National Measurement Office

SUPPLEMENT TO CERTIFICATE

Series S022 Revision 1

Certificate No.	Supplement No.	Certificate No.	Supplement No.
1828/40*	53	2176	90
1918	83	2286	67
1940	85	2461/26*	33
1967/66*	74	2486	64
2017	87	2536	71
2162	102	2650	65

(*) Refers to the dispenser only, the self service device described in these certificates is not part of this approval.

Submitted by: **Triscan Systems Ltd
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United Kingdom**

Authorisation is hereby given by the Secretary of State for Business, Innovation and Skills for the following Certificate of approval relating to a pattern of a liquid flowmeter to be modified as described below.

As described in the following Certificates but modified to have an alternative self service device, as detailed in the descriptive annex, and having the following characteristics:-

DISPENSERS: Dispensers described in above certification numbers.

SITE CONTROLLER   *VBi Triscan 'Elite' fuel island controller as described in the descriptive annex*

This Revision replaces previous versions of this certificate.

Signatory: P R Dixon
for   Chief Executive
National Measurement Office
Department for Business, Innovation & Skills
Stanton Avenue
Reference No: T1119/0007/6   Teddington
Middlesex TW11 0JZ
Date: 25 February 2013   United Kingdom

CONTENTS

Descriptive Annex

1   INTRODUCTION

Having dispensers as described in the Certification operating under the control of the 'Elite' terminal and fuel island controller as described herein.

Figure 1 shows the Elite fuel island controller (hereinafter referred to as FIC). It is a stand-alone system directly controlling all connected dispensers. No additional equipment is required once the system is configured. Site configuration and the periodic downloading of transaction data is performed from a site based, or remote PC, running appropriate software. The communications to the FIC may be hardwired or radio modem linked.

The FIC design is centred on a PC card. Solid-state (Flash) memory devices are used to store transaction data (including electronic audit journal). This memory capacity is configurable and is set on installation to a level sufficient to accommodate the maximum number of transactions expected over the longest anticipated period between downloads. If a storage fault is detected, or if the memory fills because the transaction data is not downloaded frequently enough, the terminal is automatically shut down.

The fuel island controller can be configured as a master or a slave unit. Slave units omit the PC card and have restricted memory. Slave units can only operate in conjunction with a master unit. Each master or slave unit can control up to four dispensers and up to four peripherals. Optionally, a slave unit can be configured omitting the peripheral control facility.

A site installation may range from a single master FIC controlling up to 4 dispensers and 4 peripherals, or may comprise a master FIC and a number of slave FICs permitting the support of up to 32 dispensers and 32 peripherals. Figure 2 shows a typical arrangement.

Operation is by means of a magnetic stripe card reader. Optionally, key, chip-key, or 'smart card' readers may be used. A receipt printer is built-in. Optionally, an audit journal printer may be fitted.

2   CONSTRUCTION

2.1   Master fuel island controller

2.1.1   The Master fuel island controller is a stand-alone terminal and dispenser controller.

2.1.2   The FIC is constructed from pressed sheet aluminium, with a hinged metal front door panel of cast aluminium (optionally moulded plastic). The enclosure may be wall or plinth mounted. The door houses all the user devices comprising the user identification device, LCD display, keyboard, and receipt printer (Figure 3).

2.1.3 An optional hard copy audit printer (Assembly number 05333) can be fitted (Figure 4).

2.1.4   A fluorescent lighting system located in the top of the door provides night-time illumination. This is controlled by a standard ballast unit with user replaceable lamp and starter unit.

2.1.5   The control electronics are housed in the centre section of the enclosure. Located to the right of the electronics are optional dispenser override switches for the mechanical dispensers, which are non-operational.

2.1.6   Mains wiring, lighting system control, incoming filters and transformer are located at the rear of the enclosure.

2.2   Slave fuel island controller

Construction of the FIC is identical to the master FIC except for the following.

- On any system, one master FIC must be present before any slave can be connected and controlled.

- No 386 control logic is present.

- No electronic audit roll. Sales details are passed to the master for storage.
- Backup electronic audit log remains present holding up to approximately 900 transactions

2.3   Slave dispenser controller

2.3.1   The slave dispenser controller is made up from main dispenser control logic and power supply assemblies as used in a master Elite FIC. These are re-packaged into a commercial weather resistant enclosure. Connections are otherwise identical to a master or a slave Elite FIC.

(a)   No 386-control logic is present.
(b)   No electronic audit roll. Sales details are passed to the master for storage. Backup electronic audit log is still present holding up to approximately 900 transactions.
(c)   No display, keypad or user identification device is available.

2.4   Component identification

2.4.1   386 processor card

2.4.1.1   A 386 single board computer performs all main control and data storage functions. The processor board fitted is the Arcom Control Systems SBC104 consisting of a 386SX 25Mhz processor with 2 or 4Mb of RAM.

2.4.1.2   The single board computer uses onboard Flash memory for the storage of operating system, functional software, customer data, transaction data and electronic audit log. This memory is split into two sections, 1 or 2Mb are built onto the board or use part of a DiskOnChip device. A further 2Mb to 70Mb may be installed in accordance with site demands to form the remainder of the DiskOnChip device .

2.4.1.3 The operating system is ROM DOS, see software section for full details of the software.

2.4.2 Dispenser control card (Assembly Number 04642)

2.4.2.1 The dispenser control card is a VBi Triscan interface board, Elite Main PCB board. This board provides all the interfacing between the 386 single board computer and other required devices. The system power supplies are also incorporated into this board

2.4.2.2 Where a slave FIC or slave dispenser controller is indicated, the Elite main logic provides all local control functions but requires connection to a Master FIC to allow operation. Identification for each dispenser control card is set by a BCD switch. Master or slave operation is set by jumper links.

2.4.3 Keyboard/ display interface board (Assembly Number 04647)

The VBi Triscan interface board controls the 2 row, 24 character LCD module and the keyboard. Connection to the user identification devices (see authorised alternatives, Section 4) are also possible, to the appropriate connectors. Identification for each keyboard/display interface board is set by a BCD switch allowing selection (and hence connection) of up to 32 devices per master Elite.

2.4.4 Magnetic card reader

A manual magnetic stripe card reader. The user inserts and then smoothly withdraws the card, the reading taking place as the card is withdrawn. There is no card retention or insertion prevention facility. Optionally, alternative access devices may be fitted as (see authorised alternatives, Section 4).

2.4.5 Receipt printer (PCB ref. 04650)

A VBi Triscan Petroleum Systems thermal receipt printer. The printer consists of four sections. The receipt printer thermal mechanism, paper holder/paper low detector, printer control logic and interface device. Up to 32 receipt printers may be connected per master Elite.

2.5 **Software**

2.5.1 Initial display

When initially powered, or re-booted, the LCD display monitors activities and will, briefly, show the current software issue:- elite.exe Ver 1.06.

2.5.2 Elite resident software PC card

File	Issue	Description
elite.exe	Ver 1.06	main system.exe
comms.exe	Ver 1.70	off-site comms.exe

2.5.3   Peripheral control software

Peripheral	Version	Description
Receipt Printer	Ver 1.0	Receipt printer control firmware
Audit printer	Ver 1.0	Audit printer control firmware
Display Interface	Ver 1.4	Keyboard / display interface board

2.5.4   Firmware

VBi Triscan key reader	Ver 1.3	VBi Triscan Petroleum Systems plastic key reader firmware
Dispenser control PIC 1	Ver 1.0	Elite main control and power supply board
Dispenser control PIC 2	Ver 1.2	

2.5.5   Phoenix control software

Audit release	Ver 1.0	Audit control release version.

3   **OPERATION**

3.1   **Typical operational sequence**

(1)   Customer inserts driver identification (if required) into the Elite ID device.

(2)   Customer inserts vehicle identification (if required) into the Elite ID device.

(3)   Customer enters any information requested using the keyboard when prompted to do so.

(4)   Once the information and identification has been verified the customer is informed of any fuelling limit and prompted to select a dispenser for fuelling.

(5)   The dispenser selection is made by pressing the appropriate dispenser number on the keypad.

(6)   The selected dispenser is then enabled, initialises, and the customer draws fuel. Display indicates dispenser selected and maintains display of operational status.

(7)   Once the sale is complete or the fuel limit is reached, the dispenser nozzle is returned.

(8)   The Elite receives final values for the sale.

(9)   The display offers receipt option. Customer reinserts their card (or key) to obtain a receipt. A typical receipt is shown in Figure 5. Lines 1 to 6 are for site identification, address, and general sales information.

Note: Pressing the END key at any point, until the sale has started will end the current sale. A receipt is available showing that the sale was cancelled and that no fuel was taken.

3.2   Timeouts and parameters

Timeout	Min	Typ	Max
Start fuelling timeout	1 sec	30 sec	255 sec
End fuelling timeout	1 sec	30 sec	255 sec
User keyboard timeout		30 sec	
Receipt Yes / No option		30 sec	

3.3   Mains power failure

3.3.1   The FIC contains only sufficient battery back-up to enable transactions in progress to be stored. In the event of loss of power, the unit will close down. The storage period is virtually indefinite. Upon restoration of power, the unit will re-boot, after which, the stored transactions will become available. Reinsertion of the user's card (or key) will enable receipts to be issued for the interrupted transaction.

3.4   Interlocks and security features

3.4.1   Access to the FIC is by key only. Programmable functions for site manager or maintenance purposes are only accessible with the use of special card or datakey and the entry of appropriate pass words.

3.4.2   An internal plastic cover, located over the 386 processor card, is wired in place and sealed (Figure 6). The function of this seal is to indicate if any unauthorised attempt has been made to access the data storage devices. Sealing of this cover is carried out by the manufacturer (VBi Triscan Petroleum Systems) or his authorised agents. Each seal is embossed with an identification code designated by the manufacturer.

3.4.3   Error checking and warning

3.4.3.1   Local bus device failure - If a failure of any local bus peripheral occurs, it is logged and (if functional) displayed on the LCD. Firstly, the Elite will attempt to re-initialise the device by re-sending the device configuration. If this fails, the power to the local bus can be re-booted. The Elite will not re-boot local bus power if any sales are pending or current. If after these attempts, recovery of the peripheral is not successful the following actions occur:

(i)   Display/keypad, ID device (if only one connected). Loss of these devices results in the Elite preventing further sales at this FIC.

(ii)   Remote FIC, remote dispenser controller, ID device (if more than 1 connected), audit printer. Loss of these devices results in customers being diverted to other functional devices.

(iii)   Loss of the receipt printer - allows sales to continue, but the customer will be warned that a receipt is not available. Customer must confirm acceptance of proceeding without receipt. The operation of the system without functional receipt printer will continue for 72 hours after which no further fuelling will be authorised.

(iv)   Solid state (Flash) memory faulty or full - If a fault is detected with the flash disk device or the device has become full, further sales are prevented.

4   AUTHORISED ALTERNATIVES

4.1   Dispensers

Connection of 1 to 4 dispensers per master Elite FIC, slave Elite FIC or slave dispenser controller. Dispensers may be volume only type or volume and price. The Elite may employ any dispenser control method approved for use with the dispenser.

4.2   Audit (or tally) printer (Assembly number 05333)

An optional VBi Triscan Petroleum Systems thermal audit printer (Figure 4) may be fitted. This printer is used to provide a hard copy of all transaction and other events and is in addition to the electronic audit facility.

4.3   Mounting

The Elite may be either wall mounted with the cables terminating directly into the underside of the Elite, or mounted onto a metal pedestal.

4.4   Approved methods of data download

The following methods of downloading data from the Elite FIC to PC based back-office systems are approved (Triscan's proprietary system is 'Phoenix').

4.4.1   Fixed cable using the VBi Triscan Petroleum Systems Protocol converter, part number 05392 (Figure 7). This protocol converter is located in the back-office, which may be on site or remotely located.

4.4.2   Any CE marked cellular modem. This modem is mounted within the FIC. The aerial is located on the top of the Elite FIC.

4.4.3   Any CE marked modem. Modem is mounted within the FIC

4.5   Access methods

Approved methods for customer/user identification are as follows:- (combinations of the devices below are permitted).

4.5.1   Plastic key reader (Assembly Number 03531)

A metal assembly into which an encoded plastic circular key is inserted (Figure 8: 'VBi Triscan plastic key reader').

4.5.2   Magnetic card reader (Assembly Number 00916)

A manual magnetic stripe card reader (Figure 8: 'Datastripe card reader').

4.5.3   Smart card reader

A bought-out smart card reader with solenoid release, which allows the reading of electronic data from smart card media. Writing to card is limited to mileage information only. (Figure 8: 'Amphenol Smart card reader').

4.5.4   Data / E2 key reader ('Datakey' part number 00490)

A bought-out plastic data key reader into which a data key is inserted and then turned thorough 90 degrees (Figure 8: 'Datakey reader').

4.6   **Motorised card reader (Neuron)**

As described in the certificate but having a motorised card reader manufactured by Neuron (Figure 9). The part number is MTM-570-xxx where the xxx denotes the various build options. The motorised card reader has an optional pre-read unit which, if fitted, ensures that cards can be inserted only if correctly presented. The card reader has the ability to capture cards if directed to by the main system. There is a PCB with associated control electronics and the card has the ability to read ISO standard magnetic and/or smart cards.

4.7   **Control of the dispenser(s) switched from the kiosk to Elite terminal**

4.7.1   As described in the certificate but having the dispenser connections coupled via a switch located in the kiosk. Operation of this switch transfers control of the dispensers from the kiosk equipment to the Elite terminal or vice versa.

4.7.2   For kiosk operation, the Elite terminal is non-operational (Figure 10). At times when it is required to close the kiosk (night mode), control of the dispensers will be switched to the Elite terminal and the kiosk will cease to be operational (Figure 11). Performance of the changeover is manual and the kiosk operator must ensure that any current transactions are concluded prior to switchover. A typical switch unit is shown in Figure 12.

4.7.3   For kiosk operation, transaction data will be logged on the kiosk control equipment. For terminal operation, transaction data will be logged in the electronic 'memory' of the Elite terminal

4.8   **Alternative card access assembly - magnetic stripe and smart-card**

4.8.1   As described in the certificate but having fitted an alternative card reader/writer (part number MSR-270-1R-0101) that accepts both magnetic stripe cards and smart-cards. The item is termed 'combined hybrid reader' and is pictured in Figure 13.

4.8.2   Operation is manual. Cards are fully inserted. For smart-cards, a solenoid latch holds the card in place whilst the read/write process completes. The latch then releases allowing the card to be withdrawn. For magnetic stripe cards, the latch is suppressed and the card details are read as the card is withdrawn.

4.9   **Alternative card reader/writer 'Magtek Intellistripe 320' combined smart-card and magnetic stripe**

As described in the certificate but having fitted an alternative card reader/writer assembly that accepts both magnetic stripe cards and smart-cards. The unit is motorised with cards being

fully drawn into the mechanism during the read/write process. A general view of the assembly is shown in Figure 14.

4.10   Alternative card reader: 'Professional Magnetics GP10 contactless card reader'

As described in the certificate but having fitted an alternative 'non contact' card reader assembly that accepts the associated non contact cards. The card is placed near to an area marked on the terminal. No card slot is required. A general view of the terminal head in use with card is shown in Figure 15. Situated behind the terminal panel is a Proximity Reader Assembly which interfaces directly with the existing electronics.

4.11   Connection of LPG dispenser

As described in the certificate but having connected an LPG dispenser using the same 'head' and interface arrangements as detailed in this descriptive annex.

4.12   Alternative card reader: 'Omron V2BF series'

As described in the certificate but having an alternative card reader/writer assembly that accepts both magnetic stripe cards and smart-cards. The unit is motorised with cards being fully drawn into the mechanism during the read/write process. A general view of the assembly is shown in Figure 16.

4.13   Alternative card reader/writer: 'Hopt and Schuler MCR' combined smart-card and magnetic stripe

As described in the certificate but having an alternative card reader/writer assembly that accepts both magnetic stripe cards and smart-cards. The unit is motorised with cards being fully drawn into the mechanism during the read/write process. The MCR is manufactured by Hopt and Schuler and is capable of reading magnetic cards. The card reader can, if required, 'retain' cards. A general view of the assembly is shown in Figure 17.

4.14   Alternative 386 PC card

As described in the certificate but having the option to fit an alternative 386 single board computer, the 'Icop 60-60016', or any suitable CE marked assembly.

4.15   Alternative Enclosure – "Apollo" (Figures 18 & 19)

As described in the certificate but having existing Elite fuel island controller in a new shaped all steel housing, re-named "Apollo". There are no changes to electrical electronic or software components.

4.16   Apollo 2 Enclosure

4.16.1   Construction

The Apollo 2 FIC is constructed from pressed steel sheet with an ABS plastic top cover. It can be wall mounted or plinth mounted. The front houses the main head assembly, receipt printer and user identification devices (Figure 20).

4.16.1.1 Keypad

The keypad is an EL backlit membrane with built in indication LED's (Figure 21).

4.16.1.2 Control Electronics

The control electronics are housed in the main head Assembly, comprising of Keypad, display, Tag reader and main control electronics (Figure 22).

4.16.1.3 Mains wiring

The mains wiring is located at the rear of the enclosure, and power to the main head assembly is supplied by a 13.8v 1.2 amp DC power supply (Ideal Power) brick connected at the back off the unit (Figure 23).

4.16.1.4 Processor Card

The Processor Card is a ICOP-6315D with a 512 meg IDE disk module fitted (Figure 24).

4.16.1.5 Operating System

The operating system is Windows CE6.

4.16.1.6 Dispenser control card (09533)

The dispenser control card is a Triscan interface board; this board provides all the interfacing between the ICOP-6315D board and all other required devices.

4.16.2 Software

Software	Issue	Description
Apollo 2.exe	V2.04	Main system exe i.d.PS00112V05.
Display Interface	V2.0	Keyboard / display interface board

4.16.3 Interlocks and Security features

    a)   Access to the FIC is by key and tools only (Engineer only)

    b)   Tamper switches are fitted to all access locks, the function of these switches is to indicate if any unauthorised attempt has been made to access the data storage devices, all of these switch operations are logged on the control system software.

4.16.4 Audit Printer

The Audit printer is not available on the Apollo 2 FIC.

4.16.5 Approved Methods of Data Download

The following methods of downloading data from the Apollo 2 FIC to the PC back-office system are approved. (Triscan's proprietary systems are 'Odyssey Web & Odyssey World').

1. Any CE marked cellular modem, mounted within the FIC the aerial is located beneath the top cover of the FIC or mounted external if required.
2. Fixed Cabling (CAT6)
3. Wireless network router, mounted within the FIC.

4.16.6 Access Methods

The following access methods can be used with the Apollo 2 FIC:

1. Datastripe Card Reader MCR-972T-1R-5001
2. Tag Proximity Reader GP20-MPS
3. Kisskey Reader (10159)
4. AVR (Automatic vehicle recognition)
5. Easitag (Triscan Wireless Automatic vehicle recognition system)
6. Hybrid cardreader Hopt-Schuler

5 RECOMMENDED TESTS

The following tests may be carried out in addition to those specified in the Regulations to determine conformity to the approved pattern.

5.1 Note that on initial switch-on, or when re-booted, the FIC displays the main system software issue as described in Section 2.5.1.

5.2 Verify that the seal described in Section 3.4.2 is in place and is intact.

5.3 Check transactions

5.3.1 Verify that for each transaction, there is no discrepancy between the dispenser indication and the printed receipt values with regard to price and volume.

5.3.2 Where the audit printer is fitted, verify that the audit print displays identical quantity (Note: price is not printed).

5.3.3 Record the transaction values (noting time and date) and arrange to have back-office interrogate for these transactions. Verify that there is no discrepancy.
Note: Back-office may be remote.

6 ILLUSTRATIONS

7 REVISION HISTORY

ISSUE NO.	DATE	DESCRIPTION
Series S022	17 October 2008	Certificate first issued as a supplement. Original variant certificates 1828/36, 1918/59, 1940/47, 1967/53, 2017/55, 2162/53, 2176/60, 2286/46, 2461/11, 2486/23, 2536/38 and 2650/22 and their subsequent amendments consolidated into one certificate. Section 4.15; Apollo Enclosure, and figures 18 & 19 added.
Series S022 Revision 1	25 February 2013	Revision 1 issued: Section 4.16; Apollo 2 and associated figures added

Figure 1   Elite FIC
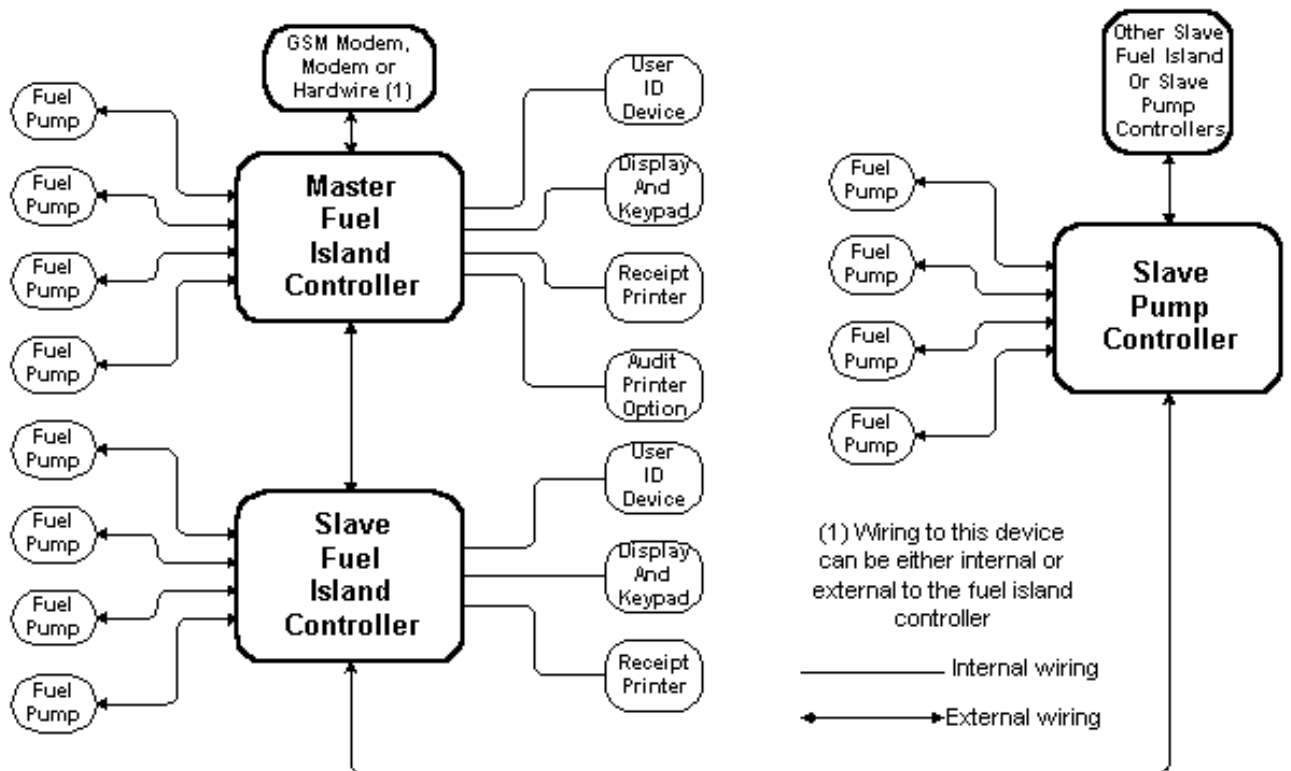
**Figure 2   Typical system interconnections showing Elite Master FIC,
Slave FIC, and Slave dispenser controller**

Figure 3   **Elite FIC, internal view**

Figure 4   **Audit printer**

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LINE 1.....................
LINE 2
LINE 3
LINE 4

No: 065533  Time: 14:18 02/11/99
Vehicle:  707844 000100 00000001
Driver:          000000 00000000
Odom: 78789    Data:
Total:£ 61.41    Qty:      79.75L
Prod:DSL  Pmp:1  Price/L:  77.0p

LINE 5
LINE 6
```
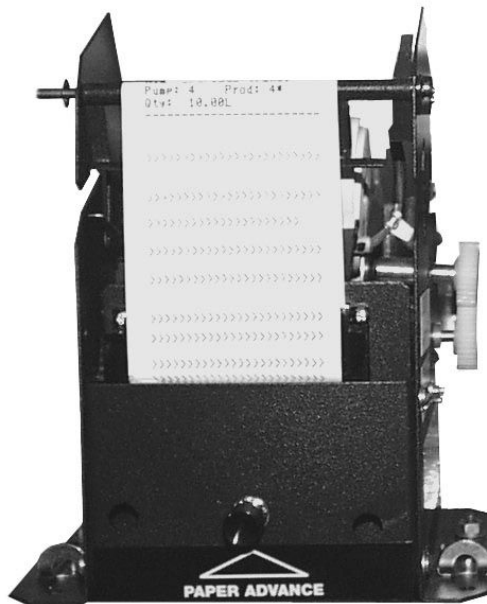
Figure 5   Typical receipt

Figure 6
View showing manufacturer's sealing arrangement for the PC board cover

Figure 7   Protocol converter

Meggitt Plastic Key Reader

Datastripe Card Reader

Amphenol Smart Card Reader

Datakey Reader

Figure 8   User access options (devices)
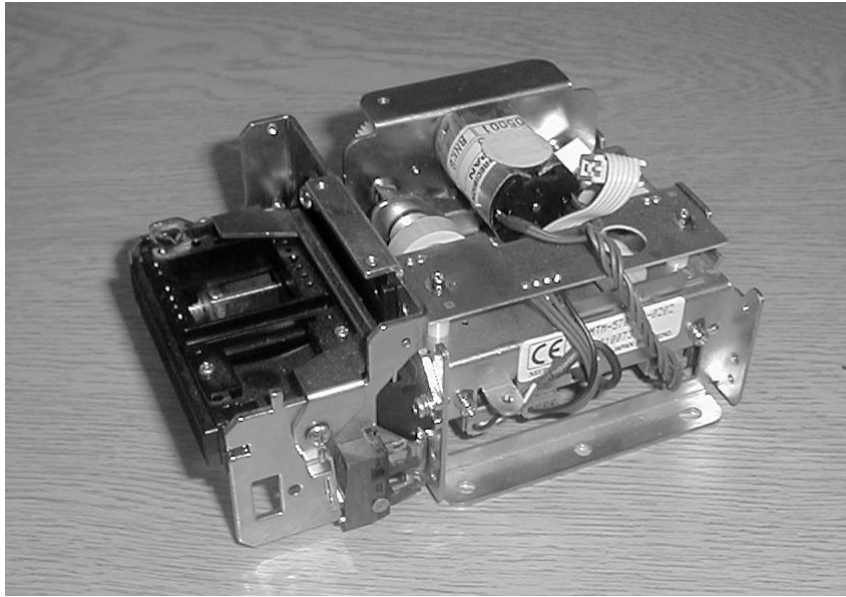
Figure 9   Card reader (Neuron)
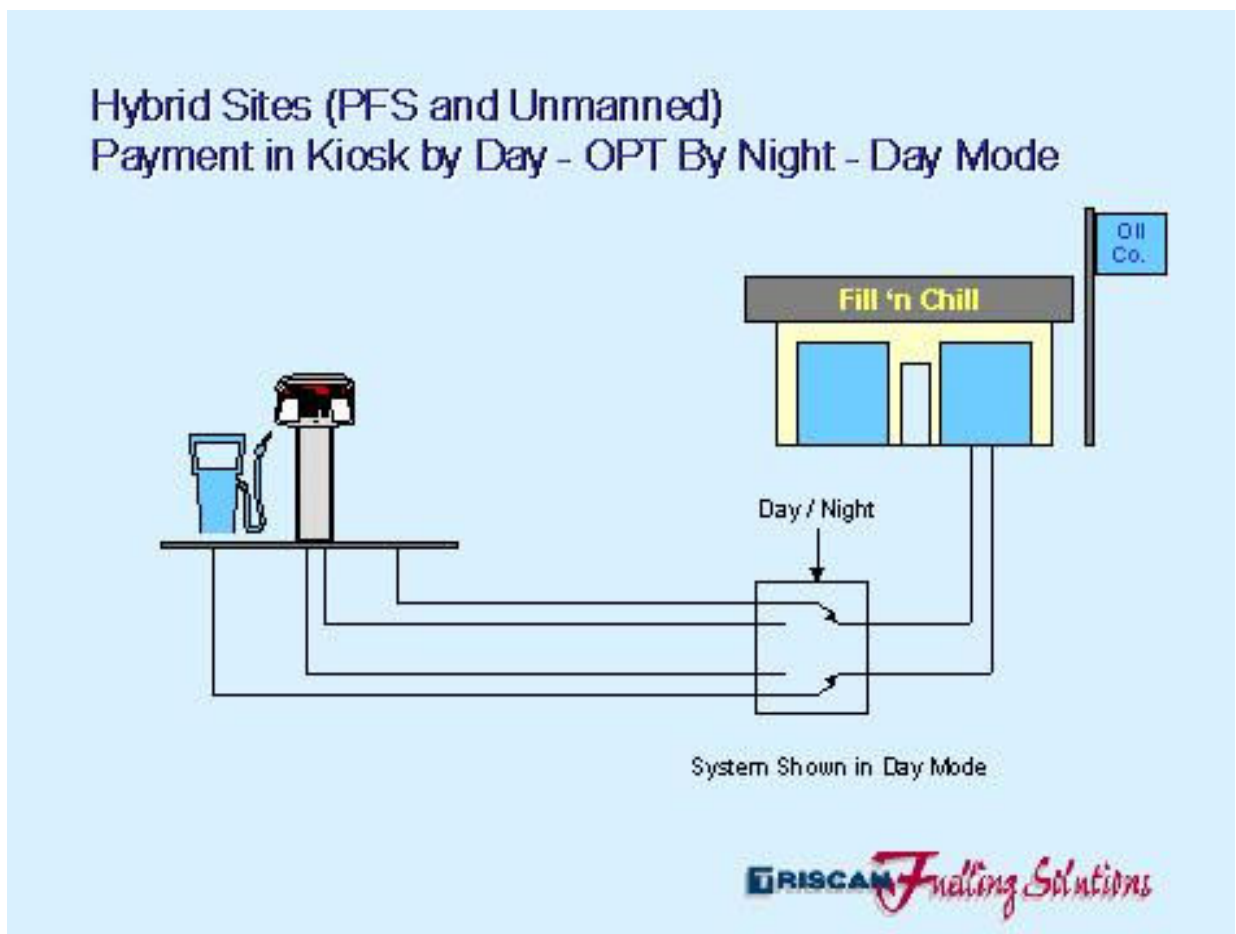
Figure 10   Kiosk operation (day mode)
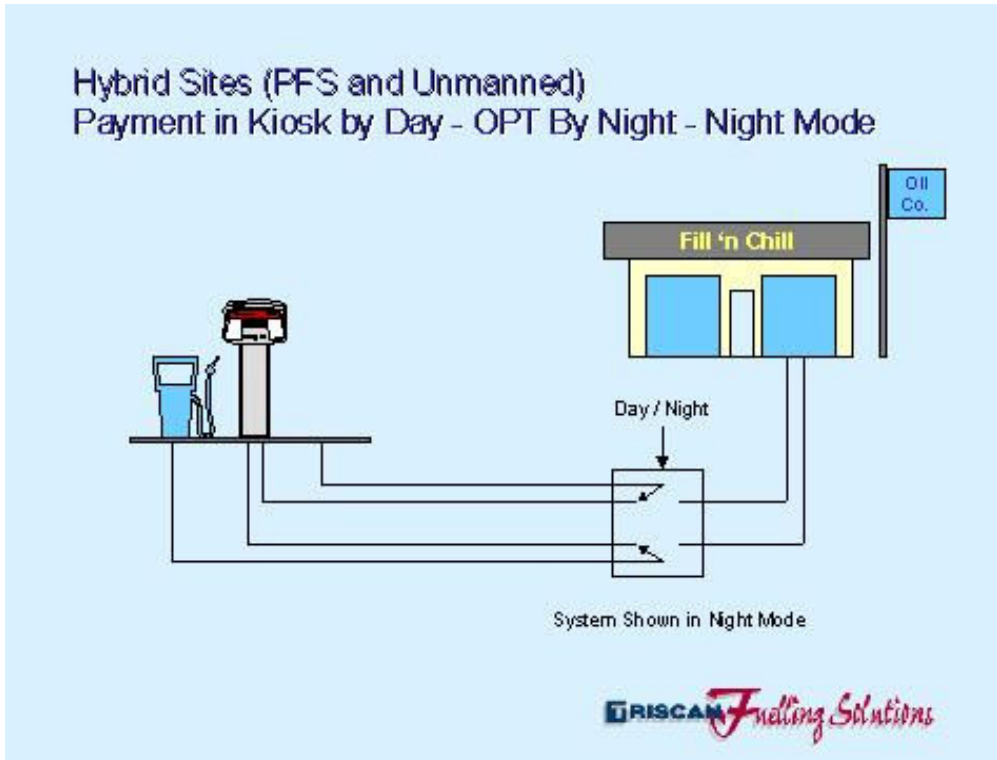
Figure 11   Elite terminal operation (night mode)
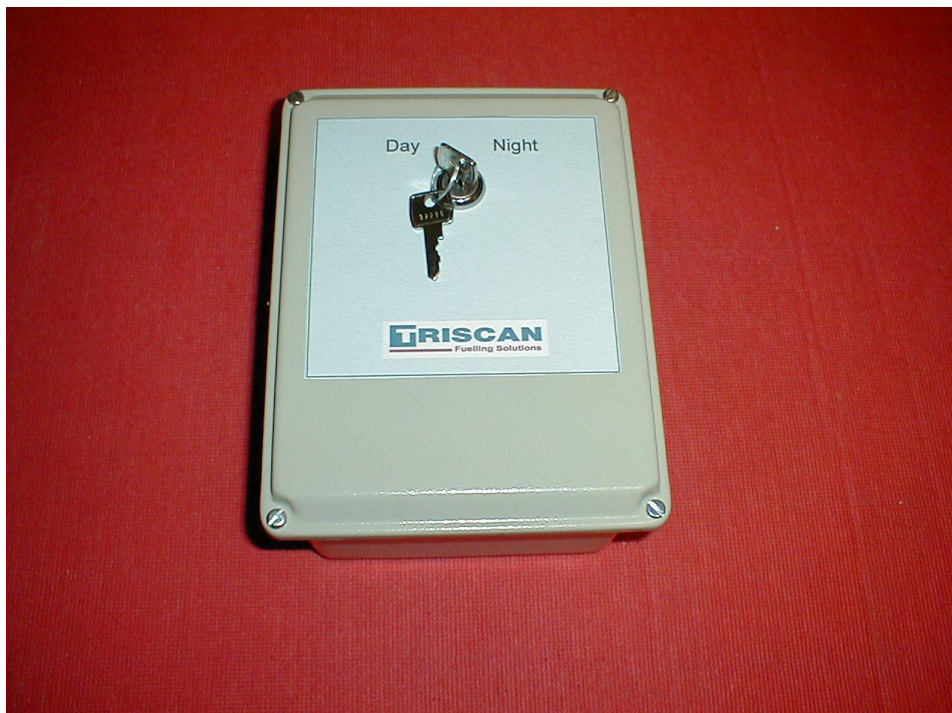
Figure 12   Typical changeover switch

Figure 13   Combined hybrid reader
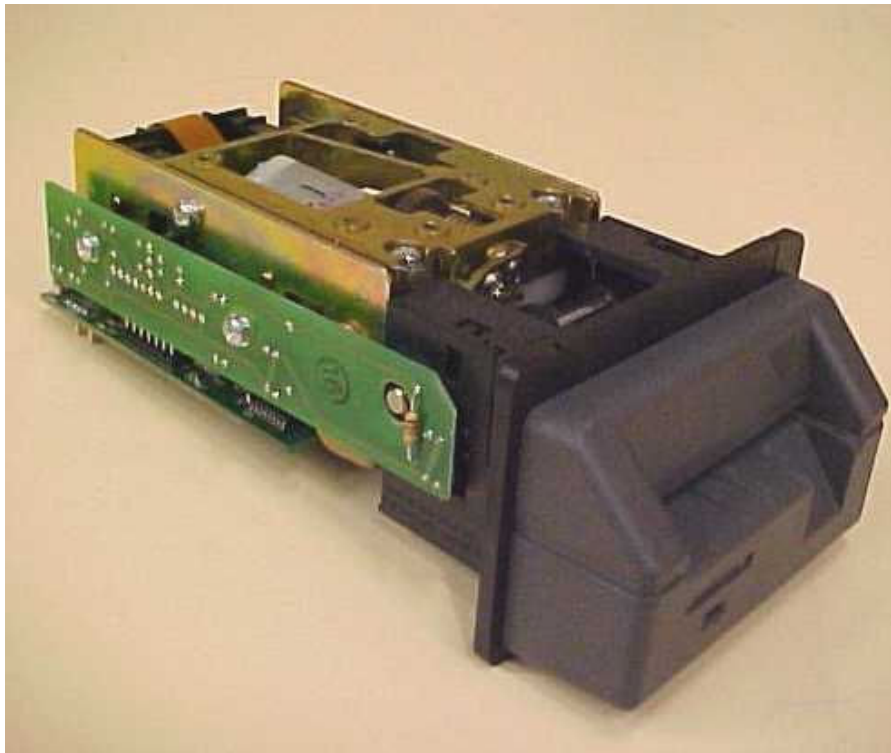
Figure 14   Magtek Intellistripe 320 card reader/writer assembly

Figure 15   Professional Magnetics GP10 contactless card reader
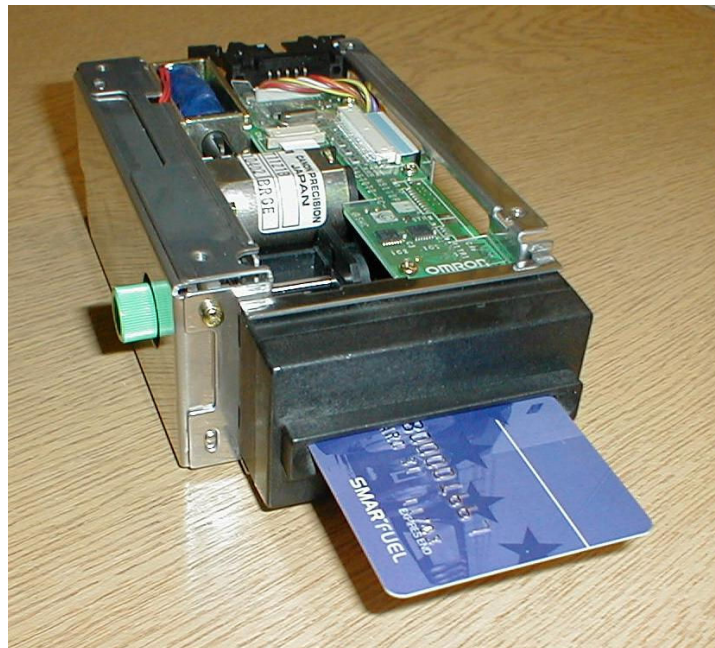
Figure 16   'Omron V2BF series' card reader/writer assembly

**Figure 17   Hopt and Schuler MCR combined smart-card
and magnetic stripe reader/writer**

Figure 18   Apollo Enclosure
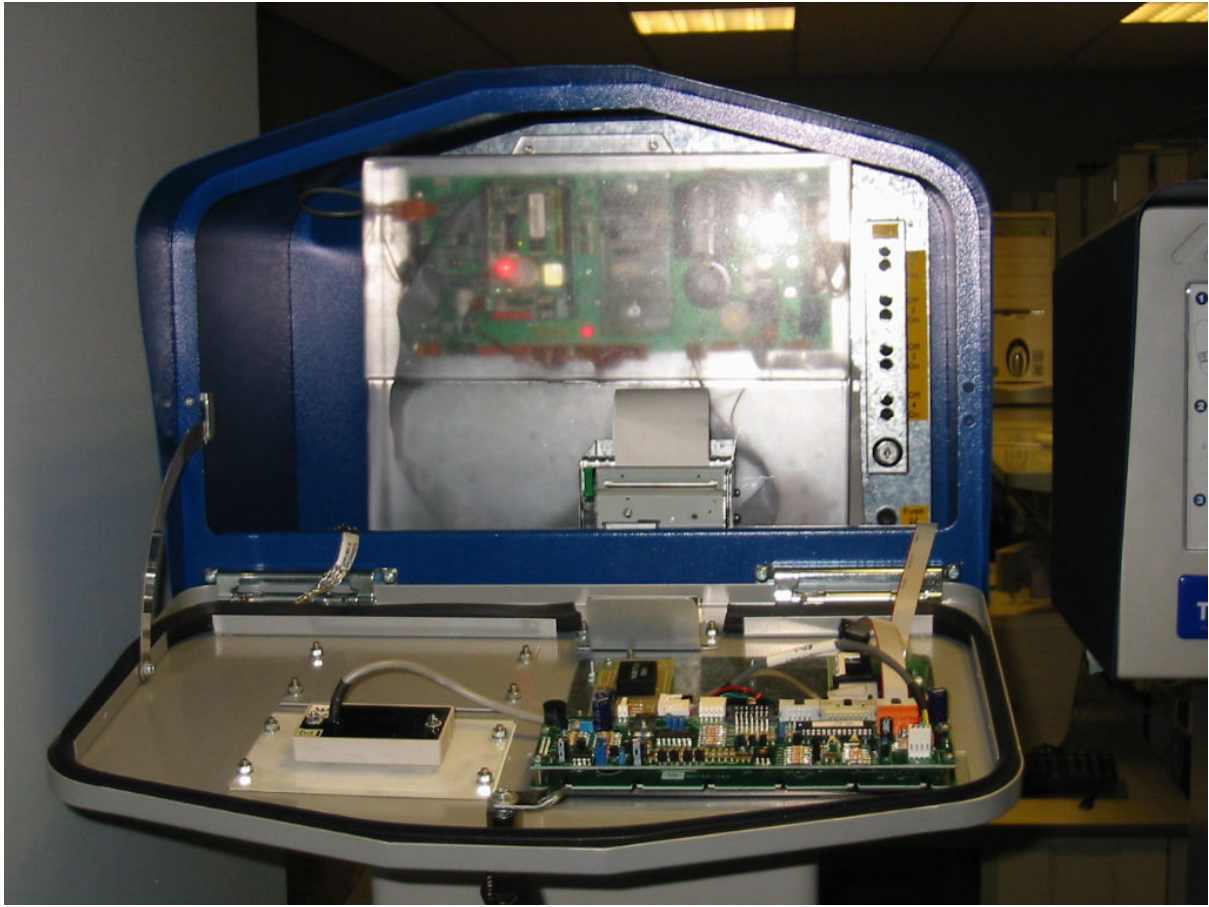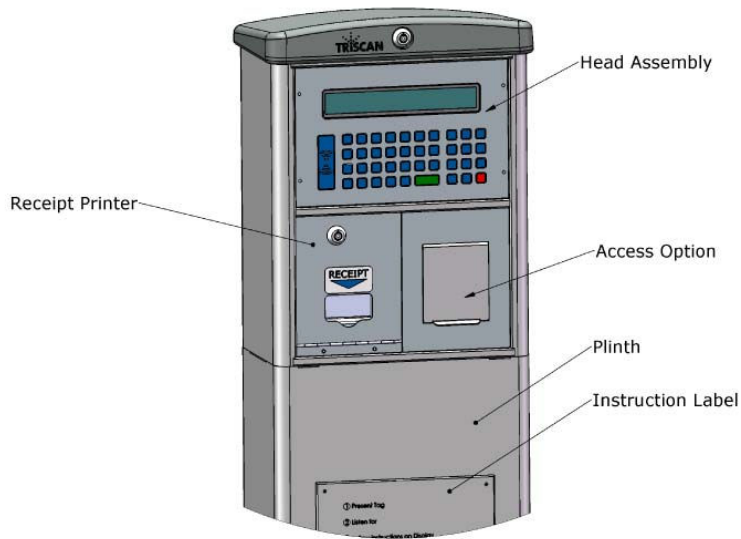
Figure 19   Apollo Enclosure – Internal View

Figure 20   Apollo 2 Enclosure
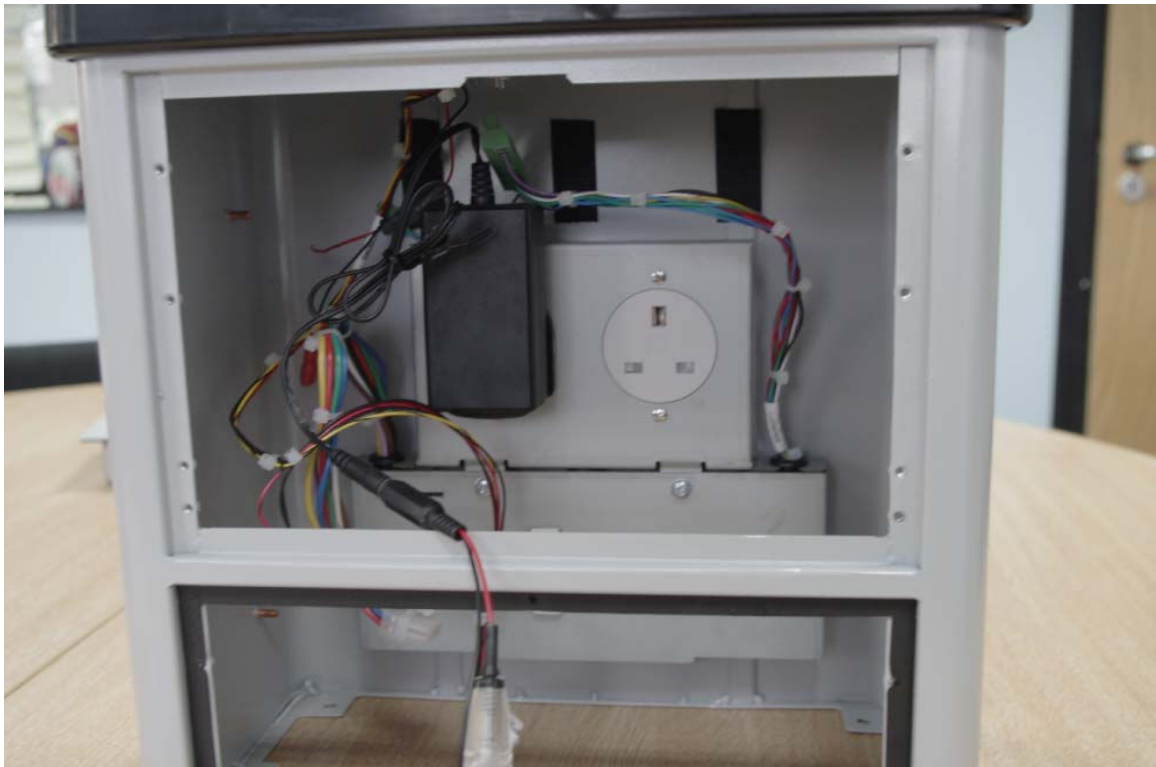

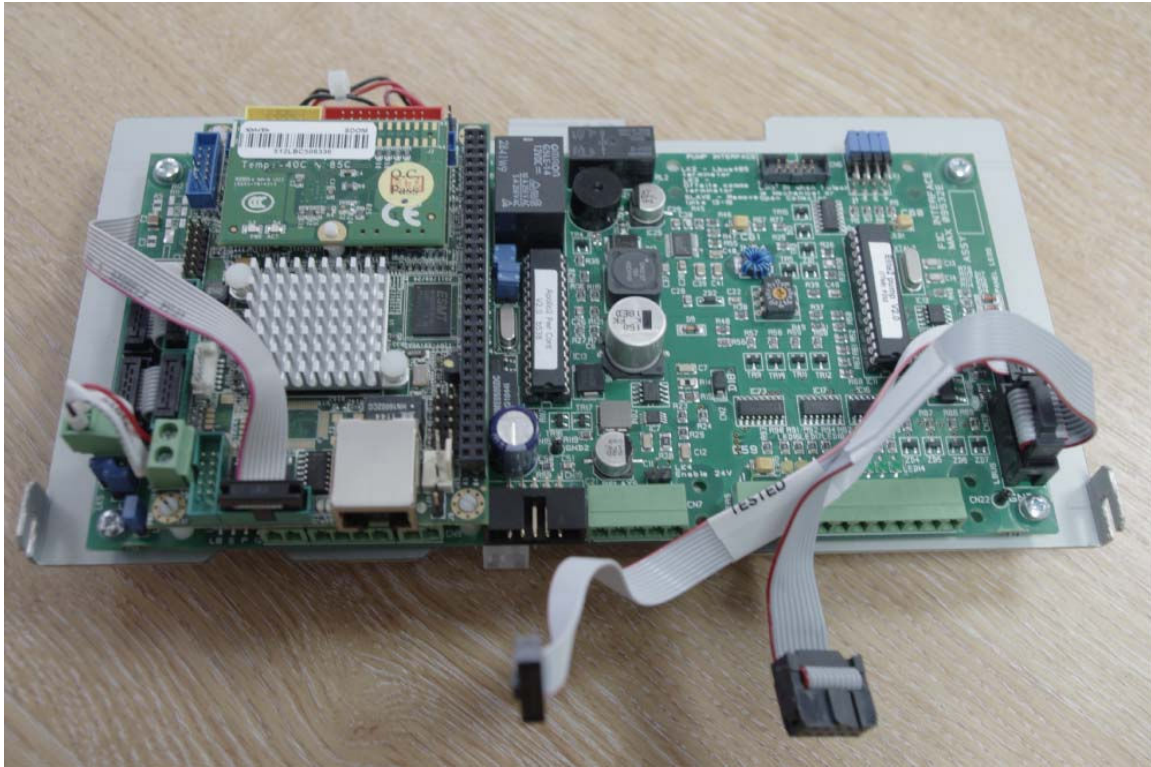**Figure 21   Apollo 2 Keypad**

Figure 22   Apollo 2 Control Electronics

Figure 23   Apollo 2 Mains Wiring

Figure 24   Apollo 2 Processor Card