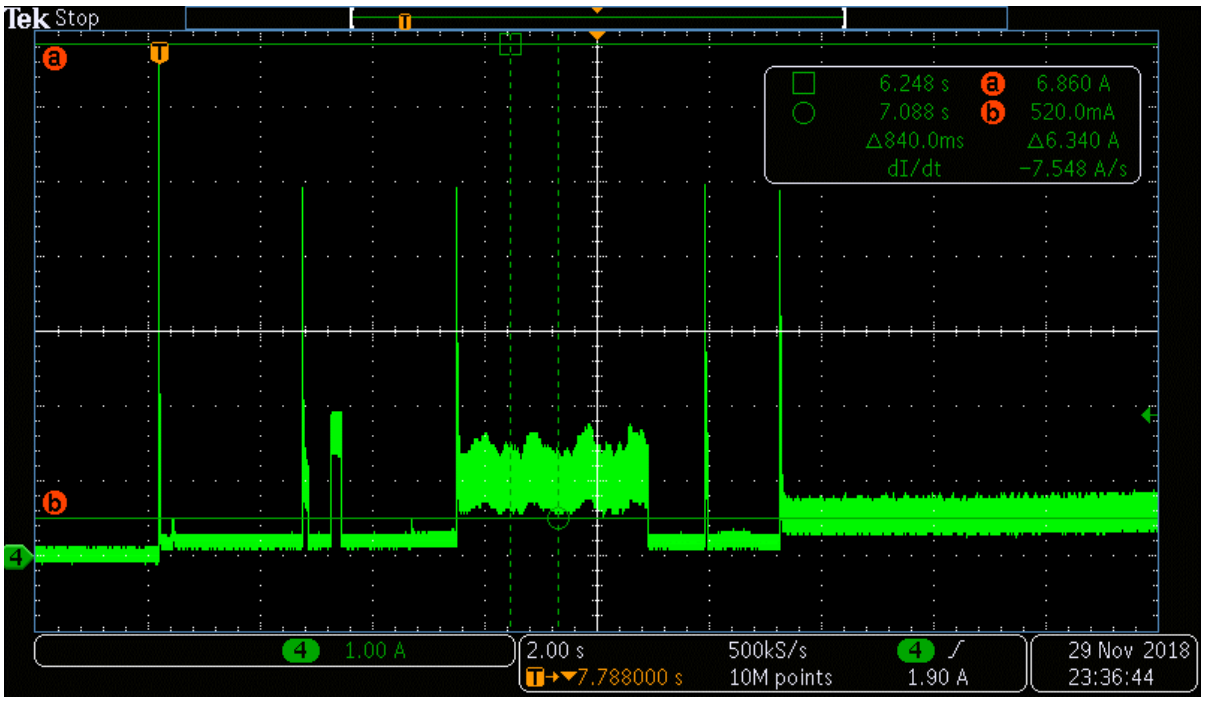
11.9 Energy Profiles SMART Coin System

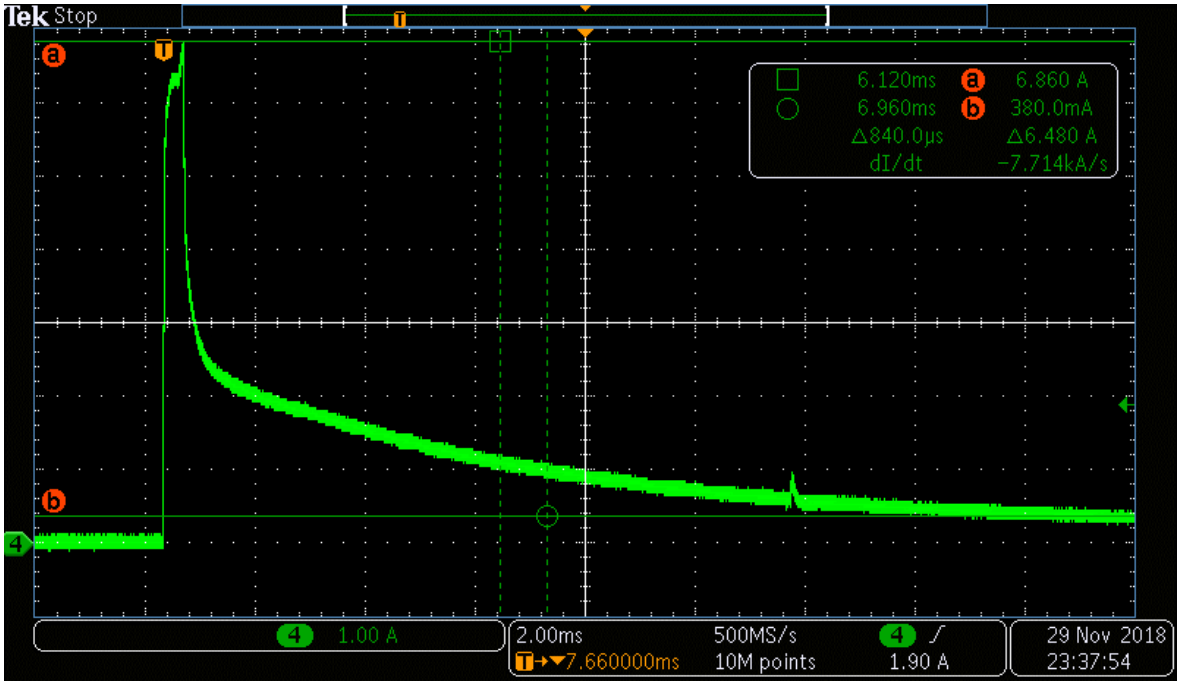
11.9.1 Idle



Peak: **170mA**
RMS: **170mA**

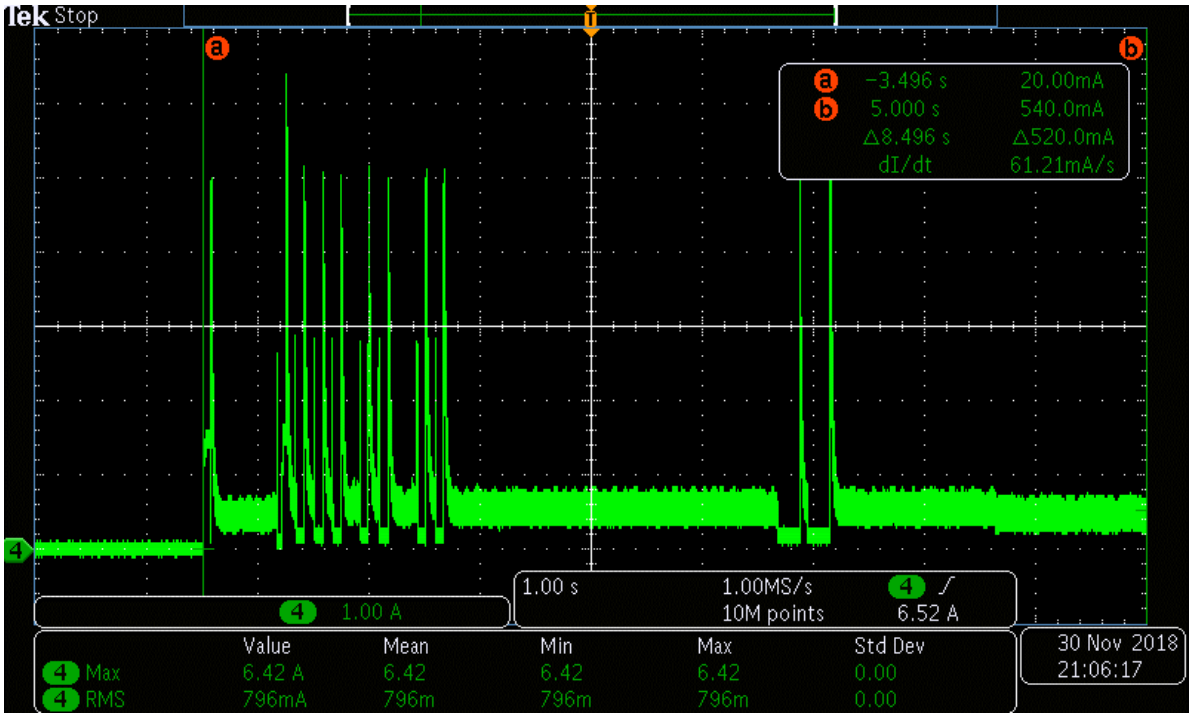
11.9.2 Power Up





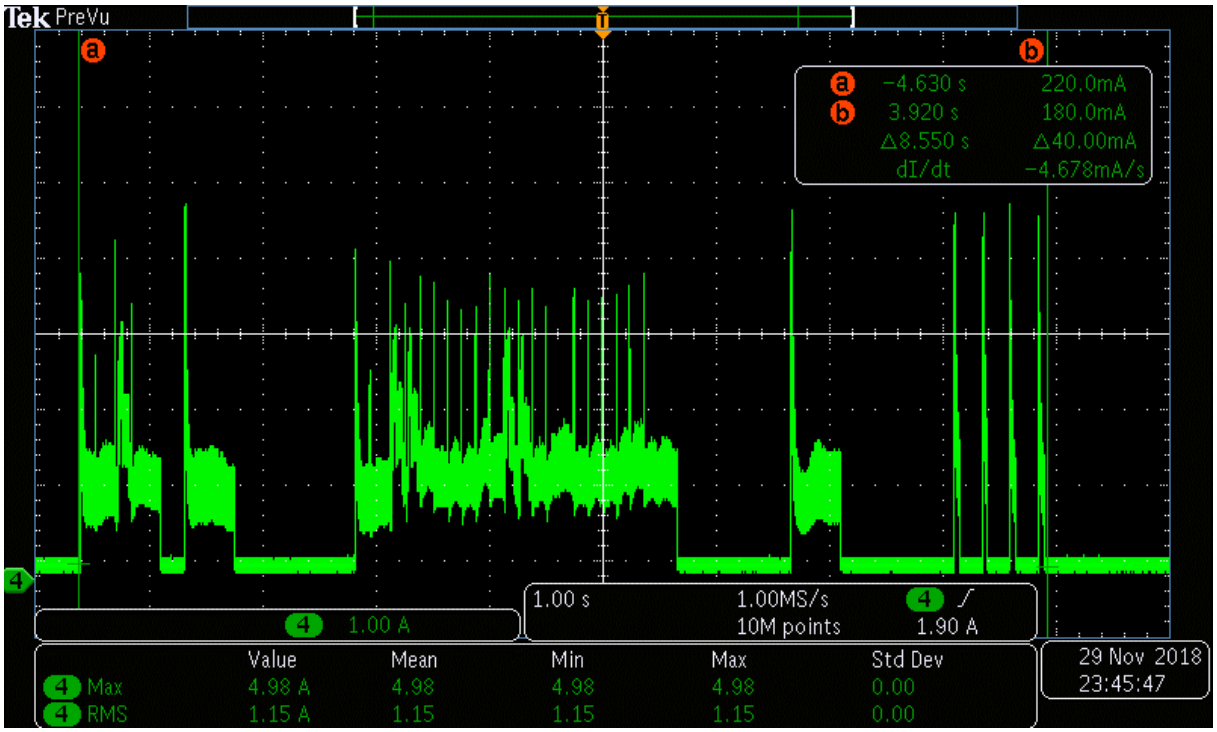
Peak: **6.86A**

11.9.3 Pay In ($3.82)



Peak: **6.42A**
RMS: **0.80A**
RMS measured across full 8.5 second pay in cycle.

11.9.4 Pay Out ($1.41 (1 of each denomination))



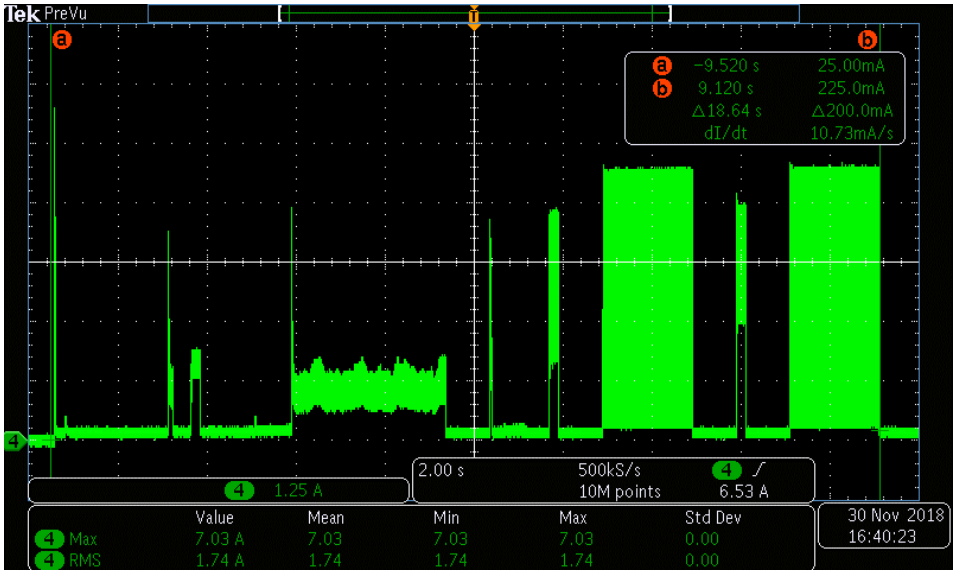
Peak: **4.98A**
RMS: **1.15A**
RMS measured across full 8.5 second pay out cycle.

11.9.5 Empty

Peak: **4.94A**
RMS: **1.33A**
RMS measured across full 6.8 second pay out cycle.

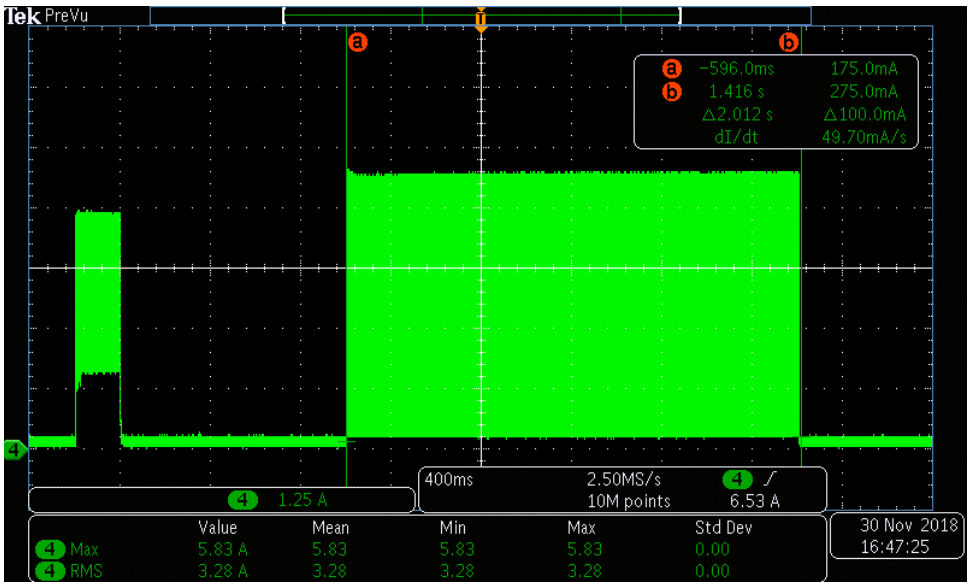
11.9.6 Coin Feeder Coin Jam

Jamming the feeder disc motor **on start-up**



Peak: **7.01A (Inrush on start-up)**
RMS: **1.74A**
RMS measured across full 18.6 second pay out cycle.

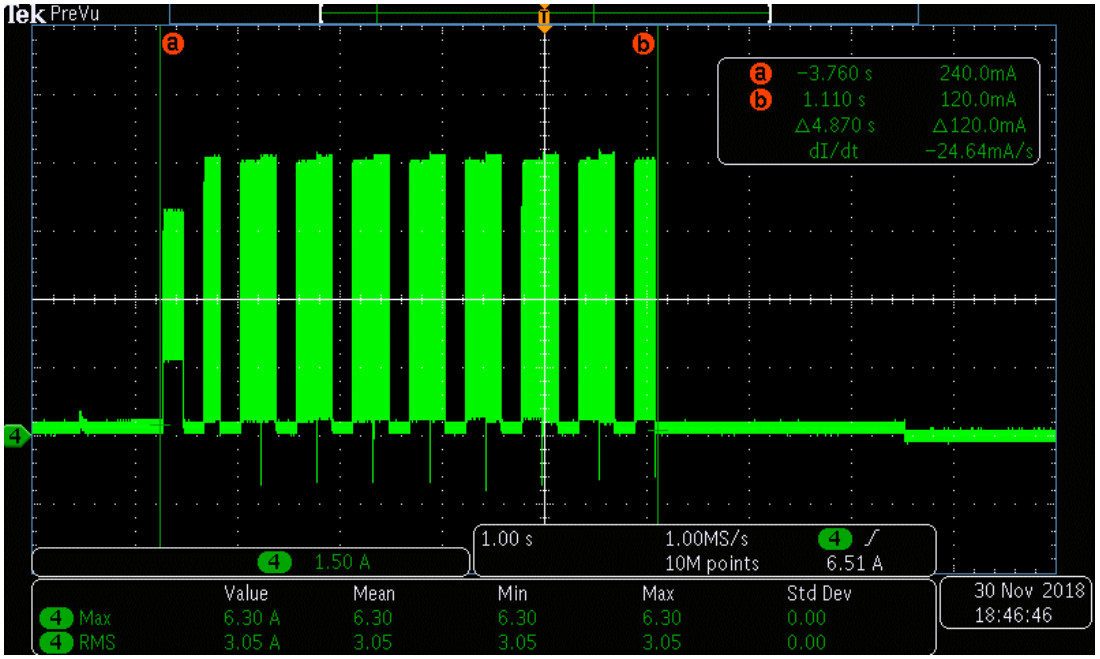
The software attempts to un-jam the motor, operating for about 2 seconds. During this period, the current values are:



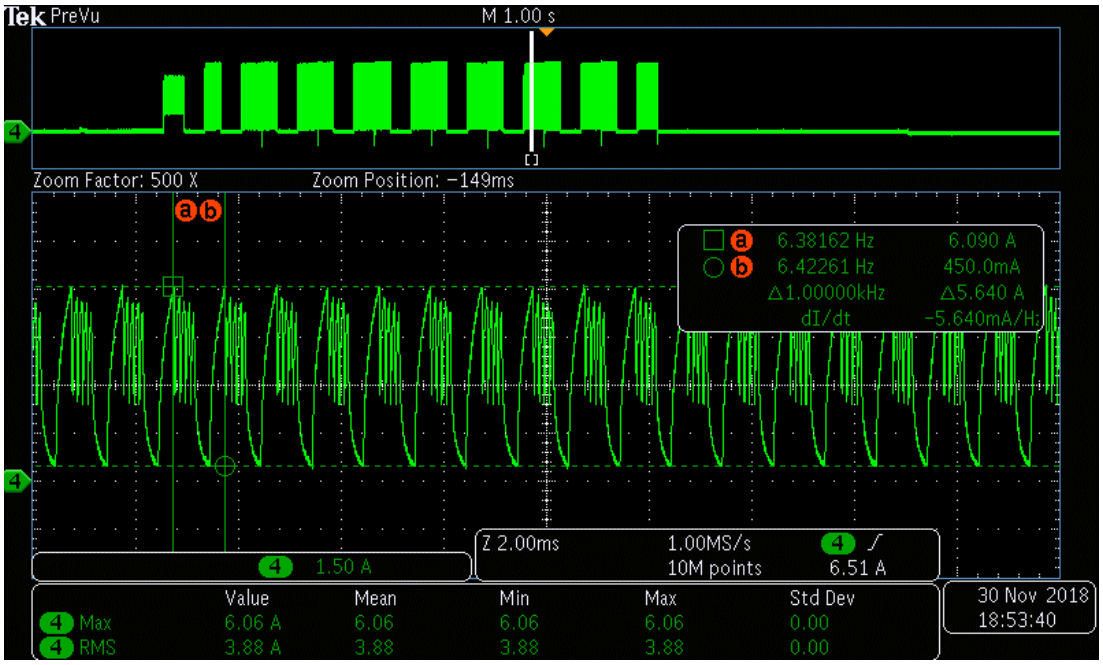
Peak: **5.83A**
RMS: **3.28A**

11.9.7 SMART Hopper Coin Jam

Jamming the hopper disc motor **on start-up**



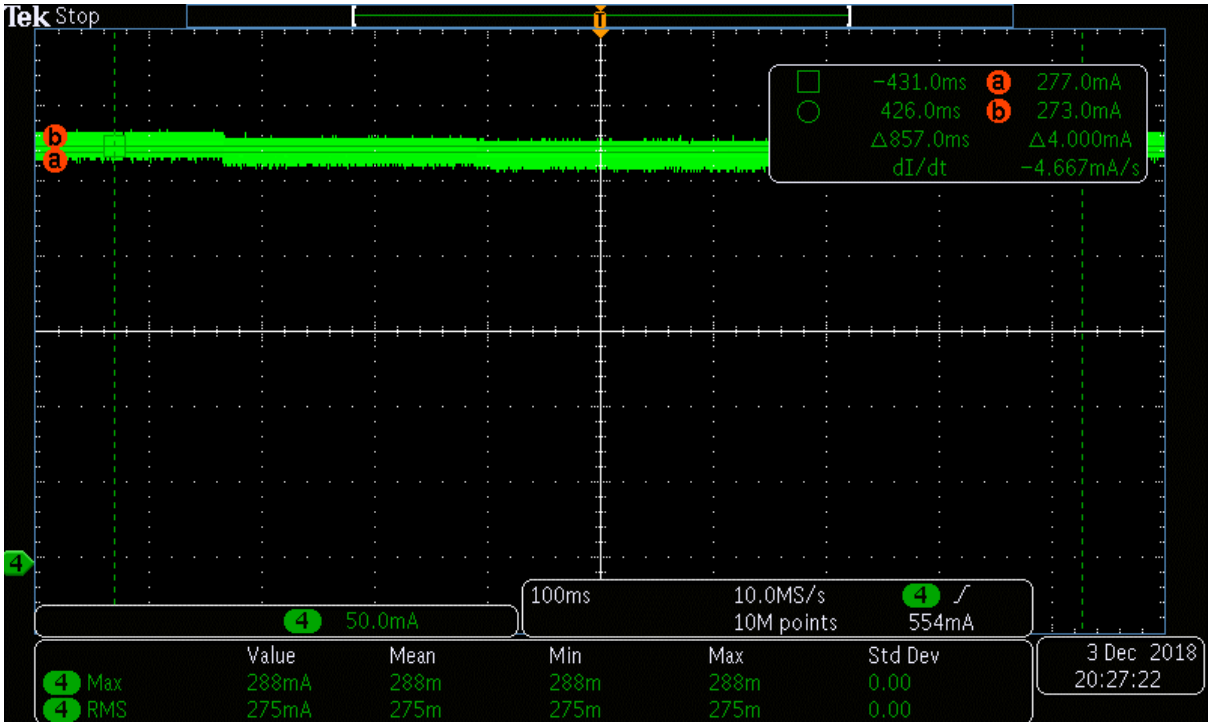
Zoomed In:



Peak: **6.30A (Inrush on start-up)**
RMS: **3.05A**
RMS measured across full 4.9 second pay out cycle.

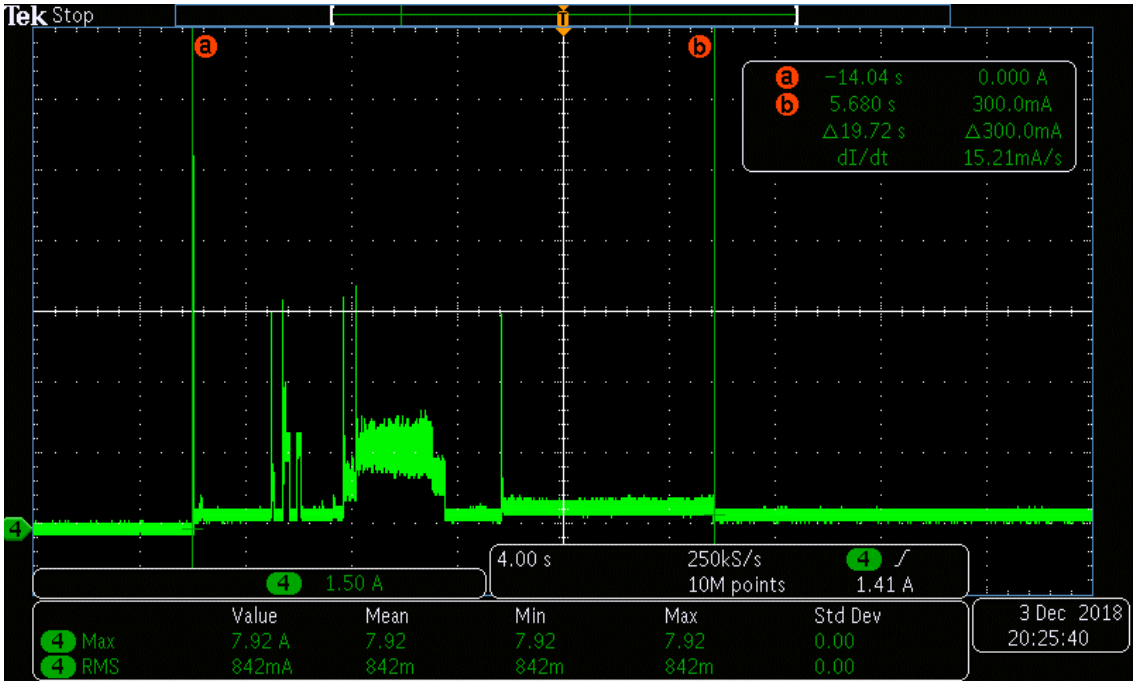
11.10 Energy Profiles TWIN SMART Coin System

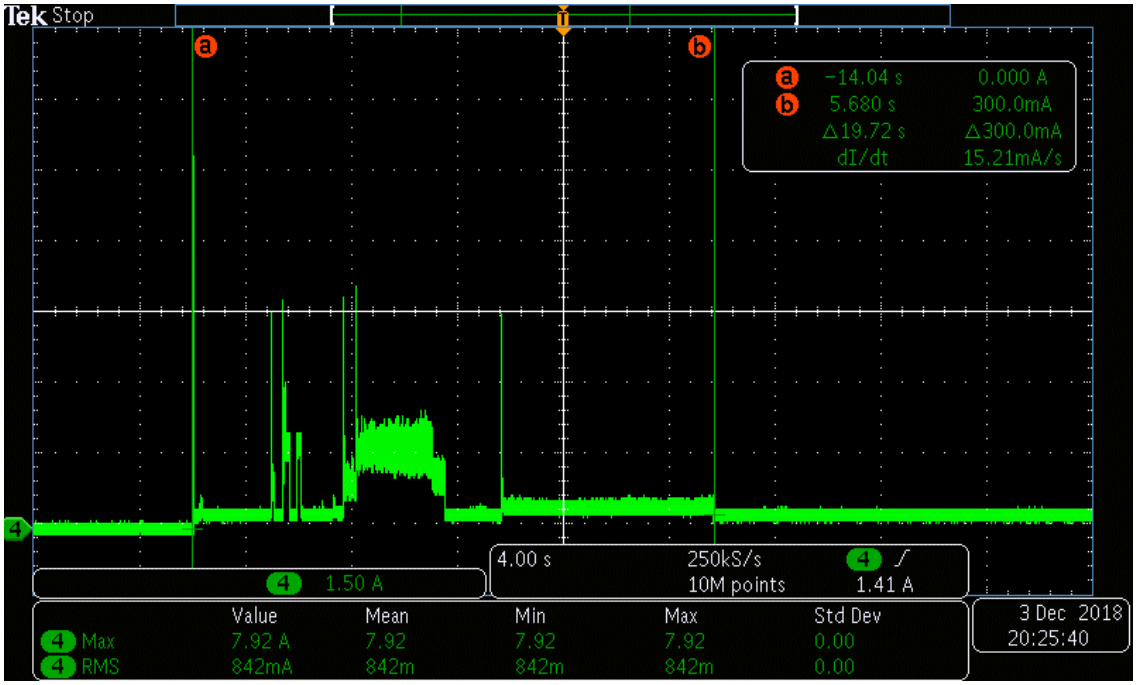
11.10.1 Idle



Peak: **288mA**
RMS: **275mA**

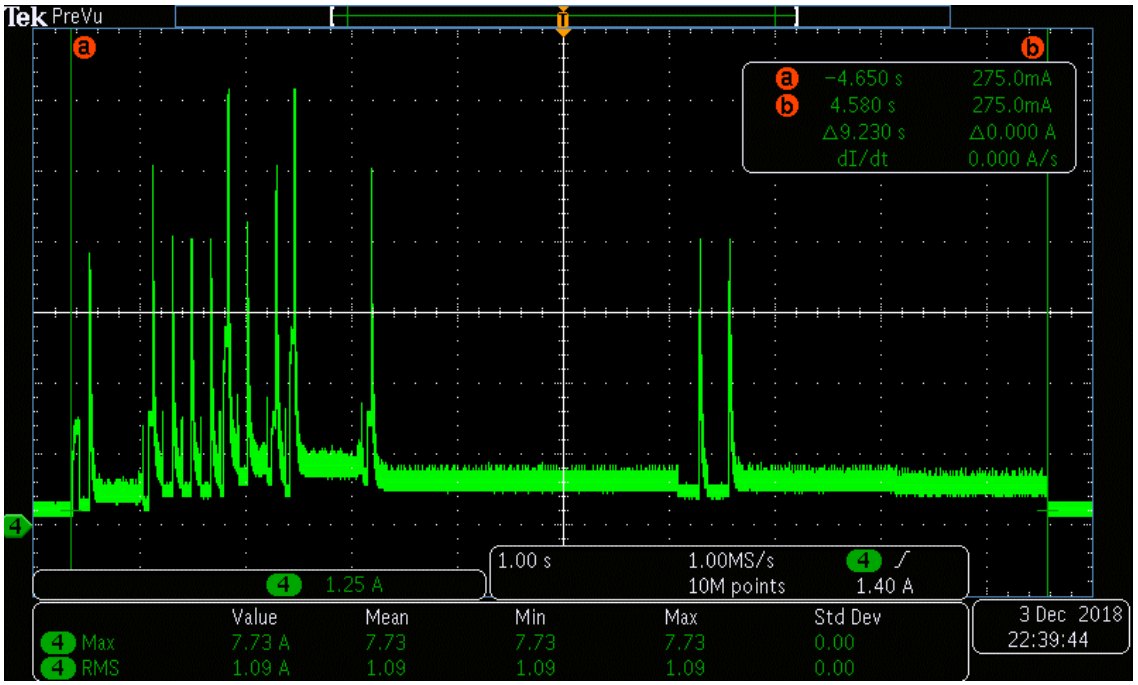
11.10.2 Power UP





Peak: **8.1A**

11.10.3 Pay In (€1.73)



Peak: **7.73A**
RMS: **1.09A**
RMS measured across full 9.2 second pay in cycle.

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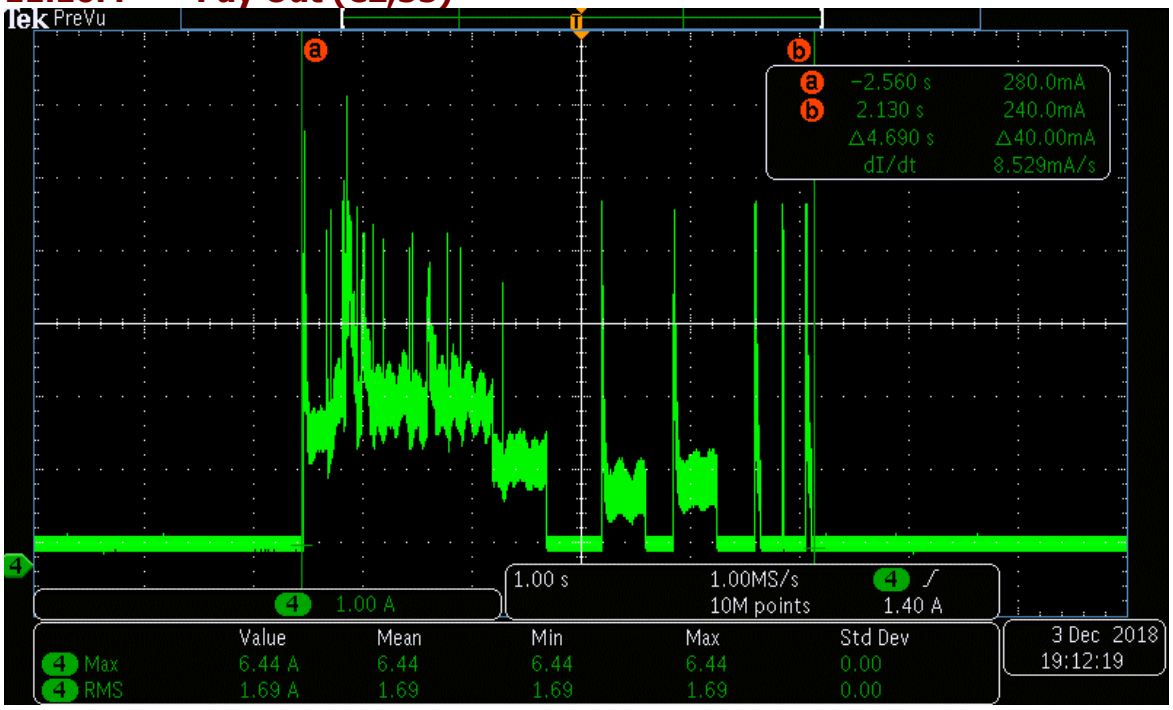
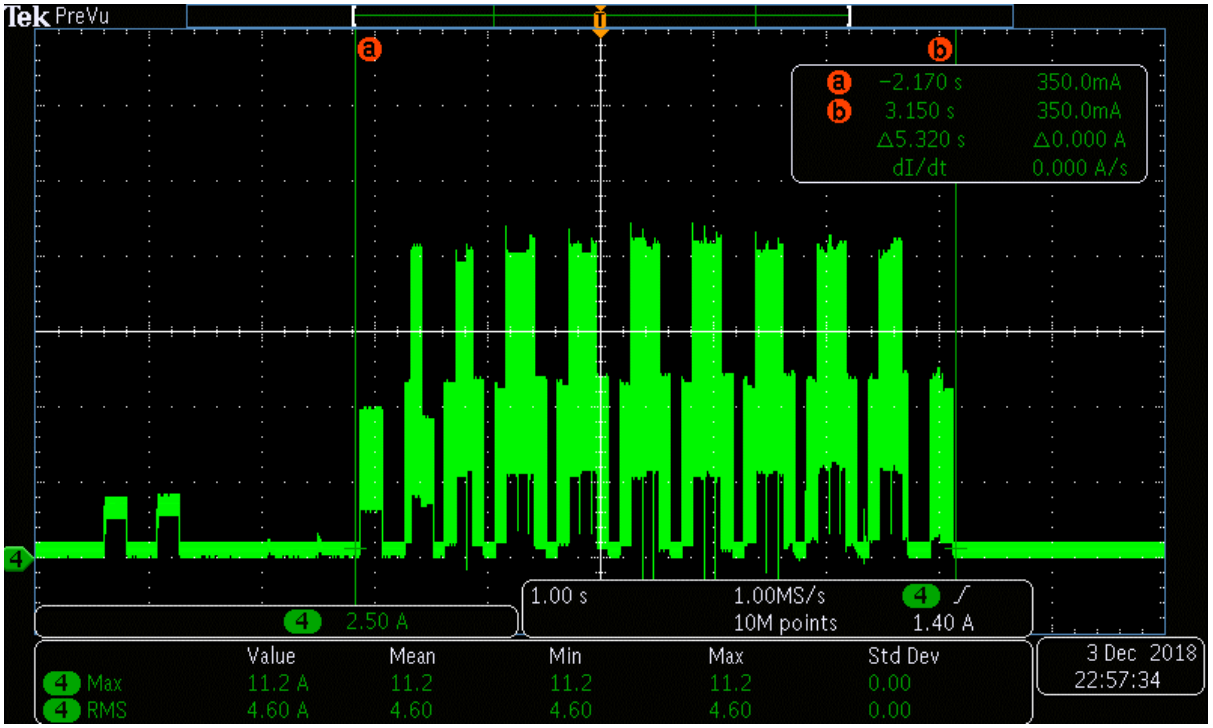
11.10.4 Pay Out (€2,55)



Peak: **6.44A**
RMS: **1.69A**
RMS measured across full 4.7 second pay out cycle.

11.10.5 Jam Master Hopper and Slave Hopper at the same Time

Jamming both hopper disc motors **on start-up**



Peak: **11.2A**
RMS: **4.6A**
RMS measured across full 5.3 second anti-jam cycle.

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11.11 Currency/Hardware Type Overview

Below a Currency/Hardware Type Overview is shown based on the Release on the 09.12.2020.

Country	Currency Code	Hardware Type	Dataset	Supported Denominations
Czech Republic	CZK	F	CZK01	1 Koruna (100) 2 Koruna (200) 5 Koruna (500) 10 Koruna (1000) 20 Koruna (2000) 50 Koruna (5000)
Denmark	DKK	F	DKK50	50 Ore 1 Krone (100) 2 Kroner (200) 5 Kroner (500) 10 Kroner (1000) 20 Kroner (2000)
Ecuador	ECD	G	ECD01	**Ecuador -** 1 Centavo 5 Centavos 10 Centavos 25 Centavos **USA -** 1 Cent 5 Cents 1 Dime (10), Quarter Dollar (25) 1 Dollar (100)
Eurozone	EUR	E	EUR01	1 Cent - 2 Euro (200)
			EUR02	2 Cent - 2 Euro (200)
			EUR05	5 Cent - 2 Euro (200)
			EUR10	10 Cent - 2 Euro (200)
Hungary	HUF	F	HUF05	5 Forint (500) 10 Forint (1000) 20 Forint (2000) 50 Forint (5000) 100 Forint (10000) 200 Forint (20000)
Japan	YEN	F	JPY01	1 Yen (100) 5 Yen (500) 10 Yen (1000) 50 Yen (5000) 100 Yen (10000) 500 Yen (50000)
Norway	NOK	F	NOK01	1 Krone (100) 5 Kroner (500) 10 Kroner (1000) 20 Kroner (2000)

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Country	Currency Code	Hardware Type	Dataset	Supported Denominations
Panama	PAB	G	PAB01	**Panama -** 1 Centesimo 5 Centesimos 1 Decimo (10) 1 Cuarto (25) 1 Balboa (100) **USA -** 1 Cent 5 Cents 1 Dime (10), Quarter Dollar (25) 1 Dollar (100)
Russia	RUB	F	RUB01	1 Ruble (100) 2 Rubles (200) 5 Rubles (500) 10 Rubles (1000)
Sweden	SEK	F	SEK01	1 Krona (100) 2 Kronor (200) 5 Kronor (500) 10 Kronor (1000)
United Kingdom	GBP	H	GBP01	1 Pence - 2 Pound (200)
			GBP05	5 Pence - 2 Pound (200)
			GBP10	10 Pence - 2 Pound (200)
USA	USD	G	USD01	1 Cent 5 Cents 1 Dime (10), Quarter Dollar (25) 1 Dollar (100)