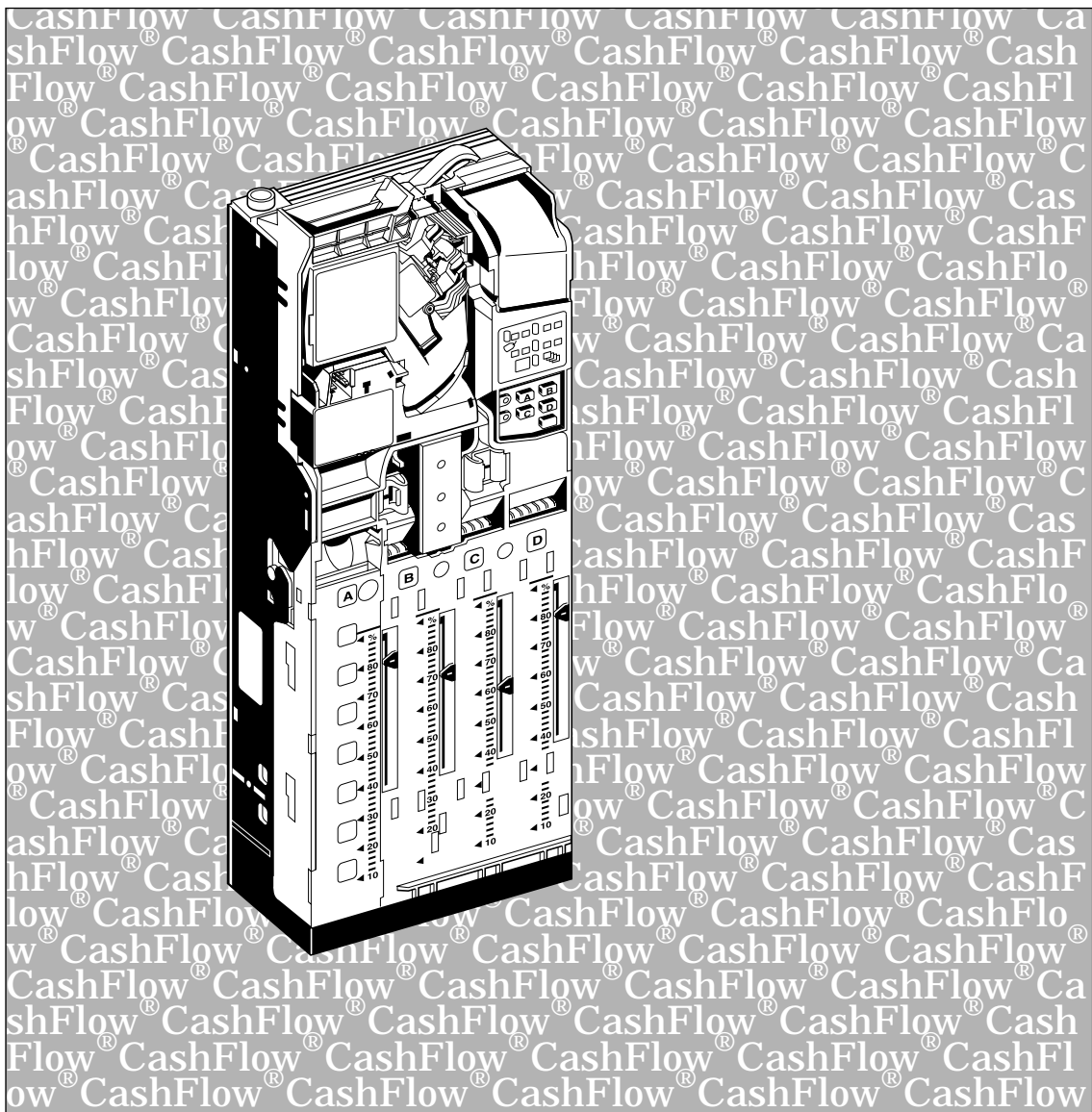


The
CASHFLOW® 350
REFERENCE SERIES
MULTI-PRICE TOTALISER
APPLICATIONS DESIGN
GUIDE



CashFlow[®] 350 multi-price totaliser Applications Design Guide

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CashFlow[®] 350 multi-price totaliser Applications Design Guide

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SAFETY AND EMC

International & National Standards Conformance

When installed and operated according to the instructions for the particular unit, CashFlow[®] 350 products are designed to meet the applicable Safety and Electro Magnetic Compatibility standards for any country in which they are used.

Maximum Operating Voltages

Do not apply more than the indicated voltage.

Dangerous Environments

Do not operate in the presence of flammable gases, fumes or water.

Disposal of Product

Do not dispose of this product by incineration.

Warning: Before removing or replacing modules **SWITCH OFF or ISOLATE the ELECTRICITY SUPPLY** to the host machine.

THIS MANUAL IS PROVIDED FOR USE ONLY BY PERSONNEL TRAINED TO UNDERTAKE ELECTRICAL INSTALLATION.

OVERVIEW

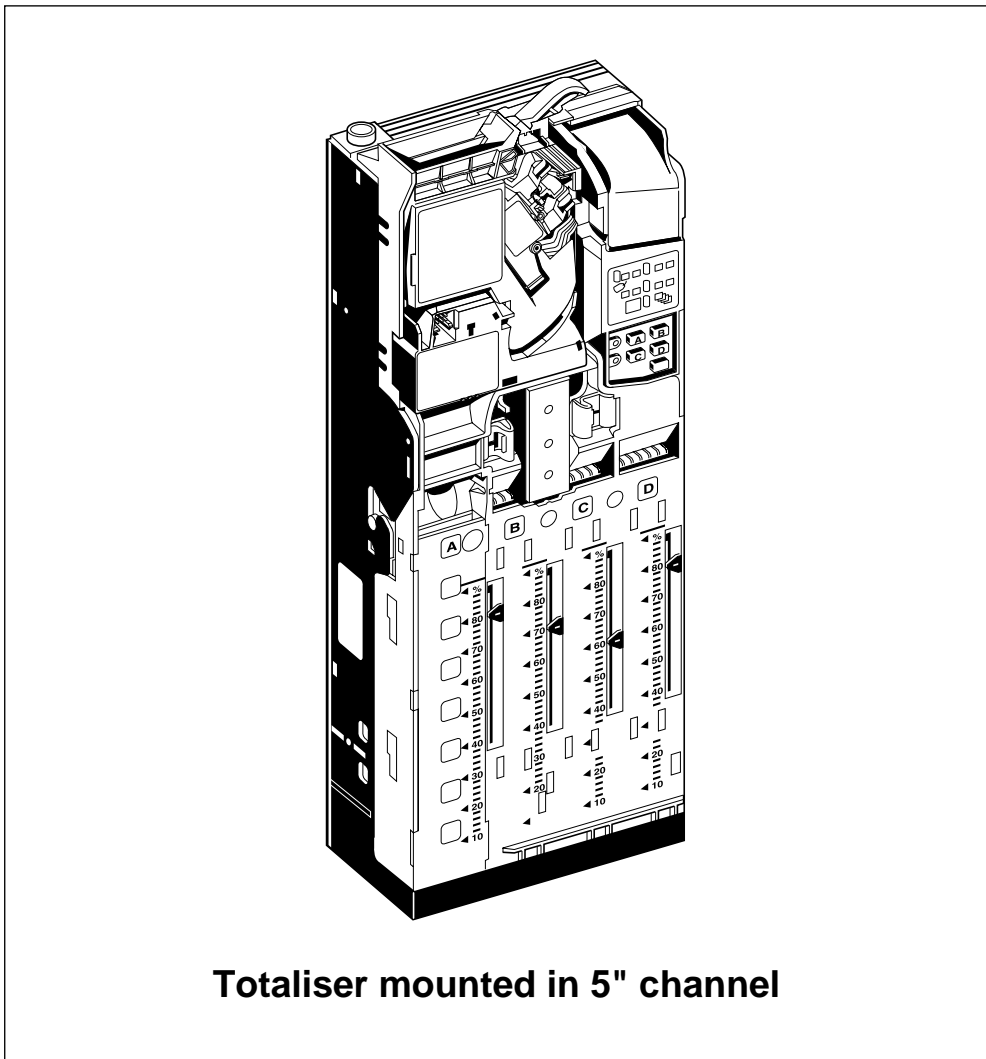
The CashFlow[®] 350 multi-price totaliser product is available only mounted in a 5" channel.

At the heart of the product is the acceptor module which controls the discrimination and coin routing functions.

An LED credit display for use with the channel version is available.

The totaliser is made up of the following modules:

- Control board
- Spine
- Transformer Assy
- Gear Case
- Acceptor
- Separator
- Front Cover Assy



CashFlow[®] 350 multi-price totaliser Applications Design Guide

The basic functionality of the totaliser is to:

- Accept payment
- Signal the payment available to the machine (credit output)
- Monitor the product request inputs (sense inputs)
- Enable the appropriate price line output (if the vend is authorised)
- Deduct the vend price from the credit available
- Monitor the machine inhibited condition (blocker)

The options currently available are;

- CashFlow[®] 350 - 4 price - A four price electro-mechanical totaliser
- CashFlow[®] 350 - 5 price - A five price electro-mechanical totaliser
- CashFlow[®] 350 - Executive - totaliser with an electronic Protocol A serial interface

With the use of the MEI[®] Route Alpha 250 terminal you can also re-configure certain operational aspects of the totaliser. This includes inhibiting coins, changing from single to multi vend etc..

PRODUCT OPERATION

GENERAL

When a coin is entered through the totaliser there are several conditions that are electronically checked.

After coins have been accepted and a product selection button is pressed a sense current flows through the totaliser's sense circuit. When the totaliser detects that a product selection button has been pressed it looks up the price associated with the selection. If sufficient credit exists the totaliser turns the price line output on. This disconnects the safety line from price line common and connects the price line output to price line common. The vend motor relay within the vending machine is then energised (turning the vend motor on and closing a switch across the selection button).

When the vend cycle begins the blocker signal indicates to the totaliser that a vend has started. The price of the vend is deducted and the totaliser waits for the vend to finish. The price line output is turned off when the totaliser considers the vend to have finished.

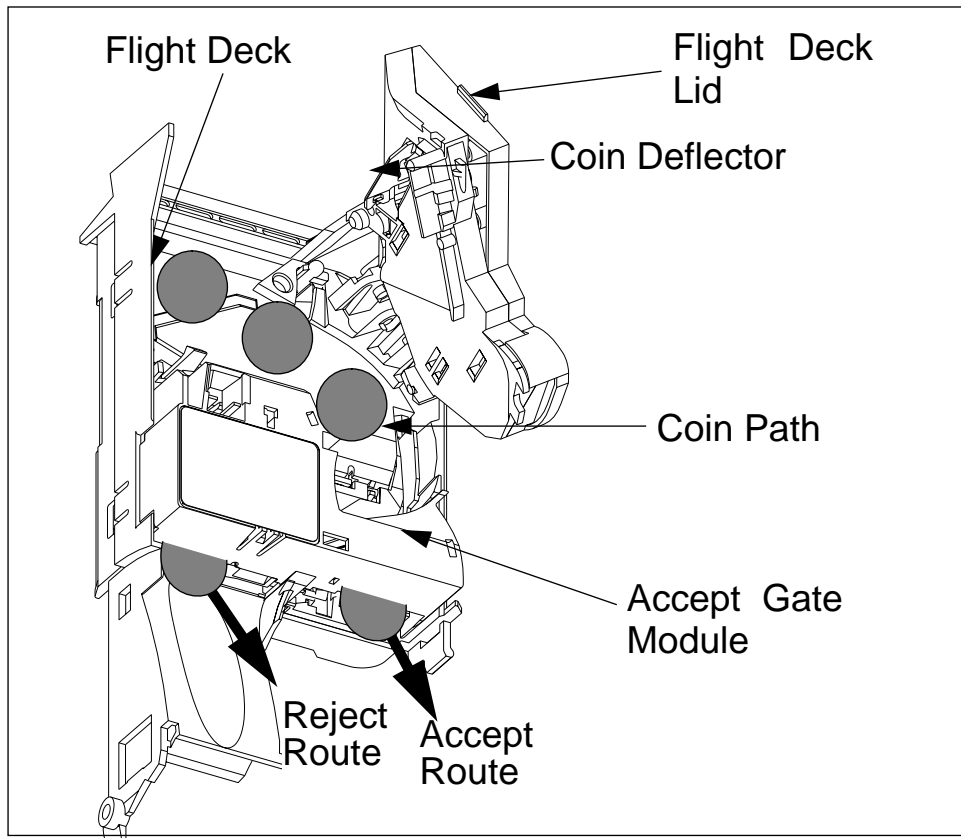
If the vending machine becomes inhibited this is signalled to the totaliser by the blocker signal. During the inhibited state all coin acceptance is disabled. This condition may occur because there are no products left in the machine or the machine has developed a fault.

ACCEPTOR MODULE

There are some functions of the acceptor module which are common across the whole CashFlow[®] product range. These include coin discrimination, control and communication.

When a coin is put through the acceptor module it's validity is determined by measuring certain parameters. It also looks at the coin type status to define whether the payment is a valid coin or token, or an invalid coin. Finally, the inhibit status is checked. If the coin is not inhibited, it will be accepted, the accept gate opened, and the coin routed to the cashbox. The acceptor module is made up of the discriminator, back cover and the accept gate.

The discriminator comprises a flight deck and lid which together form the coin control and flight path. On the inside of the flight deck lid is a mechanical device incorporated near the coin entry point. This device is known as the coin deflector and is used to bring coins under control as they enter the product



Acceptor module

A hinge at the top right hand side of the flight deck allows coupling of the lid via an intermediate component, known as the lid arm. This allows the lid to locate accurately to the flight deck independently of the hinge. The lid also maintains a parallel coin throat by being spaced from the deck on three bosses which locate the lid squarely to the deck.

The design of the lid arm hinge area allows the lid to open to 180 deg. relative to the deck. The opening is restricted to just over 100 deg. by the back cover to prevent the lid possibly fouling other parts.

The action of the lid arm hinge spring allows the lid to remain open when past about 100 deg. and will snap shut when closed to about 60 deg. although the lid will need to be pressed to ensure that it is correctly seated against the deck.

The acceptor connects to the control board via a 10 way ribbon cable.

The totaliser has a standard coin entry and exit chuting. Coin return via a reject lever is also standard.

MEI[®] ROUTE ALPHA 250 TERMINAL

On the front of the acceptor is a six way socket. This is for use with a MEI[®] Route Alpha 250 support terminal. The terminal is hand held and, when connected to the acceptor, allows some of the operational aspects of the totaliser to be altered.

ACCEPT GATE MODULE

The accept gate module contains a solenoid operated gate, optical coin strobes and coin routing components. Coins satisfactorily discriminated are routed to the accept exit by energising the accept gate. Coins that are rejected are routed to the reject exit.

SEPARATOR MODULE

The separator module directs accepted coins to the cashbox, and contains a solenoid bank to achieve this.

CONTROL BOARD

This is the main PCB which controls the way in which the change giver operates. There are several different control boards, but basically these are the 4 or 6 price for electro-mechanical machines, plus Executive, MBD and BDV for electronic machines.

SPINE

The spine, which is coloured black, provides the housing for all of the other modules. On the rear are the three standard keyhole fixing points for fitting the totaliser firmly into the machine.

TRANSFORMER

The transformer assembly is housed behind the keypad cover. To gain access to the transformer loosen the screw located under the top flap of the keypad cover. Once this screw has been removed the keypad cover will lift off and the transformer is accessible.

Note: This action must only be carried out when the product is isolated from mains power, and earthing precautions have been taken against residual power.

The transformer connects to the control board via two looms and is available in 24V, 100V, 120V, 220V, and 240V options.

KEYPAD

The keypad is used solely to set prices on the CashFlow[®] 350 multi-price totaliser.

TOTALISER BASE PLATE

The totaliser base plate, which is coloured black, is held in the spine by two clips, one on each side. Its function is restricted to providing a fixture point for the front plate assembly, as a guide for accepted coins to the cashbox and rejected coins to the front of the machine.

FRONT COVER ASSEMBLY

The front cover assembly clips to the front of the changer. Its function is restricted to providing a guide for rejected coins. These are directed to the machine by way of a channel on the left of the front plate.

Prisms are located at the top of the inside of the front cover. If the front cover is removed an error will be indicated.

COIN ACCEPTANCE

The acceptance of each coin is determined primarily by the set up of default inhibits in the EEPROM. This specifies which coins should always be inhibited (i.e. rejected). In addition to these defaults, extra inhibits will be imposed depending on the following conditions:

In normal mode with the overpay inhibit flag set:

- Coins will be inhibited and rejected if their value exceeds the maximum value set.
- Coins which would take the total system credit over the maximum allowed credit are inhibited
- Vend tokens are inhibited if the total system credit is not zero

In normal mode with the overpay inhibit flag clear:

- Coins which would take the total system credit over the maximum allowed credit are inhibited
- Vend tokens are inhibited if the total system credit is not zero

In price teach mode:

- Coins which would take the total system credit over the maximum allowed credit are inhibited
- Vend tokens are inhibited

Global coin inhibit

In addition to the individual coin inhibits described above, a global coin inhibit can be imposed. This will inhibit all coin acceptance regardless of any other conditions. A global inhibit is imposed when:

- A vend is in progress
- A price is on the display due to a product selection being made with insufficient credit
- Any bits in the EEPROM error register are set, apart from bit 5
- A vend token has been accepted
- An executive type vending machine has indicated that it requires a free vend
- The host machine has indicated it is inhibited
- The cashbox error bit or any of the protocol A error bits in MISC ERRORS is set

PRODUCT INTERFACES

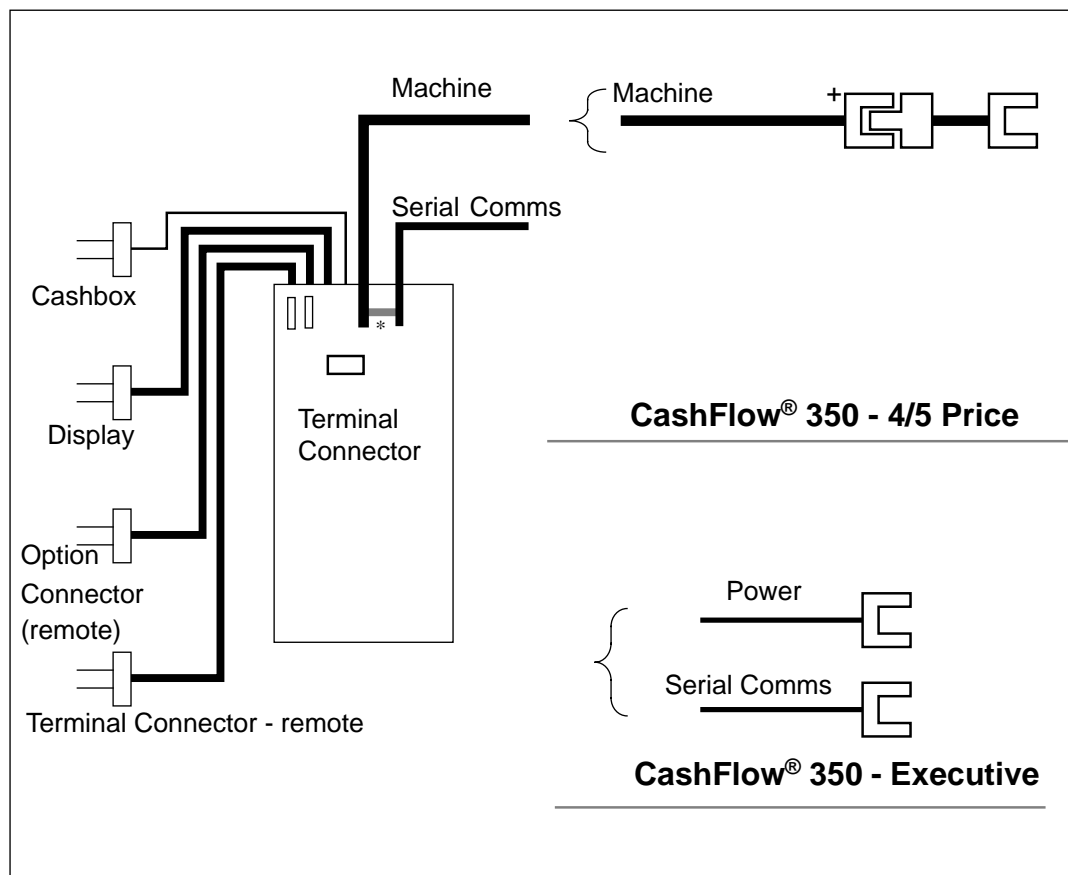
The external interfaces to the totaliser product can be divided into two groups and are explained in the following pages.

- Electrical interfaces: includes looms, connectors, power supplies.
- Man machine interfaces: includes terminal, keypad and credit display.

These are described in the following sections.

ELECTRICAL INTERFACES

The diagram below illustrates all the external electrical interfaces.



ELECTRO-MECHANICAL INTERFACE

The standard electro-mechanical interface parameters for all totalisers defined in this document are as follows:

4 Price and Executive plus

- Price line outputs
Rated 2.6 Amps AC inductive load (worst case power factor of 0.5). Fused (via price line common) 3.15 Amps fast. Fault rating 7.0 Amps.
- Safety line
Rated 2.6 Amps. Fused (via price line common) 3.15 Amps fast. Fault rating 7.0 Amps.
- Price line common
Rated 2.6 Amps AC inductive load. Fused 3.15 Amps fast. Fault rating 7.0 Amps.
- Price sense / Blocker / Escrow accept / Vend start / Inhibit inputs
Rated < 100 mA. Fault protection by circuit impedance

6 Price

- Exact change output (not used)
Rated 0.5A AC resistive load.
The circuit should be protected external to the product.
The tracking within the product is protected by a 1.5A fuse.
- Price line outputs
Rated 2 Amps total AC inductive load (worst case power factor of 0.5).
Fused (via live connection) 2.5 Amps Fault rating 5A.
- Price sense / Vend start inputs
Rated < 100mA. Fault protection by circuit impedance.

4 Price

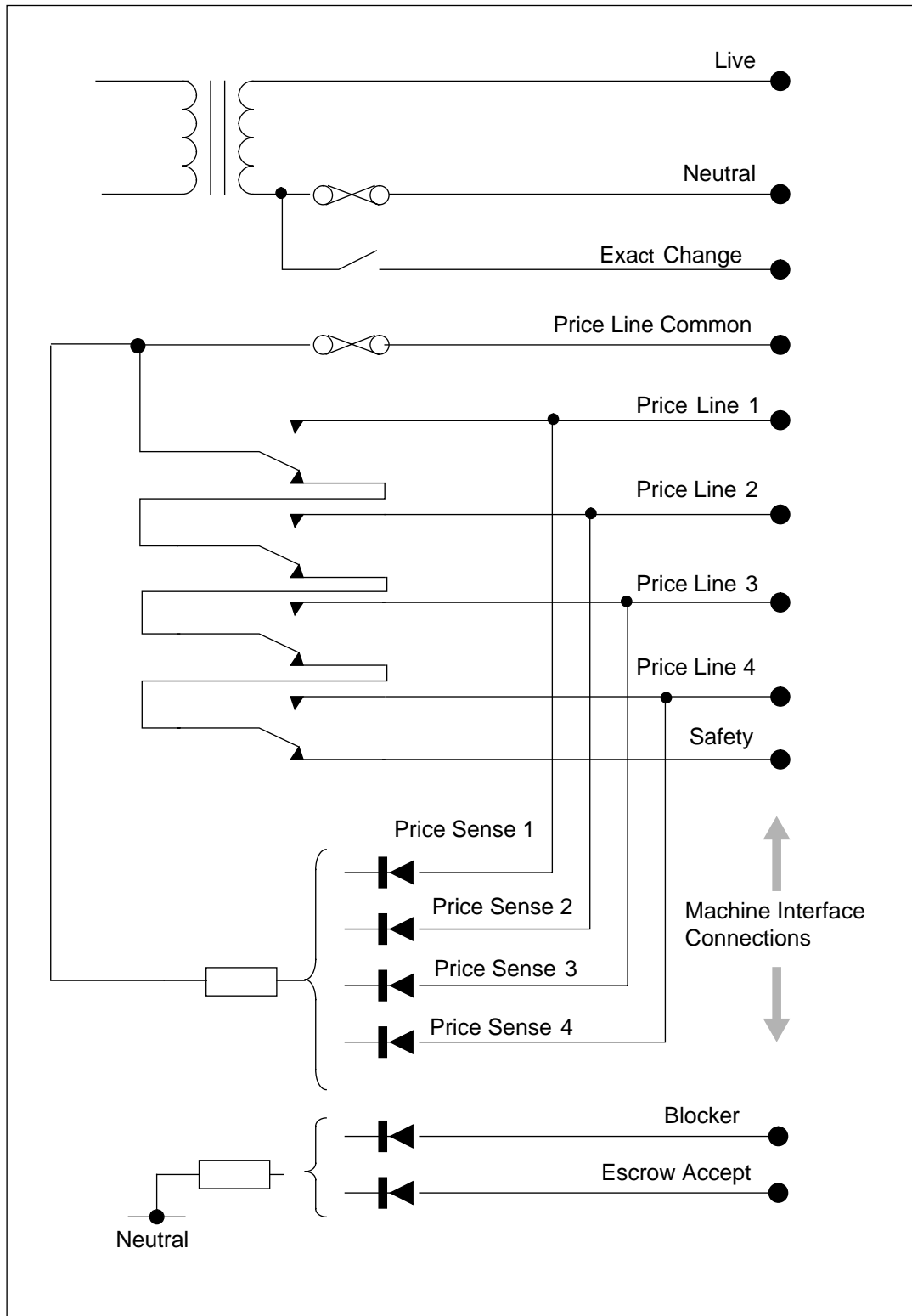
Voltage Profile Range	Mains Activated Minimum Source Impedance for OFF Condition	Mains Activated Maximum Load Impedance
20.4 - 26.4 VAC	118K ohms	10k Ω
87 - 121 VAC	475K ohms	10k Ω + 47k Ω
95 - 132 VAC	525K ohms	10k Ω + 47k Ω
187 - 242 VAC	1 M ohms	10k Ω + 47k Ω
212 - 264 VAC	1M1 ohms	10k Ω + 47k Ω

5 Price

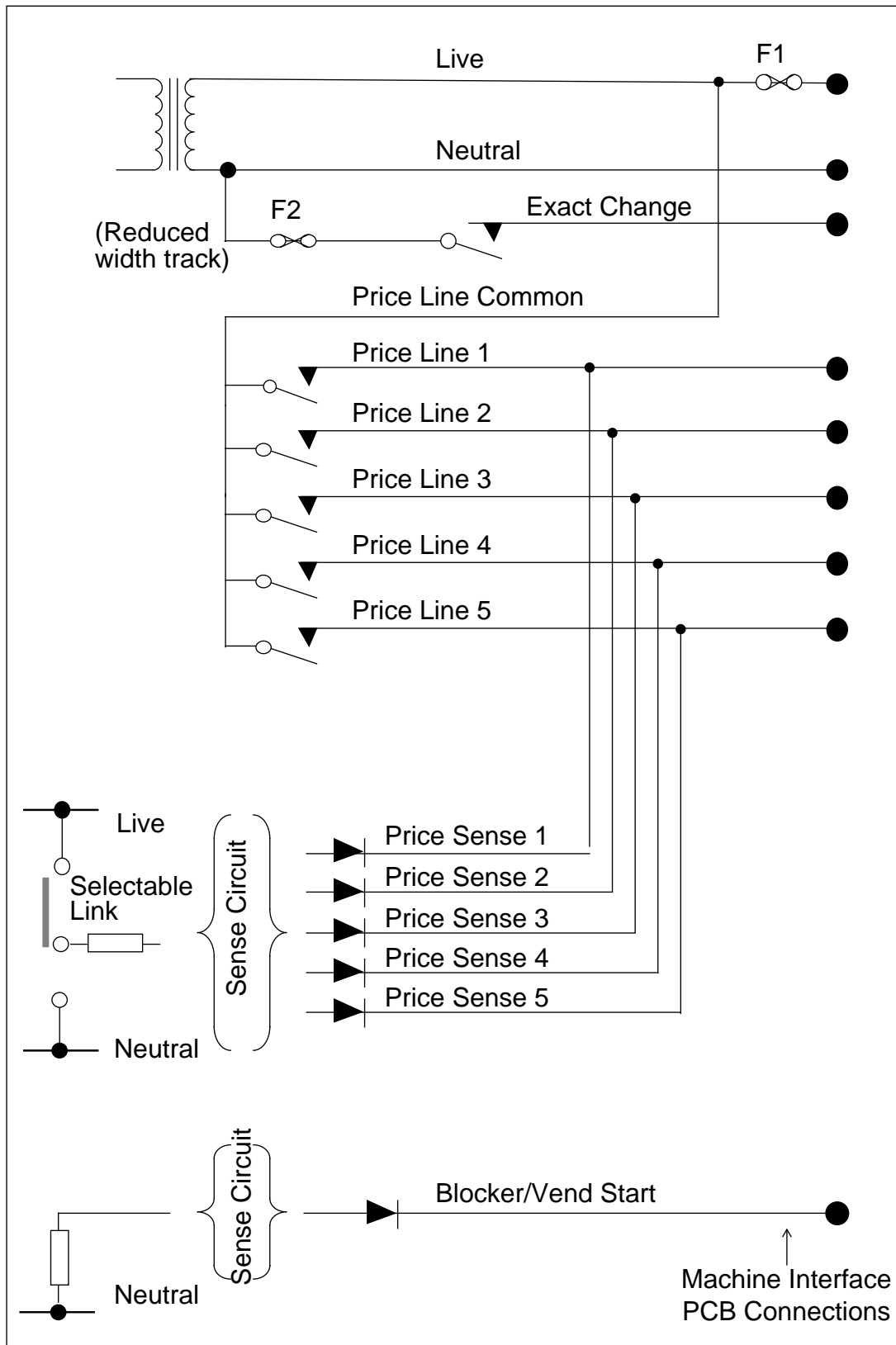
Voltage Profile Range	Mains Activated Minimum Source Impedance for OFF Condition	Mains Activated Maximum Load Impedance	
		Vend Start	Price Lines
20.4 - 26.4 VAC	118K ohms	10k Ω	8k Ω
87 - 121 VAC	475K ohms	57k Ω	35k Ω
95 - 132 VAC	525K ohms	57k Ω	35k Ω
187 - 242 VAC	1 M ohms	57k Ω	35k Ω
212 - 264 VAC	1M1 ohms	57k Ω	35k Ω

CashFlow[®] 350 multi-price totaliser Applications Design Guide

The mains electro-mechanical interface circuit diagrams for the CashFlow[®] 350 4 Price and 6 Price products are shown below.

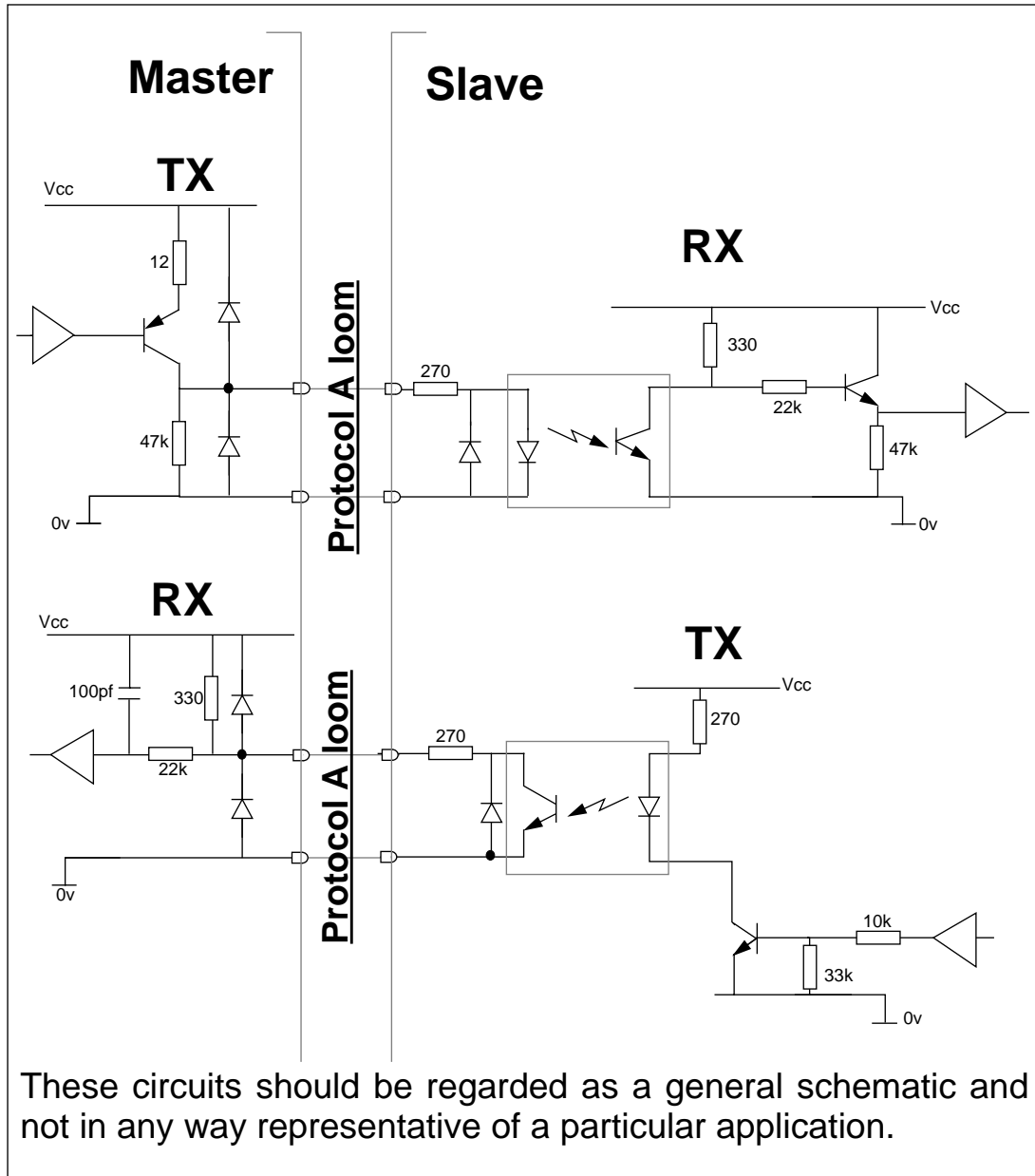


Host Interface for CashFlow[®] 350 4 Price

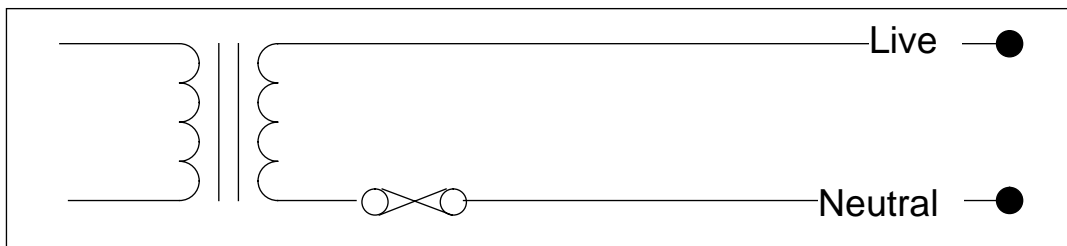


Host Interface for Cashflow[®] 350 5 price

Protocol A equivalent circuit



The CashFlow[®] 350 Executive products does not require any mains related electro-mechanical interfaces. However, the Executive does require a mains power supply as illustrated below.



Mains Interface for CashFlow[®] 350 Executive

VOLTAGE RANGES

The following profiled mains voltage ranges are supported across the defined product range:

- 20.4 - 26.4VAC covering voltages 24v +10%, -15%)
- 87 - 121VAC (covering voltages 100v -13%, 110v +10%)
- 95 - 132VAC covering voltages 120v +10%, -20.8%)
- 187 - 242 VAC covering voltages 220v +10%, -15%)
- 212 - 264 VAC covering voltages 240v +10%, -11.7%)

Note: This list is subject to change

POWER CONSUMPTION / RATING (AC Profiles)

Quiescent power	15VA @50Hz
Maximum power	20VA @ 50Hz
Input current rating	3.52A (min)
Internal fuse rating	1.6A (Thermal Delay)

TERMINAL CONNECTOR

This connector is on the front of the acceptor module. It is used with the MEI[®] Route Alpha 250 terminal to access and reconfigure certain aspects of the way in which the totaliser operates. A list of the relevant addresses can be found in a later section.

The connector type is: Staked pins 0.1" DIL

EXTERNAL CREDIT DISPLAY

The external display, if fitted, provides the following information:

- Current credit in real money (Consumer)
- Vend price in real money (Consumer)
- Accumulated credit in price teach mode (Operator / Route person)
- Power-on indicator (Service engineer)

There are both 4 and 5 digit display looms available.

The 5 digit display has a 24 way Molex connector, the 4 digit display

has a 12 way connector.

DISPLAYING CREDIT

If there is credit in the system, either coin or value token, then the total value of this credit will be displayed. The display will be in real money units. Any leading zeros will be blanked. The decimal point will be lit according to the decimal point setting in the programmed memory. A decimal point setting of 0 indicates zero places of decimal, i.e. the decimal point is lit on the right hand digit. A decimal point setting of 1 indicates one place of decimal, and so on. Any value of decimal point over 4 will be ignored and no decimal point will be lit.

If there is free vend credit available, either by free vend token or host machine free vend, the credit display will indicate this by a display of 5 dashes on the middle segments.

If there is no credit in the system, the display will show a single 0 in the right hand digit. No decimal point will be lit.

DISPLAYING VEND PRICE

If price holding is enabled, and you make a selection whose value exceeds the current system credit, then the display will show the price of the vend, in real money, while the selection is active. Leading zero blanking and decimal point will be handled as the display of credit. Note that with the 4 price product price holding will always be enabled.

DISPLAYING PRICE TEACH CREDIT

If the totaliser is in price teach mode, the current value of credit will be displayed in real money values. Leading zero blanking and decimal point will be handled as the display of credit.

POWER ON INDICATOR

On system power-up or reset, all segments of the display will be lit for 0.5 seconds. This will provide you with a basic check of the display and associated hardware.

INTERNAL DIAGNOSTICS & ERROR HANDLING

On-product diagnostics are limited to an error being present in the host. This section details various errors, and the action taken by the product.

- Host machine problems
- On-board EEPROM problems
- Audit FEM problems
- FIB communication errors
- Miscellaneous errors

HOST MACHINE PROBLEMS

Host Inhibited

On both electro-mechanical and electronic hosts, an indication is provided to the totaliser if the host is inhibited (i.e blocker inactive on electro-mechanical machines). The error handling for this condition is:

- Disabling of all coin acceptance
- Disable all coin acceptance in price teach mode
- Terminal communications are still allowed
- Totaliser will continually check if host is re-enabled

Removal of Blocker

The start of vend condition on electro-mechanical hosts is signalled by blocker becoming inactive after the price relay has been turned on. Normally there is a 2.5 second timeout on this, which will terminate the vend sequence with no loss of credit should blocker not go inactive. In blocker hold mode, due to the possibility of frauding certain machines, this timeout is not used. Therefore, if the start of the vend (as signalled by the removal of the blocker signal) does not occur, the following error state will result:

- Inhibit all functions
- Totaliser will continually check if vend starts

Blocker Return

The end of vend condition on electro-mechanical hosts depends on the reset mode selected. In blocker hold mode, the end of vend is signalled by the return of the blocker signal. If this does not occur, the following error state will result:

- Inhibit all functions
- Totaliser will continually check if host is re-enabled

Cashbox Full

An input is provided for a cashbox full sensor (provided by the host). The error handling for this sensor is:

- Disable all coin acceptance in normal mode
- Disable all coin acceptance in price teach mode
- Terminal communications are still allowed
- Cashbox must be emptied to reset error

Bad Replies Received

Protocol A serial communications error handling is summarised below:

- Suspend operation for 100ms
- Abort sequence and revert to sending status
- Set Protocol A Tx retry error flag (bit 5 in misc. error register)
- Disable all coin acceptance in normal mode
- Terminal communications are still allowed
- Totaliser will continually check if failure rectified

No Response

- Disable all coin acceptance in normal mode
- Set Protocol A Rx timeout error flag (bit 6 in misc. error register)
- Terminal communications are still allowed
- Totaliser will continually check if failure rectified

Post Gate Strobe (PGS) Failure

- Set PGS error flag (bit 7 in full sensor error register)
- On coin acceptance or rejection, totaliser will check if failure rectified

Front Plate Assy Removal

- Set front plate removed error flag (bit 4 in Misc Error register)

AUDIT FEM PROBLEMS

Audit not initialised

If an IDTS FEM is present but has not been initialised, the following applies:

- Set bit 5 of EEPROM error register
- No coin in / out events will be audited
- Vending is disabled
- Audit must be initialised to clear error.

Audit FEM corrupt

If an IDTS FEM is present but is corrupt, the following applies:

- Set bit 2 of EEPROM error register
- Suspend all totaliser operation apart from FIB comms
- Corruption may self repair if power is cycled. If not, then FEM must be replaced.

Audit removed

If an IDTS FEM had been present but is now removed, the following applies:

- Set bit 3 of EEPROM error register
- Suspend all totaliser operation apart from FIB comms
- Audit must be re-fitted and totaliser re-initialised to clear error.

MISCELLANEOUS ERRORS

Acceptor Initialising Error

If there is a failure to transfer over data between the acceptor and totaliser on power-up, the following error handling applies:

- Set bit 1 in misc. error register
- All coin acceptance will be disabled
- Terminal communications are still allowed
- While a reset device error appears to clear the error, note that the data for inhibits, coin types, etc. may not have been correctly passed between the acceptor and the totaliser, and hence the totaliser's operation will be indeterminate. After clearing the cause of the error the totaliser should be re-initialised.

CONFIGURATION

INTRODUCTION

The configuration of the totaliser can be divided into two areas; these are defined as Factory Configuration and Field Configuration.

Where field configuration is carried out this can be done with a hand held MEI[®] Route Alpha 250 terminal, and, in the case of price teaching or setting, via the keypad.

HOW THE LIMITS AND MODES ARE SET UP

Function	Factory Set	Set via Keypad	Set via Terminal
Price Teach	✓	✓	✓
Decimal Point Position	✓		✓
Coin Scaling Factor	✓		✓
Maximum Credit	✓		✓
Single or Multi vend	✓		✓
Reset Mode (Electro-mechanical only)	✓		✓
Coin Inhibits	✓		✓
Change Delay	✓		✓
Price Hold	✓		✓
Price Display	✓		✓
Fast Sense	✓		✓

FACTORY CONFIGURATION

Specific Coinsets

The acceptor is pre-programmed to accept a specific range of coins and/or tokens from the following countries.

This list does not preclude any other coinsets not specifically listed.

Australia	Hungary	Singapore
Austria	India	South Africa
Bahrain	Israel	South Korea
Belgium	Italy	Spain
Canada	Japan	Sweden
Colombia	Kuwait	Switzerland
Cyprus	Malta	Taiwan
Denmark	Mexico	Turkey
Eire	Netherlands	UAE
Finland	New Zealand	UK
France	Norway	USA
Germany	Portugal	
Greece	Saudi Arabia	

FIELD CONFIGURATION

KEYPAD

The keypad has four letter keys (blue) and a mode key (yellow). Above the keypad is a label which has a window showing the operating voltage.

In addition there are two LEDs mounted on the left hand side of the keypad (yellow and red) which are used to indicate the status of the product.

The yellow LED is used to indicate what status the keypad is in. If the yellow LED is off then the keypad is in normal mode.

The red LED is used to indicate the status of the system. Under normal conditions the LED remains permanently on. If an error is detected on the product then the LED will flash. If a fault is detected on the machine, i.e blocker, the red LED will be permanently off.

The main principle of price teach is that selections will have their prices set to the accumulated credit value. To use price teach:

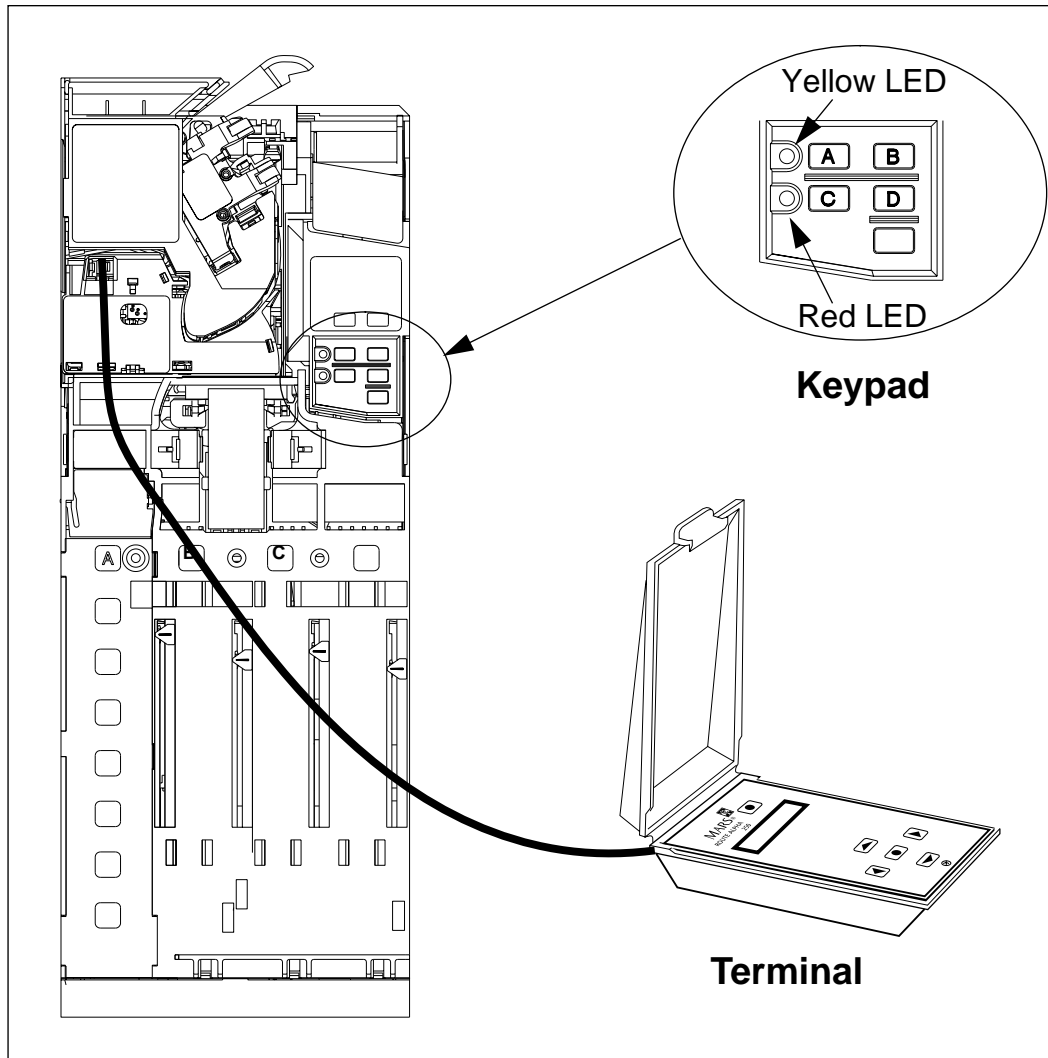
- 1 Press the (yellow) mode key on the keypad
- 2 Press key C. Any credit will be cleared and a time-out period of 45 seconds will start. The time-out period restarts after every accepted coin.
- 3 Enter coins through the acceptor until the value of the price to be set has been reached. The value of any coins entered will be accumulated as credit and will be displayed on the credit display, if fitted.
- 4 Press the vend button on the machine corresponding to the selection price. The price has now been set.
- 5 Press key C on the keypad to return to normal operation. If you do not press the C key, then 45 seconds after the last coin was entered, the unit will automatically return to normal operation.

The above stages can be repeated for any selection you wish to change the price of. If a number of selections are required to be set to the same price you only need to accumulate the credit value once. You can then press the appropriate selection buttons on the machine. If more than one price has to be set then accumulate the lowest credit value first, set the price, and then add further coins to the next highest value and set that price etc..

Note: Prices of 0 cannot be set, using price teach.

MEI[®] ROUTE ALPHA 250 TERMINAL

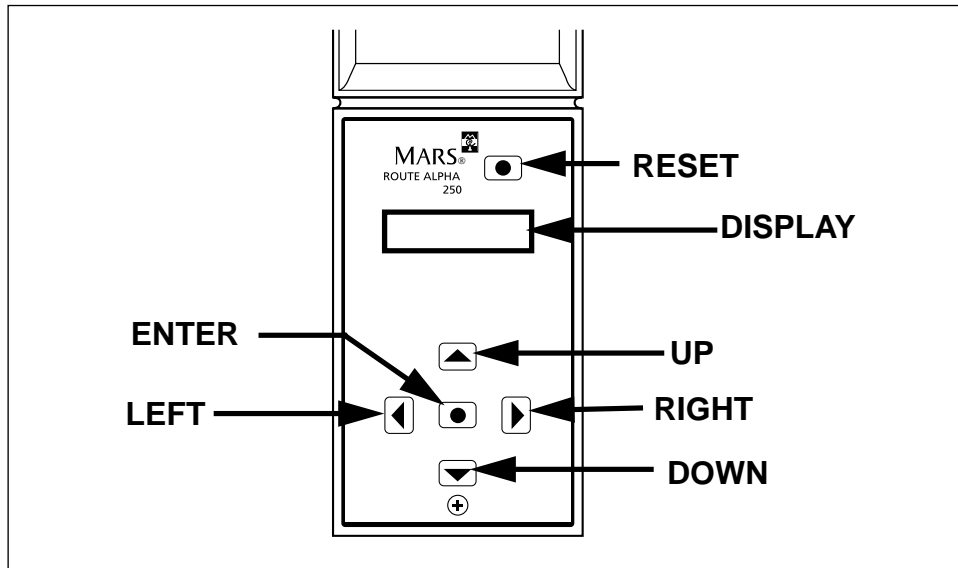
If you have access to a MEI[®] Route Alpha 250 terminal you can re-configure some of the functions available for a particular product. The terminal is connected to the acceptor via a six way connector which plugs into the front of the acceptor.



The terminal is used to check or change certain data which affects the way the totaliser operates. The data is held in addresses. Each address has a unique number which identifies the feature you wish to read or change e.g. if you want to change from single vend to multi vend then you need to go to address number 226 and put in a 1 (single vend is a 0).

The following pages will explain how to access and change the data in certain addresses. At the end of this section there is a list of addresses and the relevant values.

Key Functions



Reset Key: used to reset all modes and to initialise any settings that you have changed. If the reset key is pressed while an address is being updated then the address may not be updated. The reset key must be pressed to store the changes that you have made.

Up Key: used to increase the value displayed on the screen.

Down Key: used to decrease the value displayed on the screen.

Left Key: used to scroll the display to the left when a large number is being accessed that cannot be fully displayed on the screen.

Right Key: used to scroll the display to the right when a large number is being accessed that cannot be fully displayed on the screen.

Enter Key: used to change between the address and data displays.

Other Facilities of the Terminal

The terminal has several features to speed up its use. This includes the ability to scan at a higher speed with the keys auto repeating, to automatically roll over from its highest to lowest address and to inform the operator should a communication error occur.

Should you need to know which version numbers of the software is used in the totaliser the UP key is pressed while the terminal is in reset mode. The terminal will firstly display the acceptor HI² node address, if the UP key is pressed again the acceptor software version number will be displayed. Pressing the UP key again will display the acceptor EEPROM number and if pressed again the acceptor configuration code.

To return to normal operation press the RESET key.

Auto Repeating Keys

If either the UP or DOWN keys are kept pressed they automatically repeat. The repeat speed of the key increases the longer the key is held down.

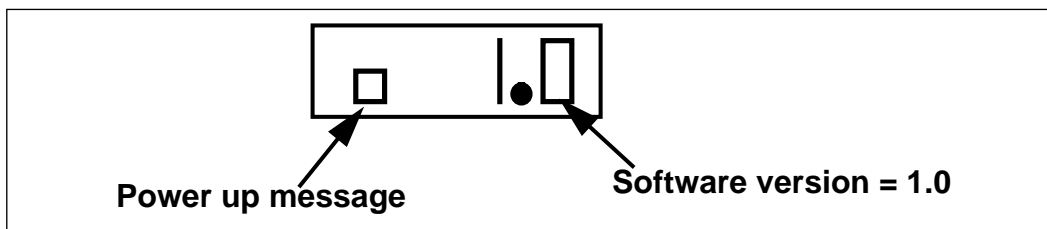
Double Click Hotkeying

If a key is double clicked (pressed twice in quick succession) then this causes the address number to increment by a larger amount. e.g. if the user starts at address number 1 then double clicks the UP key, the address will jump to 40, double click again the address will jump to address 100 etc. This is useful as the addresses used for the totaliser start at address 200. You can also double click the DOWN key to decrement by larger amounts.

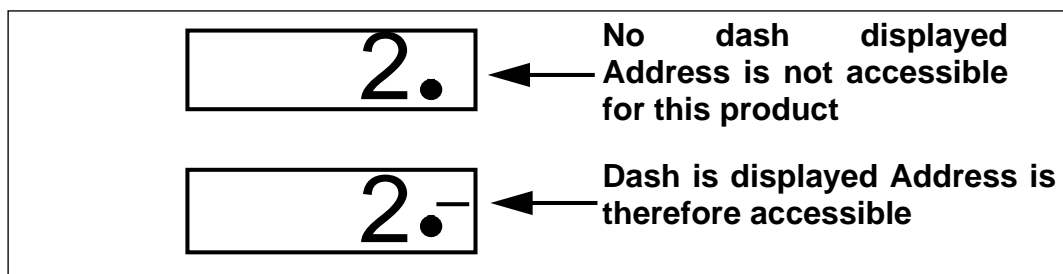
Using The Terminal

As soon as the terminal is connected to a totaliser it powers up and interrogates the product.

The terminal display will clear and briefly show a message that indicates the version of software in the terminal. A display of [0 1.0] means software with a version number of 1.0 is fitted in the terminal.



After a few seconds the display will show the number [1.] or [1.-]. Not all configuration items are applicable to every product but all the address values are shown on the display. If the value for the address is applicable to the product a dash will be present at the far right position on the display. The value can then be accessed and changed if required.



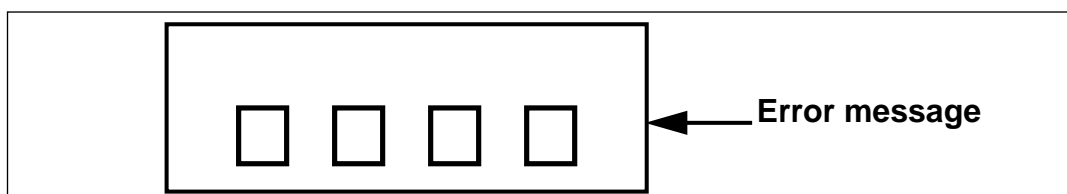
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The basic operation to alter the information held in an address is:

- 1 Connect the terminal to the CashFlow[®] product.
- 2 Wait for the terminal to power up correctly.
- 3 Select the address by using the UP and DOWN keys.
- 4 Examine the data by pressing the ENTER key.
- 5 Alter the data value by pressing the UP or DOWN keys until the new value has been reached.
- 6 Press the ENTER key to return to displaying addresses.
- 7 Press the RESET key to initialise the new value.

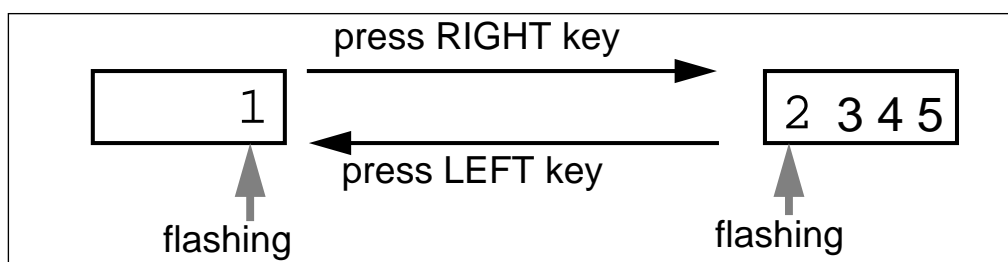
When the terminal is displaying values stored at addresses, no decimal point will be displayed.

If an error occurs with the communication between the terminal and the totaliser the display will show an error message of four half height zeroes.



This message will stay on the display. Pressing the RESET key may clear the fault. The display will then revert to showing the current address. If the error occurred while updating an address then the value of that address should be checked as it may not have been updated correctly. If, after pressing the RESET key, the fault remains the error message will stay and you need to return the terminal for repair.

As the screen is capable of only displaying four digits at any one time the number displayed on the screen can be scrolled if it is greater than 9999 by using the LEFT and RIGHT keys. The left or rightmost digit will flash indicating an extra digit can be examined by use of the scrolling keys e.g. Value is 12345



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The table below shows you the address of each item that can be re-configured and their possible values.

Addresses And Values

Address	Parameter	Range	Meaning
200	Maximum credit	0-65,535	maximum credit
201	Price 1	0-65,535	value of price 1
202	Price 2	0-65,535	value of price 2
203	Price 3	0-65,535	value of price 3
204	Price 4	0-65,535	value of price 4
205-225	Prices 5 - 25 (Executive product only)	0-65,535	value of prices 5 - 25 (When advanced audit FEM fitted only)
226	Single/Multivend	0 - 1	0 = single vend 1 = multivend
228	Reset mode (Electromech only)	0 - 4	0 = blocker reset 1 = delayed blocker reset (30ms) 2 = delayed blocker reset (200ms) 3 = blocker hold reset 4 = after escrow signal
229	Coin inhibit, coins 1-4 for multiple coin inhibit, add together e.g. 1 + 8 = 9 so coins 1 & 4 are inhibited	0 - 15	0 = no coins inhibited 1 = inhibit coin 1 2 = inhibit coin 2 4 = inhibit coin 3 8 = inhibit coin 4
230	Coin inhibit, coins 5-8	0 - 15	0 = no coins inhibited 1 = inhibit coin 5 2 = inhibit coin 6 4 = inhibit coin 7 8 = inhibit coin 8
231	Coin Inhibit, coins 9 -12	0 - 15	0 = no coins inhibited 1 = inhibit coin 9 2 = inhibit coin 10 4 = inhibit coin 11 8 = inhibit coin 12

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Address	Parameter	Range	Meaning
235	Change delay	0 - 255	delay in 1 second steps 255 = infinite delay
238	Price hold (Protocol A only)	0 - 1	0 = do not hold price 1 = hold price
239	Price display	0 - 1	0 = do not display price 1 = display price
245	Price teach inhibit	0 - 1	0 = price teach allowed 1 = price teach inhibited
246	Fast sense (Electromech only)	0 - 1	0 = normal 1 = fast sense
248	Vending mode	0 - 1	0 = European 1 - Japanese
255	Price 5 (5 price product only)	0-65,535	value of price 5
342	EEPROM errors (i) READ ONLY	0 - 15	1 = errors in page 0 2 = errors in page 1 4 = corrupt audit FEM 8 = audit FEM removed
343	EEPROM errors (ii) READ ONLY	0 - 15	1 = incorrect configuration version 2 = audit FEM not defined 4 = undefined 8 = internal write error
344	Operational errors (i) READ ONLY	0 - 15	1 = undefined 2 = acceptor error 4 = HII hardware error 8 = HII transmit error
345	Operational errors (ii) READ ONLY	0 - 15	1 = coin cassette removed 2 = protocol A transmit error 4 = protocol A receive error 8 = cashbox full error
349	Reset error flags	0 - 1	0 = do not reset 1 = reset error flags
360	Audit module - VMC identification code (When audit fitted)	0-65,535	vending machine ID

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Address	Parameter	Range	Meaning
361	Audit module - printout language (When audit fitted)	0 - 4	0 = English 1 = French 2 = German 3 = Dutch 4 = Spanish
362	Audit module - printout type (When audit fitted)	0 - 2	0 = basic 1 = basic + interim report 2 = basic + interim report + free vend report
363	Audit module - printout product limit (When audit fitted)	0 - 25	limit details on printout to first few specified price lines
364	Audit module - installation day (When audit fitted)	1 - 31	day of installation into the machine
365	Audit module - installation month (When audit fitted)	1 - 12	month of installation into the machine
366	Audit module - installation year (When audit fitted)	0 - 99	year of installation into the machine
382	Link Master ID	0 - 9999	ID code of link master node

DIAGNOSING TERMINAL PROBLEMS

SYMPTON	CAUSE	SOLUTION
Terminal displays an error message at power up	Communications error	Press RESET
Terminal displays an error message when changing from address to data mode or vice versa	Communications error between terminal and product or the terminal does not recognise the product it has been connected to	Repeat last operation
Terminal powers up correctly but no addresses are accessible	The product is not compatible with the terminal	Requires a different terminal/ software
Terminal does not power up	Bad connections or Faulty cable	Check the connections at either end of lead. Replace lead
Terminal powers up but one of the keys does not work	Faulty key	Use the self test feature. If the key is faulty send unit for repair
Non standard characters printed on display	Faulty unit	Send unit for repair

TESTING THE TERMINAL

It is possible to test all the features of the terminal itself by putting the unit into a special test mode. To enter the test mode hold the ENTER key pressed when powering the unit up. The display will initially show three digits indicating the result of an automatic on board test. The display format is:

[<BUSY state> <DATA state> <AUTO TEST result>] where
<BUSY state> = current state of BUSY line, 0 = low, 1 = high
<DATA state> = current state of DATA line, 0 =low, 1=high
<AUTO TEST result> = result of automatic test

0 = Pass

1 = BUSY line error

2 = DATA line error

3 = BUSY and DATA line errors

Pressing the ENTER key activates the next stage of test.

The terminal keys are checked next. A single number is shown on the display indicating what key was pressed last. Display shows:

- [0] No key pressed
- [1] UP key pressed
- [2] RIGHT pressed
- [3] DOWN key pressed
- [4] LEFT key pressed
- [5] ENTER key pressed

This is the last test and the RESET key must be pressed to restart the terminal in normal operational mode.

COMPATIBILITY

The CashFlow[®] 350 product range is compatible with the majority of modern vending machines. The options currently available are;

- CashFlow[®] 350 - 4 price - A four price electro-mechanical totaliser
- CashFlow[®] 350 -5 price - A five price electro-mechanical totaliser
- CashFlow[®] 350 - Executive - totaliser with an electronic Protocol A serial interface

Interfaces are provided for a credit display if required on the above.

MACHINE INTERCONNECTION LOOMS

The looms fitted to the CashFlow[®] 350 products have a range of connectors and pinouts to be fully compatible with existing machine wiring. The table below shows the new CashFlow[®] looms and the old interface looms which they replace.

CashFlow[®] Machine Loom No.	Replaces	Electro mechanical	No. of Price Lines
T3	B32,FI, F16	✓	1
T4	FF,B12,F15, F26	✓	4
T5	FB,B03,B62 F03,F10,F3 5	✓	4
T6	FJ,B02,F02, F27	✓	3
T7	FA, No credit relay	(Gen. pur- pose loom)	
T8	FD,B74,F01	✓	4
T9	FC,B60,F08 ,F33	✓	4

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CashFlow [®] Machine Loom No.	Replaces	Electro mechanical	No. of Price Lines
T11	FE,F12	✓	4
T12	FG,F44	✓	4
165972002	FF, F26 Adaptor	✓	4
165974001	FM, F75 Adaptor	✓	6
Adaptor * 167492001	XS-03	✓	6

* Requires T7 Machine Loom to effect interface.

ENVIRONMENTAL PERFORMANCE

Products are available to meet the following environmental specification.

TEMPERATURE RANGE

Working ambient	- 15 to 60°C
Max rate of change	15°C/hr non condensing
Storage	-40 to + 65°C
Solar radiation	Max. working ambient applies

HUMIDITY

Operational	Worst case up to 90% RH, non condensing at 43°C
Storage	Worst case up to 95% RH, non condensing at 65°C

VIBRATION

Operational - units will not be damaged by these conditions:

Vibration (through machine mounting)	0.25g at 5 to 500 Hz. Intermittent over the unit's life. Refer to BS2011: part 2.1 Fc:1983
--------------------------------------	---

INSTALLATION

To ensure that the changeover operates correctly it must be mounted so that it hangs within $\pm 2^\circ$ of vertical from both front and side elevations.

TRANSPORTATION

Units in the packed state will not sustain any physical damage under these conditions:

Shock	Half sine, 30g shock, 18ms dur. Refer to BS 2011: part 2.1 Ea: 1977
Bump	1000 bumps 6ms duration at 25g. Refer to BS 2011: part 2.1 Eb: 1977
Free Fall	1000mm fall onto packing faces. Refer to BS 2011: part 2.1 Ed: 1977
Crush	Neatly stacked units of the same type may be stacked to a height of 2 metres.

LIQUIDS

Water

The units inclusive of PCBs will be splash protected.

The coin entry encourages excess water towards the reject path and the front of the product out of the coin path. Coin stall under these conditions is minimised.

The above should in no way be interpreted as a specification capable of operating at 100% RH.

Salt Water

As above.

Prolonged exposure in a salt laden atmosphere will lead to PCB corrosion damage.

Other Liquids

This includes: dilute carbonic acid, dilute citric acid, carbonated drinks, beer, tea, coffee, chocolate, soup, syrup and sugar residue, uric acid.

- Certain beverages and the dilute acids may cause similar effects to salt water if they contact the PCB's.
- Wet performance will be similar to that described for water.
- Liquids which leave a residue on drying which affects the passage of coins could cause malfunction.

VOLTAGE

Supply

The unit will operate to specification on the following supply voltages:

46 - 64 Hz AC RMS.

- 20.4 - 26.4 V RMS
- 87 - 121 V RMS
- 95 - 132 V RMS
- 187 - 242 V RMS
- 212 - 264 V RMS
- 207 - 244 V RMS* single transformer profile

Note: For each of the above voltage waveforms the peak voltage must be $\sqrt{2}$ V RMS

Note: This list is subject to change.

VOLTAGE TRANSIENTS

Minimum performance can be regarded as that stated under the section on susceptibility.

The unit will perform to criteria A for supply loss (100%) of up to two cycles.

For supply loss of greater than 2 cycles then performance criteria B applies.

SAFETY CLASSIFICATIONS

CLASSIFICATION

The product will comply with :

- UL 756 “Coin and currency changers and actuators”
- IEC 335, 3rd Edition “Safety of household and similar electrical appliances”

PARTITIONS

All of the following lines are assumed to be at mains potential (live parts at hazardous voltage).

Mains input (live & neutral)

Exact change output

Price sense inputs

Price outputs

Blocker (vend start) input

Escrow accept input

Price line common input

Safety line output

All of the following lines, and any other circuits accessible without the removal of any covers using a tool are assumed to be unearthed accessible SELV circuits as defined in IEC 335.

Protocol A current loop

MEI terminal link

Credit display

Cashbox full connector

Acceptor serial link

Credit relay coil output

SAFETY INSULATION

Safety insulation is provided between :

- a) All operator points of contact without tool access and hazardous voltages
- b) SELV circuits and hazardous voltages

Safety insulation (as defined above) is provided as follows :

- Clearance through air ≥ 8.0 mm
- Creepage over insulation surface ≥ 8.0 mm
- Thickness through insulation (except for cables)
- Accessible reinforced insulation ≥ 2.0 mm
- Basic insulation ≥ 1.0 mm
- Dielectric strength of reinforced insulation : 3750 VAC RMS for 1 minute
- Dielectric strength of supplementary insulation : 2750 VAC RMS for 1 minute

Insulation is provided between poles of the supply input (live & neutral) and to other hazardous voltages as follows :

- Clearance through air before fuse ≥ 2.5 mm
- Clearance through air after fuse ≥ 1.0 mm
- Creepage over insulation surface before fuse ≥ 3.0 mm
- Creepage over insulation surface after fuse ≥ 1.0 mm
- Dielectric strength over basic insulation ≥ 1250 VAC RMS for 1 minute

ENERGY STORAGE

The maximum energy stored in the product's smoothing capacitor will be less than 5.1 Joules at maximum input voltage and no load.

FLAMMABILITY

All major plastic parts are moulded in materials with a flammability rating of UL 94 V-2 or better. Small parts which do not form part of the fire containment enclosure, or which are not located close (< 13.0 mm) to live (hazardous) parts, may be moulded from a material with a flammability rating of UL 94 V-HB.

ELECTRO-MECHANICAL AND MAINS INPUT RATINGS

4 Price

- Input: (line and neutral) fused neutral only 1.6A thermal
Fault rating 3.5A
- Exact change fused neutral only 1.6a thermal
Load rating 0.5A
Fault rating 3.5A
- Price line common
- Price lines, safety line fused PLC only 3.15A fast
Load rating 2.6A
Fault rating 7A

5 Price

- Input: (line and neutral) fused live only price lines
2.5A thermal
Fault rating 5.4A
- Exact change fused neutral only protected by a 1.5A
fuse

Executive

- Input: (line and neutral) fused neutral only 1.6A thermal
Fault rating 3.5A

The product will satisfy the requirements of class 2 equipment as defined in IEC 335.

MECHANICAL PARTS

The product does not contain mechanically moving parts, or sharp edges, which can present a hazard in normal use.

MEI OFFICES

WWW.MEIGROUP.COM

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APPENDIX

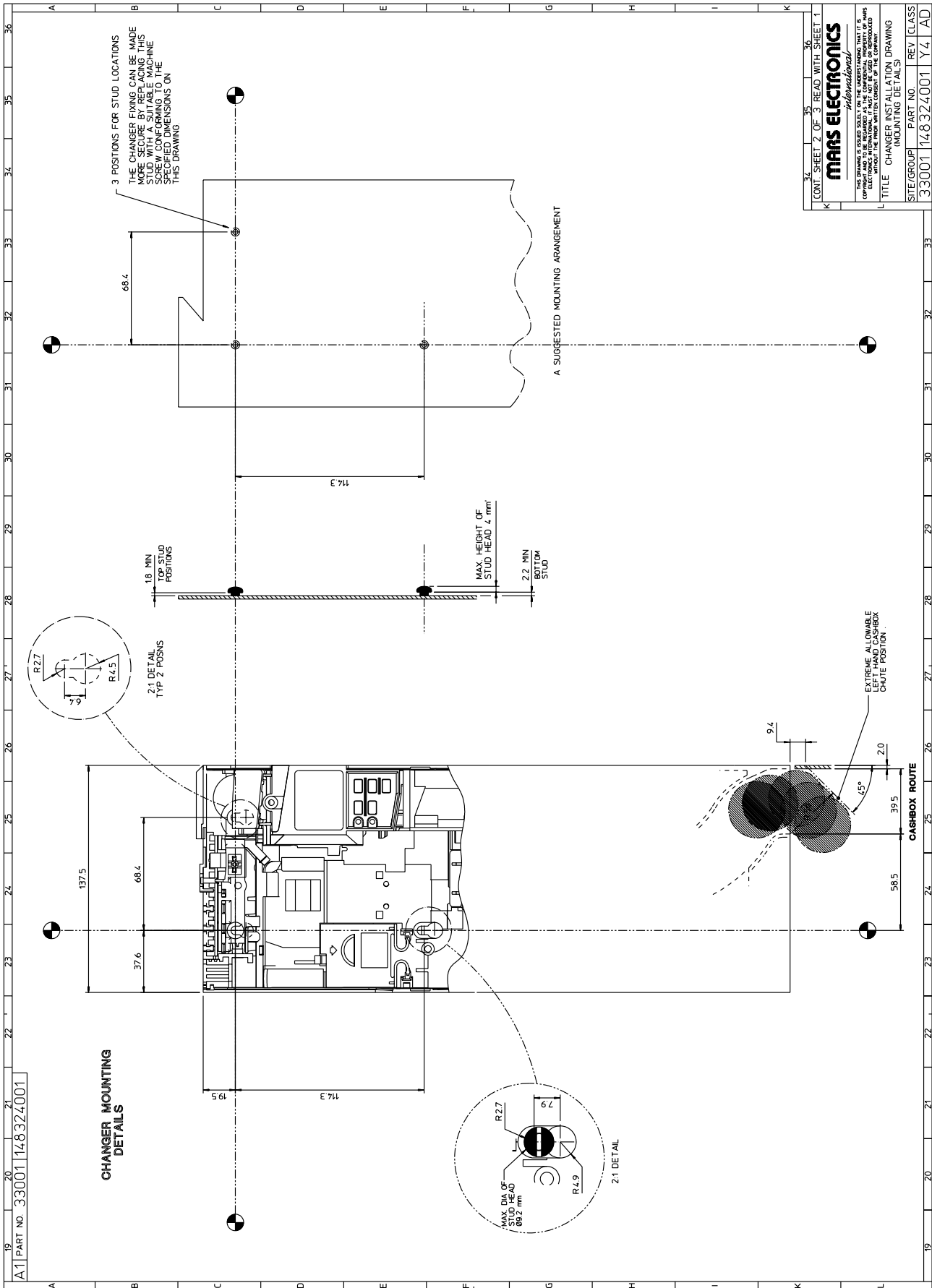
INTERFACE DRAWINGS

Mechanical interface drawing number 148324001, (consisting of 3 separate sheets), shows generic dimensional details of the CashFlow[®] range of change giver products and is not to be considered specific to the CashFlow[®] 350 multi-price product.

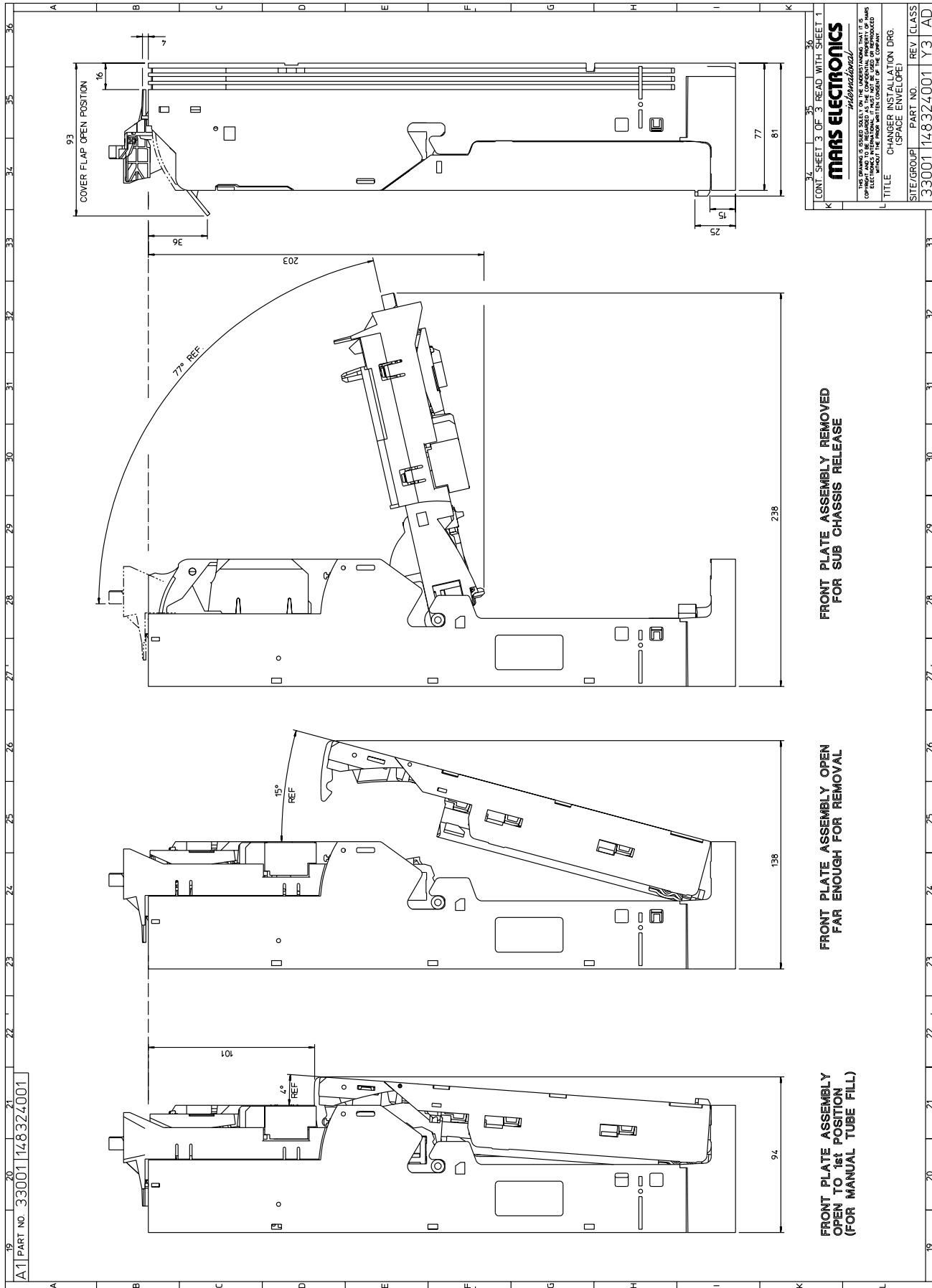
All external and internal measurements shown on drawing number 148324001 are, however, consistent with CashFlow[®] 350 multi-price products.

Details shown include the following:

- Reject Mechanism & Coin Routes
- Mounting Details
- Space Envelope



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